Developing A More Effective Agricultural Graduate
A Curriculum Conceptual Framework

Kenneth Victor Langford

A thesis submitted for the degree of Doctor of Philosophy
The University of Western Sydney.
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DEDICATION

I would like to dedicate this work firstly to one of the greatest joys in my life my daughter Belle and secondly, to my dear parents Beryl and Vic who sadly passed away during this study.
ACKNOWLEDGEMENTS

This thesis is one of the hardest things I have ever done. I have been married and separated, I have bought and sold cars and houses, I have been made redundant from work and produced and raised a daughter. I have been around the world five times and lived and worked in many other countries but none of these experiences have consumed me so fully and relentlessly as this work. I look back some eleven years at the great quest that I set myself and smile quietly now with a suitable measure of satisfaction.

I recall periods of absolute isolation, despair and anguish and other times when amazing ideas materialised in an epiphany. I experienced a cavalcade of supervisor changes and even temporarily lost all of my work from my computer. There were countless guilt-ridden weekends of inactivity. As the work developed the goal shifted slowly away from the doctoral credential and by-passed the thought of eventual status inherent in such a degree to become almost a mature age rite of passage. This thesis is a gift I have given myself through sheer tenacity of purpose for finishing it. I firstly want to acknowledge the fact that I am who I thought I was.

There have been many people who have played a part in the completion of this work. I would like to acknowledge the contributions made by my most recent Primary Supervisor Dr. Robert Woog. Dr Woog helped me develop coherence in my writing. Professor Carolyn Noble who arrived as my supervisor in just the right time to nurture my ideas and my spirit into a workable and meaningful form and direction. Associate Professor Roger Packham who in the initial period of candidature helped crystallise the direction of this thesis.

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STATEMENT OF AUTHENTICATION

I hereby declare that except where the contributions of others are acknowledged, this thesis is my own work. I further certify that the material contained in this document and the research from which it is derived has not been submitted for a degree at any other university or institution.

........................................
Kenneth Victor Langford
March 2007
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<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AAPT</td>
<td>American Association of Physics Teachers</td>
</tr>
<tr>
<td>ANTA</td>
<td>The Australian National Training Authority</td>
</tr>
<tr>
<td>AGR</td>
<td>Association of Graduate Recruiters</td>
</tr>
<tr>
<td>AGPS</td>
<td>Australian Government Publishing Service</td>
</tr>
<tr>
<td>ASHE</td>
<td>Association for the Study of Higher Education</td>
</tr>
<tr>
<td>AUQA</td>
<td>The Australian Universities Quality Agency</td>
</tr>
<tr>
<td>CBR</td>
<td>Community Based Research.</td>
</tr>
<tr>
<td>CVCP</td>
<td>Committee of Vice-Chancellors and Principals</td>
</tr>
<tr>
<td>CFC</td>
<td>Chlorofluorocarbon</td>
</tr>
<tr>
<td>CTEC</td>
<td>Commonwealth Tertiary Education Commission.</td>
</tr>
<tr>
<td>DEET</td>
<td>Department of Education, Employment and Training</td>
</tr>
<tr>
<td>DEST</td>
<td>Department of Education, Science and Training</td>
</tr>
<tr>
<td>EFTSU</td>
<td>Effective Full-Time Student Unit</td>
</tr>
<tr>
<td>ERIC</td>
<td>Education Resource Information Centre</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization (United Nations)</td>
</tr>
<tr>
<td>GPA</td>
<td>Grade Point Average</td>
</tr>
<tr>
<td>HEC</td>
<td>Higher Education (for) Capability</td>
</tr>
<tr>
<td>HECS</td>
<td>Higher Education Contribution Scheme</td>
</tr>
<tr>
<td>HEFCE</td>
<td>Higher Education Funding Council for England</td>
</tr>
<tr>
<td>KVK</td>
<td>Krishi Vigyan Kendra.</td>
</tr>
<tr>
<td>MCEETYA</td>
<td>Ministerial Council for Education, Employment, Training and Youth Affairs.</td>
</tr>
<tr>
<td>NARST</td>
<td>National Association for Research in Science Teaching</td>
</tr>
<tr>
<td>NBEET</td>
<td>National Board of Employment Education and Training.</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-Operation and Development</td>
</tr>
<tr>
<td>QHE</td>
<td>Quality in Higher Education.</td>
</tr>
<tr>
<td>PC</td>
<td>Productivity Commission</td>
</tr>
<tr>
<td>RIRDC</td>
<td>Rural Industries Research and Development Corporation</td>
</tr>
<tr>
<td>SCANS</td>
<td>Secretary of the Commission on Achieving Necessary Skills</td>
</tr>
<tr>
<td>SRHE</td>
<td>Society for Research into Higher Education</td>
</tr>
<tr>
<td>ULSF</td>
<td>University Leaders for a Sustainable Future</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America.</td>
</tr>
<tr>
<td>USEPA</td>
<td>United States Environmental Protection Agency</td>
</tr>
<tr>
<td>VSP</td>
<td>Village Stay Programme.</td>
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<td>WEF</td>
<td>World Economic Forum</td>
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ABSTRACT

This thesis focuses overtly, on developing undergraduate curricula both generally and specifically in agriculture and related fields and covertly, on an appeal to raise the status, quality and products of undergraduate education. A closer examination is made of the relationship between the structure, function and purpose of tertiary education, the immediate and long-term professional needs of the undergraduate student and the current and future requirements of the communities in which graduates will study, lead, live, learn and work. It is my contention that the reality and challenge of the undergraduate student’s on and off-campus community experiences should be the catalyst, motivation and transformational cauldron for their professional and personal development and that their curriculum should be designed, delivered, assessed and reported to reflect this individual development. I argue that currently this is not the case and consequently students graduating from more traditionally designed and delivered courses are less prepared for a changing and changeable world. Primary and secondary research evidence presented supports this position.

A universal remedial model, schema or conceptual framework emerging from the assimilation of primary and secondary research, is presented and substantially explained. The schema is so designed that a wide variety of core curricula could be developed based on context, need and circumstance. The intricate design of the schema as a “mandala” was inspired by a creative fusing of ancient western, ancient eastern and modern philosophies however, a wide range of essential underpinning ‘developmental’, ‘educational’ and ‘learning’ theories are integrated into its structure and function. The “Twilight Curriculum”, a unique component of the schema was inspired by theories relating to the “Hidden Curriculum” and “Self Determined Learning”. It focuses on the development of wisdom through interest and needs-based action research / action learning projects. Wisdom in this argument emerges in the student as attributes such as professionalism, cognisance, competency, autonomy, synergism, perspicacity, persistence and expertise all of which contribute to the student’s overall character. Contextually relative praxis development central to the student’s personal and professional transformation, is presented as the generator of wisdom.

An argument is made in Chapter 1 that universities generally have two sides “an espoused” and “an actual” this duplicity tends to diminish the veracity of the university’s purpose and subsequently stifles undergraduate curricular innovation and development. This confusion ultimately reduces a graduate’s professional effectiveness. Chapter 2 focuses on the role of the agricultural graduate in helping the community cope with an increasingly complex and changeable world. Chapter 3 presents

1 Community refers to collectives based on many uniting properties, forces and boundaries, some of which are: locale, family, social networks, culture, religion, ethnicity, norms and habits, common purpose, professional pursuits. (Smith, 2001)
the primary research process focusing on the research question ‘What are the conceptual framework design properties for an undergraduate, agricultural core curriculum that is grounded in community?’

The Research Methodology is discussed and theoretically underpinned. The three quantitative and qualitative research instruments and their respective theoretical foundations are explained and validated. The research was conducted with staff and students in two agricultural institutions, one in India and the other in the United States of America.

The research results for the three instruments are presented in Chapter 4. The results across the three research instruments indicate a desire by both staff and students for a general change in the structure, function, delivery and assessment of the undergraduate agricultural curriculum. Staff and students’ indicated a change from the current generic, teacher/subject based, theoretical approach to curriculum design, delivery and assessment, to a preferred specific, student / needs based and applied approach. These research results are analysed and discussed at length in Chapter 5. An overview argument is proposed suggesting that learning is a personal journey and that knowledge resides in the experience of the learner, however that journey can be enhanced by not only the nature of the experience but also the critical sense made. Chapter 5 also provides clarity for the results in the form of secondary research. This mainly focuses on a variety of learning theories, student development theory, community engagement theory and preferred graduate attributes as well as an array of the author’s professional experiences that related directly to the research. Assimilating the primary and secondary results provide not only an answer to the research question, but also partially lay the foundation for the core curriculum schema design. The conceptual framework design properties for designing the core curriculum schema are:

individualized personal and professional transformative learning cultivated within relevant on and off campus community engaged environments and facilitated by concerned academics, that incorporate mutually beneficial relationships between self, others and the setting using praxis development as the central educative process resulting in the development through action learning and action research projects of generic and specific attributes that are periodically formatively and summatively assessed.

The properties identified in Chapters 5 and 6 are applied in the development of a unique undergraduate agricultural core curriculum schema or model in Chapter 7. Curriculum Theory, Educational Theory, Community Engagement Theory, Rural Development Theory, Graduate Attribute Theory, ancient history and Eastern Philosophy, the author’s secondary and tertiary teaching experiences, his professional and rural development activities are discussed and provide an underpinning for the schema development process. In this chapter a philosophical argument about ‘who owns the curriculum, who owns the learning’ is presented, drawing upon ancient Chinese Taoist ideas in a generic and specific quest for wisdom. The Taoist Yin and Yang are symbolically converted into a scholarly relationship between theory and practice, as praxis. The author’s praxis development
of the core curriculum schema has also generated several innovative concepts, models, expressions and processes, such as:

- The Twilight Curriculum—the individual student’s self-initiated personal and professional development.
- The concept of ‘compotency’—a hybridisation of concepts such as capability, capacity and competency.
- A model for Praxis Development incorporating a figure eight loop that integrates research, experience and compotency.
- The notion of Career Constructivism—building effectiveness initiated through critical on and off-campus community experience.
- Presenting a curriculum model as a Mandala—an ancient Sanscrit geoglyph style based on intricate, interconnected and convoluted circles with priority positioning towards the centre.
- The notion of a Venn Trigram as a model for describing student development pathways from epistemic framework to personal and professional attributes.
- The notion of integrated three stage development modes as nested ellipsoids.

In Chapter 8 the Undergraduate Core Curriculum Mandala constructed in Chapter 6 is ‘reverse engineered’ in order to more fully explain the components in particular, the developmental process as an evolution from epistemic sources to effective student attributes producing job ready graduates who have truly learnt how to learn.

Chapter 9 presents a conclusion to the thesis. The research outcomes are briefly re-outlined and attention is drawn to the plight of rural communities and the need for a different kind of graduate—a need that could be satisfied by utilising the proposed Core Curriculum Schema to inform undergraduate curriculum design. Reservations are expressed about challenges to the status quo in modern commercial universities in that staff and student cultures are so ingrained that adoption of the proposed schema or any such diversion from a traditional model, would not be an easy. I believe that a transformational journey of approaches to undergraduate education is inevitable if undergraduate agriculture in particular is to remain viable as a tertiary field of study. Chapter 9 is concluded with a personal reflection of the scope and focus of this thesis. A plea is made for raising the status of the undergraduate curriculum as a finale to the argument.
INTRODUCTION

Universities are becoming commercialised and subsequently massified Gibbons (1994) due to reduced public funding. Massified universities are less able to allocate resources to curricula that will produce graduates who can address the needs of a changing world. Commercialisation and massification tends to stereotype approaches to curriculum design, delivery and assessment. This phenomenon is occurring at a time when rural communities are facing great challenges ranging from the pressures of climate change and globalisation through to the worldwide focus on ‘water sustainability’ to local catchment degradation. Rural communities are under great pressure to adapt to constant change and need professional help from competent degree level professionals in order to move from being the consequence of change to being proactive agents of change.

Agricultural Professions are calling for a new style of graduate—one who can work with people about their issues. One who can not only adopt and adapt as situations change but also help and build capacity in others to learn how to adopt and adapt. Governments are reducing their control of government based agricultural production bodies choosing to privatise them. This leaves primary producers vulnerable to adverse market forces and the tyranny of the ‘middle man’. Great river systems are adversely affected by over irrigation producing rising salinity levels. Eutrophication of waterways from fertiliser soaked ground water and runoff affects aquatic ecologies and rural community drinking water. Terrestrial ecologies are threatened by spray drift and other monoculture programmes involving agricultural chemicals. The burgeoning genetic modification industry in agriculture presents not only ecological dilemmas but moral and ethical ones to producers. This thesis explores the roles and responsibilities of universities in producing more effective agricultural graduates.

How Did the Modern Commercial Massified University Arise?

Marcy (2002) suggests that the traditional lecture based delivery system, credit hour format as a means of determining progress and calendar year division as a programme structure, is unsustainable both educationally and financially. These assertions are supported by Strum-Kenny (Chair 1999) in that this report suggests that lecturing was an effective pedagogy in an era when knowledge-transfer by note-taking improved economic and resource efficiencies. The report claims that lecturing has remained because of its expediency and seemingly unquestioned continuity between generations of academics.

In the modern era universities don’t seem to be capable of breaking out of a rigorous bind of covert yet generally acknowledged cultural norms that seem to tolerate innovative departments but suffocate innovation within them. How did this situation arise? Historically there are a number of eras that have
signposted the evolution of this situation. Up until the nineteenth century, universities educated the sons of the elite in classics and moral truths (Fuhrmann 1997). Science, as the principal philosophy for knowing the world and the scientific method as the primary approach to generating knowledge about the world, predominated nineteenth century European, Colonial and American Universities.

This institutionalised mindset followed German University traditions. According to Fuhrmann (ibid. p. 87), the influence of this tradition would ‘emphasize the role of the scholar,… and the contributions of research…. the rise of science led to specialization, experimentation, various forms of inductive and collaborative learning’ (ibid. p. 87). These characteristics would not be out of place today yet they were established more than 200 years ago. According to Fuhrmann (ibid.), a group of scholars in this research environment; ‘could immerse itself in the life of the mind, isolated from the trivia and distractions of everyday life.’ (ibid.). The traditions of the ‘ivory tower’ (a state or situation in which somebody is sheltered from the practicalities or difficulties of ordinary life (Encarta1999) were established at that time and academia separated itself from the world at large seemingly developing a world of its own.

Ratcliff (1997 p. 17) asserts that during the later half of the nineteenth century the needs of industry caused rapid specialisation resulting in a diversification of occupations. These occupations were serviced by the new fragmented, disciplinary knowledge following suit at universities. As the nineteenth century ended universities began to cater to the broader needs of their student body and the societies from which they came. Women and first generation students enrolled and there was a shift in the approach to curriculum design whereby process learning as well as content was emphasised.

The first decades of the twentieth century saw a radical change in the approach to university curriculum in response to the radical changes in the requirements of student body. There was a rise in ‘the utilitarian or vocational view stressing job preparation’. Science and the scientific method however was still the dominant paradigm for ‘research and the dissemination of knowledge’. This created a significant paradox in that the scientific method requires an objective approach whereas catering to the vocational development needs of a student would require a subjective approach.

The rise of an emphasis on individual student development designed into the same curriculum that required students and staff to adhere to rigid, clinical objective and measurable approaches to knowing the world in my opinion is unsustainable yet approach to curriculum design delivery and assessment permeates our courses today. What arose from this paradox was the teaching/research dichotomy. According to Fuhrmann (ibid.), ‘These often conflicting philosophies of the curriculum have coexisted in our colleges and universities throughout the twentieth century and continue to be the source of challenges from all fronts’ (p. 87). Prior to this change, universities were considered teaching institutions. Historically to the ancient Greeks and Romans, scholars taught students in the ‘quadrivium’ or arithmetic, geometry, astronomy and music, or the ‘trivium’; logic, grammar and rhetoric and guaranteed the students learned performance.
Many educationalists emerged who challenged the direction that universities were heading. John Dewey had an enormous influence on education and educational practices during the beginning of the twentieth century. His creed published in 1897 is profound and covers five broad articles: *What education is, What School is, The Subject-Matter of Education, The Nature of Method, The School and Social Progress*. Whilst initially it appears that Dewey is not directly referring to Tertiary studies his educational approach is universally applicable. Dewey’s educational philosophy has resonance today—he believed that students are the central focus and their endeavours to learn how to learn for the purpose of developing quality of life for themselves and for others is the priority of the institutions’ structure and function.

The twentieth century was dominated by a ‘Liberal Learning’ approach to education. This means ‘developing intellectual habits of mind that can be applied to all areas of human endeavor and that form the basis of lifelong intellectual pursuit’ (Fuhrmann 1997, p. 89). Fuhrmann identifies four advocates of this genre Newman, Dewey, Whitehead and Hutchins. Newman restricted intellectual development or ‘habits of mind, primarily reason and dispassionate balance of thought’ (p. 89), to within the walls of the institution, he advocated a learning community comprising the student, the professor and the other students. Whitehead advocated a curriculum suited to; ‘the developmental stage of the individual’ (p. 90). Robert Maynard Hutchins and John Henry Cardinal Newman, whilst focusing on student development, relied more on learning of or about truth, as a study of the classics and in dialectic conversations.

The tension between the experientialists and the scientists simmered throughout the twentieth century. Veblen ([1918] 1968) and Flexner ([1930] 1968) championed The German University tradition that focused on ‘scientific and scholarly enquiry’ (p. 91) as the primary purpose of the university faculty. These two intellectuals condemned the secondary schooling system for not preparing students for the rigour of tertiary research and advocated an elite cohort of dedicated researchers. They advocated the purity and autonomy of research establishments and extolled the discovery of new knowledge. Fuhrmann (p. 92) suggests that in Veblen and Flexner’s ideal university ‘researchers would be free from the demands of teaching undergraduates and supported entirely in their pursuit of scientific knowledge.’ She quotes Veblen, as he describes his ideal university ‘... a shelter where the surviving remnant of scholars and scientists might pursue their several lines of adventure . . . without disturbance to or from the worldly-wise’ ([1918] 1968, p. 209). Flexner concurs in asserting that a university should be ‘a free society of scholars... left to pursue their own ends in their own way’ ([1930] 1968, p. 216).
The tradition of the ‘isolated and insulated academic “beavering away” at their life’s work’ had their origin in these ideas. Veblen and Flexner both thought that a university should not even consider preparing students for a vocation or future professional endeavour, that practice should be done somewhere else by somebody else. Fuhrmann (p. 92) concludes that these traditions are still with us in spirit and practice. Modern academic promotions systems, publishing and presenting for prestige and prominence and the notion of an elite autonomous cohort of intellectuals, still permeates the academic worldview as well as their scholarly activities and university covert and overt consciousness.

Fuhrmann (ibid., pp. 94-96), in countering the dominance of the researching academic on university structure and function, proposes a group of alternative influences on university curricula. She lists the notable ‘Developmental Psychologists’ such as Jean Piaget (1970) ‘Cognitive Development Stages’; Erik Erikson (1968) ‘Personal Psychological And Social Development’; Lawrence Kohlberg (1971) ‘Stages of Moral Development as the Basis for Moral Education’; William Perry (1970) ‘Forms of Intellectual Development in the College Years’ and Arthur Chickering (1976) links all of the others work into a mutually interdependent theory.

A group Fuhrmann refers to as ‘The Mid-Century Radicals’ became extremely disenchanted with the direction in which universities were going, their purpose and their curriculum. They advocated wholesale change to structure and function towards more student centred approaches and self directed educational practices. This group includes Paul Goodman (1962) ‘Community of Scholars’. He advocated abandoning grades, credits etc, in order to build small developmental triumvirates of teachers, students and members of community resource persons. Carl Rogers (1969), ‘Freedom to Learn’, was an advocate of adult learning principles. He believed that instructional methods were useless and that students should be allowed to be self directed. Ivan Illich (1970) ‘Abandon Schools and Schooling Altogether’, advocated the formation of ‘learning webs’ (p. 95), in which individual learning needs would be fulfilled by corresponding offerings from suitable resource persons. Paulo Freire (1970) suggested that ‘students should be freed to tackle real world issues and problems’. Friere believed that students were oppressed by the university system he advocated a co-learning system of equality between teacher, student and community.

Throughout the twentieth century there was an emergence of a strong movement towards student centred curriculum. Research and teaching coexisted in the university however according to Ratcliff (1997) with the end of the Second World War and the onset of The Cold War; ‘scientific rationalism, specialisation and vocationalism’ (p. 17), flourished and dominated curriculum design. Gaff and Radcliff (1997) argue that the Soviet launch of Sputnik so shocked the ‘west’ and humiliated its politicians that they turned to universities in an attempt to build national capability in science and technology. Universities responded by sidelining student centred curricula in favour of the scientific and technological curricula that reflected the more lucrative requests of government. The overall approach to curricula became in essence a conveyor belt style schooling with a dominant science paradigm. This occurred despite attempts to broaden it with applied and vocational programs. This
overshadowing “Sputnik Effect” that tends to tighten curricula and prune graduate attributes has lasted until recent times. Apart from those already mentioned there are a number of other movements influencing university curriculum from this period until the current era, notably environmentalism, competency development, capability, citizenship and academic service learning.

Fuhrmann (1997, pp. 96-97) presents a summary of the main responses by higher education to the challenges presented to them over recent times. She suggests that their responses indicate that higher education has lost sight of its purpose. Fuhrmann (ibid) asserts that universities inadequately prepare students for the world of work and for a complex and changing world, partly because the curriculum fails to help students integrate their learning and partly because teachers rely on outmoded methods of instruction (lecture and discussion focused on the instructor). She contends that universities serve the purposes of elite faculty rather than the needs of society and subsequently sacrifice student needs for faculty research. This results in a failure to teach students competence in a global economy. Fuhrmann (ibid.) contends that faculty generally don't work effectively or efficiently and are subsequently responsible not only for the moral and economic decline of the nation but failure to meet the needs of women and minorities. According to Fuhrmann (ibid.) modern university curricula should reflect the ever widening age brackets, origin and diverse cognitive moral and intellectual development of students and the changing needs of community, workplace, and professions. She argues that in the 1980s and 90s there was a massive demand for change in universities to make them more relevant.

Gaff and Radcliff (1997, p. 88) suggest that prior to the nineteenth century, university was for the elite males of society. The curriculum was predetermined and emphasised that students were being taught material in order to maintain social mores. Students were expected to rote-learn material. During the nineteenth century curriculum became liberal, emphasising learning based on individual interests allowing for specialisation. Gaff and Radcliff (ibid.) suggest that in the late twentieth century the emphasis was generally on new knowledge discovery, an interdisciplinary focus, and a practical or applied orientation through career relevant courses. In the twenty first century the emphasis moved towards students developing capacity for change management, expertise in discrete fields with capacity for extending when required, competence in social interaction, work/community integration during study, development of professionalism in a ‘liberal course’ built around a common core of professional practice development through a consolidated transformational learning journey. This scenario would suggest that the professional attributes required by an agricultural graduate be much more comprehensive than merely understanding agricultural production optimising processes. Graduates would need to develop attributes that would focus on competence to deal with people about their issues in a multi perspective way. I propose that personal and professional attributes are learnt by the individual and cannot be not taught by an educator, however their development can be facilitated. The degree or intensity of development of those attributes will depend on a multitude of factors including the structure and function of the curriculum; the ability, motivation and commitment of the academic to facilitate an individual’s development, the personality and demeanour of the student and their overall willingness to explore the world, collaborate with others and take learning risks.
I am interested in learning as the vehicle for personal and professional student attribute development. It is my thesis, that learning is the fundamental process for meaningful change in the relationship between self, others and the setting. I am advocating that there should be a stronger and more sustainable recognition of learning as the primary process for undergraduate education (O’Banion 1997) and that this should become a more overt curriculum design priority for university leadership. In this thesis I present a case for a shift towards programming the personal and professional development of the individual student into their undergraduate course. To do this requires different approaches to curriculum design, delivery, assessment and reporting. I am arguing that there should be a stronger relationship between the student and the on and off campus community as a developmental platform, stimulus, challenge and focus for their learning.

What is Learning?

Analysing a range of definitions of learning (Learning Definition 2006) has revealed several shared themes:

- Learning is about permanent adaptation or modification.
- Learning is unique to the individual.
- Learning can cause adjustments in an individual’s cognition, conation, worldview and behaviour.
- Learning can be expressed now, soon and/or in the future.
- Learning results from making meaning.
- Learning is derived from experience.
- Learning can be educated by others.

In tertiary studies, learning occurs all the time both formally and informally, on and off campus. A major theme in this thesis is to access the power, relevance and motivation afforded by the informal side or ‘hidden curriculum’ (Margolis et al. 2001) of the student’s learning. The other major theme is to access the significant learning opportunities provided by engaging with the on-campus and off-campus communities.

Learning can occur in a variety of ways. In Figure 1 I have attempted to provide some organisation and order to a range of learning processes.
Figure 1: A Range of Learning Processes.

In this model on the X Axis, there is a random through tactical to strategic, left to right learning approaches trend, there is also a continuum based on learner awareness of what is happening whilst the learning is occurring. On the Y Axis, there is a low to high continuum indicating the incorporation of theories, concepts and processes as ideas and information that exist outside the learner’s current knowledge. There is also a low to high continuum indicating the use of reflection as an instrument of development.

One could argue that a number of learning processes presented in the graph are in the wrong order or misplaced but this is not the point. I am presenting a graph that proposes that we all learn in a variety of ways that range from mechanistic to proactive, Higher education unanimously lauds ‘learning how to learn’ as a primary attribute of their graduates, it is my proposal that their curricula should reflect this in its design, delivery assessment and reporting. It is my contention, that current university academic, cultural and administrative environments are stifling meaningful curriculum design. Engelkemeyer and Brown (1998) present ten principles of learning that validate the community grounded approach to curriculum design offered in this thesis. They argue that learning is about generating meaning by developing a relationship between the environment, self and others.
Table 1: Engelkemeyer and Brown’s Ten Principles of Learning.

<table>
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<tr>
<th>PRECIS OF THE TEN PRINCIPLES OF LEARNING</th>
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1. Learning is fundamentally about generating ideas, concepts, and meanings by establishing and maintaining cognitive, affective and experiential connections between; the environment, the self and others.

2. Learning is enhance by engaging in; compelling, challenging and opportunistic contexts that allow for balance between stimulation, events and reflective contemplation.

3. Learning is an active, constructed, subjective and transformative search for meaning resulting in personal knowledge.

4. Learning is developmental, it involves the whole person, relating past with present integrating new with old

5. Learning is done by individuals who are intrinsically tied to others as social beings who interact and support the learning process.

6. Learning is strongly affected by the educational climate in which it takes place; the settings and surroundings, the influences of others and the values accorded.

7. Learning requires frequent: feedback if it is to be sustained, practice if it is to be nourished, and opportunities to use what has been learned.

8. Much learning takes place informally and incidentally, beyond explicit teaching or the classroom, in contacts with faculty and staff, peers, campus life, active social and community involvement, and unplanned but interesting, complex situations.

9. Learning is grounded in particular contexts and individual experiences, requiring effort to transfer specific knowledge and skills to other circumstances or to more general understandings and ability of individuals to monitor their own learning, to understand how knowledge is acquired to develop strategies for learning based on discerning their capacities and limitations, and to be aware of their own ways of knowing in approaching new bodies of knowledge and disciplinary frameworks.

10. Learning involves the ability of individuals to monitor their own learning, to understand how knowledge is acquired to develop strategies for learning based on discerning their capacities and limitations, and to be aware of their own ways of knowing in approaching new bodies of knowledge and disciplinary framework.

The concepts, principles and processes contained in Engelkemeyer and Brown’s table are consistent with the notions proposed in this thesis. I will argue that it is the student who should determine that which is needed to ensure their own personal and professional development based on their own identified needs. This determination should not be carte blanche, it must be critical and based on proposed and defended student needs, facilitated as an agreed learning process, utilising a framework of relevant fields of study and assessable according to agreed scholarly processes. Shifting the responsibility of what is learnt to the student is not an original concept. However, providing a conceptual framework that informs the development of effective generic and specific curricula is original and this process is at the heart of this thesis.
How Modern Commercial Universities Economically Constrain Curriculum Innovation

What is the role and purpose of the modern university, how has that role changed and what influence does that change have on curriculum design? This chapter focuses on an attempt to answer these questions. There is a focus on the universities responses to internal and external pressures exerted in an atmosphere of uncertainty and change. An argument is made suggesting that there are two sides to university structure and function the espoused or overt and the actual or covert. A link is made between university structure and function and restrictions to undergraduate curriculum design and subsequently its delivery and assessment. Examples are presented from both international and Australian sources. An argument is made for the modern university to become a sustainable learning community and meld the espoused with the actual. A sustainable learning community in this context implies; needs-based research by both on-campus and off-campus stakeholders who adopt a learning framework to develop both sustainable outcomes as well as individual and group capacity.

Change can happen to us, on us and even despite us or we can make it happen with us, for us and by us. I have deliberately chosen the expression ‘Changing Universities’ to highlight the fact that universities are undergoing change driven by a variety of predominantly reactive internal and external forces. Universities’ reactions to these forces, tends to shape their structure and function. Universities can also change themselves proactively. In other words ‘Changing Universities’ can be a description or a blueprint. I contend that as universities galvanise their structure and function in response to firstly external then internal forces, there is a shift in institutional worldview from sovereignty to subsistence as leadership gravitates to management. Senator J. William Fulbright (in Altbach & Davis 1999) contends that education can be the conduit for persuasive renewal. He argues that education has the cooperative purpose of individual, group and societal development in an atmosphere of decency and fulfilment. Despite Senator Fulbright’s noble calling, the Higher education system seems to be gravitating to more of an egocentric and econo-centric structure and function. As a staff member at a University I have experienced great upheaval and change over the past 15 years including the rapid realignment of University functioning with business principles, competition, commercialisation, consumerism and privatisation (Gibbons 1994, Massy 2003) a huge trend towards increasing numbers and diversity (McInnis et al. 1995) of those attending or massification (Gibbons 1994, Massy 2003) standardising of courses and programmes, and delivery systems to increase efficiencies (White 1994, Farmer 1999) the rise of the power and control of the administrator and internal and external

This chapter will expand and clarify these and other issues along with trends and patterns associated with Universities in a time of change.

The following image suggests a focus for this discussion. Change for the sake of change is damaging to effectiveness, morale and sustainability, when decisions resulting in change are made without appropriate consultation. A President or Vice Chancellor has the power to make pervasive change however it is often the way they approach the change process and their world view promulgated by their life experience that determines short or long term effectiveness as a leader. Change is inevitable however ‘learning one’s way through’ can increase inclusiveness and assist in bringing sustainable change.

Image 1.1: Leadership and Efficiency.

In Image 1.1 the mule is securely harnessed to the cart. The cart is heavily overloaded and has tilted backwards alarmingly to the point where the mule’s hooves no longer touching the ground. In short the mule, the cart, the goods and the men are going nowhere. The following question and answer is written on the placard Students and staff ask: ‘Are we mule or cart?’
Answer: ‘It doesn’t matter!’

The intention of comparing the predicament of the university staff and students with the dilemma faced by the mule and the cart is to draw attention to the atmosphere of powerlessness. Decisions made by University leadership, management and administration that were intended to improve efficiency can often decrease efficiency by indirectly disenfranchising those required to successfully enact the decision. There is an attempt to draw an analogy between the stranded mule still harnessed to the cart full of goods, and a staff member having little or no say about class sizes, financial and material resources, curriculum design, assessment methods, educational process, bureaucratic processes and other personal and professional workplace aspects. Staff members both carry the load as well as being the load. As the cart, the staff may come to realise that they are overloaded with work, accountability that has emerged from trying to achieve somebody else’s’ expectations. They are routinely expected to do work as a cost saving measure or workplace demarcation, that previously was done by administration.
University students are different today (Marcy 2002) they work part time for significant periods. Fewer live on campus and a significant number are predominantly influenced by stimuli originating outside university. Students’ worlds are generally outside the campus. This results in lower loyalty to campus groups, clubs and engagement in ‘campus life’. Students give cursory attention to courses culminating in a tenacious focus merely on gaining accreditation. A powerful and relentless, university bureaucracy and administration that anonymously demand adherence to rigid bureaucratic processes designed to streamline red tape and increase efficiency exacerbate this situation. Academic staff, often seem bewildered and sidelined. They are subject to constant change regarding working conditions such as class sizes, subject groupings, subject existence, course offerings, course groupings, the make up of professional academic groupings and their campus location to name a few. Bureaucrats in the name of attracting and keeping students, make decisions affecting the quality of the academic staff’s working conditions. Generally, staff appear to be an arm of the bureaucracy rather than an autonomous body of scholars supported by that bureaucracy.

Universities seem to manage by making wholesale internal changes. They attempt to prop up their image and sure up their client base. According to Altbach & Davis (1999, p. 5) ‘... conditions of study have deteriorated in response to financial constraints. Enrolments have risen but resources, including faculty, have not kept up with needs.’

**The University Core Business**

What is the core business of a University? Why do these institutions exist? What is their purpose? How should they be structured? Who should attend? Who should work there? Who should pay for it all? Is the core business - business? Professor Ron Dearing, who chaired The National Committee of Enquiry into Higher Education (1997), began the introduction to his report with the following quote about Higher Education from John Masefield - Poet Laureate 1930.

> ‘It is a place where those who hate ignorance may strive to know, where those who perceive truth may strive to make others see; where seekers and learners alike, banded together in the search for knowledge, will honour thought in all its finer ways, will welcome thinkers in distress or in exile, will uphold ever the dignity of thought and learning and will exact standards in these things.’
>
> (John Masefield 1946)

Newman in 1854, penned one of the most famous descriptions of the purpose of a University in which he writes

> ‘If then a practical end must be assigned to a University course, I say it is that of training good members of society. Its art is the art of social life, and its end is fitness for the world.’
>
> (Newman 1910)
Newman goes on to say:

‘But a university training is the great ordinary means to a great but ordinary end; it aims at raising the intellectual tone of society, at cultivating the public mind, at purifying the national taste, at supplying true principles to popular enthusiasm and fixed aims to popular aspiration, at giving enlargement and sobriety to the ideas of the age, at facilitating the exercise of political power, and refining the intercourse of private life.’ ibid.

Newman is quoted often as the archetypal description of the purpose of a university. Newman captured in a perennial way, what one would probably think of when considering the university’s purpose – the ‘intellectual flagship’ of the nation. One feature of Newman’s definition is his allusion to universities as places embodying a process for the nation to examine itself, to either create the nation’s soul or to edify it. Masefield (ibid.) parallels Newman in that he refers to universities as places where knowledge is sought by ‘seekers and learners’. He talks about the ‘dignity of thought and learning’ that is made to materialise in that place. Newman (ibid.) refers to the end product of university as; ‘fitness for the world’.

Clark Kerr was an outspoken University of California’ President in the lat 1950s and 60s. He oversaw unprecedented change and renewal in the United States’ university system. Kerr who was dismissed by Governor Ronald Reagan for his lenient response to campus student unrest, was also blacklisted by the FBI. He presided over the restructuring of campuses into a three-tiered model. In this model certain campuses focused on research, others managed the bulk of undergraduate teaching and another group delivered vocational and community based courses. Kerr (1963) believed that the purpose of a University was to generate knowledge that had some utility in the purpose of the nation. He connected university purpose, knowledge generation with economic and social growth, as well as with culture.

Kerr is credited with the expression ‘multiversity’. I am drawn to Kerr’s thinking because I too believe in the power of the institution to build nations. However, Kerr’s and my own pathways diverge in the area of knowledge generation. Kerr seems to subscribe to the idea that knowledge exists ‘out there’ like a commodity and as such, can be not only of universal use but can be transferred in tact between parties. Part of my argument in this thesis is that knowledge resides in the minds and consciousness of the learner and therefore cannot be transferred intact between parties.

Change in universities generally, has a dramatic influence on curriculum. Universities, who either focus predominantly on generating income or orchestrate to save costs, could easily sideline innovative curriculum design, delivery, assessment and reporting in order to streamline efficiencies and maintain a status quo image.
According to Collins (2001), the purpose of a university is a combination of traditional and non-traditional activities. Traditional activities could include behaving in a scholarly way, conducting pure and applied research, teaching students in order to produce a ‘generally educated person’ (AAC&U - Gaff 2004b, Boyer 1988). Other traditional pursuits might be broadly described as ‘nation building’. In more recent times, universities have engaged in non-traditional entrepreneurial activities that are designed to make or save money. There has been a move towards more capacity development in the individual student body and a more intense focus on engagement with, and in, the community. Lyall (2005) suggests that universities are slowly gravitating towards a new model that he terms ‘a public purpose university’.

The Rise of the Modern Commercial University

The Parliament of Australia Senate Committee report on Higher education entitled Universities in Crisis (Collins 2001) outlined a picture of transformation in the Higher Education Sector. This transformation was primarily a response to a combination of financial constraints and market forces. Chapter 2 of the report is devoted to discussing issues related to ‘Universities at a Time of Change’. According to the Senate Report, thirty-seven Australian Universities are publicly funded. There are two privately funded Universities and a several non-university tertiary institutions.

Public funding restricts universities’ autonomy because of Government caveats, yet this funding provides the bulk of finances for university functioning. Accountability is the emergent property of public funding and with accountability comes boundaries and with boundaries comes priorities and curriculum innovation in turn goes. The transition from an entirely public to partially or completely public tertiary system is a minefield of speculation and conjecture (Massy 2003, Schultz 2005).

Horne & Hu (2005) present data related to university costs and revenues, student numbers and staff salary between 1995–2002, a very volatile period in university management and administration. The data provides an interesting story of the relationship between changes in the sources of funding, changes in the numbers of students and the costs associated with teaching those students.
Table 1.1: University Income and Expenditure

| Table 1. Revenues and Expenditures of Australian Universities 1995 – 2002 (in percent) |
|-----------------------------------------------|-----------------|-----------------|
| Revenues                                      | 1995        | 2002        |
| Commonwealth Gov’t Grants                      | 57.2        | 40.1        |
| HECS                                          | 12.0        | 15.8        |
| Fees & Charges                                | 11.7        | 21.2        |
| Investment Income                             | 4.0         | 1.8         |
| State Government                              | 1.4         | 4.0         |
| Other                                         | 13.8        | 17.1        |
| TOTAL                                         | 100.0       | 100.0       |
| Costs                                         |              |              |
| Salaries (Academic)                           | 63.6        | 58.7        |
| Other                                         | (33.1)      | (31.2)      |
| Memorandum Items                              |              |              |
| Ave. Real Revenue/EFTSU ($)                   | 7,535       | 11614       |
| Ave. Real Cost/EFTSU ($)                      | 15,069      | 15,677      |
| EFTSU’s                                       | 544,146     | 626,749     |
| Student/staff ratio                           | 15.3        | 21.4        |


Table 1.1 portrays Department of Education Science and Training (Horne & Hu 2005) data relating to research carried out from 1995 to 2002. The figures represent various revenue and expenditure components of Australian Universities. Some data is represented as a percentage and some in dollar amounts. It is interesting to consider the change in these components between 1995 and 2002. There has been a 17.1% reduction in Commonwealth Grants to Universities over that period. Some of that shortfall has been made up as increased HECS (Higher Education Contribution Scheme), extra fees and charges, State Government and ‘other’ contributions, jointly these have increased revenues by 19.2%. University investment income has fallen by 2.2%. The net result is no real change in revenue over the period except that the source of revenue has shifted from the Commonwealth Government to the students, the States and other sources. In terms of costs, staff salaries overall have fallen by 4.8% with academic staff salaries falling by 1.9%. ‘Other’ costs have fallen by 8%, so there has been a net reduction in costs of 14.7%. In dollar terms, the average revenue per EFTSU (Effective Full-Time Student Unit) has increased by just over $4,000; yet the cost of servicing that EFTSU has increased marginally by just over $600. There have been 82,603 more students attending universities over that period. Universities on average have increased class sizes by just over 6 students.
These statistics indicate that academics are being asked to teach more students per class for less money in real terms. Students are being asked to contribute more towards the cost of their degrees however the cost of those degrees has not increased substantially over the period. The numbers of students enrolling in courses has dramatically increased over this period. The reduction in public funding comes with an increase in accountability. Managing this accountability may be more costly than first realised because there is no evidence from these figures that education is the priority. On what is the money being spent? The following two graphs show the decline in relative terms of government financial support for universities.

Figure 1.1 portrays the recent trends in the sources of contribution to the Australian University’s financial situation. The ‘x’ axis represents a range of years from 1995 to 2002. The ‘y’ axis shows the percent of financial contributions made to university operations. There are three lines on the graph describing the trends for the sources of finance. One line shows a declining trend in the contributions made by the Federal Government from approximately 60% in 1994 to approximately 40% in 2002. Another line shows an inclining trend made by contributions from fees and charges from approximately 10% in 1994 to over 20% in 2002. A third line portraying the HECS shows a decline from 1994 at approximately 12% to about 10% in 1996 and then an inclining until just after 1999 to approximately 20% then a decline until 2002 at approximately 15%.
These lines would manifest the political will and disposition of the day as most universities are publicly funded, the prevailing ideology of the Federal Government would influence the rate of funding. The funding accountability paradox is quite interesting because as the government contributes less and less, it seems to want to still have a large say in university affairs. The dilemma for universities is that they can’t influence their benefactor but that benefactor, ‘even at arms length’ can determine so much about them.

Fig. 1.2: Australian Higher Education Funding Sources.

![University funding sources (%)](chart)

This graph provides a broader picture of the financial contributions to university operations. The three ‘rising’ funding sources are the fees and charges, the HECS and the ‘other’. The interesting segment, ‘other’, would probably represent the private and commercial funding sources – the ‘business development groups’ in the university. It appears if these trends continue, that the Federal Government is slowly divesting itself of the financial burden of funding universities. However, there is a clear picture emerging of that government’s policy to increase its meddling in the running of universities by way of increased accountability.

**Massification of Universities**

Universities are being massified. This means that their enrolments are increasing, the profile of student body is changing. There has been a shift in the last 25 years from a small, isolated, focused, intimate, collegiate of exclusive staff and students to a large, public, commercialised, commodified throng of poorly directed, unfocused, individuals representing a huge strata of society. ‘*The shift from elite to mass higher education was a global phenomenon.*’ (DEET/OECD 1993:2, in Rosenman 1996).
According to Rosenman (1996), in 1988 the Federal Minister of Education John Dawkins, outlined the following parameters for the massification of Australian education:

\[ \text{The Federal Government's commitment to a mass system of higher education necessarily included mechanisms to increase access which included:} \]

- planning for changing demographics;
- encouraging adult training and retraining;
- improving graduation rates;
- cooperating with TAFE; and
- encouraging credit transfer

(Dawkins 1988)

Gibbons (1994, pp. 76-80) suggests a number of patterns resulting from the massification of university research and education. Gibbons, paints a concerning picture about changes in university functioning priorities from core to peripheral, due to massification. His main point relates to the blurring of the core and periphery activities of the university resulting in the dilution of the university mission in general. He cites examples such as the decline in the importance of mainstream undergraduate and postgraduate training and the increase of part-time study and fee paying professional continuing education or in-servicing. He describes an increase in more abstract research, a decline in the efficacy and cultural activities of student organisations. The student body is no longer stereotyped as white, upper middleclass males who will eventually take their places in the professions.

The students from a wide variety of backgrounds and social origins are attending universities in larger numbers. The genders are becoming more balanced. Graduates tend to be employed across the board in both public and private ‘middle range salariat’, (p. 77) not necessarily only in purely leadership positions. Students are electing to stay in their own communities and attend their local institution. Gibbons (1994) suggests that environmentalism may be the next core. Some commentators point to community service as the next dominant paradigm. Gibbons argues that despite the massification of universities resulting in huge numbers of undergraduate students, the focus has been an increase in research and publication. Gibbons writes; ‘The product of elite institutions is seen to be knowledge in the form of scientific publications and technological devices rather than in the form of trained young minds.’ ‘Most teachers, even in non-elite institutions, have reshaped their professional ambitions accordingly’. Gibbons points out that as a result of this shift away from teaching to research; ‘It becomes increasingly difficult to sustain a coherent undergraduate curriculum’ (p. 78).

Universities have become incredibly more bureaucratic. Gibbons argues that as universities have become ‘fragmented and specialised’ with structures composed of ‘division and subdivision’ (p. 79). This structure and function has seen the rise of the administrator as a planner, designer and often deliverer rather than a traditional support activity for those activities by academics. ‘Faculties have become organisational rather than intellectual categories; even departments are seen as largely
administrative units rather than as intellectual centres’ (p. 80). Gibbons argues that significant moral
territory has been lost by academia as the result of this specialisation. Academics and their
programmes have become easy targets for cuts and economic rationalisation. Guskin & Marcy (2003)
capture succinctly a general institutional response to fiscal restraint that they call ‘muddling through’.
This approach to management and leadership incorporates believing the situation will eventually
‘right itself’ so they impose short term budget restraint, draining reserves, reduce staff, freeze
appointments, engage gap-filling fractionalised staff, focus on mass-delivery technology, marginalise
innovative curricula and maintain and even strengthen administrative function.

The implications of this style of management would adversely impact on staff morale, student choice,
diversity and general servicing, curriculum relevance, university profile, graduate outcomes and
industry satisfaction. Guskin & Marcy (ibid.) suggest that muddling through as a management
approach; ‘undermines the academic profession, lowering job satisfaction, ... cause better staff to ...
leave, reduce capability to deliver traditional or innovative curricula with quality.’ Universities
muddle their way through their response to fiscal restraint, but maintain a pseudo-ethical stance
throughout the process.

The Rule of Accountability in Higher Education

According to Burke (2005, ch. 2, p. 1) ‘accountability is the most advocated and least analysed word
in higher education.’ Accountability is the driving force of the modern commercial University. It is all
purveying and seems to reach into the heart and soul of the institutions structure and function. Corbett
describes further the effect of accountability in ‘eroding ... a national consensus’ causing confusion as
to the core purpose of a university. The confusion emerges when consensus is based on a belief that
higher education is for the public good yet there is evidence that it is now operating for individual
benefit. Universities seem accountable to everyone including various levels of government, funding
bodies, accreditation bodies, communities, staff, students, internal governance groups like the Board
of Trustees and The Board of Examiners, they are accountable to bodies representing their history and
heritage, their academic and non academic staff and to their alumni and most of all to their students.

Generally, the theory of accountability has its roots in ethics and morality. Schedler (1999 p. 14)
raised the notion of ‘answerability’ as a synonym for accountability. To whom is the university
answerable and for what is it answerable? (Lingenfelter 2003, Behn 2001, Trow 1996). Burke outlines
six aspects of accountability relevant to universities. He suggests that they should:

1. Use power properly.
2. Work to achieve a mission and set priorities.
3. Be publicly transparent in operation.
4. Express stewardship by building efficiency and effectiveness (Shavelson 2000).
5. Ensure quality of programs and services.
6. Implement collegial governance and a diverse constituency.
Burke (2005) presents ideas proposed by Lingenfelter (2003), Behn (2001) and Trow (1996) in establishing to whom universities traditionally are accountable. They draw upon political and organisational theory to identify the trio of agent, principal and beneficiary, (ch. 1, p. 2). They (ibid.) argue that elected officials are the agents (supposedly of the legislators) and the general public ‘play a dual role of both principal (delegating the authority) and beneficiary (receiving the ultimate rewards) (ibid.).

Other agents would be internal governing bodies such as The University Board of Trustees or the University Senate. Confusion is exacerbated when there are multiple layers and chains of agents. Moe (1984) suggests that as chains of governmental and university bureaucracies emerge it becomes more and more complex allowing for the rise of self-interest and the decline of public purpose.

Bogue & Hall (2003) suggest that the rise of accountability has produced conflict between the higher education ‘civic and collegiate interests and cultures’. Burke (ibid.) has added a third interest ‘commercial or entrepreneurial culture’.

Fig. 1.3: The Higher Education Accountability Triangle.

Figure 1.3 represents Burton Clark’s (1983) model of the forces governing accountability in higher education. Each point of the triangle is associated with an internal or external accountability force. Clark (1983, in Burke 2005) suggests that ‘state control, academic oligarchy and market model’, (p. 21) summarise the dominating forces influencing higher education systems. He implies that the structure and function of a university is subject to the pressure exerted by each of these three components. In other words governments should ensure that academic discourse, curriculum planning and design, and modes of course delivery, results in programmes that effectively prepare graduates for a changing world and who will serve the greater good/needs of society. It is interesting that Clark (1983) uses the term ‘oligarchy’ in his discussion when referring to the academic force because one definition of oligarchy is:

_A small group of people who together govern a nation or control an organisation, often for their own purposes._

(Encarta 1999)
To imply that the academic force’s motives could be self-serving may be interpreted by some as cynical. Clark also intimated that there is an overt, light or espoused side and covert, dark or actual side to each of these three forces. In the case of the State priorities or Political force, Clark suggests that the espoused side of this component of accountability coerces universities into producing ‘what citizens of the state most need’ such as ‘better schoolteachers, an educated workforce, and an informed citizenry’ (p. 22). Alternatively, ‘it can also replicate the partisan interest of the party in power’ (p. 22). Academic forces also have two sides. The espoused side relates to producing a free, open, objective institution based on scholarship. Clark suggests that the actual side of the academic force is really about the ‘resource-reputation model of education’ whereby the quality of the institution is determined by recruiting the brightest students, hiring the faculty stars, and raising the most resources’ (p. 22). The third point of the triangle is occupied by Market Forces. Whilst overtly it appears that submitting to the accountability required by this force results in the university meeting the needs of its citizens and society for programs and services, Clark suggests that covertly it could also leave the institution open to forces that produce commercial schemes and consumer fads.

Emerging from all of this is the conflict between the institutions autonomy or its ability to self organise and its accountability for that self-organisation.

There is a major struggle between the internal and external university design, structure and functions frameworks. Universities seem to be gravitating to a dualistic paradox in their struggle for accountability. Universities, according to Burke (2005, p. 10), are torn between their desire for self-direction, self-determination and self-organisation and their requirement to submit their structure and function to external accountability. There seems to be a struggle to appease the external forces by rearranging the internal structures and functions. This situation causes constant re-structuring which in turn causes huge problems in stability, continuity and the general disposition of institution’s staff, students and often alumni. Burke (ibid.) outlines a series of paired opposites in which he actually uses the word ‘versus’, an adversarial connecting term:

- Institutional improvement versus external accountability.
- Peer review versus external regulation.
- Inputs and processes versus outputs and outcomes.
- Reputation versus responsiveness.
- Consultation versus performance.
- Trust versus evidence.
- Qualitative versus quantitative evidence.

This list is quite concerning because it indicates that accountability or even the threat of accountability has a huge influence on how the university works. This makes for a climate of nervous apprehension for the leadership. Leadership would rely more and more on management who would in turn seek advice from administrators. The power pendulum may tend to shift away from the traditional leadership more towards a management model. In the environment outlined above, administrators could be elevated to a position that allows them albeit indirectly, to infiltrate and influence non
traditional aspects of the universities including policies relating to academia, teaching, curriculum design, course delivery, subject/unit assessment, evaluation and reporting.

It is interesting to note that the list Burke (ibid.) has outlined is dualistic, that is one approach versus another and either/or situation. ‘Dualism’ is one of Perry’s (1970) stages in his work on intellectual and ethical development in college students. It is ironic that if a university were to be equated with one of its students, according to the list above they would be operating in a very immature way indeed. Kezar (2001) suggests that universities are undergoing massive change. She presents a description of the difficulties currently facing university management and leadership. She refers to University Presidents as ‘Corporate Managers’ and that the primary driving force behind decision-making is accountability. Conway (2003) refers to an increased sense of partnership between the world of business and the world of academia.

Lyall (2005) asks some very poignant questions relating to the purpose of universities in a climate of declining fiscal support from governments.

America is rapidly privatizing its public colleges and universities, and that process is raising questions our society desperately needs to grapple with. Who should aspire to a higher education? To what extent are education’s benefits public and social in nature, and to what extent is higher learning a private good? What are the core values of higher education and what are we willing to pay to preserve them?

(Lyall 2005)

Lyall (ibid.), when discussing university and college privatisation, refers to a ‘perfect storm’ of economic and political trends that are putting insurmountable fiscal pressures on the states’ (ibid.). She goes on to describe the governments desire to shift costs away from federal and on to state responsibility and subsequently on the individual institutions. In the USA, there has been a steady decline in operating support from the mid 1980s at 50% to a current level of 30%. The University of Virginia and the University of Colorado are funded at less than 10 percent by the state (ibid.). State income sources decrease, whilst student numbers increase along with the cost of education and research. The income difference is now to be made up by the Universities and Colleges however they can. In summarising the current situation that Universities and colleges face Lyall (ibid.) presents these three points:

1. Public support (per student) for public universities has been falling for two decades.....
2. Higher education leaders have encouraged growing access without considering how it can be paid for....
3. The 20th century ‘social compact’ among states, families, and higher education has been abandoned de facto—neither elected officials nor educators want to admit this, but a realistic adjustment cannot be made until they do. Finger-pointing and accusations of bad faith, bad management, and bad priorities will not work.
Lyall (ibid) suggests that some Universities, in response to this situation, have introduced three alternative styles of operation:

1. **Charter Universities** (Virginia State) are granted ‘greater operating autonomy in exchange for meeting specified state performance goals’ ... ‘frees the university to obtain management efficiencies outside the contractual constraints of state government’ (ibid.).

2. **Hybrid Universities** (Cornell University and the University of Virginia) ‘operate with a mix of publicly supported and privately endowed units within the same university structure’ (ibid.). A hybridised system frees the state to financially support programmes within their sphere of influence and allows the University autonomy to design programmes according to their particular needs.

3. **Full Cost Universities** (Miami University in Ohio) ‘tuition is set to cover full costs of operation’. There is some suggestion that excess funds from tuition could be used to support economically disadvantaged students. One might ask if this need is so obvious why is the state not stepping up to the plate?

Altbach and Davis (1999) suggest that a user pays system now dominates the political policy rooms externally and internally. They believe that the mindset of policy makers has shifted from universities existing predominantly for public good or general benefit to society in the long term, to a belief that they merely benefit the individual. That benefit may be in terms of credentialing, increased graduate salary, increased graduate kudos and standing in the community. It could also mean that individual and groups of staff benefit now from a more varied source of research funding. It could also mean the University itself could improve its own kudos because of the relaxation of government intervention. This has shifted the financial burden away from the public coffers to the ‘user’.

Universities have responded by raising fees, instigating full fee paying courses, initiating student loan schemes, privatising sections of the institution and or its functioning, creating business arms of the executive. The effect of accountability on approaches to curriculum can clearly be seen in the following extract by Hawkins (2004) as a comparison between a university’s ‘core activities’ in 1999 before the threat of an audit and in late 2004 as the audit grows near:
The challenges outlined for the University’s core activities in 1999 are no less prominent in 2004. These were to develop a University which is:

- Responsive to diverse student learning needs and changes in professional roles and industry opportunities;
- Designed to enable staff to create rigorous, imaginative, contemporary challenging course and learning opportunities;
- Sensitive to the character of campus, the characteristics of the region, and to the demands of its population;
- Nationally and internationally recognised and benchmarked for quality, relevance, currency and employability;
- Enriched by all-of-University collaboration and partnerships in the development of curricula, flexible learning resources and the sharing of resources, such as library and student services;
- Assuring the capacity of the University to assess and improve the quality of its subjects and courses and the experience of its students, and to provide a framework of priorities and principles which will underpin course development and review.

There is a number of intersecting projects that will complement this overarching strategy for sustainability. These include the:

- Academic Program Review and Review of Postgraduate Programs
- Savings targets for 2004
- 2005 budget development process
- Campus Land Development Project
- Implementation of the Review of the International program
- Preparation for the AUQA audit
- Data integrity improvement and course performance reporting
- Negotiations of new enterprise agreements

There is a distinct change in focus from 1999 to 2004. The 1999 list focuses on student learning needs, staff course design innovation, recognition of individual campus character, the potential for employability, community/industry partnerships and the rigour of assessment in course development. In the Hawkins’ 2004 list there is a token connecting statement but there is not one reference in the list to students, staff, curriculum, learning, employability, flexibility, opportunity, other than a cursory program review statement and threats of performance reports. Some individual campus’ existence is under threat from the possible sale of land on which it stands. It is crystalline that the pendulum had swung and that the focus was now not only on the budget and revenue raising, but also how to organise structure and function in order to profess their accountability. Despite the claim that the projects in 2004 will ‘compliment’ those from 1999, it would be difficult to make any connections between the two approaches other than, the inundation of the former by the latter.
To Whom are Australian Universities Accountable?

The paradox of ‘espoused versus actual’, is prominently underlying much of the current literature relating to how universities cope with the forces of change. Burke (2005) alludes to the notion that as universities become more market orientated they seem to have shifted from an ideological focus to one of economic imperative. With that shift, traditional structure and function have changed dramatically. Universities are becoming more and more accountable to government for funding and for accreditation. The Australian Universities Quality Agency (AUQA) is a recent phenomenon comprising a panel whose job it is to make a report on the veracity of the university to not only ‘do what it says it does’, but also to demonstrate the quality of that performance. Universities are becoming more accountable to free enterprise funding bodies and to entrepreneurial and commercial organisations.

Money talks and talks loud in relation to the nature of the research, the focus for the research and the ownership of the outcomes. Communities are also becoming ‘curriculum stakeholders’ because the rise of the ‘engaged university’ has seen a forced shift in the general focus from institutional introversion to collaborative extroversion. This shift has enormous ramifications for curriculum. According to Benedetti (2000) universities are under pressure for relevance through engagement with their communities, professions and students:

‘….the context of higher education is changing, and as it does, the changes are challenging the university to develop its capacity for engagement in the years ahead. The old models for education no longer apply.’

(Benedetti 2000)

Universities are also accountable to course accreditation bodies. Accountability is not only the watchdog of this process but it seems to be one of the recent design drivers of university structure and function. In other words, it seems that as universities have responded to the changes in funding sources, the level of accountability has increased. As the level of accountability increases universities respond by adjusting internally. Internal and external accountability systems have became more and more mainstream and invasive to the point where constant restructuring seems to have become the university’s modus operandi.

The Australian Universities Quality Agency (AUQA)

Australian universities are currently undergoing a Federal Government audit. The audit is conducted under a ‘Quality Assurance Framework’ that includes ‘The Australian Qualifications Framework’, the roles of the universities, State, Territory and Federal Governments and The Australian Universities Quality Agency (AUQA). This framework anecdotally has literally ‘put the cat amongst the pigeons’.
The Australian Universities Quality Agency (AUQA) is an independent, not-for-profit national agency established to monitor, audit and report on quality assurance in Australian higher education. AUQA was established by the Ministerial Council for Education, Employment, Training and Youth Affairs

(DEST, AUQA 2005)

I was a Lecturer in an Australian University; my university was subject to an AUQA audit in 2005/2006. We were required to respond to a plethora of questionnaires produced by every department and administrative group. Every unit was required to survey their students with regard to learning outcomes. There were surveys about service provision and quality assurance. There were surveys about how engaged the university is with its associated professions and community. AUQA has the authority to conduct an audit every five years and according to the DEST web site:

The audit report for individual universities and self-accrediting providers determines how appropriate and effective their quality assurance policies and processes are for:
- teaching and learning
- research and research training
- community outreach program
- internationalisation
- academic support
- students and student services
- staff and staff services
- infrastructure and administration.

(DEST, AUQA 2005)

By scrutinising the above list one must assume that the audit process is very thorough. An audit assesses the correlation between the universities espoused mission aims, objectives etc and their actual achievements. One highly contentious element of the audit relates to whether the university is ‘maintaining appropriate standards’. No information was available from the AUQA website as to what these standards were, other than references to ‘good practices’. It appears that AUQA is learning its way through this process by discovering what the standards of good practice are, then broadcasting those standards to other universities. The AUQA site has the following to say about standards in terms of ‘good practice’:

In the course of undertaking academic audits, AUQA acquires knowledge of a range of good practices that are transferable throughout the sector. One of AUQA’s purposes is to help with quality improvement of the sector as a whole. Therefore, AUQA has developed a Good Practice Database as a means of promoting these good quality practices.

(AUQA 2005)
AUQA is an extremely powerful yet nebulous body. They have the power to make University Leadership/Management respond to questionable practices, policies, espoused and actual anomalies relating to any of the listed components of their university’s structure and function. Failure to appropriately respond to issues of concern raised in the AUQA report can lead to funding cuts. If after an audit there are issues or anomalies then it would be in the universities interest to obtain as clearer definition as possible, of the expression ‘appropriate’, from the auditors before they left the university premises.

*Failure to respond appropriately to negative reports can lead to funding sanctions by the Commonwealth.*

(DEST, AUQA 2005)

I recall the outrage expressed by staff when asked to fill out a pro-forma table, outlining the community engagement projects in order to comply with an impending AUQA audit. The university management required this information in order to comply with one of the audit requirements. The university espoused that it was engaged in community yet staff found it extremely difficult to design, resource, manage and assess such projects because the bureaucracy involved was stifling all effort.

The community engagement projects submitted by staff for the audit were extremely successful, very satisfying at a number of levels, and produced valued learning for staff, students and members of the community. These projects also fulfilled the University’s Mission. Community engagement projects were regularly programmed into courses. These projects existed and flourished because of the good will, commitment and personal sacrifice by dedicated staff who were forced to by-pass interventionist administration in order to more fully service the project needs. Staff often had to be strategic and creative in a climate of administrative obstructionism and reduced support, in order to sustain the community engagement projects whilst still complying with the rules. Staff outrage was fuelled by the fact that in complying with the directive to list the community engagement projects, staff were in fact assisting the university to disguise their actual structure and function by providing them with evidence that supported their espoused structure and function.

AUQA requires the university to demonstrate how effectively they comply with their espoused mission, values, aims and objectives with regard to areas such as teaching and learning, research and research training, community outreach program, internationalisation, academic support, students and student services, staff and staff services, infrastructure and administration. One other important factor in the audit is that the university maintain appropriate standards, yet I could not find any guidelines as to what these standards might be.

The dilemma for university governance is a series of issues relating to compliance with these appropriate standards. They may ask themselves questions like what are these standards and how do we measure them? How do we know if we are complying with AUQA’s idea of standards? Does
AUQA represent other stakeholders such as community, professions and the general public? What if AUQA’s idea of standards is different from our accrediting bodies? The paradox is that AUQA does not publish the standards to which they require universities to comply. AUQA merely broadcast examples of what they call ‘good practice’ in their reports and on their web site. Consistently publishing examples of good practice would eventually lead to a generalised or conceptualised approach to university practice however the tension between what universities think is required and what they actually do seems overwhelming and extremely divisive. That is not to say that universities don’t do what is required, it is just that they don’t know what that is. They design their response to the audit by best second guesses based on the results of other audits.

It is ironic that AUQA can sanction universities by reducing funds if they don’t respond sufficiently to their AUQA report yet only AUQA knows what compliance means after they have done their audit. The Hon. Dr Brendan Nelson MP, Minister for Education, Science and Training (AUQA Good Practice database 2005) made the following statement:

*The AUQA Good Practice Database is another step forward in the promotion of high-quality practices in the Australian higher education sector. These practices have been identified during AUQA audits of Australian universities and state accrediting agencies. The Database provides an opportunity for the whole sector to benefit by sharing and learning from these good practices.*

(Nelson 2005)

Universities seem to anticipate this situation by attempting to make the original audit as compliant as possible. This means that they make assumptions about what compliance means and gather evidence to support those assumptions. AUQA has stipulated that they are very interested in the effectiveness of policies and practices relating to the implementation, monitoring and measurement of university *missions, aims and objectives* (the university ‘core business’). University governance closes ranks around their best guesses as to the level of scrutiny, audit compliance procedures and the validity of evidence. They build a response to the impending audit that is designed to protect and maintain the status quo and that diverts attention away from that status quo, yet projects an image of application of the university’s core business. Maintaining the status quo would be attending to:

- Hierarchy of position, levels of influence, factional power bases,
- Prestige, status, esteem, kudos, reputation,
- Applications for sources of research and other income,
- Publishing peer review and presentation for individual prominence,
- Traditional promotion, tenure and political hierarchical systems,
- Bureaucratic systems to save money and make money, and
- Dominant and powerful administration and bureaucratic structure and function.
It is also ironic that universities and AUQA seem to be inadvertently designing an action research/action learning project in which they are both stakeholders. The irony is that both of these stakeholders will gain immensely in terms of both outcome and understanding by action learning their way through the audit experience. The university has inadvertently become a learning community. However, it has yet to make the espoused into the actual by building capacity for learning in order to become more sustainable. I am advocating such processes in undergraduate curriculum design. However for the university governance, the thought of such an uncontrollable circumstance would possibly make them incandescent with trepidation.

Eugene Rice (1996) has affinity with the status quo list. He outlines in his work related to ‘what it means to be a professor’ an approach to academic work based on a set of assumptions focusing on research. Rice argues that there is a three-way purpose in the ‘academy’ research, teaching and service. The prevailing conditions including academic reward and promotion processes have relegated teaching and service to the background. Rice (ibid.) contends that research is the central academic activity whose quality is maintained by peer review and professional autonomy. Knowledge, organised by disciplines and departments is pursued in order to establish reputations in the eyes of national and international associations. Independence is accorded for emphasis on specialisation. Bringle et al. (1999) broadens and extend this approach by academia, to include administrators and other institution types:

Not only is this picture accurate for the major research universities, but it also portrays the attitudes and behavior of administrators and faculty in the other types of institutions.

(Bringle et al. 1999)

Boyer (1990) supports this view when he writes; ‘the focus had moved from the student to the professoriate, from general to specialized education, from loyalty to the campus to loyalty to the profession.’ Ernest Boyer had a distinguished career that focused professionally on research related to what it meant to be an educated person. (Strum-Kenny 1999). I would suggest that what universities do, given the dilemma they face, is ‘stitch together a patch-work quilt’ demonstrating audit compliance connected with a cavalcade of supporting evidence.

Externally, the ‘winds of funding’ seem to be blowing from the market place fanned by a self-funding government agenda. It is almost impossible for universities to function without external funding so as sources of funding shift and government policy tightens, the university structure and function adjusts accordingly. One of the easiest components of the university structure and function that can be readily adjusted to make immediate efficiencies is curriculum. Internally, the winds of promotion, tenure and prominence blow from publishing refereed journals and research grant application success. These parameters cause staff to set their attitudinal and activity priorities to capture the ‘downwind ride’.
Universities must maintain and increase student enrolments in order to secure the fees component of their funding. ‘Tuition income from undergraduates is one of the major sources of university income.’ (Strum-Kenny 1999, p. 13) In order to do this they engage in strategic marketing exercises whereby they construct ethically defensible mission statements, list morally enriched values and advertise individually: attractive, beneficial and rewarding, conditions of study. ‘Recruitment materials display proudly the world-famous professors, the splendid facilities and the ground-breaking research that goes on within them’ (Strum-Kenny, ibid.). Students however often find, that what they eventually receive as curriculum, personnel, tuition and resources, is an abbreviated version or even totally different to that which was advertised.

Shirley Strum Kenny, Chair of the Boyer Commission on Educating Undergraduates, is very critical of universities in regards to the inconsistency between their espoused missions and what actually happens. She writes, ‘Again and again, universities are guilty of an advertising practice they would condemn in the commercial world.’ (Strum-Kenny1999, p. 13). Strum-Kenny is scathing of the subsequent environment that students encounter once they have enrolled. She uses expressions like ‘Undergraduates Too Often Short Changed’ (ibid.) and ‘universities have too often failed, and continue to fail, their undergraduate populations’ (ibid.). She continues to write, ‘the students paying the tuition get, in all too many cases, less than their money’s worth’ (ibid.). Strum-Kenny saves her final salvo for the teaching staff when she writes, ‘Some of their instructors are likely to be badly trained or even untrained teaching assistants who are groping their way toward a teaching technique; some others may be tenured drones who deliver set lectures from yellowed notes, making no effort to engage the bored minds of the students in front of them.’ (Strum-Kenny 1999, p. 13).

Universities that recruit in this way must know that they cannot possibly follow through with their offerings. This is not to say that all academic staff fit this description, but the point is broadly made that there are very often corporate promises made that cannot be kept and were never intended to be kept unless there is an element of corporate psychosis and delusion. It is important in this thesis, to rationalise this aspect of university structure and functioning because the dichotomy between the espoused and the actual has a massive limiting influence on curriculum design, delivery, resource availability, assessment, reporting, not to mention the associated bureaucracy. University policy that crams masses of students into lecture theatres, assesses predominantly by competitive examination, reports results as grade point averages, reduces elective choices and limits community development projects, in order to save money and indirectly free staff to write for refereed journals and apply for research funding is not, in my opinion, public purpose. The core business of a university is not business or the things that count can’t always be counted (after Naishe & Kline 1990).

Universities cannot be all things to all people but they can be what they say they are. This, of course, would mean that they would identify what that is. If they proclaim that they are predominantly about teaching and student-centredness then they should be accountable for that. If they are a business and wish to run themselves like a business then they should behave that way. What appears to happen is
an espoused educational approach that attracts students is mitigated by the time those students reach the classroom, with an actual economic imperative. For example, it is common now to link the cost of undergraduate teaching with the number of students attending a class. Administrators set the number of available class at say 16 students. This means that if the class has less than 16 students enrolled it can still run but the school or College will not be paid for it from central administrative funding. In some universities this number is as high as 25. This has massive ramifications for curriculum. The pressure is to reduce the choice and variety of classes. In my experience this seriously reduces student choice to the point where they tend to search for suitable electives on other university campuses or at Technical and Further Education Colleges in order to satisfy their interests and in some cases to conform with degree requirements.

The whole system of academic orientated curriculum design is compromised by this situation. There are many other such economically driven restrictions that have seen whole courses discontinued because they were too costly. In this climate, economic expediency drives policy that limits curriculum innovation. Policy requirements are placed on staff to generate income. Under this all-purveying climate of economic rationalism, the curriculum tends to become factory-like and the learning process conveyor-belt like. The student becomes a machine-like unit of income, stripped of their individuality forced to operate in a Fordist (Henry Ford 1863–1947), Taylorist (Taylor 1911) educational system. Universities need student fees—they need to attract students—they need to graduate students in order to sure up their income and maintain the status quo.

Conclusion

Modern commercial universities seem to be performing as if they were under siege. They manage in a reactive and restrictive fashion. Decisions are being made for survival in an atmosphere of confusion, uncertainty and accountability. The university power base pendulum appears to have shifted towards the administrator/manager and away from academic/leader/visionary. Accountability and economic imperatives drive the university decision-making and resource allocation environment. Courses are being sanitised and made conveyor-belt like in order to streamline process and create efficiencies and economies of scale. Students are being mined for funds. Choice and innovation in curriculum design and delivery are reduced in order to justify budgets. Staff seem to work in an atmosphere of uncertainty promulgated by persistent and pervasive administrative intervention and constant restructuring. University leadership does not seem to learn from their experiences. They rarely consult staff expertise to help them managing change. There is a distinct gap between what the university espouses and what they actually do.

In a time when the world needs intellectual and scholarly approaches to issues such as community development, maintaining peace, food security, water management, climate change and social justice, universities seem to be spinning a personal economic cocoon. University graduates should be capable of inventing the future with the communities and professions in which they find themselves. A university and its community should operate in a synergy. A university graduate should not have a
‘used by date’ or shelf life’. Curricula are the conduit between need and capacity development. It is the means to connect the present with a future that can be invented and learnt into existence.

Scott & Awbrey (1993) believed in the early nineties, that higher education was on the verge of a major transformation in structure and function:

‘This next transformation will tackle the disconnection, disillusionment, and fragmentation many of us sense about our academic enterprise, the modern ‘multiversity’ with its proliferation of centers, departments, and institutes that are merely externally rather than internally related.’

The needs expressed by Scott and Awbrey are still current—and remain unfulfilled. It may also mean that higher education; leadership, culture and mindset is so entrenched in preserving traditional approaches that maintain the status quo, that it may not change by evolution but by revolution.

According to O’Banion (1996) learning should be the priority for policy, program and practice. O’Banion (ibid.) advocates that judgement of the success of the institution should be based on student learning effectiveness. The Wingspread Group (1993) suggests that there is a ‘mismatch’ between the needs of American society and what universities are producing. This group (ibid.) argues that graduates lack essential skills a situation that could be remedied by a change towards a ‘learning paradigm in higher education’. Barr & Tag (1995) advocate an approach to curriculum that facilitates student learning through personal ‘discovery’ and ‘construction’. They suggest that educational programmes should focus on ‘the mastery of functional, knowledge-based intellectual frameworks rather than the short-term retention of fractionated contextual cues. Boggs (1995-96) argues that many traditional administrative and instructional systems and approaches are ‘entrenched’ and labels these the ‘dominant paradigm’ and suggest that they are extremely hard to change. O’Banion (1996) advocates a wholesale reform of the university curriculum structure and function. He suggests that the traditional classroom model be abandoned along with a ‘reconceptualization of instruction beyond the classroom’. O’Banion (ibid.) argues strongly for administration to be generally dis-empowered and dissociated from resource allocation and generating institutional reputation. He believes that administration efficiency should be gauged by the ‘cost per unit of learning’. O’Banion’s efficiency model has enormous resonance because in this thesis I will be advocating models for curriculum design based on individual learning for professional effectiveness in and with community.
CHAPTER 2
NON-CHANGING AGRICULTURE CURRICULA

Agricultural Undergraduate Curricula may not be ‘Keeping Pace’ with Changing ‘Industry, Professions and Community Development Needs’.

Introduction

This chapter focuses on the direct or indirect relevance of modern agricultural undergraduate curricula to the needs of industry, the professions and urban and rural communities. Global issues affecting agriculture, such as climate change, the introduction of widespread biotechnology, world trade systems, systemic poverty and the burgeoning economies of Asia are implicated. Local issues such as land degradation, drought, rural regional decline, cost price squeeze, the decline of the family farm, the emergence of industrialised agriculture are also considered. The agricultural professions as well as the general industry, the employers and regional communities, require graduates with different and often non-traditional capabilities in order to help rural people not only manage change but also be part of a managed change process. The question should be asked – ‘is the current general approach to undergraduate agricultural curriculum design, producing graduates who can accommodate these needs?’ I would say no!

Gaff and Radcliff (1997, p. 87) argue that there have been three ‘philosophical viewpoints’ that have caused perennial conflict in university curriculum design and function. Gaff and Radcliff write

First was the utilitarian or vocational view that stresses job preparation skills; second was the scientific view that stresses the centrality of research and the dissemination of new knowledge; and third was the liberal learning view that stresses the importance of human development and the intellectual habits of mind that lead to lifelong learning.

According to Gaff and Radcliff (ibid) this conflict has emerged in response to a desire to respond to societal needs. I would suggest that a synergy could be reached by exploring the nature of the relationship between these three conflicting domains or purposes. All three intentions could then be achieved. The generic and emergent outcome would not so much serve societal needs, but help society determine what its needs actually are. Ways to fulfil the needs could then be devised. A synergy is not a compromise between the components where parts are discarded in order to make a ‘model of best fit’. A synergy requires a creative, wholesale melding of the ingredients in one instance and the generation of an emergence in another, all of which should produce an outcome that is greater than, and different from, the mere sum of the parts.
J. Abner Peddiwell (1939) aka Harold Benjamin, wrestled with curriculum ideas. He was interested in the gap between what, how and why, curriculum taught what it did and what, how and why, it should teach what it should. Peddiwell argued that the purpose of curriculum was to build effective, evolving and opportune capacity in the student. Peddiwell suggested that stasis in curriculum evolution occurs when the anonymous yet powerful ‘forces’ of conservatism maintain traditional curriculum, design, delivery and assessment approaches, despite evidence of the need for change. It is interesting and ironic that Peddiwell was challenging contemporary curriculum approaches in 1939 and his argument could be, and is, still made today.

Alfred North Whitehead (1929), published several essays critiquing the then, current approaches to curriculum design, delivery and assessment. He called for a holistic approach, favouring a focus on student interest in a generalised specialised curriculum design. Whitehead thought that ‘depth was more important than breadth’ and in order to achieve this, the focus for the student should be on ‘engaged learning’ through ‘cyclical explorations’. He thought that staff could compliment their student’s learning by learning themselves through researching in pertinent areas by interacting with students and their interests. Whitehead (ibid.) advocated the uniqueness of the Campus; he viewed the context in which the institution found itself as the primary focussing element for curriculum design.

John Dewey (1916), suggested that each individual creates their own knowledge. Gaff and Radcliff (1997 p.89) relates Dewey’s educational philosophy in the following way:

‘we are not merely passive receptacles of fixed knowledge, but that we must interact with both things and ideas if we are to understand them, own them, and eventually transform them.’

Gaff and Radcliff (ibid) presents a profound charter for curriculum design by including the three curriculum ingredients of utility, exploration and learning development in a way that challenges the individual to adopt and adapt to a meaningful role in an evolving world.

The Australian University Story

Australian Universities, up until the Second World War were few with small cohorts of students. According to Breen (2002), in 1914 there were 3,300 students at all of the Australian Universities, by 1939 there were 14,000. The six originating universities began from acts of parliament, Sydney (1850), Melbourne (1853), Adelaide (1874), Tasmania (1890), Queensland (1909), Western Australia (1912). Each state or colony had its own Agricultural College. These were modelled on the Land Grant Universities of the United States that resulted from the Morrill Act of 1862 (Caff and Ratcliff 1997). Universities began offering agriculture and related courses after the emergence of these Colleges.
The universities in the early colonial period and up until the late 1940s, virtually mirrored the UK Oxbridge system in both structure, function and profile. The vulnerability lessons of the Second World War forced the Australian Government to rethink the purpose of its universities. This coincided with a series of policies relating to mass immigration and an increased focus on rapid industrial development (Milne 2001). The later half of the twentieth century saw a two tiered system with Universities in one tier and Colleges of Advanced Education/Technical and Further Education in a second. The Agricultural Colleges were located in the second tier. Up until the 1970s funding was provided predominantly from state and federal sources with a minor contribution from student fees. Universities were described during this period as having a rigid structure based on the dominance of the professor. Promotions structures and processes were extremely difficult leading many younger academics to change faculties or leave the system altogether.

In 1972, the election of the Whitlam Labour Government ended 26 years of conservative rule. They immediately set about remodelling the tertiary system; student fees were abolished, an egalitarian access established, endowments were taxed at 100% and all university funding was sourced by the Federal Government. (Milne 2001). This situation was dismantled following the election of the Fraser Government in 1975. Universities were scrutinised for the next thirty years. This resulted in numerous committees and reports beginning in 1977 with the Commonwealth Tertiary Education Commission (CTEC). This was a ‘watchdog committee’ consisting of ex-academics and a majority of senior government bureaucrats whose job was to scrutinise universities in order to ensure:

‘the balanced and co-ordinated development of the provision of tertiary education in Australia’ and ‘the diversifying of opportunities for tertiary education’.

(Milne 2001, par. 9)

The process of government intervention into structure, function and purpose of universities had begun in earnest. In 1983 the Hawke labour Government was elected but did not dismantle the previous government’s financial constraint policies. The ‘Accord’ which was an arrangement between the government and trade unions according to Milne (2001), set academic wages back 20% in real terms compared with industry averages. During this period the media and government denigrated universities and their status, staff morale and student enrolments fell.

‘Anti-intellectual and anti-academic sentiments, always latent in Australian society, began to appear more frequently in public and private debate.’

(Milne 2001, par. 11)
In 1985 the Hawke Government commissioned the Hudson Committee Review into Higher Education, this review saw further bureaucratic constraints and intervention imposed. One of the most significant changes to Higher Education occurred in 1987 when John Dawkins was appointed Minister for Education. The Dawkins era brought in massive changes designed to increase economies of scale and in some commentators eyes, ‘dethrone’ the older institutions. Dawkins’ policy objectives could be summarised as follows:

1. Raise the level of participation in higher education to levels similar to those in Europe and North America.
2. Widen access to the system to a broader spectrum of Australian society.
3. Improve the efficiency and effectiveness of the institutions.
4. Increase institutional responsiveness to Australia’s economic and social needs.

(Milne 2001, par. 16)

Dawkins abolished the CTEC and introduced a new body called the National Board of Employment, Education and Training (NBEET). This had associated Councils but more importantly according to Milne (2001), the new committee contained many influential bureaucrats from the Department of Finance. One of the most penetrating of Dawkins’ policies was that of increased undergraduate participation. ‘In the period from 1987-1996, the undergraduate population rose from 394,000 to 634,000’ (Karmel 1992). This rapid increase was a delayed response to the 1990 worldwide recession. Youth unemployment skyrocketed to between 50%–60% (Milne 2001), this caused the Federal Government to encourage students to initially stay on in the senior years of high school, then enrol in university courses. According to Rosenman (1996) the policies of the Federal Education Ministers, John Dawkins and later Peter Baldwin, caused a massive retention in the numbers senior secondary students in the late 80s early 90s. This had a huge pipeline effect on numbers seeking tertiary enrolments.

‘National secondary school retention rates rose from 36 per cent in 1982 to 53 per cent in 1987, with a goal of 65 per cent by the early 1990s (Dawkins 1988: 16). That goal was surpassed in 1991 when a retention rate of approximately 70 per cent was attained’.

(Baldwin 1991:18)

This policy was interpreted by many as by-passing entry standards for university level studies because as Rosenman (1996) writes:

‘3. Tertiary education has become the preferred option for a wide range of school leavers who would formerly have considered employment or vocational post-secondary paths’.
University funding at that time, was based on graduating student numbers not entry student numbers. Students were asked to contribute to their tuition fees at the rate of 20% (Milne 2001). It was at this time that universities were allowed to charge full fees to international students. This system of income generation became so popular that it was eventually ranked with other commodity trading items, as an export industry. The revenue generated from international full fee paying students sparked huge competitive, university marketing and administrative systems that are a significant part of university bureaucracies today.

One other outcome of the international full fee-paying student system was the diversion of attention away from the undergraduate curriculum. Universities went all out to attract these students. They sent emissaries and trade delegations to foreign lands to establish links and exchanges, establish courses and recruit students. The international student was seen as the ‘cash cow’ (Milne 2001, par. 38), and university budgets bristled with future revenue sources related to these students. Dawkins introduced an array of quotas, reviews and student profile requirements, incentives and sanctions (ibid.). He presided over the conversion of all Colleges of Advanced Education into Universities in their own right. He did this supposedly, to indirectly commodify research, to increase competitive access to research funding and to activate economies of scale. Many of the amalgamations were disastrous but most were successful.

Table 2.1: Offers to, and First Preferences of, Australian Students for NSW and ACT Courses.

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<tbody>
<tr>
<td>Agriculture, Animal Husbandry</td>
<td>1,538</td>
<td>1,720</td>
<td>1,390</td>
<td>1,278</td>
<td>-9.62</td>
<td>-25.70</td>
</tr>
<tr>
<td>Total Science</td>
<td>10,144</td>
<td>10,499</td>
<td>10,404</td>
<td>10,989</td>
<td>2.56</td>
<td>4.67</td>
</tr>
<tr>
<td>Veterinary Science</td>
<td>138</td>
<td>482</td>
<td>130</td>
<td>437</td>
<td>-5.80</td>
<td>-9.34</td>
</tr>
<tr>
<td>Total Offers</td>
<td>55,257</td>
<td>75,490</td>
<td>62,727</td>
<td>78,604</td>
<td>13.52</td>
<td>3.86</td>
</tr>
</tbody>
</table>

(Source: DETYA in Falvey 1998)

Table 2.1 portrays a serious decline in both offers to students and first preferences by students for agriculture and Animal Husbandry Courses. The table also contains a comparative Science, Veterinary Science and Total offers. It is clear that Agriculture became less popular in the period 1990 to 1996 as the data indicates a decline in first preferences of almost 26% and a decline in offers by universities of almost 10%. Correspondingly there was a slight increase in first preferences and offers for science. University first offers overall to undergraduates in the same period increased by 13.5%. These figures indicate that numbers wanting to attend university are increasing but numbers wanting to study agriculture are declining.
The post Dawkins era was rife with confusion, constant policy change, government intervention and ever restrictive funding. Policies encouraged both prudent economic management and cavalier entrepreneurial activity. This paradox was referred to as ‘inconsistent and often capricious’ (Milne 2001). In 1996 the Howard Liberal Government began a long period of declining funding per capita and inclining HECS liabilities. State originated research funding dried up forcing universities to seek research funding from private sources. In the later period student tuition liabilities increased to 25% and universities were allowed to charge full fees to Australian students provided other non-full fee places were filled.

The Minister of the day, David Kemp, tried to introduce more deregulation but was, according to Milne (ibid.), opposed by; firstly, bureaucrats whose power and control bases were threatened, and secondly, by cabinet members who were hostile to universities. In recent times groups have banded together in order to voice disapproval. Groups such as The Australian Vice Chancellors Committee (AVCC) and ‘The Group of Eight’. Milne (2001, par. 39) concludes his paper with a stinging indictment of the Australian University System:

‘... Australian universities are seriously underfunded ... they are slowly deteriorating in quality; ... that there is inadequate infrastructure funding for research in many technical field; ... that quality graduate training has been run down in many fields; that the government and the society has no appreciation or serious interest in academic quality; that there has been inadequate monitoring of quality for incoming foreign students – they are seen as cash cows for an underfunded system; ... many academic administrators who have prospered under the existing system, are overly concerned with revenue generation and bureaucratic empire building.'

It is hard not to be despondent about the university system. A combination of anti-intellectualism and ideological suspicion of universities and their purpose and motives by politicians and the media has led to a serious situation of what amounts to simple neglect due to changed priorities.

Changing Agriculture

Agriculture as a livelihood, process, industry, profession and community focus, is changing. The majority of landholders in Australia are family-farmers, that is to say that the farm is owned and worked by a family as both their home and their business. No longer can farmers grow crops or livestock economically, ecologically and sustainably, by intuitive frameworks and rote practices. If farmers wish to retain their livelihood and lifestyle they are required to become more proactive (Bawden 1989).
Many farmers still farm as their predecessors did. However there is a growing cohort in rural and regional areas, demanding more from their production and environmental systems but require this in an ecologically sustainable way. This group is demanding more of the advisory and consultancy support systems in order to learn how to manage this process. They are also demanding more of themselves as resource managers, efficient practitioners and innovators. In order to do this Bawden (1989), suggests that they are realising the need to become more effective learners.

A Brief Overview of Australian Agricultural History

Historically Europe an settlement set about transforming the Australian landscape into the image of a European agrarian environment. This transformation went through a pioneering phase that included large-scale land clearing and the introduction of exotic animals and plants. Many of the introduced species proved to be a disaster. One significant change was the practice of changing a predominantly summer dominant native flora system into an autumn/winter/spring dominant, cropping/pasture regime. This alone caused massive upheaval in Australian arable landscapes. The following model summarises the main eras in the evolution of the Australian Agricultural landscape.

In Figure 2.1 Bawden (1989a) portrays four distinct eras of agriculture spanning the time since European settlement to the present and beyond. Beginning in the late eighteenth century settlers began a period of pioneering. In the late nineteenth century, the scientific research and technology of the time was applied and generally improved production. Into the twentieth century the focus changed to efficiency and productivity i.e. increased production per unit input. It wasn’t until the late twentieth century that the focus changed to sustainability or persistence.

One feature of this graphic is that none of the periods are isolated from the other. This would indicate that each period emerged from the one preceding it. Another feature is that each emergent period involves significantly more complexity and uncertainty. Since the Second World War, the focus for agriculture has undergone a series of changes. Immediately after the Second World War there were millions of displaced persons. Worldwide infrastructure, economies, transport, mercantile, marketing and trade was devastated. The immediate need was to produce more food and to distribute it from areas of production to areas of consumption.
Chapter 2—Non-Changing Agriculture Curricula

According to Bawden (1995), both management and cultural agendas develop simultaneously to form a ‘wave of development’ (p. 7). Wave participants form an ‘organisation as a learning system’ (p. 7). One important feature of this learning system according to Bawden (ibid), is its ability ‘to learn how to make simple adjustments to itself in order to remain ‘coupled’ to its environment - to retain stable relationships between the two even as they are together changing.’ (p. 7). Bawden argues, that as the wave moves through time, the participants become more closely connected with their environment. Their attitudes change over time to favour sustainability, as the community learns about the effect that their practices have on the environment. Often the learning is facilitated by professional others. This is a useful model for explaining and informing current and future agricultural development.

The Current Rural Situation

According to Pritchard (2002) the nature of Australian landholdings has changed, farms are becoming larger and therefore there are less of them, he cites the following:

‘Between 1996 and 2000, the number of Australian farms fell from 115,514 to 103,815. Moreover, the number of large farms (defined as having annual turnover of $500,000 or more) increased by 32 per cent while the number of small farms (with turnover less than $50,000) fell by eighteen per cent.’

(Pritchard 2002)

Farms are getting bigger and there are less of them, they are becoming more global in their outlook particularly economic, yet are still part of the rural landscape, region and community. Despite the demographics, rural regions are under enormous threat from isolation and administrative neglect. The National General Assembly of Local Government (2005) produced a list of issues facing rural regions and their communities. There was strong demand for regional areas to develop a quality of
life for their communities. Issues affecting the achievement of that quality of life include the following maintaining farm viability, making necessary rural adjustments, as well as maintaining social cohesion in times of massive change. Sustainable management of soil erosion, salinity and acidification; as well as the management of river catchments, watercourses and artesian water sources, were vital. Provision for native flora and fauna corridors and habitats and their subsequent management, was also a significant issue. Noxious weed and feral animal management and control, were also significant concerns.

The National General Assembly of Local Government (2005) supports the principles of Ecologically Sustainable Development and emphasise the following in achieving an improvement in the quality of life of rural people:

- Provision of reliable electrical power.
- Widespread networked telecommunications.
- Improved geographically strategic and effective health, aged care and disabled person’s facilities.
- Relief from escalating fuel prices was extremely important for industries reliant on diesel and where isolation forced reliance on motor vehicles and long distance fuel delivery.
- Reliable banking and other professional services.
- Effective disaster (flood, fire, drought, etc) relief and services,
- Effective road, rail and air transport infrastructure.
- Recognition of and support for indigenous, heritage and cultural aspects of rural communities.

The Trends in Agricultural Production

According to the Productivity Commission (2005, pp. XI-XLII) agriculture as an industry has undergone substantial change in the last four decades. The main influences on this change are:

- shifts in consumer demand,
- changes in Government policy,
- technical advances and innovation,
- emerging environmental concerns, and
- a relentless decline in the sector’s terms of trade.

This paints a picture of a steady decline in the sector’s importance in Australia’s economy. However, despite this in the last 40 years, agricultural production has doubled and exports have tripled. Most of the wealth in the industry has come from exports that not only account for two-thirds of production but also have diversified from staples like wool and beef, to wine, cheese and seafood. Farms are getting larger but the number of farmers is declining. The majority of agricultural production, or 50% of its output, is produced by about 10% of the larger and more commercially productive farms. In contrast the smallest 50% of farms produce 10% of gross farm output.
The Productivity Commission (ibid) suggests that the rural workforce is still dominated by families, self-employed and casual workers whose educational standards are slowly rising. Off-farm derived income, has seen farm family incomes rise from 30% to 45% since 1990. There has been a significant rise in the number of employees and a decline in the number of employers. Agriculture in general has grown at more than twice the average of the market sector in general with cropping contributing more to this characteristic than sheep or beef.

According to the Productivity Commission (ibid) rural communities are generally experiencing rural decline and hardship, due to a combination of economic, social and environmental effects. Yet the sector is generating 4% of GDP and employing 375,000 persons and producing 22% of Australia’s exports. Agricultural production has doubled since the 1960s and exports have tripled since the 1970s. The agricultural sector trends, tell a far different story. Trends from the past, according to the Productivity Commission (2005) (P.C.), indicate that for the first half of the 20th Century, agriculture accounted for a quarter of the nation’s output, and between 70% and 80% of the nation’s exports. Since these halcyon days the trends are declining. In the 1960s agriculture’s share of GDP was 14%, it currently hovers between 4% and 6%. Over the same period the agricultural workforce has more than halved. The agricultural share of total exports has declined from two-thirds to one-fifth in 2004 with no real increase in local demand for products.

The Productivity Commission (ibid) proposes that drought has a significant influence locally and nationally for example the 2002-3 drought reduced exports by 23% ($2 billion) and employment in the sector by 15% or 70,000 jobs. The flow-on effect saw manufacturing productivity fall by 17%. Recovery in export terms was rapid during 2003-4, however the current trends are in decline. The agricultural responses to the last three droughts have reduced the GDP by 1%. Agriculture employs 80% of the non-metropolitan workforce. This includes secondary food processing.

Agriculture as an Industry of Family Farmers

According to the Productivity Commission (ibid) there were 46,000 fewer farms in 2003-4 than twenty years ago according to the P.C. (ibid.); this is consistent with global trends. In this same period, there was a 9% reduction in the amount of land farmed, whilst the size of the average holding increased by 23% from 2,720 hectares, to 3,340 hectares. Small farms (up to 24,999 hectares) are still the most numerous holdings 98.2%, whilst large farms (25,000 hectares and over) comprise 1.7% of all holdings. These figures disguise an extremely important fact, 53% of the small farms are 499 hectares or less. Some 25,400 farms or 20% of all farms are less than 50 hectares in size, while 33% of farms are between 100 and 499 hectares. Medium sized farms over 2,500 hectares made up approximately 11% of the total holdings. So 63% of Australian farms are 2,500 hectares in area or less. Production activities on these smaller farms include intensive pig, egg and meat-poultry enterprises as well as nursery and cut flower production systems. However, if the medium size farms were added they would include beef and sheep grazing properties, as well as vineyards, fruit and vegetable farms and some equine establishments. The proportion of large
farms increased by 10% in the last 20 years whilst the value of farm production they produced rose from 38% to 64%. All other farm size types fell in the share of production in that twenty-year period.

The Productivity Commission (ibid.) also notes a trend towards the intensification of agriculture supported by changes in production techniques that increased the use of fertiliser, pesticides, veterinary chemicals, irrigation and manufactured feeds. Intensification has seen a closer relationship with the marketing chain and changes in the way products and resources are marketed.

The proportion of total agricultural exports occupied by wool, cereals and meat fell from four-fifths in 1970 to half in 2003-4. Other processed foods such as dairy, tinned and frozen foods, animal feed, wood chips and other inedible products rose from 16% to 39% in the same period. Wine export rose from less than 0.5% in 1970 to 9% in 2003-4 (worth $2.5 billion), making Australia the fourth largest wine exporter in the world. In world terms, Australia accounted for 65% of wool, 15% of wheat and 15% of bovine commodity exports. Mutton, lamb, cheese, live cattle, fruits and nuts, and processed foods all grew at double digit rates and accounted for almost one-fifth of the total export growth.

Seventy percent of the agricultural workforce is 35 years or older, compared to fifty eight percent for other sectors. The average age of farmers is increasing, compared to other sectors, from 44 years in 1981 to 50 years in 2001. University trained agriculturists are three times rarer than the rest of the average workforce. Ninety nine percent of Australian farms are family owned and operated. Farm families are the typical Australian Farmers. These families live where they work. This fact has advantages and disadvantages. The families also form a significant part of rural communities. Around 29% of farm families received $600 per week this equates with other non-farming low-income groups. Off-farm sources contribute strongly to overall farm income.

Productivity is related strongly to farm size. Productivity has a significant flow on effect on the manufacturing sector. Trends are far from uniform with the highest gains in broad acre systems (3.3% per annum over 1977–2001). Increased growth is driven by improved markets and marketing systems as well as:

- machinery and technology,
- fertilisers, pesticides and herbicides, and
- genetic modification and other biotechnologies,

Farms are predominantly family homes and family businesses. These holdings surround rural regional centres or form a large part of peri-urban demographics. They contribute to the wealth, diversity, society, community and character of rural cities, towns or villages. This group also contribute significantly to soil degradation, catchment problems and other environmental issues. Approximately half of all Australian agricultural production is produced by 10% of the larger farms. The remainder of farms are medium to smaller family farms. The family farm is at the heart
of Australian agriculture and the production/productivity of the family farm relates directly to that family’s quality of life. Their situation, whilst dependent on so many parameters, permutations and conditions often beyond their control, originates with the decision maker(s)’ worldview. The worldview of the decision maker(s) is developed by a multitude of internal and external social, economic, environmental and other esoteric factors. It is at the assumption informing decision making level that the most effective and sustainable help can be provided by agricultural professionals.

The Global Perspective

Falvey (1998) suggests that the very nature of agriculture itself is changing. According to Avery (1995) the population of the planet will reach eight billion in 2030. This means that the need for increased food production will be a critical issue. This fact alone will put huge pressures on the arable and potentially arable farming environment. A critical issue associated with increased demand for food is the capacity of the farmer to produce it. Another issue associated with increased food production is the distribution of that food from areas of high production to areas of high consumption.

Jacobs (2001) asserts that as population increases, greater pressures are placed on available land for farming. Whilst more land is being farmed, less people are directly involved with farming due to increased use of labour-saving technology and machinery. Jacobs (ibid.) suggests that one of the most significant issues facing, not only rural populations but also the urban and peri-urban populations is the use, over use and misuse of domestic and agricultural water. Jacobs cites figures from the United Nations Food and Agriculture Organisation, pertaining to total estimated land area irrigated:

‘Asia, excluding the former Soviet republics, irrigates close to 65 percent of the total area ...... most of this is the large surface-irrigated, rice-producing areas of the People’s Republic of China, India, Pakistan, and Southeast Asia. The United States has approximately 10 percent of ...... Europe has roughly 7 percent, South America and Africa each about 4 percent, and Central America about 3 percent. Australia and New Zealand together have 1 percent or less.’

(FAO in Jacobs 2001, par. 2.6)

Jacobs (ibid.) asserts that land drainage is always associated with land irrigation. Draining land is practiced to avoid the build up of salt deposits on the surface. Salt deposits will render land useless for agriculture. However in developed countries the drainage systems can cause eutrophication of watercourses and ground water with fertiliser, pesticide and weedicide laden runoff, if not managed ecologically. The other side of drainage, according to Jacobs, is the acquisition of new land for farming by draining swamps and reclaiming deltas. Whilst these practices have short term benefit, the draining swamps and reclaiming deltas, often causes long-term detrimental imbalances.
in the natural ecology of the region. Irrigation and drainage practices can have long-term negative ramifications for hydrological and ecological systems within the catchments if not designed in conjunction with a systemic, ecological and sustainable view of the use of the available water.

**Climate Change**

Associated with the use of available water is the general availability of water to agriculture, watercourses and irrigation, through rainfall patterns, frequency, duration and intensity. Patterns of global rainfall are changing possibly due to climate change. The suspected climate change is brought about by the greenhouse effect. Climate change according to The FAO, can be a help or a hindrance to agricultural production and productivity.

![Diagram of the Climate Change Pathway](Figure 2.3 FAO 2004, PAPER #145)

In Figure 2.3., The FAO cites climate change as a significant influence on agricultural production. Global warming will continue and will be an influence on future climatic patterns. Climate change can have a negative or a positive effect on the level of agriculture. According to the Dowlatabadi & Morgan (1993), Hope et al. (1993), Manne et al. (1995), Nordhaus (1991) and Peck & Teisberg (1992) it is generally agreed that climate change follows this pattern. Fossil fuel emissions such as carbon dioxide can cause a build up of greenhouse gases that increase global temperatures including eventually that of the oceans. Other greenhouse gases include water vapour, methane, nitrogen oxides and CFCs. Ocean temperatures are the genesis of world climate patterns. Increased mean global temperatures increase the evaporation rate causing wide scale cloud cover increasing atmospheric temperature. The increase in temperature tends to begin in the lower latitudes and spreads gradually to the higher latitudes. Green house gasses can be generated in ways other than burning fossil fuels.
Greenhouse gases can also include methane. Methane is produced naturally when organic matter is decayed. Sources of methane according to Holper (2002) are ruminant animal digestion, decomposition in rice paddy slurry, landfills, burning vegetation coalmines and natural gas fields. One significant source of methane is from organic matter eroded down streams and rivers and deposited in continental river estuaries and oceanic deltas. This organic matter settles to the bottom of the ocean usually at great depth where decay is slow and encapsulated into ice as methane hydrate due to low temperatures at such depths. Global warming can increase ocean temperatures providing warmth to a greater depth than before, melting the methane-riddled ice. The gas escapes into the atmosphere causing a chain reaction that increases the ambient atmospheric temperature that further warms the oceans that melts deeper ocean ice releasing more trapped methane and so on forming a positive feedback loop.

There is some evidence that plant life under stress from drought conditions emits more carbon dioxide than it takes in, enhancing feedback loop. Another important greenhouse gas is nitrous oxide. Holper (2002) asserts that concentrations of nitrous oxide are increasing due to land-use changes, biomass burning, fertiliser use and some industrial processes. He suggests that nitrous oxide is more tenacious as a greenhouse gas because; ‘it does not easily break down, having an atmospheric lifetime of more than a century’. Preventing or slowing erosion of organic material would slow this process. This may require farmers, loggers and other land clearers, causing some of this erosion, and greenhouse gas production and accumulation, to reconsider their practices in light of these effects.

Global climate change can have both damaging and beneficial effects on agriculture. Random drought and flood patterns increase and known climatic regimes lose their predictability. Massive random weather shifts occur. The resulting long-term effect is that arable land can become marginal, marginal land rendered useless and arid land uninhabitable. Conversely in other areas arid land can become marginal and marginal land can become productive. This scenario can be mitigated by a decrease in fossil fuel emission levels. However there will be a lag phase despite any change. This does not include already established patterns such as El Nino and La Nina, that have a huge effect on climatic systems causing alternate yet irregular, intense drought and rain regimes, certainly across the southern hemisphere and possibly influencing the rest of the world. It may mean however that these established systems may intensify or become even more predictable or unpredictable. Climate change also means agricultural production change. Some climate change effects may mean an increase in an areas’ agricultural production, other climate changes may reduce an areas capacity to produce. There can be a lag period of up to 40 years from the cessation of fossil fuel emissions to the cessation of greenhouse gas effect on climate change. It is estimated that the world’s fossil fuel reserves will last for about 40-50 years yet climate change effect models are designed to show the impact for approximately the next 100 years. This will not only influence the level of agricultural production but also the location of that production.
The sensitivity of crops to climate change is a significant factor in this scenario. Reilly et al. (1996) found that crops are sensitive to long term variations in temperature and rainfall. This means that if the mean global temperatures are increasing then agriculture is affected. The FAO (2004, Report #145) suggests that the responsibility for the production of the bulk of food in the next century will shift away from the OECD and ‘towards the tropics where it will be more vulnerable to warming’. There is some evidence that global climate change actually causes a cooling effect in the higher latitudes.

Table 2.2 indicates a shift of bulk food production from the developed world to the developing world. Research shows this trend is current. Whilst developing country’s use of biotechnology and electrical and mechanical technology is now mainstream, producing about one-third of the world’s food. Productivity has been increasing at the rate of 1-2 % per year under the current regimes. In the future developing countries economies are growing at a faster rate so their capacity and position in the global food production ranking will consolidate and surpass the OECD within 100 years. This table shows that by 2100 when Africa, Asia and Latin America’s GDP figures are combined they total more than half of the world’s total agricultural production.

<table>
<thead>
<tr>
<th>Continent</th>
<th>1990</th>
<th>2050</th>
<th>2100</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>84</td>
<td>202</td>
<td>416</td>
<td>5.0 fold</td>
</tr>
<tr>
<td>Asia</td>
<td>492</td>
<td>1 125</td>
<td>2 259</td>
<td>4.6 fold</td>
</tr>
<tr>
<td>Latin America</td>
<td>89</td>
<td>213</td>
<td>441</td>
<td>5.0 fold</td>
</tr>
<tr>
<td>W. Europe</td>
<td>191</td>
<td>337</td>
<td>542</td>
<td>2.4 fold</td>
</tr>
<tr>
<td>E. Europe</td>
<td>231</td>
<td>421</td>
<td>360</td>
<td>1.6 fold</td>
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<tr>
<td>N. America</td>
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<td>224</td>
<td>360</td>
<td>2.8 fold</td>
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<tr>
<td>Oceania</td>
<td>16</td>
<td>28</td>
<td>47</td>
<td>2.9 fold</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1 230</td>
<td>2 551</td>
<td>4 759</td>
<td>3.5 fold</td>
</tr>
</tbody>
</table>

Eastern Europe includes the former Soviet Union.

(Source: (after) FAO 2004, Report #145)

Table 2.2. These trends indicate that the first world will rely on the third world for its food. However, the third world is located in the tropics, the area most affected by climate change.
Global Issues Local Response

The Rural Industries Research and Development Corporation (RIRDC) report on Resilient Agricultural Systems Research Program, Wilson (2004) cited as the primary objective for their research:

‘To foster the development of agri-industry systems that have sufficient diversity, integration, flexibility and robustness to be resilient enough to respond opportunistically to continued change’.

This research objective highlights the notion that change is a mainstream factor in rural and regional Australia. The capacity to deal with change is an issue that is challenging the resilience of farms as well as their associated communities and regions. Resilience is the priority theme for Wilson’s research. Research outcomes mean that farms and farming may not be able to rely on traditional approaches to production for current and future survival. The report lists challenges and trends to rural industry resilience such as dealing with:

- changing mind sets from production to marketing,
- declining air and water, quantity and quality,
- loss of biodiversity,
- increased soil salinity, acidification and degradation,
- impact of globalisation on food industry, research, processing and marketing,
- working with climate change, developing approaches to risk management in terms of mastery of computer based:
  - seasonal forecasting,
  - production prediction,
- adoption of resource conservation technologies such as:
  - precision farming, incorporating Global Positioning Systems,
- sourcing and using information systems,
- incorporation of plant and animal genetic manipulation,
- increased vertical integration,
- implementation of industry-wide quality assurance,
- increase in farm size and numbers of part time farmers,
- holistically managing the economic, social and environmental ‘regional fabric’ in areas such as:
  - sustainable weed, pest and disease control strategies,
- enterprise diversity including
  - pharmaceuticals
  - nutraceuticals
- design of methods for determining sustainability.
There is clearly a very complex and changing world facing current and future farmers. The integration of production with technology, whilst being conscious of sustainable environmental and sociological approaches in an increasing global market, present massive challenges. The reference to farms being integrated with a community and a region has an enormous impact on not only the production and productivity but also the quality of life of the farming and non-farming population. It would appear that farmers need professional help to design, plan and manage their resilience not only for themselves and their families but for the communities and regions in which they operate and live.

**The Modern Agricultural Professional**

What kind of agricultural professionals will be able to work with people who are directly or indirectly, affected by these tends and challenges? Will the graduates be capable of managing logistical and market chain issues? Will they be able to predict local, national and international, market trends and patterns in order to advise, design and plan with producers, cooperatives and consortia? Will graduates be able to manage trade negotiations in foreign languages, with regard to foreign cultures and customs? Can they learn their way into better efficacy? Climate change is predicted to shift broad acre farming away from the OECD countries and into the developing world. Agriculture in the first world may become boutique-like and require specialists to help entrepreneurial activity and product development and marketing, as much as with production/productivity.

One feature of modern times is the desire to own ‘acreage’, i.e. for families to live on larger allotments on the peri-urban fringe of major cities. Indications are that as rural and urban population centres expand, large areas on the fringe of developments that were once one large farm will quickly become many small farms. Many of these new landholders would be amateurs, not trained in farming and whilst lifestyle is the purpose, many will want to produce agricultural crops and keep livestock. Will current curricula approaches develop capacity in agricultural graduates to work effectively with these groups?

The modern Australian farm is run managed by a family. The purpose of that family farm may be extremely diverse – it would not be realistic to assume that the family is only interested in maximising production and optimising profit however as a business, farm profitability would be a primary consideration. It may be optimistic to also assume that every decision made gives due consideration to the environmental and in particular the catchment ramifications. One of the most significant emergent properties from such a large number of decision makers is that each decision maker has a unique worldview based on a value and belief system that evolved from their life’s history. Fewer larger farms are managed by less people, whilst more numerous, smaller farms are managed by more people. More decision makers produce a rich democracy but often, in respect to catchment management, consensus is desirable. Reaching effective and sustainable consensus on approaches to ecological versus production issues is often difficult. An agricultural professional
would need a particularly skilful capacity to manage professional relationships with large numbers of diverse producers who hold a diverse range of worldviews.

A graduate entering the agricultural sector would need to be capable of comprehending and managing this kind of complexity. A graduate would need to have developed the capacity to empathise with this diverse farming cohort and be versatile enough to work with each farm family in identifying their individual purpose and be competent enough to help that family move forward towards achieving that purpose. A curriculum that produces such a graduate would need to be more than a cavalcade of scientific reasons for the effective production of crops and livestock.

There are huge ramifications given this scenario for professionals dealing with people and agricultural production systems at all levels and locations. That is to say another way to mitigate the climate change effect is to produce professionals in agriculture who can take advantage of the changed and changing system by working within its parameters. This scenario presents a significant challenge to current undergraduate agricultural education that primarily focuses on the scientific basis for singularly optimising agricultural production. One of the challenges to this requirement is the historical and institutional mindset of the academic and university leadership. There is a compelling argument to rethink the nature of undergraduate agricultural education in order to produce graduates who can engage with people and their issues in context. Science has as its foundation the concept of objectivity, the problems facing farm families in Australia and farming across the world will require a mixture of objective and subjective approaches. The choice of which approach to apply, will be determined by the context in which the professional is operating.

Cortese (2000) argues for a change in mindset. He suggests that it is the way we think about problems that firstly identifies what the actual problem is, then we should consider how to deal with it. He advocates ‘a revolution’:

‘…..I believe we do need a revolution. We need a mindset change if we are to attain a just and sustainable future. And the revolution must be in our thinking.’

(Cortese 2000, par.1)

Cortese ibid. advocates a change in the nature of university education. He suggests that universities should mirror the kind of sustainable world that they advocate. Cortese argues that undergraduates should be transformed by their courses into agents who after graduation, demand and are capable of, delivering sustainability. He suggests that higher education has the capacity to achieve this however he laments the fact that higher education does not play a significant part in this transformation:
‘Higher education has the critical mass and diversity of skills to help society move forward sustainably ….. It (Higher Education) is an overlooked leverage point in the transition to sustainable development.’

(Cortese 2000, par. 12)

Cortese ibid. goes on to advocate a closer alliance between the student, the community and their learning. He suggests that:

‘The university will operate as a fully integrated community that models social and biological sustainability itself and its interdependence with a local, regional, and global community…..students learn from everything around them and everyone they talk to, sometimes called the ‘shadow curriculum,’ which is all those activities and things around them that affect their learning.’

(Cortese 2000, par. 15)

Cortese advocates a stronger learning relationship between humans and their environment. He argues for a stronger emphasis on experiential learning. This could be achieved through individual as well as collaborative group and team - problem solving, capacity building projects, conducted both on campus and off campus. He suggests that Service Learning could be a model that should be mainstream and integrated across the curriculum. Service Learning curriculum should be designed so that students engage in community based problem solving with on and off campus community, industry and government. This he would argue could readily prepare students for challenges beyond graduation. Cortese ibid. captures both a stinging indictment and a plaintive cry when he suggests:

‘The university is a microcosm of the larger community. Therefore, the manner in which it carries out its daily activities is an important demonstration of ways to achieve environmentally responsible living and reinforcing the desired value and behaviors in the whole community. By focusing on itself, the university can engage students in understanding the institutional metabolism and the ecological footprint of materials and activities.’

(Cortese 2000, par. 20)

Cortese ibid. is suggesting that universities are not like this now. He argues that they need to rethink their primary purpose, their responsibility for producing; today’s and tomorrow’s, agents of change—their graduates. He suggests that they consequently change how they operate. He advocates that graduates can only produce more of the same, if higher education educational processes do not change. However, graduates have the potential to become the catalysts of a more sustainable tomorrow if the educative processes they undergo build relevant personal and professional capacity to achieve this. Jiggins & Roling (1994) asserts that there has been a
significant increase in the use of participatory methods of rural engagement by rural professionals in the last twenty years. This, associated with a ‘bottom up’ approach to rural development has seen a radical change in the nature of extension, consultancy and advisory in the agricultural professions. They suggest that the competence needed to apply these participatory practices resides more with the professional in the field than in the undergraduate curriculum.

Jiggins and Roling (ibid.) argue that descriptions of methods and their applications are circulated in what they refer to as; ‘informal networks in the form of fugitive ‘grey’ literature.’ (ibid., par. 2). According to: ILEIA (1991), Altieri & Yurjevic (1991), Lightfoot et al. (1989), Checkland (1981) there are four reasons for the use of participatory approaches by agricultural professionals in rural development interactions:

1. to quickly and accurately assess the situation from the owners perspective,
2. to build capacity in the individual and community participants,
3. to develop mutual understanding of and accord with, the sustainable management of farm resources and wider catchment ecosystems,
4. to facilitate expedient consensus amongst disparate, confrontational groups.

Jiggins & Roling. assert that:

‘academic institutions, even those whose main purpose is to train students in the disciplines relevant to agriculture and rural development, have been slow to train students in the emerging professionalism of systems management and participatory research and extension.

(Jiggins & Roling 1994, par. 5)

In summary, Jiggins & Roling. suggest that the gulf between the practices of professionals in the field and the training processes offered by higher educational institutions is wide and intransigent. The dominant paradigm is the scientific basis for agricultural production, yet the professional and industry needs are significantly more than that. Fourali (1997) suggests that education is much more involved than mere understanding and scholarship. Fourali (1997) cites a definition of capability in ‘The Education for Capability Manifesto’ as outlined in ‘The Capability Journal’ (1994) this states that:

‘A well-balanced education should, of course, embrace analysis and the acquisition of knowledge. But it must also include the exercise of creative skills the competence to undertake and complete tasks and the ability to cope with everyday life; and also doing all these in cooperation with others.’ (I(1), p. 2).
Stephenson extends the definition by adding:

> ‘an integration of knowledge, skills and personal qualities used effectively and appropriately in response to varied, familiar and unfamiliar circumstances.’

(Stephenson 1994, p. 3)

Sims & Woodrow (1996) critique the ‘The Capability Manifesto’. They suggest that this statement indicates a serious flaw in the approach that higher education takes to both the education and training of its undergraduates. The Manifesto suggests that higher education institutions produce graduates who are ‘able to understand but not to act’. They are ‘taught to practice the skills of scholarship and science’. Graduates tend to ‘Acquire knowledge of particular subjects but are not equipped to use knowledge in ways which are relevant to the world outside the education system.’ (ibid). Once again reference is made to a competency gap between current educational approaches and the student, profession, industry, community needs beyond graduation.

**Australian Agricultural Education**

Hemmings et al. (2000) have conducted comprehensive research into Agricultural Higher Education including student entry and exit attributes and industry needs. Agricultural Education in Australia began formally in the 1880s with the establishment of various colonial colleges awarding Diploma Level qualifications (Edwards 1990, in Hemmings et al. 2000). These colleges were established some 50 years before Agricultural Science Faculties in Universities. The main aim of these colleges according to Tribe & Peel (1989) was to produce graduates with improved practical and scientific farming skills that when applied, improve the productivity and profitability of farms. These colleges eventually became associated with various State Departments of Agriculture until the 1970s when they became Colleges of Advanced Education (CAE) offering quasi-degree level courses. Eventually these CAE’s became part of the Dawkins Model Universities in the late 1980s and 1990s.

There are still a small group of Department of Agriculture run Colleges offering certificate and diploma level qualifications. The new agriculture faculties in the Dawkins universities stressed research and postgraduate courses. Very few of these university faculties, according to Hemmings et al. (2000), focussed on curriculum design to achieve a specific purpose other than a scientific basis for production supported by a research pathway, ‘only a small number have stressed the value of the undergraduate curriculum and teaching and learning’ (p.15). Agriculture Faculties at universities, according to Hemmings et al. (2000), now train students for research, provide degrees in agricultural science and postgraduate degrees, whilst TAFE provide apprenticeships and continuing education. The regional merged faculties specialise in production related to the region in which they are located. The McColl report (McColl et al 1991) recommended that the number of providers of tertiary agricultural education be reduced to six. However this recommendation was not adopted.
The Curricula

In the last 20 years Australian Universities have struggled to identify what it is they are trying to achieve. It is clear that economic survival is uppermost in the consciousness of the university administration however putting that aside, I would like to focus on the relevance of the curriculum as a means to achieving the aims of the university, the student and the community. The turbulent times of the 1980s saw Federal Education Ministers; Dawkins and Baldwin, introduced policies that had significant impact on the purpose and ultimately, the function of universities. Dawkins especially saw a need to include universities in the general economic growth of the nation. He initially made changes in the secondary sector retention rates to ameliorate rampant youth unemployment. However, eventually the numbers attending university presented an opportunity for connection with the economy if they were prepared in the right way. This view is supported by Rosenman (1996) who suggests:

‘the Federal Government began to require universities to produce graduates for the 'national interest'; that is graduates who could enhance Australia's international competitiveness.’

(Rosenman 1996)

University enrolments exploded, with a flow on effect on curriculum to cater for the numbers their diversity, their backgrounds and their coping capacity. According to McInnis et al. (1995:32), a survey of 4,000 school leavers revealed that ‘45 per cent of school-leaver students admitted that the standard of university work was higher than they had expected’. Putting the jigsaw pieces together might indicate that if approximately half of the first year cohort are struggling to cope with university courses, then a response by university might be to change the approach or levels or standards in order to maintain enrolments, otherwise funding for low retention rates may be cut this was called ‘dumbing down’. Other components of the jigsaw might include a general resistance to the impost, environment and challenges of massification leading to an entrenched mind-set focussing on traditional approaches to education despite calls for change. Dawkins in response wrote:

‘... the Government's proposals for reform and reorientation of Higher Education should not distort the system's traditional functions of intellectual inquiry and scholarship.’

(Dawkins 1988:5)
Dawkins also saw a need to make the curriculum more learning and vocationally orientated. He was an advocate of graduates who were capable of making ongoing adjustment as their lives moved on. This attitude is supported by Lingard who states:

‘... the multi-skilled, creative and flexible workers necessary ... [to achieve] micro-economic reform of workplaces ...’

(Lingard et al. 1994:5)

This graduate adjustment attitude was as much about producing industry ‘cannon fodder’ to the strengthening of the economy, as it was about improving the graduates’ quality of life. Dawkins writes:

‘If we are to respond and prosper as a nation, there must be changes in attitudes, practices and processes in all sectors and at all levels of the Australian community’ (Dawkins 1987: iii). For higher education to make this contribution it was going to have to expand in order to affect a ‘... better educated and more highly skilled population [which] will be able to deal more effectively with change’ (Dawkins 1987: 1); that is, shift from elite to mass higher education.

(Trow 1974)

In order to achieve the kind of graduate Dawkins required, he began to make statements about the nature of the undergraduate curriculum. He suggested changes needed to be made:

'[a] major function of education is, after all, to increase individuals' capacity to learn, to provide them with a framework with which to analyse problems and to increase their capacity to deal with new information’ (Dawkins 1987: 1). In recognition of this purpose, the content and structure of courses would have to change in order to ‘... provide a greater emphasis on broad and transferable skills as insurance against the uncertainties of the future'

(Dawkins 1987:2)

Dawkins in his quest for the production of a more contextually relevant graduate has influenced the approach to curriculum. The influence in my opinion has been to cause academics to initially consider their options, given the challenges that Dawkins presented, then bunker down and entrench their attitudes and mind sets in order to maintain the status quo.

‘The search for the optimal curriculum is an ongoing and evolutionary process which has shifted from promoting the ideal of an educated person to teaching vocational skills, and again to the cross curricular approach of imparting skills and knowledge which will encourage lifelong learning.’

(Rosenman 1996, Executive Summary)
'Vocationalism’ as a conceptual framework for curriculum design has infiltrated the undergraduate consciousness but in my opinion, it is still at a stage whereby students are taught about what is needed rather than learn for their own capability or capacity. The agricultural workplace is changing and evolving, undergraduate agriculture students need to be job ready upon graduation in order to not only immediately be effective but to be able to evolve that effectiveness as needed. This means that the purpose, design, delivery and assessment of the curriculum should reflect this need. Guskin & Marcy (2003) support this view. They advocate a three-stage change process for universities based on a vision for the future whereby the student’s learning needs become the priority for strategic planning. They organise this process around three principles:

**Organising Principle I**
Create a Clear and Coherent Vision of the Future Focused on Student Learning,
Quality of Faculty Work-life and Reduced Costs per Student

**Organising Principle II**
Transform the Educational Delivery System Consistent with Vision of the Future

**Organising Principle III**
Transform the Organizational System Consistent with Vision of the Future

This approach would mean a complete inversion of the priorities of the current situation. Currently the student is treated as a ‘cash cow’. The curriculum is a complicated and convoluted mess of units, subjects, cores, electives, majors and minors in undergraduate, postgraduate and short courses. Very few of these connect within and across the university and with the mission statement and values. The success of a university is gauged on the number of graduates not their learning outcomes apart from minimum competency.

In 1999 the Evaluations and Investigations Programme (EIP 1999) of the Higher Education Division, Department of Education Training and Youth Affairs, sought research data on ‘Employer Satisfaction With Graduate Skills’. AC Nielsen Research Services surveyed employers and presented the following results (DETYA No. 6442HERC00A). The performance of Graduates who were suitable for positions was reasonable—neither high nor low. The performance of graduates considered unsuitable was poorer. These outcomes by themselves would not indicate a problem with university undergraduate education however the average proportion of unsuitable graduates was 75% and ranged as high as 85% and as low as 69%. What this means is at worst 8.5 in every 10 and at best 7 in every 10 graduates across the board were deemed unsuitable for employment by their employers. These figures indicate a serious problem with undergraduate education and the development of graduate attributes in Australian Universities. According to AC Nielsen Research Services (2000) the employers suggested that the deficiencies most commonly sited in graduates were:
• creativity and flair,
• oral business communications,
• problem solving,
• lack of communication skills,
• a lack of interpersonal skills, and
• a lack of understanding of business practice.

One of the most critical comments relating to graduate attribute deficiency, was a general lack of the student’s ability to rationalise their situation through thought:

‘the capacity for independent and critical thinking. This skill is of great importance to employers and seems to be the skill that most sets apart successful from unsuccessful applicants;’

(AC Nielsen Research Services 2000)

The research indicated that these results were across the entire spectrum of undergraduate courses:

‘There does not appear to be an industry in which University graduates perform well across all or most of the skill areas.’

(AC Nielsen Research Services 2000)

According to AC Nielsen Research Services (2000), employers favoured the employment of graduates as opposed to non-graduates, because they (employers) had a perception that the graduates would present themselves in a condition that would:

• enable them (employers) to train that person in the organisation’s procedures,
• be more trained/educated better,
• provide tomorrow’s managers, and
• introduce new ideas or fresh thinking into the organisation.

The survey results show a distinct discrepancy between the employers’ perception and the graduate attributes. This research supports the notion that graduates in general are not being prepared for the workplace. It may also mean that the current university approaches to curriculum design, delivery and assessment, seems to be inconsistent with the needs of the professions. Those professions seem to have disconnected, unrealistic and possibly unachievable, perceptions of the attributes of a modern graduate. The interesting part is the notion that the employers regarded the ‘graduate’ as the genesis of change and development for their organisation. The AC Nielsen Research Services results are not a reflection of the employment rate of graduates because studies from the Graduate Careers Australia (2003) site show that 80% Agricultural Graduates who get employed do so within four months of graduation. The research is about the attributes that those graduates possess on graduation and take into the workplace.
The following graph is from research conducted by Truelove (2002) to ascertain the viability of an Agribusiness Degree at The University of Western Sydney Hawkesbury Campus. The information relates to the agriculture graduate qualities and attributes deemed important at the point of hiring and is clearly consistent with the AC Nielsen Research Services (2000) findings. This information was to be used to inform the curriculum design. The course was never pursued due to economic constraints despite success of another agribusiness courses in other universities.

![Graduate Competencies Required By Agribusiness](Image)

Figure 2.4 Graduate Competencies Required By Agribusiness.

*Figure 2.4 indicates that employers place a significant emphasis on communications, interpersonal and business management skills as required graduate qualities or attributes at the point of hiring. It is interesting that technical knowledge rated 45% (very important) compared to communication at 80% (very important). How does one develop these skills? How does one assess that they have been developed? It was interesting that as part of the research, a group of high school students were engaged in a focus group and asked what they thought agribusiness was. Their perception of agribusiness was basically ‘how a farmer organised and managed his desk and did his paperwork’.*

These ideas are consistent with the argument presented in this thesis. Employers are seeking a certain type of graduate and are interested in the person and their persona, qualities and attributes...
not just their credential or subject knowledge. They require a person who has the capacity to perceive the situation and understand quickly ‘where they are and what is happening around them in order to decide and take effective action’, a person who can quickly move from the ‘what’ though the ‘how’ and on to the ‘why’! They seem to require a person who can effectively interact with a variety of people at a variety of levels and a variety of contexts. Employers require a person who can successfully manage interpersonal engagements. They require a person who is capable of organising then effectively and professionally communicating their ideas in written, spoken and presentational formats. There is a strong desire for a person who can not only manage themselves in complex situations but also effectively lead and manage others around them.

One major requirement of graduates is their ability to think creatively, innovatively and introduce new ideas into the organisation. Those qualities or attributes will be difficult to achieve from a content-based curriculum whereby the course is didactic in mode assessed by examination and the central challenge to the student is to develop and demonstrate their mastery of a long term memory. Graduates are not being prepared for a career however they are generally achieving employment. The following table from the Graduate Careers Australia (2003) Media Release 2004, outlines an interesting scenario. It shows the graduate employment destinations in terms of broad classifications of occupations.

Table 2.3: Employment Classification of Agricultural Graduates.

<table>
<thead>
<tr>
<th>Broad level of employment</th>
<th>Management &amp; Administration</th>
<th>Professional</th>
<th>Paraprofessional</th>
<th>Trades</th>
<th>Clerical, Sales &amp; Service</th>
<th>Manual Work</th>
<th>Total %</th>
<th>Total N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture etc</td>
<td>4.7</td>
<td>42.8</td>
<td>21.2</td>
<td>3.9</td>
<td>15.6</td>
<td>11.8</td>
<td>1.9</td>
<td>636</td>
</tr>
<tr>
<td>TOTAL %, all Graduate fields</td>
<td>5.1</td>
<td>65.4</td>
<td>15.5</td>
<td>0.3</td>
<td>12.9</td>
<td>1.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

(Source: (after) Graduate Careers Council Australia, Graduate High Level Employment 2003)

According to Table 2.3, approximately two-thirds of agriculture graduates are employed in professional or paraprofessional positions. All professional and paraprofessional employment graduate fields total approximately 81%. Whilst the proportion of agriculture graduates in this classification is lower than the percentage of the entire field of graduates, the most damning statistic is that less than half (47.7%) of agriculture trained/educated graduates, work in the designated industry. In other words less than half of the agriculture graduates actually end up working in agriculture however of those that do work in the industry, approximately two thirds work in professional and paraprofessional roles.
Half of the agriculture graduates work in the industry for which they were trained. There could be several reasons why this is the case, such as refusal to work in rural and isolated areas, there were not enough jobs available, the work was too difficult from that expected. Based on these figures and the AC Nielsen research outcomes, there could be an argument made that a negative relationship between the educative process and the employment trends. The following extract from the current Minister for Education and Training, Brendan Nelson (2002), captures in summary the needs of the modern day graduate

‘The new century is generating a need for ‘emerging’ skills and knowledge that have not been previously a focus of higher education. These include initiative and enterprise skills; information literacy and management skills; the capacity for lifelong learning; the ability to be adaptable and ‘learn-to-learn’ in jobs and roles yet to be envisaged; and skills to work effectively in multidisciplinary contexts.’

(Nelson 2002, Executive Summary)

The Roles and requirements of the (Agricultural) graduate are changing so traditional approaches to Undergraduate Agricultural Curriculum design, delivery, assessment and reporting may limit the effectiveness of graduate professional development. Nelson advocates a focus on lifelong learning and learning how to learn. If the Federal Minister is calling for these approaches to be included in university curricula, then they must not be currently part of that design. What then are the professional characteristics of the modern Agricultural Graduate? What are the current agricultural curriculum approaches to design, delivery, assessment and reporting, are there alternatives? What is the relationship between the qualities and attributes of an effective agricultural graduate and the educational processes required for their development?

‘There is no doubt that students enroll in university courses to improve their vocational opportunities. Universities in general advertise this fact to prospective students and include career development as part of their values and even in their mission statements.’

(Rosenman 1996)

Employment of graduates has become a benchmark for assessing the efficacy of university structure and function. It would serve universities well in light of the argument presented in this thesis, to move away from numbers graduating as a benchmark of success to a focus on the quality of individual graduate learning development.

There are many traditional academics who might denigrate the pathway towards vocationalism. I would argue however that the traditionalists may not be seeing the ‘glass half full’. Seeing the glass half full means recognising the opportunities that developing students for job readiness at
graduation, presents. A University of Queensland Report (1995) suggests that vocationally specific curricula may produce graduates incapable of socially and intellectually contributing to society:

‘...pressures on higher education to produce employment-ready graduates has led to a narrowing of university education into a vocationally-specific focus, at the expense of developing socially and intellectually aware graduates who are prepared to contribute to society.’

(University of Queensland Report 1995)

Little et al (2003), Otter (1992) and Ramsden (1985) argue that both graduates and employers agree on the attributes they require. These focus on critical thinking, problem-solving, evidence based decision making, ability to organise and synthesise complex ideas, in addition to subject-specific knowledge. It is interesting that these attributes are mostly higher order thinking skills. Another study by Harvey & Knight (1996) suggest that there are four underlying reasons for employing a graduate:

• their willingness to learn and speed of learning,
• their flexibility adaptability and ability to deal with change,
• their logical, analytical, critical problem-solving and synthetic skills, and
• their ability to innovate.

Harvey et al. (1997) suggest that a UK study indicates that employers were interested in graduates who were self motivated, self assured, and were able effectively interact with others.

West (1998, p. 47) indicates that employers require the following attributes as a supplement to those already outlined:

• technical, conceptual and theoretical competence in a field,
• a sense of curiosity, intellectual openness, appreciation of interconnectedness and areas of uncertainty,
• effective written, reading, speaking and listening communication skills,
• capacity to research, discover, retrieve and use information,
• capacity for working in a team,
• high personal and professional, ethical standards,
• capacity for self directedness, and
• capacity to learn.

The West Report (1998) substantiates many of the evolving tenets in this thesis. The universal capacity however emerging from all of the attributes outlined is the ability of students to manage change and to be able to change effectively with change by learning how to learn.
**Undergraduate Agricultural Curriculum**

Hemmings et al. (2000) have conducted the most comprehensive study of the entry and exit attributes for agricultural courses. They have related the student entry and exit attribute to the curriculum that produced them. They outline the basic and common design of an Australian degree in agriculture, as a range of three and four year, science orientated programmes. In this design, the first year consists of a collection of science basic units and subjects such as soils, plants, animals and farm management. Subsequent years allow for specialisation through electives. There may be facility for a major capstone project in the final year whereby students define and investigate a research problem and report its outcomes both orally and in writing. Other variations include a focus on sustainable, economic and productive, resource management and on agribusiness. An earlier feature of these variations was a significant half-year ‘experience’ with business and on farms however this is being reduced and eliminated according to Hemmings et al (ibid).

Hemmings et al. (2000) also stresses that there is pressure from government to shorten courses to three years, make them generalised not specialised and to move professional training into postgraduate studies. Falvey (1996) asserts that the future introduction into mainstream agricultural education of ‘humanities and social science values’ that are different from the ‘extension and economic components’ (p. 16) of the past and present will have a differing and profound impact. In the curriculum recommendations section of the report (RIRDC 2000 00/104) Hemmings et al. ibid. (p. XIII) suggests that curriculum designers

‘Should aim to develop a broad undergraduate course with an appropriate balance of the following components: viz., industry experience, ethical and professional work practices, project management, management of people, material and resources, social, economic and environmental costs and benefits, the fundamental characteristics of physical and biological characteristics, effective listening, communication and questioning skills, information management, learning skills, and problem solving.’

Hemmings et al. (ibid.) is suggesting radical change in the agricultural graduate attributes this would suggest that currently these attributes are not prevalent. He also suggests that curriculum should be broadened to include industry experience in their formative years. Hemmings et al. (ibid.) argue that it is the people management skills and ethical approaches to problem solving that are required to develop the graduate. He argues for clarity between what can be achieved through formal education and what can be learnt on the job or in the workplace and suggests that the relationship between those two facilities should compliment each other. The final point relates to the growing relationship between agriculture and environmentalism.

‘a cross curricular approach is advocated which identifies those core skills and knowledge which contribute towards the development of employable and intellectually flexible graduates, and integrates these core orientations into each course of study. It is
suggest that the development and teaching of such core skills and knowledge within the discipline or course context is the optimal route to broaden undergraduate education through curriculum change.'

(University of Queensland Report 1995)

An Approach for a New Agricultural Curriculum

Hemnings et al. (2000, p. 27) suggest that currently agricultural faculty and schools’ curricula generally focus on ‘dissemination of technical and scientific knowledge.’ The National Academy of Science (2002), suggests that that available information is increasing at a rate of 40% annually. It would be impossible for an institution to remain current. So institutions that practice an educational format of lecture, tutorial examination are immediately invalid if their purpose is to maintain currency. Phillips (2005, par. 11) supports the post-modern notion that knowledge is constructed not discovered:

‘More recently, the post-modern period has challenged the notion of the neutral observer. Knowledge is seen as being constructed and contextual, rather than existing independently, waiting to be discovered.’

These ideas are supported by Gibbons et al. (1994) in their manifesto focusing on Mode 2 Knowledge. In comparison, Mode 1 Knowledge essentially focuses on discovery of phenomena using the scientific method, or an objective approach, whilst Mode 2 knowledge is generated in the mind of the inquirer. Unlike Mode 1 knowledge, Mode 2 knowledge is tacit, transient, contextualised, trans-disciplinary evolutionary and applied, Gibbons et al (1994, p. 18) writes:

‘Mode 2 knowledge production is above all embodied in people and the ways they are interacting in socially organised forms.’

Hodgson (1996, pp. 48-49) has established that agriculture courses are designed around a science paradigm. This means that the fundamental learning framework is to maintain objectivity whilst trying to comprehend the scientific basis for animal and plant production optimisation. Agriculture courses generally have their curricula historically ‘adapted from the goals of science education.’ Hemnings et al. (ibid.) argue that a dominant paradigm based entirely on objective enquiry is inappropriate as an educational framework for curriculum design. This curriculum approach actually causes an inconsistency between graduate development and attributes required by employers.

Bezzi (1996) argues that the didactic style of agricultural studies usually associated with science education ‘relying on lecture delivery, demonstration, textbook reading and memorisation,’ is inadequate for developing higher order skills required of graduates by employers. Bishop & Anderson (1990) and Hewson & Hewson (1988) concur with Bezzi but go further to assert that instructional methods actually lower a student’s ability to understand at a conceptual level and it
also reduces their motivation. Lecturing and exams are the dominant pedagogy yet research indicates that this approach is entirely ineffective in producing the required student transformations required by employers. The espoused does not fit the actual. Fetherston (2001), suggests that the theory in use is inconsistent with the espoused theory and therefore the outcomes are consistent with employer dissatisfaction. Fetherston (ibid) presents this tabled summary of the espoused versus the actual.

Table 2.4: Components of the Learning Environment—Espoused Theory and the Theory-in-Use.

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<thead>
<tr>
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<th>Espoused Theory</th>
<th>Theory-in-Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedagogical philosophy</td>
<td>constructivist</td>
<td>instructivist</td>
</tr>
<tr>
<td>Approach to learning</td>
<td>deep</td>
<td>surface</td>
</tr>
<tr>
<td>Approach to teaching</td>
<td>student-centred</td>
<td>teacher-centred</td>
</tr>
<tr>
<td>Subject design</td>
<td>outcomes-based</td>
<td>content-based</td>
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In Table 2.4., Hemmings (ibid.) asserts that an instructivist mode in a science paradigm restricts students’ capacity to relate with actual people in agriculture. This causes a serious reduction in student learning opportunities and reality gaps in their professional and personal development. Hemmings notes that learning how to deal with people in agriculture is different from an ‘extension approach’ or and ‘economic/production approach’. A traditional extension approach to dealing with people relies on a professional being the ‘middle person’ between research and improved production.

Dealing with people in Hemmings’ description includes the values of agriculture that, according to Hemmings, is ‘far more consequential’. Phillips (2005) asserts that the traditional view of knowledge ‘existing independently’ and being ‘out there waiting to be discovered’ by the neutral observer has been successfully challenged by a post modern view that knowledge is a contextual construct and resides in the mind of the learner. These ideas are consistent, according to Phillips (ibid.), with research about how people learn. Funtowicz & Ravetz, (1990) challenge the validity and dominance of science as the sole framework for developing knowledge:

‘The validity of ‘science’ as a body of knowledge and as a rigorous set of practices and intellectual endeavour is being challenged by other ‘ways of knowing’, which give greater weight to a broader canvas of experience, self-reflection, and indigenous traditions of learning and conceptualization’.

They advocate a more systems orientated approach to education. This type of approach would be more realistic as it allows for complexity and cross-disciplinary and non-formal inquiry suitable for use by non-science trained persons or others wishing to engage in holistic research. Bawden (1989a) supports this view. He advocates a range of approaches or methodologies to inquiry. He suggests that rural professionals should be able to access a variety of approaches according to the needs and rigour of the context. He has collaboratively designed a spiral model, known as the
Hawkesbury Spiral, to accommodate this thinking. This model represents a shift away from a dominant science paradigm towards a contextually selective paradigm that allows more choice in the research approach.

In Figure 2.5 Bawden (1989a) advocates a spiral of methodologies as a more suitable approach to understanding the complexities of agriculture and for engendering more realism into curriculum. This approach connects a subjective or holistic end with an objective or reductionist end of a continuum of methodological approaches. Bawden refers to this as a ‘nested hierarchy of methodologies’. Figure 2.5 depicts five methodologies connected in a spiral model. The lower end of the continuum represents a reductionist/objective approach to inquiry and the upper end represents a holistic/subjective approach. There is a relationship between inquiry with people about their situation at the upper end of the spiral and inquiry about things and phenomena at the lower end of the spiral. The results of the inquiry for both ends of the spiral can also be linked.

This model allows students to choose the most appropriate methodology for the context problem or situation encountered. If a field trial is required in order to establish the effect of a variable on a cropping system, then the student would choose a methodology at the reductionist end of the spiral. If the student were to be working closely with a farmer about a problematic situation they have encountered then they would select a suitable methodology for inquiry from the more holistic end of the spiral. One of the features of having the methodologies nested is that the student can move up or down as the inquiry intensifies drawing upon other research outcomes and opening new approaches as needed. Students are not paralysed by a single paradigm because the context determines the approach accessed and utilised.

This is not to say that a scientific/technological approach within the curriculum is not important but it should be just one component of a variety of approaches that facilitate both objective and subjective enquiry and understanding. When a scientific paradigm is superimposed over a lecture, tutorial exam educational framework then there is cause for concern. Laurillard (2002, p. 81) suggests that the lectures, tutorials and laboratory practicals are the prevailing delivery systems for undergraduate education. Assessment patterns usually focus on assignment and on examinations. This educational pattern, according to Laurillard, is ‘legitimised only by 800 years of tradition’. Administrators reinforce the lecture, tutorial, exam pattern in workloads and casual allocations, according to Laurillard (2002, p. 93).
Bligh (1972,) suggests that numerous studies have shown that lectures are unsuitable for stimulating thought and affecting attitudes. Phillips (2005) contends that lecturing as a practice, has historical overtones relating to the controlling of knowledge by regulating the transmission of content. There are many assumptions relating to the role of students in the lecturing process, some portray students as tacit receivers, empty vessels to be filled. Featherstone (2001) suggests that the implication of lectures is that students will learn by osmosis. Rowntree (1987) questions the process of examinations as a viable assessment process he contends that they merely test speed writing, stress tolerance and memorisation. If a student fails, it is their fault (Laurillard 2002), or Failure means forgetting the content before the exam, success means the same but after the exam. (Traditional)

Extensive research by the US National Research Council, focussing on the learning process revealed three themes relevant to tertiary education:

- Expert performance.
- Transfer of learning across contexts.
- The design of the learning environments.

Bransford et al’s (1999) research indicates that becoming an expert in a particular discipline is advantageous. In order to do this a learner should engage deeply with a prolonged episode of learning. Bransford et al. assert that experts have acquired extensive knowledge that affects what they notice and how they organize, represent, and interpret information in their environments. As a result they can exhibit credibility, authority and reliability. A person who is an expert is able to recognise and organise meaningful patterns of information, they have deep understanding, they can readily access their knowledge and apply it in a specific context. However, the research also indicated that experts were found to have varying levels of flexibility to new situations, and there was no guarantee that they could instruct others about their area of expertise. (Bransford et al. 1999, p. 31)

According to Bransford et al. (ibid.) the implications for university are that students should strive to be an expert in a ‘field of knowledge’. They suggest that an expert has ‘deep’ understanding of a particular concept, phenomenon or process. They (ibid.) assert that an expert can notice significant patterns and that their knowledge reflects ‘contexts of applicability’. Bransford et al. suggest that experts can ‘retrieve important aspects of their knowledge relatively easily’. I would argue that capacity in this context is not just about knowledge. Being an expert is often a disadvantage to a complex situation because it can limit the ‘view’ and the ‘approach’. It may be wiser to have the expertise to call upon experts in order to comprehend a certain aspect as part of the overall situation. Part of the expertise is to know upon which kind of expert to call. Even more, it is wiser to develop the capacity to develop expertise; this makes the learner universally appropriate for the context requirements.
A singular focus on the development of knowledge proficiency in a particular discipline at the expense of more generalised professional practice development would eventually limit the student’s overall capacity. What I believe is needed is a system of education that facilitates the development of expertise for developing expertise. What is required is an undergraduate curriculum that develops the graduate capacity to understand the environment in which they are required to operate and then draw upon learning systems to facilitate the development of the expertise required to perform. It is better to learn how to be an agronomist than just learn about agronomy.

Bransford, Brown & Cocking (1999) suggest that for learning to be effective, certain ancillary activities and processes must take place. They indicate that learning is transferable if it is converted into principles and concepts, ‘Knowledge learned at the level of rote memory rarely transfers’. Bezzi (1996) supports Bransford et al. by suggesting that didactic educational systems based on students’ memorising facts ‘have been shown to be inadequate in developing conceptual understanding’ (p. 49). These ideas are also supported by Ramsden (1988), Gibbs (1992), Ramsden (1992) and Biggs (1999) who collectively argue for ‘deep learning’ educational processes versus didactic or ‘surface learning systems’. In order to make a conversion from surface, rote, or memorisation learning strategies, to strategies that build concepts and principles, the learner must adopt an independent focus and strategically concentrate on what it all means to them. Nobody else other than the individual can learn what a learner learns, the way they have learnt it. This is an acquired skill in itself and is more about a multi-perspective capacity to learn. A tremendous amount of curriculum time, effort, design and resources are needed if this is to happen apart from the academic training and in-servicing and professional development.

In order to achieve a high level of individual expertise and to ensure that that expertise is transferable, Bransford et al. (2000) suggests that a ‘learning environment’ is essential. The nature of that learning environment is also important. Bransford et al. (ibid.) suggests that there are four parts to this environment the student, knowledge, assessment and community. According to Duffy & Jonassen (1992), Marra & Jonassen (1993) and Reeves & Hedberg (2002) an effective learning environment encourages and facilitates students’ individual development in a constructivist, problem solving atmosphere utilising a ‘deep’ approach to learning whereby they learn to ‘use current knowledge to construct new knowledge’. They emphasise that content is utilitarian, i.e. is applied contextually and constructively to collaboratively solve or improve problematic situations. Rowntree (1987) and Bransford et al. (2000) suggest that in this learning environment, student assessment could be formative and summative Hawthorn (1989) Atherton (2005). Students would orchestrate their preparedness for assessments according to agreed criteria. Bransford et al. (ibid., par. 41) suggests that developing a collaborative learning environment supports Vygotsky’s (1978) ‘zone of proximal development’ theory. The idea of community can mean any relationship between; staff, students and undetermined yet significant others. Allen (1996, p. 107) suggests that this type of student centred learning environment is an outcomes based not an input based system.
She has identified three types of outcomes *subject based outcomes, personal transferable outcomes and generic academic outcomes*. I would argue that in order for students to develop to the degree required by employers, they would need to focus on all three types in their personal and professional development.

Hemmings et al. (ibid.) supports this model when he suggests that an alternative approach would be to concentrate less on disseminating technical and scientific knowledge and more on *problem solving, communication, international and interdisciplinary perspectives of agriculture, foreign languages, and concepts of lifelong learning*. (p. 27). Hemmings devotes considerable attention to the quality of *persistence* (p. 30). He draws distinction between the notion of persistence relating to *an academically-oriented student to complete a task or solve a problem* (Attinassi 1992, Graham 1988, Saenger-Ceba 1972) and the persistence of a student to finish their course (p. 30). Hemmings believes that it is more beneficial generally to develop the capacity of the student as a learner in order for them to on one hand, cope with the explosion of knowledge and secondly manage the variety of workplace contexts. There is a third reason for focussing on capacity development not mentioned by Hemmings that relates to the student developing their own knowledge (Mode 2). Harvey et al (1997) suggests that in order to produce graduates who as *‘adaptive’ workplace ‘recruits’* can *‘evolve the organization’* more coherence, learner focus and integration across all aspects of the curriculum needs to be built into the curriculum design. In order to overcome the common approach to curriculum that appears to be a smorgasbord of elective subjects or units based on prevailing staff expertise or the elective choice remnants of after a round of administrative economic rationalisation. This approach is limited by the backgrounds and expertise of whom ever is on the staff. One outcome of this design is that students choose *‘the path of least resistance’* and select subjects that may be considered easy rather than integral their purpose (AAC 1985:3). Rosenman (1996) supports this view she suggests that:

> ‘The use of stand-alone subjects to teach specific vocational skills to undergraduate students divorces these skills from the relevant context.’

A more appropriate curriculum would allocate more responsibility to the student to generate content in a self-directed or even self-determined way. Students could also have a say in the focus for the suite of subjects from which to choose. There is a need to design integration between the student’s interest or vocational purpose and an appropriate and challenging agricultural community experience. McInnis et al. (1995:6) supports this assertion:

> ‘... whether and in what ways, undergraduate degrees can promote ‘enabling characteristics’ in graduates-defined broadly in terms of the skills, attributes and outlooks that allow students to take control of their learning for both vocational and personal development throughout life.’
Hemmings (2000) suggests a model that includes some compulsory core subjects and variety of electives, whose main design and complementarity is to develop the capability and capacity of the students to become lifelong learners. Vocationalism could provide a framework however some academics and curriculum design commentators reject it as being Technical Education like and lacking in scholarship. A vocational framework would provide many of the challenges and motivation needed for a student orientated capacity building curriculum and scholarship could be the cornerstone of this design. Wiltshire et al. (1994) draws connection between student lifelong learning and developing the capacity to ‘organise society’:

‘Lifelong learning should not be an “... endless series of courses and qualifications” but characterised by “... the capacity not simply to learn new skills, but to keep on doing so and to learn new concepts, new ways of organising society, new views that are valued and worthwhile”’.

This would indicate that a component of the undergraduate curriculum should be devoted to learning about, with and for, community. Lifelong learning has already been determined by the Federal Minister, as a necessary part of the undergraduate experience and an essential attribute for graduates. Candy et al. (1994:16) defines lifelong learning as:

‘... the deliberate and intentional efforts of learners themselves, consciously planned, self-managed, and generally in proportion to their motivation, their ability and the opportunities available to them ... [that is] deliberate self-directed learning.’

Designing an undergraduate curriculum around the theme of learning for life would be a strategically positive step in closing the gap between employer perceptions and graduate performance.

*Figure 2.6 is a model that portrays the integration of components forming a framework for the purposes of designing an Undergraduate Curriculum in Agriculture. All of this occurs in an atmosphere of scholarship. The integration of inquiring or researching, teaching and learning with an agricultural community produces improved pedagogy, realism and authenticity as well as the potential for development. By co-learning with, from and about an agricultural community as a series of research and development projects, the student the academic and the community members will all benefit. Community in this model represents a*
locale, industry, the professions, the inhabitants and population groupings. Within the parameters of teaching and learning is the process of learning how to learn or lifelong learning.

This model integrates Gaff and Radcliff’s (1997) three conflicting philosophical components of utility, research and learning development into a holistic framework from which an effective undergraduate curriculum in agriculture could be designed.

**Conclusion**

In this chapter, I am suggesting that current approaches to agricultural curriculum design, delivery and assessment are inadequate for the current industry and, professional and community needs.

There is a compelling argument that recent and current graduate attributes fall short of employers’ requirements. There is a connection between those inadequate attributes and the curriculum that either produced them in the graduate or by default did not produce them. The nature of agriculture is ever changing. There are substantial local, national and international social, environmental and economic pressures on farmers. Farmers are generally members of family groups on relatively small to medium holdings who contribute in a variety of ways to rural communities.

Employers seem to require more in their graduate employees than mere subject knowledge. One attribute that was strongly emphasised was the ability of the employee to adapt and adjust by learning. Another desirable attribute was that the graduate could ‘grow the company’. Numbers of students selecting agriculture as a preferred study area are declining. Research indicated that under current circumstances, less than half of the graduates eventually work in the field in which they studied. Overall, the current curriculum models do not seem to be able to produce graduates who can work with people experiencing change which is essential, given the volatile nature of world trade and the spectre and impact of climate change on agricultural production.

The approach to current undergraduate agricultural curriculum design has its origins in science education and this may be proving to be a barrier to more pertinent and effective approaches to graduate development given the current and future needs of the profession and community. In the undergraduate curriculum science should be viewed as just one approach to inquiry and comprehension in a suite of approaches available to students. There is evidence for a change in curriculum design away from an instructional mode that emphasises content and long term memory development towards development of professional effectiveness in the individual learner. There is compelling evidence to focus on learning as well as teaching. There is also evidence for a shift in assessment away from general recall of comprehended ideas to a system that focuses on assessing individual student development. These ideas form the genesis for a proposed model for curriculum change that is outlined and discussed in detail in ensuing chapters. Chapter 3 begins the research process by discussing the methodology, method and research techniques.
CHAPTER 3
THE RESEARCH PROCESS

Introduction

I am interested in the capacity of the undergraduate agricultural curriculum to develop capacity in the undergraduate student so that they can subsequently develop capacity in the community. I would like to develop a conceptual framework for a universal core curriculum that facilitates this pre/post graduation capacity development. I have decided to focus on developing a core curriculum rather than an entire curriculum because the versatility and universality of a core curriculum allows for greater diversity of application. Focusing on researching the effectiveness of the undergraduate curriculum is appropriate because I believe that it is a vital springboard for a greater number of university-qualified people entering the workforce and the professions.

The research is based on two case studies:

1. Tamil Nadu Agricultural University (TNAU)
2. The University of California at Davis (UC Davis)

The case studies will draw upon appropriate literature. TNAU emerged as a case study context because I was already engaged with a joint TNAU/UWS Hawkesbury Campus curriculum development project sponsored by the Ford Foundation. UC Davis had a rural community development program called The Sustainable Agricultural Research and Education Program (SAREP). I visited this group in order to more fully understand how they engage with community. One of the SAREP staff was also an undergraduate lecturer and invited me to survey his agriculture class.

The research methodology incorporated primary and secondary research methods focusing on the relationship between curriculum, learning and community engagement. Quantitative and qualitative data was obtained utilising survey, workshop, critical personal experience and literature reviews. The selection, design and/or construction of the three primary research instruments, emerged from a desire to provide a variety of data gathering approaches that strengthened the validity of the results by integrating or triangulating them. I was granted permission to use The Gainen Inventory from the originator. Agreement was reached with the TNAU and SAREP administration about the research, timing, location scope and format. The research approach was relevant because it served the needs of my research and also provided impetus for the concurrent Ford Foundation Project.
CASE STUDY #1 DESCRIPTION
TAMIL NADU AGRICULTURAL UNIVERSITY - INDIA

Tamil Nadu Agricultural University (T.N.A.U.) is the premier agricultural university in the State of Tamil Nadu, South India. It has a prestigious history and is recognised world wide for its biotechnology research. Its students do extremely well in the All India Agriculture Examinations from which they draw a significant percentage of available scholarships. T.N.A.U. has seven campuses - Agricultural Colleges and Research Institutes (A.C.&R.I.) spread throughout the state. The University comprise the following campuses:

5. T.N.A.U. (A.C.&R.I.) Kuttapattu (Irrigation)
7. T.N.A.U. (A.C.&R.I.) Mettupalayam (Forestry)

Fig. 3.1: Map of India Showing the State of Tamil Nadu.
The above maps (Figs 3.1 & 3.2), show both the location of the state of Tamil Nadu in the southern, right extremity of the sub-continent and each of the seven campuses of the Tamil Nadu Agricultural University.

Thesis Research within the TNAU / UWS Hawkesbury Campus - Ford Foundation Project

The University of Western Sydney Hawkesbury Campus has for three years prior to my engagement in 1995, been engaged in a joint project sponsored by the Ford Foundation with The Tamil Nadu Agricultural University. The aim of the project is to develop an agricultural, undergraduate degree curriculum based on the concepts, principles and processes relating to experiential learning. My role within the Ford Foundation Project was to visit the TNAU Campuses and conduct a series of lectures and engage with staff and students. My thesis research paralleled and complimented this work.

History of the Ford Foundation Project

The project began at a conference held in Hyderabad, attended by Vice Chancellors and Deans from all Agricultural Universities in India. The T.N.A.U. Vice Chancellor, Dr. Sankaran, The Dean of Agriculture Dr. Kannaiyan, was inspired by an address on the benefits of experiential learning to rural development, delivered by Professor Richard Bawden, Dean of the Faculty of Agriculture and Rural Development at The University of Western Sydney Hawkesbury Campus. TNAU and UWS Hawkesbury Campus subsequently collaborated to seek funding in order to introduce experiential learning to the TNAU undergraduate curriculum.
The Ford Foundation Project Rationale

The following information was gathered during interactions with The Dean of Agriculture Dr. Kannaiyan (1995), as a preliminary briefing for the Ford Foundation Project. Other sources include, *The Hindu Survey of Indian Industry* (Parthasarathy 1996). The employment environment for graduates from Agriculture courses had changed over the last decade. Originally, 90% of all graduates who sought employment were absorbed by the public sector into either basic, low or high-tech research or into the extension service. That figure has, over the last decade, deteriorated to between 5 and 10% of graduating students. The curriculum that produced those public sector orientated graduates continues, and has now left a gap between graduate competencies and what is now required by the ‘work place’.

The generally accepted overview is that the T.N.A.U. curricula had not been adjusted enough to suit the new rural employment and agricultural work place needs. There is no question that students are still being well trained. The training process and outcomes however, appears to be focused the remnant of an era and environment of employment, that has now past. This did not mean, however, that there were now little or no employment opportunities; it meant that the predominant arena for jobs was now with the private sector and with avenues for self-employment.

Recent surveys indicate that unemployed graduates were in great supply. Feedback from employers indicated that whilst graduates had significant technical knowledge they generally lacked decision making skills, enterprise management skills, problem solving skills, people management skills, and were on the whole, poor at generating new ideas. Overall, employers and staff felt that students did not possess a sense of enterprise nor the degree and type of self confidence to move out of well defined and dependent, routines. Graduates tended to be able to work mechanistically but did not seem to be able to, or willing to innovate, create. They were not ‘self starters’ and lacked motivation to generate or pursue self-employment opportunities. It was felt both in the work place and at University that there was a pressing need to develop new more vocationally oriented qualities in undergraduates.

The Project Big Picture

According to Kannaiyan (1995) India’s economy in the 1990s, was expanding quickly. A burgeoning middle class was emerging with new discerning tastes, and more disposable income. The nation had been for some time, self sufficient in food production. So whilst T.N.A.U. was well positioned to assist in research and extension processes that maintained and improved productivity of food and fibre it was lacking in vision and proactivity consistent with the changing vocational scene. The University had not developed until now, a strategy for producing graduates who were capable of synthesising ways of addressing the changing needs of the ‘New India and the India of the next twenty to fifty years’.
As India modernised, new opportunities were opening rapidly in fields such as biotechnology, agricultural engineering and machinery technology, value adding of agricultural products, post harvest technology, extension and rural community development and exports. TNAU’s research agenda boasted up to date technologies and cutting edge research especially in the field of biotechnology. The undergraduate curriculum however, seemed to generate dependent, passive recipients of information not dynamic, self confident, innovative adventurous graduates, who had vision, enterprise and a will to change and challenge and be challenged.

Graduates seemed either incapable, or simply were not interested in perceiving opportunities to forge new careers. It is as if they had a mind set on what an agricultural graduate was supposed to do and would not deviate from that position. Anecdotally, graduates enjoyed the status inherent in a professional agricultural degree however they sought a career that provided a work environment that merely allowed the animation of that status and the privileges which accompany that position. There are many socio-cultural explanations for this situation including ‘class’ and ‘tradition’.

The TNAU Vice Chancellor, Dean of Agriculture and The Registrar believed that a change in the educational approach of the curriculum towards ‘learning from community experience’ could inspire students and staff to become more proactive. They believed that developing student capacity in ‘experiential learning’ and ‘self directed learning’ may encourage greater opportunities for vocational education than the current curriculum. So by incorporating some concepts of experiential learning into the undergraduate degree, students and staff could learn to adjust their mind sets, their knowledge, skills, and attitudes towards opportunities for job creating rather than job seeking.

Between 1993 and 1995 there were several staff exchanges between UWS and TNAU. Staff engaged in many field trips in order to see first hand the rural conditions in both countries. Collaborative curriculum development workshops generated student centred strategies and plans for inclusion into the TNAU Curriculum. In 1995 the plans were implemented. One of the most crucial strategies related to the duration of the TNAU practical field experience (The Village Stay Programme) and its timing in the sequence of the undergraduate curriculum.

**The Village Stay Programme (VSP)**

The Village Stay Programme (VSP) is a component of a series of practical activities of varying length and purpose within the UG curriculum, that have been developed and bundled into a overarching agenda called The Rural Agricultural Work Experience Programme (RAWEP). The VSP requires students to experience the rural community first hand by living in the village and working with allocated farm families on nearby farms. The model for engagement between students, farmers and other agricultural professionals was to ‘find out, make sense and take action’.
It was thought that the challenge of the VSP experience to the students’ knowledge, skill, attitudes, values and overall ‘worldview’, would heighten their awareness of their professional development needs. The feeling was that the students were going to experience the farm, farmers and the community, not just stay in the village. My research focuses on the potential for curriculum development. The research focus was firstly, on the understanding and acceptance by staff from the seven campuses of the collective vision of the TNAU’ Vice Chancellor, Dean and Registrar. Secondly, on how their collective vision may and could be enacted.

The Staff, Student and Farmer Research

Staff, students and farmers’ opinions, attitudes and ideas formed the focus of the research. I needed to gather quantitative as well as qualitative data on the relevance and impact of the current curriculum. I also wanted to be able to ascertain the level of understanding by the staff and students, of a variety of curriculum issues relating to self directed learning. I also wanted to research the major practical programme (V.S.P.) I wanted to do this in order to build a better understanding of their attitude to change, their readiness for the challenges which the project would mount and their perceptions on the wider issues of education vocation, in a context of India’s future.

Quantitative Data Sources

This would provide me with objective, statistical, numerical, calculable and comparable data. Questionnaires like the ‘Inventory of Learning Preference’ (Gainen 1987) could produce numerical results as percentages and trends. I could use this data to compare situations within and between campuses, campuses versus the university, university versus university, as well as student/staff, groups.

Qualitative Information Sources

Activities like the lectures, the workshops, student and staff personal opinion surveys, formal/informal/social interactions with students/staff/farmers/families, formal interviews, farm visits and tape-recorded interviews would provide me with subjective information. I could guide the agenda towards information about the environment, tone, ambience, atmosphere and demeanour of individual campuses as well as the university. I could also gauge the disposition, assumptions, convictions, points of view, feelings, spirit, positions, hopes, values, community, aspirations, requirements, expectations, desires and confidence levels of the students and staff. I could also gather information about the relationship between the university and the rural community. The combination of these types of information would enhance my understanding of the T.N.A.U. situation. An interpretation of this situation could give a basic indication of the potential for paradigmatic change. The interpretation of this data could be very helpful in establishing a premise for the direction of Ford Foundation Project and for constructing the core curriculum conceptual framework.
Researching with the Students

I enjoyed working with the students very much. The formal interactions with them ranged from me presenting to a silent audience to a jovial, relaxed encounter which went backwards and forwards between us for hours. I value, particularly those students who stopped and talked to me on the various campus grounds; the two courageous first-year girls who spoke to me after class at Periyakulam; the Madurai final-year boys who guided my climb up ‘Elephant Rock’ and who took me to the cinema the same evening despite their exams the next day; the final-year and first-year boys who invited me to lunch and the two third-year students who took me sight seeing at Tanjore and Tiruchirappalli.

Which Students to Survey?

Normally a final year student would be completing their fourth year. In two campuses, Kuttapattu and Kumulur the final years were in third year as these campuses were still developing, and third year was the current final year. I chose these particular years in order to gain as wider view of the student ranks as possible. The first years would have been in the system long enough to have developed some form of opinion, and the fourth years could reflect over at least three and a half years in order to draw conclusions, reveal attitudes and express opinions.

How Many Students to Survey?

I asked a staff representative to organise for 10 boys and 10 girls in each year group at each campus. It was my understanding that there were approximately 100 students in the final year of each of the larger campuses such as Coimbatore, Madurai Killikulam and Trichy and approximately half of that number in the other smaller campuses making a total population of 450. This was not always possible due to clashes with other activities coinciding with my visit. Clashes were caused by such events as examinations, religious holidays or term breaks; but generally those were the student numbers. I had no influence over which students were chosen but those students who had a good grasp of ‘spoken English’ made interactions easier and more effective.

A member of staff was present at each formal interaction with students. Their role was to translate and clarify any difficult instructions or deal with any cross-cultural issues. I would begin each interaction again with a parable from the oriental stories book (Peseschkian 1981). I chose what I consider to be a humorous tale. I would then outline who I was in detail, where I was from, and what I was doing there. In some campuses the interaction progressed to a more challenging level. I was pleasantly surprised at the warm reception I received and in several campuses My aim was achieved completely when a genuine rapport was created.
Researching with the Staff

It was my aim to involve as many staff as possible in the activities of the project. I wanted my visit to be provocative and provide stimulus for thought, at a number of levels and through a number of formal and informal means. It was essential to have a blanket exposure, of experiential learning concepts to as many staff from all ‘hierarchical levels’ as possible i.e. Dean, Professoriate, Lecturer. I was also acutely aware of gender issues. It was also necessary for staff to engage in conversation about the issues. I felt that it should be informed discussion so the workshop activities should assist with this process. I tried to conduct the staff survey at each campus during the workshop period. I did this so that curriculum ideas would be focussed. There was an issue of the amount of time that staff could provide. The planned agenda was one two hour workshop. In most campuses the workshop time tended to extended to three hours in most campuses and in some cases an extra one, two or three hours was required by staff, in order to finish. This was a lot of time to devote to activities other than teaching and research. I was acutely aware of these issues. I confined and streamline activities, so that as many and varied staff as possible could participate in the research activities. I quickly determined the level of awareness for the workshop and adjusted by negotiation the format, duration and intensity to accommodate the identified needs and timeframes. Surveying the staff presented somewhat of a problem in that I was never sure how many staff would be available to participate in the project activities. Staff were requested to attend all activities by each campus Dean, but each staff member had many other teaching, research, and administrative commitments. I surveyed whoever was present, so I cannot determine exactly the proportion of the total staff in the sample. I can confirm that in every case more than half of the staff participated, so the survey and workshop results are significant.

CASE STUDY #2 DESCRIPTION
THE UNIVERSITY OF CALIFORNIA AT DAVIS
SUSTAINABLE AGRICULTURAL EDUCATION AND RESEARCH PROGRAM. (SAREP)

SAREP was created by the Californian State Legislature as a response to rural community needs. They worked at arms length with the Agriculture Faculty at UC Davis in offices on campus. The SAREP group act as a publication and information node for the rural community. They conduct situation improvement action research projects with the surrounding rural community and manage and allocate research funds for other sustainable agriculture research projects. SAREP fosters ecological thinking in UC Davis undergraduates and postgraduates. They conduct research into ecologically sustainable practices and advise extension and community groups about improving their situations in a sustainable way. They facilitate conferences and seminars with and for community as well as a widespread number of research groups.
Figure 3.3 locates the state of California in the North American continent.

Figures 3.4., locates U.C. Davis near Sacramento in Northern California.

The major thesis research was conducted through Case Study # 1 at TNAU in India. The UC Davis research allowed me to gather data from students studying at an alternative ‘western’ tertiary institution as a comparison with the Indian data. The SAREP group engaged significantly with the rural community and provided experience and relevant participant observation opportunities. The UC Davis component of the research is minor and could be considered a form of research control.

The Research Question:

‘What are the conceptual framework design properties for an undergraduate, agricultural, core curriculum that is grounded in community?’
The Methodology

Quantitative and qualitative data was gathered in the case studies via surveys, workshops and participant observation. Secondary data was gathered via literature searches. Quantitative data was analysed using percentage calculations and subsequently represented as graphs, tables and charts. Qualitative data was analysed using a combination of hermeneutics and semiotics. In the semiotic analysis process both ‘content analysis’ (Krippendorf 1980) and ‘conversational analysis’ (Wynn 1979) were utilised. The result of the analysis would be a series of themes and issues with due cognisance of the research question. One of the most important outcomes of the research is the development of a ‘rich picture’ (Checkland 1981) of the proposed undergraduate curriculum situation. The rich picture in this study eventually results in a generalised undergraduate core curriculum schema.

A ‘Case Study’ as Research

According to Yin (1994) a case study is appropriate in a thesis such as this because it is a form of empirical research that explores a contemporary issue in situ, using a variety of sources of data. The epistemology guiding the case study research can be positivist, interpretive or critical, depending upon the underlying philosophical assumptions of the researcher (Myers 1997).

Justifying Triangulating the Epistemologies

Three pertinent epistemologies postivist, interpretive and critical, were triangulated (Ragin 1987, Gable 1994, Kaplan & Duchon 1988 and Lee 1991) in order to provide a more viable research foundation and to enable diversity and enhance validity in the research process. In my primary research design I have incorporated a variety of methods and techniques that would facilitate data gathering from a wide variety of sources and in multiple ways. My research is designed to be informative, partly measurable, meaningful and somewhat emancipatory.

According to Orlikowski & Baroudi (1991) positivist research can be considered interpretive if the research draws ‘inferences about a phenomenon from the sample to a stated population.’ Interpretive research is an appropriate epistemology in this research because, according to Myers (1997), the researcher assumes that ‘access to reality (given or socially constructed) is only through social constructions such as language, consciousness and shared meanings’ (p. 4). Boland (1985) asserts that, ‘The philosophical base of interpretive research is hermeneutics and phenomenology’ (ibid.). There is a huge emphasis in this approach in comprehending; ‘the meanings that people assign to them’. According to Walsham (1993), the interpretation is based on understanding the relationship between the information system and the context in which the system exists.
Critical research is an appropriate epistemology because it allows for qualitative data resulting from ‘social reality’. Critical research allows for subjectivity and assumes that there are ‘historical, cultural, political’ and other reasons for the current situations. Often the subjects of the research are unaware of those reasons and can be emancipated by participating in the research to the point where they initiate self-determined change. According to Myers (1997, pp. 4-5),

*The main task of critical research is seen as being one of social critique, whereby the restrictive and alienating conditions of the status quo are brought to light. Critical research focuses on the oppositions, conflicts and contradictions in contemporary society, and seeks to be emancipatory i.e. it should help to eliminate the causes of alienation and domination.*

(Myers 1997, p. 5)

**Methods and Techniques**

Data gathering methods include surveying, workshops and focus groups. Associated techniques include questionnaires, semi-structured interviews and participant observation. The triangulated epistemologies, incorporating a suite of qualitative methods and associated techniques used to research both TNAU and UC Davis, are organised in Table 3.1.

<table>
<thead>
<tr>
<th>Epistemology</th>
<th>Research Method</th>
<th>Data Gathering Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positivist Research</td>
<td>Survey</td>
<td>TNAU &amp; UC Davis, Gaines Inventory (Questionnaire)</td>
</tr>
<tr>
<td>Interpretive Research</td>
<td>Survey</td>
<td>Farmer/student/staff, relationship (Questionnaire)</td>
</tr>
<tr>
<td>Critical Research</td>
<td>Workshop</td>
<td>Staff ‘Self Employment Workshop’</td>
</tr>
<tr>
<td></td>
<td>Experiential Engagement</td>
<td>Participant observations</td>
</tr>
</tbody>
</table>

**Table 3.1: TNAU & UC Davis, Research Structure.**

**Reviewing Related Research Techniques and Instruments**

The following discussion draws heavily upon Kuh, Gonyea & Rodriguez’s (2002) work in outlining studies relating to student learning and development from the 1930s to current times. According to Kuh et al. (2002), research into the university or college experience, with regards to student development began with studies involving both enrolled students (Jones 1938; McConnell 1934 and Pressy 1946) and alumni (Havemann & West 1952 and Newcomb 1943) in the 1930s. Researching broader aspects of student learning development such as their attitudes to authoritarianism, motivation to learn and general interests occurred from the 1960s. Chickering (1969) suggests that of the three instruments used in these studies:
The Omnibus Personality Inventory (OPI),
• The California Psychological Inventory, and
• The Minnesota Multiphasic Personality Inventory (studies of student development).

The OPI became the most frequently used.

The 1960s also saw an increase in the use of student and graduate interviews as opposed to questionnaires, as the preferred research format. Researchers became interested in the actual process of student learning development in terms of the impact of the college experience on student ‘coming of age’ ‘growth’ and ‘change’, cause and effect. Kuh et al. (2002), suggests that these 6 publications in conjunction with the increased prominence of the UCLA Student Research programme (Astin 1977, 1993) incited this growth in student learning development research.

• ‘Changing Values in College’ (Jacob 1957)
• ‘The American College’ (Sanford 1962),
• ‘The Impact of College on Students’ (Feldman and Newcomb 1969),
• ‘Education and Identity’ (Chickering 1969),
• ‘No Time for Youth’ (Katz and Korn 1968), and
• ‘Growing up in College’ (Heath 1968).

Kuh (ibid.) suggests that one of the results of this heightened research interest, was the formulation of four student developmental theories or models. These development theories formed the conceptual framework for future research instruments and understanding (Kuh & Stage 1992; Rodgers 1989; Widick, Knfelkamp & Parker 1980).

The four theories or models are:
1. Psychosocial Theories.
2. Cognitive-Structural Theories.
3. Person-Environment Interaction Theories.
4. Typology models.

1. Psychosocial Theories

Psychosocial theories focus on how students manage personal growth challenges in their struggle for personal identity. Chickering’s (1969) suggests that each student should master a series of individual character development components such as:

1. Confidence.
2. Emotions.
3. Autonomy.
4. Identity.
5. Interpersonal relationships.
6. Purpose.
7. Integrity.

Hood (1986) developed, in conjunction with several post graduate students, ‘The Iowa Student Development Inventories’ that collectively measure all but one (developing integrity) of Chickering’s vectors. Sue & Sue’s (1990) ‘Minority Identity Development Model’ and Cross, Strauss & Flagen-Smith’s (1999) ‘Cross’s Model of Psychosocial Nigrescence’ have extended the racial boundary of the research to include minority Black and Latino students.

2. Cognitive-Structural Theories
Cognitive-Structural Theories relate to the individual’s intellectual and ethical development. It is about their ability to construct meaning from their reality and develop personal ‘ways of knowing’. It is also about their capacity for making meaningful judgements and for managing complexity. Kuh (ibid.) suggests that the theorists who have contributed to this framework are: Perry (1970), King & Kitchener (1994), Baxter Magolda (1992), Kohlberg (1981), Gilligan (1982) and Fowler (1981). Questionnaires have been developed that assist with the measurement of cognitive development. Black and Latino minorities have been accommodated through suitable adjustment of questionnaires by Atkinson, Morten & Sue (1993), Banks (1993) and Shaw (2000).

3. Person-Environment Interaction Theories
According to Strange & Banning (2001) the person-environment interaction theories relate to the optimising of student performance based on their compatibility with the institutional environment. There is a sense that these theories are not directly related to researching student development, they are focused more on helping to explain the performances in appealing and unappealing institutional setting. Student ‘best fit and satisfaction’ (Kuh 2002) research has been conducted by Pascarella & Terenzini (1991) ‘student satisfaction and retention’ by Astin (1977), Bean (1986), Bean & Bradley (1986), Pascarella & Terenzini (1991) and Tinto (1993). Other related research includes:

• Moos's social ecological approach (Moos 1979, Moos & Brownstein 1977, Moos & Insel 1974).

Other instruments for researching the educational environment are:

• The University Residence Environment scale (Moos & Gerst 1976).
• The Classroom Environment Scale (Moos & Trickett 1976).
4. Typology Models

Typology Models are not designed to describe student development. Their purpose is to categorise similar and different individuals according to how they ‘manage and cope with common developmental collegial setting tasks’. Like the person-environment instruments, these models indirectly portray development by attempting to ‘predict performance under various circumstances’. Typology Model inventories have been developed by Myers (1997), Myers & Myers (1995), Ballou et al. (1999) and Boyatzis & Kolb (1991).

Kuh, Hu & Vesper (2000) identified 8 groups of undergraduate performances some of which are listed below. Another typology is to identify indicators of levels of engagement that can ‘predict desired learning and personal development outcomes’. Kuh (2001a) suggest such indicators as:
- Studying.
- Reading.
- Writing.
- Interacting with peers from diverse backgrounds.
- Discussing ideas from classes and readings with faculty members.

Banta & Associates (1993) and Ewell & Jones (1996) suggest that high performance in these indicators, presage ‘high levels of student learning and personal development’. Associated with student performance is research into what supports this learning and personal development.

Chickering & Gamson (1997) assert that there are ‘seven good educational practices’ some of which are:
- setting high expectations,
- providing prompt feedback, and
- developing student-centred learning environments.

The Education Commission of the States (1995) support these practices but add one more practice:
- creating a learner-centred culture.

Kuh et al (2002) supports the approach of assessing both the student and the institution associated with their behaviours, as the results can indicate immediate improvements to their education. These ideas are underpinned by a number of conceptual frameworks including:
- ‘The theory of involvement’ (Astin 1984),
- ‘The quality of effort’ (Pace 1982), and the

Kuh et al (2002) lists several instruments that focus on assessing student engagement:
- College Student Experiences Questionnaire (Pace & Kuh 1998),
- The College Student Report (Kuh 1999), and
- UCLA’s College Student Survey.
Bawden & Macadam (1990) report program changes at Hawkebury Agricultural College towards a more student centred curriculum and more client centred research. More recent research relating to student development and curriculum design has been published by Peat, Taylor & Franklin (2005) who focused on undergraduate professional attribute development in first year students by introducing work experience into the curriculum. Sahli (Ed. 2006) presents a series of papers that focus on bridging the gap between theory and practice. Bernstein, Marx & Bender (2005) suggest that graduates need deeper and more learning and skilling to support their professional lives after content-based knowledge has become outmoded and obsolete. They (ibid) argue that courses that produce such graduates have prepared them for engagement with the world. Kotrlik & Burnett (Eds. 2001) present an array of educational research in the proceedings of the 28th Annual National Agricultural Education Research Conference. Of particular interest is using conceptual and theoretical frameworks to structure agricultural education and the use of learning communities.

The Thesis Research Instruments

Three research instruments were selected that involved the collection of both quantitative and qualitative data:

1. The Student and Staff, Curriculum Questionnaire (The Gainen Inventory).
2. The TNAU Staff ‘Self Employment’ Workshop.
3. The Staff/Student/Farmer Relationship Questionnaire.

By critiquing the literature it was reasonable to assume that the application of these research instruments would provide suitable data for reviewing undergraduate curricula in the case studies. The subsequent analysis of the review would assist a proposed curriculum schema development process later in this thesis.

1. The Student and Staff, Curriculum Questionnaire

I chose the ‘Inventory of Learning Preference’ (Gainen 1987, in Woods, D 1994, pp. 1-7, Table 1-3,) as a curriculum questionnaire for the students and the staff. This was a multiple choice questionnaire consisting of eight questions each with four alternative answers A, B, C, D. This was a very useful questionnaire as it not only provided a suitable range of curriculum structure and function themes but also had a number of embedded or built-in analytical devices. One important device was Perry’s (1970) work on ‘Intellectual and Ethical Development’. Gainen ‘built’ Perry’s generalisations into the range of responses A, B, C, D.

**Gainen Inventory Structure (See Appendix 1)**

The Gainen Inventory questions were numbered 1-8. Each question had four alternatives, signified by the letters A, B, C, D.
Gainen Inventory of Learning Preference, Questionnaire themes:

1. The purpose of the instruction.
2. Who decides what topics are covered?
3. Who decides what instructional methods are used?
4. The degree of complexity in the content organisation?
5. The approach taken in analysing and critiquing the topic.
6. The choice of mode of pedagogy or educative process.
7. The purpose and method of assessment.
8. What students are required to do in order to succeed.

Respondents were required to choose the; A, B, C, D, options twice for each of the 8 questions.
Firstly, selecting the option that best described the current curriculum; secondly, selecting the option that best described their preferred curriculum. Respondents would signify their current curriculum selection by circling the letter and then signify their preferred curriculum selection by slashing the letter. Current and preferred could be the same selection.
The student and staff’s current and preferred ‘A’, ‘B’, ‘C’ and ‘D’ responses were tallied, converted into a percentage and graphed for each campus and across all campuses and across both institutions. The responses for question 1 to question 8 were also tallied and converted into a percentage and then displayed as a series of graphs so that various trends could be interpreted.

**Gainen Category A Approach to Curriculum Design Précis (after Gainen 1987)**

This is a précis of the entire A responses for all eight questions as a description of the ‘Category A’ curriculum. In the ‘Category A’ curriculum staff select and use a unified, single, standardised approach in conveying facts, concepts, skills and/or procedures within a staff-determined set of topics, from a single text book to all students. Staff teach using formal lectures; sometimes incorporating examples and visual aids with possible time for questions. The taught material is assessed by multiple choice or short answer objective examinations. In order to succeed students should learn important facts, skills, procedures and/or concepts that have been taught.

**Gainen Category B Approach to Curriculum Design, Précis (after Gainen 1987)**

This is a précis of all of the B responses for all 8 questions as a description of the ‘Category B’ curriculum. In the ‘Category B’ curriculum design staff focus on sharing and clarifying ideas, experiences and/or opinions covering two or three themes or perspectives relating to topics they have selected. Staff members vary the instructional options with each topic and students have some choice with these options. Staff teach using lecture and discussion and students can express their opinion. Taught material is assessed by examination however student opinion is assessed through short assignments. In order to succeed students should fully understand two or more theoretical perspectives.
Gainen Category C Approach to Curriculum Design, Précis (after Gainen 1987)
This is a précis of all of the C responses for all 8 questions as a description of the ‘Category C’ curriculum. In the ‘Category C’ curriculum design staff members select topics and instructional methods in consultation with students in order to reflect their preferred learning modes. Staff explain theories and/or issues and systematically compare and contrast various perspectives in order to identify their strengths and weaknesses. Through discussion or exercises students and staff explore conceptual relationships and implications. Assignments and/or examination assess the depth to which students have pursued an aspect of the subject. In order to succeed students should demonstrate their ability to compare, contrast, analyse and evaluate a range of theories or methodologies or issues or use course concepts to solve unfamiliar problems.

Gainen Category D Approach to Curriculum Design, Précis (after Gainen 1987)
This is a précis of all of the D responses for all 8 questions as a description of the ‘Category D’ curriculum. In the ‘Category D’ curriculum design staff members assist students in choosing topics that reflect the student’s interest. Staff facilitate the development of the student’s ability to analyse and evaluate theories and/or issues in order for them to develop their own perspectives. Students supported by staff solve problems or deal with issues ‘in the field’ by applying and synthesising course concepts. Students are assessed on their capacity to demonstrate their application and synthesis of course materials. In order to succeed students should integrate concepts and perspectives from the course in demonstrating their capacity to present arguments for a position, innovate or design a system, or develop a new approach to a problem in the field.

Critique of The Gainen Inventory Curriculum Questionnaire
My research needs went beyond the limitations of the two questionnaires. The questionnaires in their present form contained the kinds of questions I wanted to ask. The questionnaires also had the depth and variety of alternatives that were relevant to my research, (given the cross-cultural, time and communication constraints). The inventories if used as the originators intended were excellent in ascertaining the students’ and staff’s description of their preferred or ideal learning environment. However I was most interested in how the current curriculum and learning environment compared with the students’ and the staff’s preferred curriculum and learning environment. In other words what changes if any would the students and staff make to the curriculum if given the chance? This information would not only indicate if there was a general potential for curriculum change but also identify the change components of that preferred curriculum. Four themes in the Gainen questionnaire design - Q.1-Instruction, Q.5 & 6 -Instructors and Q.7-Grades, could cause some confusion in the current versus preferred responses. Instruction, instructors and grades may not be seen as consistent in a preferred curriculum yet there is no alternative in the question design.
I made a point of this and declared this limitation in the questionnaire design to the staff and student respondents when outlining the how to approach answering the questionnaire. The question also asks the respondent if they ‘prefer’ which may cause some confusion when they are asked to describe the current then their preferred curriculum. I drew attention to these possible confounding issues in my opening instructions and confirmed with the sample groups their comprehension of how to approach the questionnaire according to the research needs.

**Lower order attitudes in Curriculum Design, Delivery and Assessment**

Lower order attitudes to curriculum tend to correlate to an educational environment that could be described as didactic, teacher centred, requires right and wrong answers, is recall or rote or surface learning in expectation and mode, assessed by examination and relies on an authority or expert to decide on the content (Ryan & Martens 1989, Marton & Saljo 1976b, Chickering & Ehrmann 1997, Bloom 1956). This would represent a more traditional curriculum where the teacher is the source of knowledge and the administrator of learning activities; and the student is an obedient, compliant, conforming, disciplined, unquestioning, passive, recipient of the teacher’s information, activities and the learning management routines.

**Higher order attitudes in Curriculum Design, Delivery and Assessment**

Higher order attitudes to curriculum tend to correlate with an educational environment that could be described as ‘active’ (Ryan & Martens 1989, Chickering & Ehrmann 1997); experiential, applied or engaged, student / learner centred, requiring generated contextually relative answers to complex problems, transformative or producing ‘deep learning’ (Marton & Saljo 1976a) leading to capacity building. Higher order thinking in student development is supported and guided by a facilitator who provides both positive and negative feedback. The learning is process focused in design and strategy and is based on engagement. The teacher is a mentor, guide or facilitator who believes that knowledge is contextual and who encourages students to create syntheses rather than compromises (Bloom 1956) and think systemically rather than systematically. The learning environment requires inter-disciplinary and trans-disciplinary approaches to problem solving. Higher order attitudes would represent a more ‘post modern’, constructivist curriculum where the student with the assistance of a mentor/facilitator, is the prime manager of learning activities. The learner is free to explore topics of their own choosing within a curriculum essentially designed by themselves, assisted with various staff. The staff become resources who support the student learning.

These higher and lower order attitudes to curricular design have resonance in the Gainen Inventory A, B, C, D, responses. In general lower order processes such as competitive attitudes to learning, competitive course engagement, surface as well as passive learning resulting in rote knowledge and comprehension relates well to the Gainen ‘A and B’ responses. Higher order processes such as transformative learning, collaborative course engagement, deep as-well-as active learning relate well to the Gainen C and D responses. There are many theories embedded in the questionnaire.
design that will be discussed in more depth and in relation to the research results and the research question in Chapters 6, 7 and 8.

2. The TNAU Staff ‘Self Employment’ Workshop

The workshop method used was ‘The Technology of Participation or ‘ToP process’ (Burbidge 1997, Spencer 1989). The workshop was also designed as a learning experience for both the facilitator and the participants. This method was selected in order to assemble, organise, record and present the thinking and opinions from a large number of people with diverse experience, knowledge, skills, attitudes and perceptions into a workable form without losing any individual’s contribution. It is also a method that can empower and emancipate.

*The Technology of Participation*

This model incorporates the Technology of Participation (ToP) process similar to a Dewey (1938) Learning Cycle. It provides structure for groups with a problematic situation to work it through to an improved state without necessarily solving the problem that would take much more time. The ‘ToP’ approach allows groups to contribute, manage and convert their ideas into action taking relatively quickly. Unlike other planning activities this process acknowledges the difficulty in just moving forward despite the impetus generated by an agreed goal or vision or mission.

The Technology of Participation strategically moves the group forward in an alternative way to just action planning towards a mission, by identifying and action planning to overcome the obstacles that prevent the mission being achieved. This is a much more ‘user friendly way to move a group forward. According to Spencer (1989), The ToP (ibid.) Strategic Planning process progresses through the following five Phases:

1. Map out the group's practical vision of the future.
2. Analyse the underlying contradictions preventing that vision from being realised.
3. Set the strategic directions to deal with the contradictions.
4. Decide specific actions to be accomplished.
5. Draw up an implementation action plan and timeline--the who-what-when-where-how.

*The Five Phases of the Self Employment Workshop*

There are five phases to this workshop design:

1. Move from Question to Mission Statement
2. Identifying the Obstacles to the Mission
3. Identifying Actions to Overcome the Roadblocks
4. Develop an Action Plan
5. Implement the Action Plan and Evaluate
Each of the phases is cyclic, sequential and iterative. Phase one was completed with staff from each campus during the first Hawkesbury staff visit in 1995. Phases two and three were completed during my second visit to all campuses. Phases four and five were not completed as part of this workshop. The Self Employment Workshop Method is Spiralling and Continuous. The methodology is a cycle of ‘find out, make sense, make a plan and take action’. As one takes action one becomes aware of new needs and begins the cycle again.

Theoretically the situation changes and should improve as the awareness of the participants increases and new needs are identified. The participants should also theoretically experience a formative change, challenge, or confirmation of their ideas by engaging in this cyclic process. The degree to which the individual formative process occurs in a workshop situation will depend on a number of factors like personal commitment, personal empowerment, number of participants, personal learning style, quality of venue, availability and quality of facilities, the demeanour manner and skills of the facilitator, available time, available resources, status of participants and quality of inputs; to name a few.

**PHASE ONE: Move from Question to Mission Statement**
Generate a provocative and universally applicable question that sets the focus, direction and impetus for the workshop. Drawing upon the participant’s individual and collective experiences, build their ideas into a collaboratively generated statement. This phase ‘maps out the group’s practical vision of the future’ (Burbidge 1997, Spencer 1989, # 1).

The workshop question that stimulates the generation of the mission statement by the participants, then becomes:

*‘How do we organise T.N.A.U. (Coimbatore, Forest College, Madurai, Periyakulam, Killikulam, Kuttapattu, Kumulur), for a significant increase in the self as well as private sector employment opportunities, of our graduates’*

**PHASE TWO: Identifying the Obstacles to the Mission**
By drawing upon the collective understanding and experience of the participants; identify then order or prioritise the obstacles or roadblocks to achieving the collaboratively generated mission. This phase helps to ‘Analyse the underlying contradictions preventing that vision from being realised.’ (Burbidge 1997, Spencer 1989, #2).

**PHASE THREE: Identifying Actions to Overcome the Roadblocks**
Utilising the collective experience of the participants, identifying activities which will deal with those roadblocks. In this phase the participants’ ‘Set the strategic directions to deal with the contradictions.’ (Burbidge 1997, Spencer 1989, # 3).
PHASE FOUR: Develop an Action Plan
Design a plan that will ensure the strategic application of the activities to overcome the roadblocks. ‘Decide specific actions to be accomplished. Draw up an implementation action plan and timeline—the who, what, when, where, how.” (Burbidge 1997, Spencer 1989, pp. 4-5).

PHASE FIVE: Implement the Action Plan and Evaluate
Identify and allocate personnel and material resources. Develop an assessment/evaluation strategy for the action plan. Evaluate the impact of the strategically planned activities on fulfilling the mission. Assimilate and incorporate the results of the evaluation to confirm the validity and appropriateness of the original mission or begin to develop a new or modified mission statement. Continue as a group, to experientially, learn your way through the future.

Image 3.1: Madurai Workshop.

*Members of the Madurai staff selecting, displaying and deciding their ideas in such a way that assimilation can occur without losing anyone’s ideas.*
Image 3.2: Periyakulam Workshop.

Members of the Periyakulam Staff collaboratively discussing, agreeing and recording their ideas in order to effectively display their group’s ideas to the whole workshop.

Image 3.3: Killikulam Workshop.

Members of the Killikulam staff selecting, displaying and deciding the roadblocks to achieving the mission. They are seen displaying their ideas in ‘like’ columns.
3. The Staff/Student/Farmer Relationship Questionnaire (See Appendix 2)

This was designed to gather information about the relationship between the university curriculum and the rural community. The survey was completed by staff and final year students from each campus except Kumulur. The survey was designed to provide information and opinions centring on the Village Stay Programme (VSP). Whilst it had a focus on the VSP, the information had a meta-connection with the undergraduate curriculum that produced and supported that programme. The survey assumed that the Village Stay Programme involved the following three ‘actors’:

- The student.
- The staff/university.
- The farmer/rural community/other agribusiness workers.

The Staff/Student/Farmer Relationship Questionnaire was designed as a series of integrated questions in a number of circular models. The students and staff were asked to consider the implications of the models and answer questions about them. The models began simply as three single circles, representing individually the ‘farmers’, ‘students’ and ‘staff’. Respondents were asked Q1. ‘Think about and record, the roles and activities for the 3 groups in figs. 1, 2, 3.’

The next phase was to partly overlap the three circles in pairs forming a partnership arrangement. The respondents were asked Q2. ‘Think about, then record, your ideas about what these groups in figs.4, 5, 6, can learn from each other.’

Questionnaire-Fig 4. The student and staff circles were partly overlapped. Questionnaire-Fig.5. The student and farmer circles were partly overlapped. Questionnaire-Fig.6. The farmer and staff circles were partly overlapped.

Respondents were then asked if these three groups presently interacted during the VSP, and to explain the nature of that relationship if any Q2.a. ‘In your opinion do these three groups presently interact during the village stay programme? Please explain.’. Respondents were asked to state their satisfaction with the present organisation of the VSP, and explain what they meant by their answer Q2.b. ‘Are you satisfied with the present organisation of the village stay programme? Please explain.’

The next phase was to partly overlap all three circles to form one triumvirate model. The boundary for contemplating the relationships formed by this new model was the VSP. In other words, imagine this model as a description of how the three ‘actors’ relate, or might relate to each other in the VSP. This model was described as an ‘Action Learning Organisation’; by this expression I tried to convey concepts about a partnership, alliance, coalition, or concord. I wanted the respondent to contemplate the strengths and weaknesses of this kind of thinking with the current situation. Attention was drawn to the area between two adjacent circles. This area was described as
a ‘Mutually Beneficial Relationship for Action Learning’. There were three of these regions representing a co-learning relationship between:

- the students and the farmers/other agri-industry workers,
- the students and the staff/TNAU resources, and
- the staff/TNAU resources and the farmers/other agri-industry workers.

Respondents were asked to judge whether this ‘Action Learning Organisation’ would be useful model in designing the VSP, and to explain their answer.

In the final question, the respondents were asked to give their opinion as to what they thought was produced in the region in the model that is created where all three circles overlapped.

Image 3.4: Forest College Students.

The Staff/Student/Farmer, Relationship Questionnaire Design Theory

I drew upon theoretical frameworks such as Neuro-Linguistic Programming (O’Connor & Seymour 1990); Strategic Questioning (Peavey & Hutchinson 1992) and Hemispherology (Grinder 1991, Meister & Vitale 1982) to generate the survey.

1. Neuro Linguistic Programming

Neuro-Linguistic Programming (NLP) is useful as a design process. Using NLP to design this survey allowed me to achieve two objectives at once:
i. Generate a successive pathway of thinking by building a revealing and clarifying illustration of concepts in the mind of the respondent. The concepts are designed to increase their complexity and sophistication by manageable and non-threatening increments, it may be possible for the respondent doing the survey to generate new ideas and formulate new attitudes about those ideas. NLP allows a researcher to inform and learn at the same time.

ii. Gather intuitive, tacit and incremental information rather than linear, pedestrian, prosaic, information. In the questionnaire, the models went from simple to complex, that is they began as single circles with simple concepts based on one theme, next came an intermediary stage consisting of partly overlapped circles involving more diverse concepts in three regions, and finally a complex model made up of three overlapped circles within a boundary, containing more sophisticated concepts in eight regions.

2. Strategic Questioning
I chose to make my questions strategic (Peavey & Hutchinson 1992) in order to extend the capacity of the question to force the calibre, vigour and potency of the answer. I wanted the questions to provoke well beyond a simple yes/no answer. To do this, the choice of words and the sentence construction is extremely important. I had experienced some language gaps between myself and the staff and students, so I tried to word the survey as sensitively yet as comprehensively as possible.

Whilst the ‘vocabularic’ connectedness presented some problems, the main challenge in designing a strategic question is in building it’s structure and volition. Theoretically the question should be constructed so as to reveal attitudes and conjecture, not just obsequious replies. A well-constructed strategic question, by its very nature, should be able to cause the respondent to question their own attitudes; either confirming, changing and or challenging them. In other words, strategic questions may probe deeper into ideas about what ‘ought to be’ rather than ‘what is happening already’. I believed that by having very general questions at the beginning of the survey, ‘what do these people do?’, the respondent could open their thinking more easily. The questions became more focussed as the survey unfolded.

The last question asks ‘in your opinion what is ‘produced’ in area (a) in the model?’, not ‘what happens there?’, or ‘what does this area represent?’. I wanted this question to challenge the respondent to mentally combine the actors in a plausible real world situation. By using the word ‘produced’ I wanted the respondents to go beyond description and on to assimilation or even synthesis (Bloom 1956).
3. Hemispherology

According to Grinder (1991) humans have two brains, or our brains behave as two. The hemispheres have been found to have distinct roles. The theory of hemispherology recognizes that the function of the brain’s right hemisphere, or right brain, is to deal with creative or abstract concepts, whilst the function of the left hemisphere, or left brain, is to deal with logical, or more ‘concrete’ issues. In designing the survey I tried to combine pictures or graphics to cater for the right brain preference and words as strategic questions to suit the left-brain preference.

In combining pictures or models and words, I tried to generate a deep understanding of the issues pertaining to the survey. It is from this premise that I tried to evoke a deeper attitudinal response from the respondents. A possible synergy between the left and right brain is created when the answers are required to be written inside the pictures. If I had time and resources, instead of a circle representing the staff, I might have drawn the outline of a person standing in academic clothing, or for the farmer, the outline of a person on a tractor. The open silhouette would provide the boundary in which the answer would be written, and in so doing, the shape should concentrate and provoke thought about that answer.

Conclusion

The purpose of this chapter is to outline the thesis research process. The venues for gathering data were The Tamil Nadu Agricultural University and The University of California at Davis although UC Davis was viewed as more of a control or benchmark against which TNAU student data could be compared. By incorporating a suitable methodology appropriate methods and techniques it should be possible to accumulate data that could assist in answering the research question;

“What are the conceptual framework design properties for an undergraduate, agricultural, core curriculum that is grounded in community?”

The research methodology is designed to allow for the assimilation of primary and secondary research data into a ‘rich picture’ of the situation that will eventually provide a set of guiding principles or properties for designing a core curriculum conceptual framework. The primary data-gathering framework was the Case Study whereby three epistemologies (positivist, interpretive and critical) were triangulated in order to assimilate the results.

The methods were surveying, a workshop and experiential engagement; whilst the data gathering techniques were questionnaires and participant observation. Each of the research instruments was described and discussed including their inherent supporting theories. Three instruments were used to gather primary data:

2. Farmer/Student/Staff Relationship Questionnaire.
3. Staff ‘Self Employment Workshop’.
Research data relating to the research question emerging from this process will be applied in the design of a conceptual framework for an undergraduate core curriculum in agriculture. Chapter 4 will outline the research process application including dates, numbers of respondents, overall results and related explanatory discussion.
CHAPTER 4
THE RESEARCH RESULTS

Introduction

Primary research was conducted with staff, students and farmers related to two venues, The Tamil Nadu Agricultural University and The University of California at Davis. The primary research process focuses on gathering data in order to assist with answering the following research question:

‘What are the conceptual framework design properties for an undergraduate agricultural, core curriculum that is grounded in community?’

Three instruments were used across both venues (7 TNAU Campuses and UC Davis) and with a number of groups. The following table shows the research groups.

Table 4.1: The Research Instruments and Groups.

<table>
<thead>
<tr>
<th>INSTRUMENT</th>
<th>VENUE LOCALE</th>
<th>RESPONDENTS</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gainen Inventory (after Gainen1987)</td>
<td>TNAU Campuses</td>
<td>Staff</td>
<td>104</td>
</tr>
<tr>
<td>Gainen Inventory (after Gainen1987)</td>
<td>TNAU Campuses</td>
<td>Senior Students</td>
<td>117</td>
</tr>
<tr>
<td>Gainen Inventory (after Gainen1987)</td>
<td>UC Davis</td>
<td>First Year Students</td>
<td>87</td>
</tr>
<tr>
<td>‘The Self Employment Workshop’</td>
<td>TNAU Campuses</td>
<td>Staff</td>
<td>121</td>
</tr>
<tr>
<td>Farmer/student/staff, relationship Questionnaire</td>
<td>TNAU Campuses</td>
<td>Staff</td>
<td>91</td>
</tr>
<tr>
<td>Farmer/student/staff, relationship Questionnaire</td>
<td>TNAU Campuses (except Kuttapattu)</td>
<td>Senior Students</td>
<td>94</td>
</tr>
</tbody>
</table>
1. The Gainen Inventory TNAU Staff, TNAU Students and UC Davis Student

Tamil Nadu Agricultural University staff and students as well as students from the University of California at Davis, were surveyed about their current and preferred undergraduate curriculum using the Gainen ‘Inventory of Learning Preference’ (Gainen 1987). The Gainen Inventory has eight questions each with four alternatives—A, B, C, D. The respondents were asked to consider and select one of the four alternatives for each of the eight questions twice. Firstly their descriptions of the current undergraduate curriculum and secondly their selection describing their preferred undergraduate curriculum. The following groups participated in this questionnaire:

Table 4.2: Gainen Inventory Survey Details.

<table>
<thead>
<tr>
<th>INSTITUTION</th>
<th>CAMPUS</th>
<th>DATE SURVEYED</th>
<th>NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TNAU</td>
<td>Madurai</td>
<td>8/8/95</td>
<td>40</td>
</tr>
<tr>
<td>TNAU</td>
<td>Periyakulam</td>
<td>14/8/95</td>
<td>11</td>
</tr>
<tr>
<td>TNAU</td>
<td>Killikulam</td>
<td>23/8/95</td>
<td>17</td>
</tr>
<tr>
<td>TNAU</td>
<td>Kumulur</td>
<td>31/8/95</td>
<td>11</td>
</tr>
<tr>
<td>TNAU</td>
<td>Coimbatore</td>
<td>6/9/95</td>
<td>17</td>
</tr>
<tr>
<td>TNAU</td>
<td>Forest College</td>
<td>9/9/95</td>
<td>8</td>
</tr>
<tr>
<td>TOTAL TNAU STAFF</td>
<td></td>
<td></td>
<td>104</td>
</tr>
<tr>
<td>TNAU</td>
<td>Forest College</td>
<td>5/8/95</td>
<td>17</td>
</tr>
<tr>
<td>TNAU</td>
<td>Madurai</td>
<td>11/8/95</td>
<td>23</td>
</tr>
<tr>
<td>TNAU</td>
<td>Periyakulam</td>
<td>14/8/95</td>
<td>15</td>
</tr>
<tr>
<td>TNAU</td>
<td>Killikulam</td>
<td>23/8/95</td>
<td>7</td>
</tr>
<tr>
<td>TNAU</td>
<td>Coimbatore</td>
<td>6/9/95</td>
<td>17</td>
</tr>
<tr>
<td>TNAU</td>
<td>Kuttapattu</td>
<td>28/8/95</td>
<td>11</td>
</tr>
<tr>
<td>TNAU</td>
<td>Kumulur</td>
<td>31/8/95</td>
<td>27</td>
</tr>
<tr>
<td>TOTAL TNAU STUDENTS</td>
<td></td>
<td></td>
<td>117</td>
</tr>
<tr>
<td>UNIVERSITY OF CALIFORNIA</td>
<td>U.C. Davis</td>
<td>9/1/96</td>
<td>87</td>
</tr>
<tr>
<td>16/1/96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL UC DAVIS STUDENTS</td>
<td></td>
<td></td>
<td>87</td>
</tr>
<tr>
<td>TOTAL STAFF AND STUDENT PARTICIPANTS</td>
<td></td>
<td></td>
<td>308</td>
</tr>
</tbody>
</table>

Table 4.2 lists the institutions, campuses, survey dates, the sample groups and their numbers. The results of the Gainen Inventory administered in this way are presented as both tables and graphs with explanations and discussions according to the following arrangements:

- A, B, C, D, current and A, B, C, D, preferred responses and current to preferred, change magnitude trends. (Percentages are rounded).
- The A, B, C, D, change magnitude trends—current to preferred curriculum, for each of the 8 Gainen Inventory Questions. (Percentages are rounded).
Table 4.3: Gainen Inventory Q1-8, Current and Preferred A, B, C, D, Raw Scores.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
<th>Q6</th>
<th>Q7</th>
<th>Q8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GAINEN CATEGORY A SCORES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TNAU Staff Current</td>
<td>74</td>
<td>59</td>
<td>78</td>
<td>58</td>
<td>66</td>
<td>68</td>
<td>40</td>
<td>79</td>
</tr>
<tr>
<td>TNAU Stud Current</td>
<td>74</td>
<td>47</td>
<td>107</td>
<td>62</td>
<td>81</td>
<td>95</td>
<td>46</td>
<td>90</td>
</tr>
<tr>
<td>UC Davis Current</td>
<td>45</td>
<td>6</td>
<td>77</td>
<td>16</td>
<td>23</td>
<td>52</td>
<td>25</td>
<td>52</td>
</tr>
<tr>
<td>TNAU Staff Preferred</td>
<td>26</td>
<td>11</td>
<td>11</td>
<td>14</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>TNAU Stud Preferred</td>
<td>15</td>
<td>2</td>
<td>2</td>
<td>14</td>
<td>1</td>
<td>4</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>UC Davis Preferred</td>
<td>13</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>10</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td><strong>GAINEN CATEGORY B SCORES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TNAU Staff Current</td>
<td>7</td>
<td>34</td>
<td>19</td>
<td>27</td>
<td>21</td>
<td>29</td>
<td>49</td>
<td>9</td>
</tr>
<tr>
<td>TNAU Stud Current</td>
<td>4</td>
<td>67</td>
<td>7</td>
<td>22</td>
<td>22</td>
<td>13</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>UC Davis Current</td>
<td>5</td>
<td>77</td>
<td>10</td>
<td>30</td>
<td>21</td>
<td>28</td>
<td>22</td>
<td>2</td>
</tr>
<tr>
<td>TNAU Staff Preferred</td>
<td>64</td>
<td>15</td>
<td>33</td>
<td>17</td>
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<td>6</td>
</tr>
<tr>
<td>TNAU Stud Preferred</td>
<td>96</td>
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<td>31</td>
<td>23</td>
<td>7</td>
<td>44</td>
<td>52</td>
<td>3</td>
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<tr>
<td>UC Davis Preferred</td>
<td>35</td>
<td>7</td>
<td>44</td>
<td>6</td>
<td>10</td>
<td>39</td>
<td>37</td>
<td>1</td>
</tr>
<tr>
<td><strong>GAINEN CATEGORY C SCORES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TNAU Staff Current</td>
<td>23</td>
<td>8</td>
<td>6</td>
<td>17</td>
<td>10</td>
<td>3</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>TNAU Stud Current</td>
<td>36</td>
<td>3</td>
<td>2</td>
<td>32</td>
<td>9</td>
<td>3</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>UC Davis Current</td>
<td>27</td>
<td>4</td>
<td>0</td>
<td>39</td>
<td>32</td>
<td>1</td>
<td>18</td>
<td>29</td>
</tr>
<tr>
<td>TNAU Staff Preferred</td>
<td>9</td>
<td>40</td>
<td>45</td>
<td>52</td>
<td>26</td>
<td>21</td>
<td>24</td>
<td>35</td>
</tr>
<tr>
<td>TNAU Stud Preferred</td>
<td>1</td>
<td>45</td>
<td>54</td>
<td>48</td>
<td>18</td>
<td>18</td>
<td>26</td>
<td>29</td>
</tr>
<tr>
<td>UC Davis Preferred</td>
<td>14</td>
<td>60</td>
<td>32</td>
<td>70</td>
<td>31</td>
<td>13</td>
<td>28</td>
<td>34</td>
</tr>
<tr>
<td><strong>GAINEN CATEGORY D SCORES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TNAU Staff Current</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>4</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>TNAU Stud Current</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>34</td>
<td>4</td>
</tr>
<tr>
<td>UC Davis Current</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>11</td>
<td>6</td>
<td>22</td>
<td>4</td>
</tr>
<tr>
<td>TNAU Staff Preferred</td>
<td>5</td>
<td>38</td>
<td>15</td>
<td>21</td>
<td>60</td>
<td>41</td>
<td>52</td>
<td>54</td>
</tr>
<tr>
<td>TNAU Stud Preferred</td>
<td>5</td>
<td>65</td>
<td>30</td>
<td>32</td>
<td>91</td>
<td>51</td>
<td>26</td>
<td>79</td>
</tr>
<tr>
<td>UC Davis Preferred</td>
<td>25</td>
<td>19</td>
<td>8</td>
<td>9</td>
<td>46</td>
<td>25</td>
<td>17</td>
<td>43</td>
</tr>
</tbody>
</table>
Table 4.3 presents all of the Gainen Inventory Q1-8 A, B, C, D, scores for TNAU staff and student as well as UC Davis Student respondents. These scores were the genesis of the other tables and graphs throughout this chapter.

Table 4.4: All Staff and Student Current Curriculum Data.

<table>
<thead>
<tr>
<th></th>
<th>A Score</th>
<th>B Score</th>
<th>C Score</th>
<th>D Score</th>
<th>Respondents</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>TNAU Staff</td>
<td>522</td>
<td>195</td>
<td>88</td>
<td>27</td>
<td>TNAU Staff</td>
<td>832</td>
</tr>
<tr>
<td>TNAU Students</td>
<td>601</td>
<td>167</td>
<td>115</td>
<td>53</td>
<td>TNAU Students</td>
<td>936</td>
</tr>
<tr>
<td>UC Davis Students</td>
<td>297</td>
<td>193</td>
<td>150</td>
<td>56</td>
<td>UC Davis Students</td>
<td>696</td>
</tr>
</tbody>
</table>

Table 4.4 presents the TNAU Staff and Students’ and UC Davis Students’ current curriculum data as scores and percentages.

Fig. 4.1: Staff and Students Current Curriculum Trends Graph.

* 99.98% not 100% due to rounding to 2 decimal places.
Discussion
The staff and students’ description of the current curriculum indicates a dominance of the ‘A’ and ‘B’ curriculum alternatives and a dearth of the ‘C & D’ alternatives. TNAU Staff ‘A & B’ alternatives representing 86% and their ‘C & D’ alternatives representing 14% of their choices, TNAU students’ ‘A & B’ alternatives representing 82% and their ‘C & D’ alternatives representing 18% of their choices. The UC Davis students trends seem to be less severe with their ‘A & B’ alternatives representing 70% of their choices and their ‘C & D’ alternatives representing 30% of their choices. There is a strong declining trend from the ‘A’ alternative to the ‘D’ alternative. The UC Davis students seem to suggest that there is more emphasis placed on the ‘B’, ‘C’ and ‘D’ alternatives in their current curriculum, than both the TNAU staff and students. However there is a slight suggestion that the TNAU students have placed a higher emphasis on the ‘C’ & ‘D’ alternatives than the staff.

Table 4.5: All Staff and Student Preferred Curriculum Data.

<table>
<thead>
<tr>
<th>A Score</th>
<th>B Score</th>
<th>C Score</th>
<th>D Score</th>
<th>Respondents</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>214</td>
<td>252</td>
<td>286</td>
<td>TNAU Staff</td>
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<tr>
<td>57</td>
<td>258</td>
<td>243</td>
<td>378</td>
<td>TNAU Students</td>
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</tr>
<tr>
<td>43</td>
<td>182</td>
<td>278</td>
<td>193</td>
<td>UC Davis Students</td>
<td>696</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A %</th>
<th>B %</th>
<th>C %</th>
<th>D %</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.61</td>
<td>25.72</td>
<td>30.28</td>
<td>34.37</td>
</tr>
<tr>
<td>6.08</td>
<td>27.56</td>
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</tr>
<tr>
<td>6.17</td>
<td>26.15</td>
<td>39.94</td>
<td>27.72</td>
</tr>
</tbody>
</table>

*Table 4.5 presents the Staff and Students’ preferred curriculum data as scores and percentages for the Gainen Categories A, B, C, D.*

*99.98% not 100% due to rounding to 2 decimal places.*
Discussion

The Staff and students’ description of their preferred curriculum indicates a minor emphasis on the ‘A’ curriculum alternative and a reasonably uniform predilection for the Category ‘B, C, & D’ curriculum alternatives. TNAU Staff ‘A & B’ alternative choices represent approximately 35% and their ‘C & D’ alternatives represent approximately 64% of their choices. TNAU students’ ‘A & B’ alternatives represent approximately 34% and their ‘C & D’ alternatives represent approximately 66% of their choices. The UC Davis students’ ‘A & B’ alternatives represent approximately 32% of their choices and their ‘C & D’ alternatives represent approximately 68% of their choices. There is a strong inclining trend from the ‘A alternative through to the ‘D’ alternative. The UC Davis students seem to suggest that there is more emphasis placed on the ‘C’ alternative in their current curriculum than both the TNAU staff and students. However there is a slight suggestion that the TNAU students have placed a higher emphasis on the ‘D’ alternative (40%) than the UC Davis students (28%) and the TNAU staff (34%).
Table 4.6: All Staff and Students Gainen Inventory Change Trends.

<table>
<thead>
<tr>
<th>GAINEN INVENTORY STAFF AND STUDENTS CHANGE TRENDS</th>
<th>A %</th>
<th>B %</th>
<th>C %</th>
<th>D %</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
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<td>34.72</td>
<td></td>
</tr>
<tr>
<td>UC Davis Students</td>
<td>-36.5</td>
<td>-1.6</td>
<td>18.5</td>
<td>19.6</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.6 presents the staff and students’ current to preferred curriculum change percentages for the Gainen Categories A, B, C, D.

Fig. 4.3: Staff and Students Current to Preferred Curriculum Change Trends graph.

Discussion

All staff and students are reasonably uniform in their dissatisfaction with the Category ‘A’ alternatives in the current curriculum and their desire to have less of them in the preferred curriculum. The Category ‘B’ alternative seems to be less defined with a marginal 2% change preferred by TNAU staff, a 10% change by TNAU students and almost a 2% dissatisfaction by the UC Davis students.

There seems to be widespread support however, for the ‘C & D’ alternatives in the preferred curriculum with staff combined ‘C’& ‘D’ support of 51%, TNAU students’ combined support of 48% and UC Davis combined ‘C’& ‘D’ category students’ support of 38% in their respective preferred curricula. This compared with the ‘A’& ‘D’ combined disapproval by TNAU Staff of 51%, TNAU Students disapproval of 48% and UC Davis disapproval of 38%.
<table>
<thead>
<tr>
<th>ALL STAFF, ALL STUDENTS CURRENT TO PREFERRED % CURRICULUM CHANGE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Respondent</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAINEN CATEGORY A % CHANGE</td>
<td>-46.15</td>
<td>-45.96</td>
<td>-64.43</td>
<td>-42.3</td>
<td>-58.66</td>
<td>-64.42</td>
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<td>-28.2</td>
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<td></td>
<td>-36.78</td>
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<td>-48.28</td>
<td>-22.99</td>
<td>-49.43</td>
<td>UC D. Stud</td>
</tr>
<tr>
<td>GAINEN CATEGORY B % CHANGE</td>
<td>54.8</td>
<td>-18.27</td>
<td>13.47</td>
<td>-9.62</td>
<td>-7.69</td>
<td>11.54</td>
<td>-23.08</td>
<td>-2.89</td>
<td>TNAU Staff</td>
</tr>
<tr>
<td></td>
<td>78.64</td>
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<td>20.51</td>
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<td>26.49</td>
<td>29.06</td>
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</tr>
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<td></td>
<td>34.48</td>
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<td>12.64</td>
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<td>1.15</td>
<td>UC D. Stud</td>
</tr>
<tr>
<td>GAINEN CATEGORY C % CHANGE</td>
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<td>37.5</td>
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<td>12.82</td>
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<td>TNAU Stud</td>
</tr>
<tr>
<td></td>
<td>-14.94</td>
<td>64.37</td>
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<td>35.63</td>
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<td>13.8</td>
<td>11.5</td>
<td>5.75</td>
<td>UC D. Stud</td>
</tr>
<tr>
<td>GAINEN CATEGORY D % CHANGE</td>
<td>4.8</td>
<td>33.65</td>
<td>13.46</td>
<td>18.27</td>
<td>50.96</td>
<td>35.58</td>
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<td></td>
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<tr>
<td></td>
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<td>21.84</td>
<td>-5.74</td>
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<td>UC D. Stud</td>
</tr>
</tbody>
</table>

Table 4.7: Staff and Students’ Gainen Inventory Data Q1. A, B, C, D, Responses to Q8. A, B, C, D, Responses.

Table 4.7 presents the TNAU Staff, TNAU Students’ and UC Davis Students’ current to preferred curriculum change percentages for the Gainen Categories A, B, C, D, across all eight questions. The negative values represent disapproval, diminished support for, or a desire for a reduction in type or intensity of those components in the respondents’ preferred curriculum. The positive values represent approval, amplified support for, or an increase in type or intensity of those components in the respondents’ preferred curriculum.
Discussion

The combined staff and students' current to preferred curriculum change trends graph reveals an overall steady incline from the ‘A’ curriculum alternatives to the ‘D’ alternatives. The ‘A’ alternatives are generally negative, the ‘B’ alternatives are a mixture of negative and positive the ‘C’ alternatives are generally positive and the ‘D’ alternatives are solidly positive excepting one component. The general nature of the trend inclining from ‘A’ to ‘D’ is consistent, with a few anomalies.
Fig. 4.5: Comparison of Individual Staff and Student Group Change Trends.

Figure 4.5., represents the individual staff and student change trends from both Universities.
Staff and Student Change Trends Discussion

*Category A, Questions 1–8: Results Discussion*

- **TNAU Staff**
  TNAU Staff have shown substantial disapproval with the ‘A’ curriculum alternatives, as every one of them is negative with the lower four responses (Q. 1A, 2A, 4A, 7A) indicating a range, between 35% and 46% with an average of 42%, reduction and the upper four responses (Q. 3A, 5A, 6A, 8A) indicate a higher range, between 59% and 67% with an average of 63%, reduction from the staffs’ current to preferred curriculum.

- **TNAU Students**
  Like the staff, the TNAU Students have shown a very substantial disapproval with the ‘A’ Category alternatives, as every one of them is negative however their responses are more pronounced than the staff. Students’ lower four responses (Q. 1A, 7A, 2A, 4A,) range between 28% and 50% with an average of 40%, whilst the upper four responses (Q. 5A, 8A, 6A, 3A) range between 68% and 89% with an average of 77%. This would indicate a strong reduction of these components in the TNAU students’ preferred curriculum.

- **UC Davis Students**
  The UC Davis’ Students have also shown a similar trend of disapproval of the category ‘A’ curriculum components to that of the TNAU Staff and students, however they are not as pronounced, excepting in question 3A in which they disapproved more than the TNAU students. The UC Davis students’ lower four responses (Q. 2A, 4A, 7A, 5A,) range between 6% and 26% with an average of 18% whilst the upper four responses (Q. 1A, 6A, 8A, 3A) range between 37% and 85% with an average of 55%. This would indicate a strong reduction of these components in the TNAU students’ preferred curriculum.

*Category A Results—General Observations*

Clearly, the staff and student groups describe the current curriculum as being driven by this style of teaching and learning. The overwhelming collective opinion is a desire to have less of these components in their preferred curriculum. In every question the ‘A’ alternative was less popular in the majority of staff and students’ preferred curriculum. The largest disapproval focussed on four responses 3A (-64%, -89%, -85%, *Instructional methods for each topic selected by the instructor and used by each student?), 5A (-59%, -68%, -26%, *Stick close to the most widely-accepted view of the subject?), 6A (-64%, -78%, -48%, *Formal lectures, using examples and visual aids whenever possible; or lectures with time for questions?) and 8A, (-67%, -72%, -49%, *Learn important facts, skills, procedures and/or concepts*).
These results suggest that both staff and students are subject to the same instructional methods that these methods were limited to lecture, visual aids and occasional questions and the entire reason for this instruction is for students to learn standardised facts, procedures and concepts. The success of the student is gauged on their ability to recall the information distributed by the instructor. There is a sense that this interaction is one way—that the students are not consulted about the teaching and learning environment, and that both teacher and student are passive actors in a drama that has been written and directed by some body else. In other words, they are passive receptacles in a mechanical system that requires rote processes in response and does not recognise them as individual learners. The staff suggest that they are harnessed to an educational system they do not value.

**Category B, Questions 1–8: Results Discussion**

- **TNAU Staff**
  The staffs’ ‘B’ alternatives are a mixture indicating an increase of some alternatives (Q. 1B, 3B, 6B) ranging from 13% to 55% with an average of 27% and a decrease of others (Q. 2B, 4B, 5B, 7B, 8B) ranging from 3% to 23% with an average of 12%. Question 1B shows a substantial approval (55%) whilst Q. 2B and Q. 7B, show significant disapproval or 18% and 23% respectively in the preferred curriculum.

- **TNAU Students**
  The TNAU Students’ category ‘B’ change trends are similar to the staffs’, with some anomalies. There is a mixture of increases in some alternatives (Q. 1B, 3B, 4B, 6B, 7B) indicating a range between 1% and 79% with an average of 31% and decreases in others (Q. 2B, 5B, 8B) showing a range between 8% and 53% with an average of 24.5%. Again the response to Question 1B shows substantial support with an increase of 79% in the TNAU students’ preferred curriculum. Question 2B has a substantial decrease in approval, plummeting 53% in the students’ preferred curriculum.

- **UC Davis Students**
  The UC Davis students’ category ‘B’ trends presents a similar mixture of approval and disapproval to that of the TNAU Staff and students, however questions 2B and 4B show a more pronounced disapproval than both of the other groups responses. There is a mixture of increases in some alternatives (Q. 1B, 3B, 6B, 7B, 8B) indicating a range between 1% and 39% with an average of 21% and decreases in others (Q. 2B, 4B, 5B) showing a range between 13% and 80% with an average of 40%. The response to Question 1B shows strong support with an increase of 34% in the UC Davis students’ preferred curriculum. Question 2B has a substantial decrease in approval, plunging 80% in approval from the students’ current to their preferred curriculum.
Category B Results—General Observations

The ‘B’ alternatives trends show a mixed response from staff and students. Some curriculum components are favoured or by all three groups and others by just one or two. Some are universally rejected and others by just one or two. The two responses that attracted universal disapproval are 2B, (-18%, -53%, -80%, Topics selected according to the instructor’s preference) and 5B (-8%, -13%, -13%, Give equal treatment to a variety of perspectives, emphasising that they are all equally valid and important?). Component 7B (-23%, A mix or objective examinations and short assignments in which students express their own opinions on the subject?) was singularly rejected by staff.

The three responses that attracted universal approval are 1B (55%, 79%, 34%, Sharing of clarifying ideas, experiences and/or opinions), 3B (13%, 21%, 39%, A variety of instructional options for each topic (e.g. individualised instruction, media-supported instruction, research papers, group work); students can select the approach they prefer) and 6B (12%, 26%, 13%, A mix of lecture and discussion with opportunities for students to express their opinions?). Response 8B (Fully understand two or more theoretical perspective) was disapproved by both TNAU staff and students yet supported by UC Davis students. Alternative 4B (The course covers two or three themes or perspectives on the topic) was rejected by TNAU staff and UC Davis students, yet supported by TNAU students.

Staff and students preferred sharing and clarifying ideas and opinions, using a variety of instructional methods giving students choice about the approach, and a mixture of lecture and discussion where students are invited to formulate and give their opinion. Alternative 7B presents somewhat of a dilemma in that staff want students to express their opinion, yet not in exams. It may be that they are separating the two issues; that of examinations and an interactive relationship with students. It might simply be a case of disliking the chore of setting, marking, grading, and reporting on assignments and exams.

Students want to be able to develop and express their own opinions. They want to be able to contribute to the choice of what is studied and the nature of the instructional methods used. They seem to suggest that they are not particularly interested in just learning about standardised perspectives on a limited number of topics. They are more interested in pursuing some aspect of the course in depth.
Category C, Questions 1–8: Results Discussion

- TNAU Staff

Excepting for Question 1C, all Category ‘C’ alternatives for staff are positive; indicating their increased support in the preferred curriculum. Question 1C has decreased in approval by 13%. Some category ‘C’ alternatives (Q. 2C, 3C, 4C) indicate a range of between 31% and 37.5%, whilst 8C has a 24% increase in the staffs’ preferred curriculum. The average increase in support by staff for the ‘C’ components is 24%.

- TNAU Students

The students’ category ‘C’ change trends are very similar to the staffs’. Again question 1C has decreased in approval but by 30% for the TNAU students substantially more that the staff. All other questions increased in approval ranging from 6% to 45% with an average of 36%, indicating a predilection for ‘C’ components in the students’ preferred curriculum.

- UC Davis Students

The UC Davis students’ category ‘C’ change trends are very similar to the staffs’. Again, question 1C has decreased in approval, but by 15%; slightly more that the TNAU students, but less than the staff. All other questions increased in approval, except question 5C, which decreased in popularity by 1%. Question 2C increased by 64%; almost the aggregate of the TNAU staff and students. The general increases ranged from 6% to 64%; with an average of 28%; indicating a predilection for ‘C’ components in the UC Davis students’ preferred curriculum.

Category C Results—General Observations

The ‘C’ alternative trends in this category reveal a desire by staff for collaboration with students to create a joint teaching and learning environment. Six of the eight alternatives have attracted universal support from both staff and students. The only alternative that has been universally rejected by staff and students is 1C (-13%, -30%, -15%, Explaining theories and/or issues). Alternative 5C (-1%, Compare various perspectives systematically to identify their strengths and weaknesses), seems to have decreased in support in the UC Davis students’ preferred curriculum.

Staff and students are making a statement about their desire for variety of inputs, processes and outputs in the teaching and learning environments. They wish to have less emphasis on just explaining theories and issues and more emphasis on developing skills to explore the strengths, weaknesses and relationships within and between, mutually interesting concepts and situations.

The students are making a statement about their desire for variety of inputs, processes and outputs in the teaching and learning environment. They wish to have less emphasis on just explaining theories and issues and more emphasis on developing skills to critically explore with staff the strengths, weaknesses and relationships within and between, mutually interesting concepts and situations.
Category D, Questions 1–8: Results Discussion

- **TNAU Staff**
  All of the staff’s ‘D’ category change responses are positive ranging from 5% to 18% (Q. 1D, 3D, 4D) in the lower ranges and from 34% to 51% (Q. 2D, 5D, 6D, 7D, 8D) in the upper range of responses. Staff strongly favoured 7D at 46% in their preferred curriculum, this went against both student groups who disapproved of this component and decreased their support by 7% and 6% respectively. This indicates that the staff have a predilection for ‘D’ category alternatives in their preferred curriculum.

- **TNAU Students**
  The students’ category ‘D’ change trend is similar to those of the staff in that all questions received increased support with one exception question 7D decreased in support by 7%. The increased support for the ‘D’ components ranged from 1% to 73% with an average of 41%. This indicates that the students’ have a predilection for ‘D’ category alternatives in their preferred curriculum.

- **UC Davis Students**
  The students’ category ‘D’ change trend is similar to those of the TNAU staff and students’ in that all questions received increased support with one exception question 7D, which decreased in support by 6%. The trend is generally lower than the TNAU staff and students except for question 1D in which the UC Davis students’ response was significantly increased (17.24% as opposed to 4.8% and 1.17%) The students’ increased support for the ‘D’ components ranged from 8% to 45% with an average of 23%. This indicates that the students’ have a predilection for ‘D’ category alternatives in their preferred curriculum.

Category D Results—General Observations

The ‘D’ alternative trends reveal a desire by staff for freedom to meaningfully explore their world with students in a way which is mutually beneficial. Seven of the eight alternatives have attracted universal support. The student and their individual learning development is emerging as the educational priority as confirmed by alternatives 2D (34%, 56%, 23%, Topics chosen by students to reflect their interests), 5D (Show their students how to analyse the material so they can arrive at their own perspectives on the topic) and 3D (37.5%, 45%, 37%, Instructional methods proposed and implemented by the students and supervised by the instructor).

Responses such as 6D (36%, 38%, 22%, Exercises or activities that require students to use course material to address problems or issues in the field), seem to suggest a significant predilection for not only applying course concepts in challenging and engaging, problem solving scenarios or improvement projects in the field, but also generating individual and unprecedented approaches to innovation. Responses to alternative 8D (Formulate and present arguments for a position or design a system, or develop a new approach to a problem in the field, integrating concepts and
perspectives from the course) show universal support by staff (46%) and both student groups (64% and 45%).

The response to alternative 7D (Assignments or exams that require students to synthesise material from the course) was supported by staff (46%) yet not supported by both student respondents (-7% and -6%).

Gainen Inventory Conclusion

Staff and students were in agreement about the need to change from a system which requires students to learn facts, skills, procedures and/or concepts as a measure of success. They differed somewhat in their opinion as to what constitutes a measure of success. The staff felt that students should be able to critically analyse a situation using a variety of methodologies, students also favoured this but not as much as staff. The workshop results support the Gainen Inventory results trend and provide some guidance and direction for curriculum development.

The UC Davis students’ results varied slightly from the TNAU results; however, the trends were very similar—the differences were in degree. One explanation of this difference could be that the UC Davis Students were juniors and the TNAU students were seniors. Another influence may have been the ‘East/West’ cultural differences. I chose to include the UC Davis results as a quasi-control. In other words, were the trends in an Indian University similar to those in an American University?

2. ‘The Self Employment Workshop’

The Self Employment Workshops emerged from a desire by the TNAU leadership to help their graduates become ‘job seekers’ and ‘job creators’. The vocational environment in India at that time was rapidly moving away from the security of Public Service employment of graduates towards private enterprise employment. The TNAU leadership realised that the curriculum was designed for an age that was passing and it had to change. For my purposes it was necessary to gain another perspective and generate data in order to accommodate the research question. Researching with the staff about their approach to the university/agri-industry nexus would be essential for identifying properties of a curriculum that was grounded in community. The workshops were designed around four main themes:

1. Helping staff clarify and generate feasible and achievable solutions as they collaboratively work through a problematic situation.
2. Present a collective decision making process.
3. Facilitate staff through a collaborative workshop process.
4. Help the staff appreciate facilitation as an educative process.
Table 4.8: The Self Employment Workshop Details.

<table>
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<th>DATE</th>
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<th>NUMBERS INVOLVED</th>
</tr>
</thead>
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<td>Actions Stage</td>
<td>40</td>
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<tr>
<td>Periyakulum</td>
<td>14/8/95</td>
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<td>11</td>
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<tr>
<td>Kilikulam</td>
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<td>Kumulur</td>
<td>31/8/95</td>
<td>Actions Stage</td>
<td>11</td>
</tr>
<tr>
<td>Kuttapattu</td>
<td>1/9/95</td>
<td>Actions Stage</td>
<td>17</td>
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<tr>
<td>Coimbatore</td>
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<td>9/9/95</td>
<td>Actions Stage</td>
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</tbody>
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TOTAL STAFF WORKSHOP PARTICIPANTS 121

Table 4.8 lists the institutions, campuses, workshop dates, the sample groups, the stage of completion in the workshop process and the participant numbers. There are three main Self Employment Workshop results:

A. The Mission Statements.
B. The Roadblocks to achieving the missions.
C. The Actions to overcome the roadblocks.

These results will be presented as: tables, explanations and discussions.

A. The Campus Mission Statements

Developing a mission statement is a focussing process. In the workshop method according to Spencer (1989), generating a Mission Statement is the first in a line of stages in the ‘The ToP’ (Technology of Participation) Strategic Planning process. The steps are as follows:

1. Map out the group's practical vision of the future (Mission Statement).
2. Analyse the underlying contradictions preventing that vision from being realised.
3. Set the strategic directions to deal with the contradictions.
4. Decide specific actions to be accomplished.

Groups can generate a mission statement by concentrating on answering a focussing question. In the case pf the Self Employment Workshop the question was:

‘How do we organise T.N.A.U. (Coimbatore, Forest College, Madurai, Periyakulum, Killikulam, Kuttapattu, Kumulur) for a significant increase in the self, as well as private sector employment opportunities of our graduates’
Generating the Mission Statements

Mission statement generating ideas for each workshop, incorporated some of the following ideas. We need to establish and understand the magnitude of the gap between our current curriculum and that required by the workplace. In order to do this we need to establish a database and survey employers and other relevant agri-industry employers, entrepreneurs and recent graduates in order to identify the required qualities, competencies, knowledge, skills and attitudes of contemporary and future TNAU Graduates. We should respond to the survey and design a curriculum that requires students to develop an aptitude during their course. Local, state and national government, and semi-government bodies should be involved in policy formation about modifications to the course.

The university should invest time and money in the vocational training of staff and students in agri-finance, agri-commerce, small business management and accounting and international trade apart from general agricultural production and productivity. Each faculty and department should then re-examine their philosophy, mission, structure, ‘modus operandi’ and resources for providing employment opportunities for graduates and make adjustments where necessary in response to the curriculum changes.

**Table 4.9: The Individual Campus Mission Statements.**

<table>
<thead>
<tr>
<th>CAMPUS</th>
<th>MISSION STATEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madurai Mission Statement</td>
<td>Guided by industry and institutional feedback and improving ‘HR’ (Human Resource Development) and infrastructure we revamp the present curriculum towards a dynamic vocational education system.</td>
</tr>
<tr>
<td>Periyakulum Mission Statement</td>
<td>By establishing a two-way connection between the campus and agro-industries we can reorientate the existing curriculum towards the self employment training needs of the students, through including specialised courses offered by resource persons or specialists.</td>
</tr>
<tr>
<td>Killikulam Mission Statement</td>
<td>By identifying the self and public sector employment opportunities we could make suitable modifications in the curriculum and infra structures as well as developing two way linkage between university and agro industry (production to consumption). This should help to foster career interest and aptitude of students which would culminate in appropriate staff and student training programs.</td>
</tr>
<tr>
<td>Kumulur Mission Statement</td>
<td>An industry uni tie up <em>mutual benefit, mutual need, mutual involvement, mutual commitment, partnership, nexus, interaction, relationship, connection,</em> will identify career opportunities that will inform curriculum orientation and development. This will inform and improve understanding and motivation of staff and students.</td>
</tr>
<tr>
<td>Kuttapattu Mission Statement</td>
<td>Assessment and reorientation of facilities, opportunities towards generation of employment for agricultural graduates.</td>
</tr>
<tr>
<td>Coimbatore Mission Statement</td>
<td>Based on surveys and feedback of industry as well as students about the present system we can reorientate the curriculum and infra-structure as well as train students and staff to fulfill their vocational needs.</td>
</tr>
<tr>
<td>Forest College Mission Statement</td>
<td>Through survey feedback of employment potential and opening a two way link with essential government, private as well as financial institutions, we can make our curriculum more vocational than it currently is.</td>
</tr>
</tbody>
</table>
The Seven Campus Assimilated Mission Statements

"Guided by feedback from industry, current students and graduates, we should establish mutually beneficial industry partnerships, improve staff development, campus resources and infrastructure, in order to reorientate the curriculum towards a dynamic vocational education system."

B. The Roadblocks to Achieving the Mission

The ROADBLOCKS to achieving the missions for each campus are listed in Tables: 4.10, 4.11, 4.12, 4.13, 4.14, and 4.15.

C. The Actions to Overcome the Roadblocks

According to Spencer (1989), identifying the roadblocks to achieving the mission and designing ways to overcome the roadblocks, are the second and third stages in the ‘The ToP’ (Technology of Participation) Strategic Planning process. The following tables summarise the results of the second and third stages of the workshop. In the ACTIONS TO OVERCOME THE ROADBLOCKS column the actions are numbered, these represent the prioritised ideas from each workshop sub-group.
# Table 4.10: Madurai Roadblocks and the Actions

<table>
<thead>
<tr>
<th>MADURAI CAMPUS WORKSHOP ROADBLOCKS AND REMEDIAL ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ROADBLOCKS</strong></td>
</tr>
</tbody>
</table>
| Problems on creation of ‘feedback network’ | 1. Closer tie-up between university and industry  
2. Viable export-oriented avenues in agriculture to be identified  
3. Establishment of Agricultural Technology Park  
4. Central Research Institutions, implementing agencies cooperation  
1. Agro industries/TNAU Student Employment Conference  
2. Governmental agencies, banks and private sector organisations opinions should be gathered  
3. Opinions from Dept. Agriculture should be gathered  
1. training students to assess the problems  
2. Gaining confidence of farmers and industrialists that TNAU will solve their problems |
| Financial support & infrastructure | 1. Unconditional financial support by the industries  
2. Adequate finance from the Govt  
3. Centralisation of available infrastructure  
4. Milking the NRI-COWS  
1. Cataloguing the sources of finance  
2. Encouraging the person oriented projects through freedom of work  
3. Patenting the technology  
4. provision of suitable working atmosphere to the scientists  
1. Agro Industries sector, state government, and private agencies should assist with the revised syllabus financially as graduates will be employees  
2. Central government agencies should be brainwashed to support this at least as an ‘experimental measure’  
3. Equipment necessary for the revised curriculum should be provided with liberal financial support of all government & non government agencies. |
| Issues on ‘Human Resource Development’ and personnel policy of the uni | 1. Frequent in-service training to staff members  
2. Main emphasis on field of specialisation  
3. Exchange of scientists at National and International level.  
4. Freedom of work  
1. Identifying the areas of training  
2. Recruiting required training specialists  
3. Deputing our scientists to suitable Institutions to get training  
4. Provide a suitable personnel policy so that trained person is utilised in an effective manner.  
5. To revise the workload norm of staff  
1. Staff should be encouraged to develop Professionalism (area of speciality)  
2. Adequate training for identified staffs  
3. Accountability of the Professionals  
4. Transfer threat should not exist |
| Curriculum designing | 1. Design personal development courses and incorporate them at the beginning (to build up self confidence)  
2. Include understanding the basics of agriculture without subject duplication  
3. Practical experience & problem solving capabilities to impart analytical skills  
4. Problem identification and science at work (project approach)  
1. Academic freedom and consensus produced following thorough discussion  
2. Flexibility should be there to change the design if the need arises  
4. Workload for both teachers and students should be the prime criteria while designing the curriculum  
1. More emphasis on practical training  
2. Number of courses to be reduced  
3. Intensive coaching on students’ field of specialisation  
4. Offering courses to student’s desires |
### Table 4.10 (Cont.)

<table>
<thead>
<tr>
<th>MADURAI CAMPUS WORKSHOP ROADBLOCKS AND REMEDIAL ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ROADBLOCKS</strong></td>
</tr>
<tr>
<td>Student’s inadequate motivation</td>
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<td></td>
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<tr>
<td></td>
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<tr>
<td>Final Statements from the Madurai group.</td>
</tr>
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<td></td>
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</table>

### Table 4.11: Periyakulam Roadblocks and the Actions.

<table>
<thead>
<tr>
<th>PERIYAKULAM CAMPUS WORKSHOP ROADBLOCKS AND REMEDIAL ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ROADBLOCKS</strong></td>
</tr>
<tr>
<td>Lack of influence over the curriculum (syllabus) in order to suit students’ needs</td>
</tr>
<tr>
<td>Inadequate trained personnel to instruct and conduct management/enterprise and commercial classes problems with the inter campus transfer system</td>
</tr>
<tr>
<td>Staff training in financial management trade economics business management</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Lack of specialised facilities for enterprise training classes</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Campus/agro-industry connection for curriculum design and real world experience</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Table 4.12: Killikulam Roadblocks and the Actions.

<table>
<thead>
<tr>
<th>KILLIKULAM CAMPUS WORKSHOP ROADBLOCKS AND REMEDIAL ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROADBLOCKS</td>
</tr>
</tbody>
</table>
| Identifying self employment opportunities and two way linkage | 1. Survey to identify potential areas/fields that favour self employment  
2. Assess the cost benefit ratio and viability of the self employment unit  
3. Periodical discussions between uni and agro-industries to monitor and to develop the existing conditions (twice a year)  
1. Motivate students to gather information from newspapers, magazines, tv, radio  
2. Contact government departments private firms  
3. Discussion with entrepreneurs  
4. Presenting successful case studies  
1. Develop mutual commitment  
2. In built problem solving  
3. Ensure mutual benefit  
1. Conducting survey  
2. Organising orientation programmes with industry |
| Commercially based curriculum changes | 1. Students should be given industrial oriented project work  
2. Exercises on the preparation of commercially oriented project proposals  
1. Survey need (in curriculum change environment?)  
2. Identify available solution (imagine, design, postulate?)  
3. Evaluate the present curriculum  
4. (initiate) appropriate change  
5. Pilot study effectiveness (related to change)  
1. Understanding the requirements of agro-industries  
2. Studying the potentials and problems of commercial agriculture  
3. Discussion with people experienced in commercial agriculture?  
1. Based on survey commercial courses can be designed  
2. Consult agro-industry personnel to formulate curriculum syllabus |
| Lack of appropriate staff training | 1. Needs based training to the staff  
2. Deputing the staffs to the successful commercial units  
3. Developing infra structural facilities for training  
1. Identification of specialists in each area  
2. Exchange of views  
3. Deputation of staff to gain practical training  
1. Determine training needs  
2. (Obtain, identify?) Resources—persons institutions  
3. Finalise course outline  
4. (Formalise, design, initiate?) Training methods, duration  
5. Provide facilities  
6. Ensure effectiveness  
1. Recruiting staff having experiences in teaching agri-business  
2. Providing training to the selected staff |
| Instability due to policies of government and uni leading to lack of finance for change | 1. Long term policies (concerning university issues?) Should be stable (a sense of higher education autonomy?) Irrespective of government change  
2. Science and education should not be politicised.  
1. More finance focus to university  
1. Freedom for innovative ideas  
2. Independence for action  
3. Monetary recognition and reward  
1. Representation  
2. Alternative funding agencies  
5. (construct an) outreach directory of village stay programme. |
Table 4.12 (Cont.)

<table>
<thead>
<tr>
<th>ROADBLOCKS</th>
<th>ACTIONS TO OVERCOME THE ROADBLOCK</th>
</tr>
</thead>
</table>
| Lack of self confidence among students | 1. Arranging meetings with successful entrepreneurs  
2. Encouragement—fellowship  
3. Imparting more practical oriented learning  
1. Provide work experience  
2. Promote diagnostic (analytical?) Skill  
3. Inculcate problem solving ability  
4. Ensure financial gain  
1. Motivate students by outlining self employment’s contribution to society  
2. Interaction with successful entrepreneurs  
1. Deputing the students to the courses, subjects, projects, activities of their interest |

Table 4.13: Kumulur Roadblocks and the Actions.

<table>
<thead>
<tr>
<th>ROADBLOCKS</th>
<th>ACTIONS TO OVERCOME THE ROADBLOCK</th>
</tr>
</thead>
</table>
| Lack of university/industry connection | 1. Creation of rapport with industry and improving the awareness (of each others activities, roles, opportunities for mutual benefit perhaps?)  
2. Formation of an alumni association  
3. Organisation of conferences and workshops with funding by external agencies university to provide facilities and infra structure  
1. Establish the university/industry connection  
2. Maintain the university/industry connection  
1. Create a coordinating cell (on each campus?)  
2. Support, lobby for?, suggest?, the enacting of legislation which will formalise the nexus between universities and industry. (at this time agriculture and its related fields are no formally considered an industry yet figure well in the all india hindu annual report for the performance of industry)  
| Poor university leadership lack of mission, direction and vision | 1. Kick off bad leaders  
1. Training on administrative, financial and (human resource?) Management to be imparted to staff at different level  
1. Selection based on merit and experience  
2. (improved?) Training  
3. Decentralisation (of leadership, decision making, power?) |
| Lack of financial, physical management and quality not quantity human resource management - sincerity | 1. Budgeting at local levels  
2. Right man for the right job  
3. Periodical review of progress  
1. Industrial tie up established (to supply funds?)  
2. Suggest that grants by industry/donors should be exempted from income tax  
1. (establish, identify, join with?) External agencies  
2. Insist the leadership to prioritise things |
| Lack of encouragement & incentives for teaching and all levels staff & students | 1. Nil - we can only console each other  
1. Teachers should be recognised during promotion  
2. In service training may be imparted to upgrade the knowledge  
3. Workload (rights, roles, responsibilities?) Should be spelt out  
1. (devise and establish a culture of?) (financial academic other?) Incentives for outstanding contributions  
2. (instigate?) A faculty improvement and exchange programme  
3. (establish workable?) Psychological motivation for students |
## Kuttipattu Campus Workshop Roadblocks and Remedial Actions

<table>
<thead>
<tr>
<th>ROADBLOCKS</th>
<th>ACTIONS TO OVERCOME THE ROADBLOCKS</th>
</tr>
</thead>
</table>
| Mindset on government not private employment | 1. Lack of motivation towards self employment than government jobs (both staff and students)  
2. Government jobs assured till late 80s: need for self employment doesn’t arise (mindset on government owes me a job!) |
| Direction and know how for curriculum change | 1. Non realisation of the issues in change of curriculum |
| Funding and infrastructure | 1. Political lack of funds—state government and general government  
2. Lack of financial assistance/minimum assistance extended from private industry  
3. Allocation of funds for change  
4. Administrative hurdles due to lack of interest on both sides i.e. TNAU and private industries |
| Lack of knowledge about agro-industry opportunities | 1. No survey leading to defective planning  
2. No detailed survey due to assured government jobs (depending)  
3. Financial hurdles in production and marketing of agro products |
| Staff enterprise training | (No actions presented) |

## Coimbatore Campus Workshop Roadblocks and Remedial Actions

<table>
<thead>
<tr>
<th>ROADBLOCKS</th>
<th>ACTIONS TO OVERCOME THE ROADBLOCKS</th>
</tr>
</thead>
</table>
| Soft systems problems - psychological problems, values, beliefs, customs, hierarchy, psychological constraints | 1. Open treatment to all categories of teachers  
2. Conduct workshops to open and improve issues  
3. Invite guest lecturers  
4. Group discussion of attitude change  
5. Task group to work on curriculum change  
6. Experience sharing with other agricultural universities  
7. Group discussion staff/student/farmer/industry/psychiatrist  
8. Senior staff realisation of needs |
| Teacher training | 1. Training for new systems  
2. Staff curriculum development  
3. Training in operating agri-business units  
4. Training in developing case studies  
5. Identification of exclusive teachers (expertise?, facilitation, teaching skill?)  
6. Arrange training programmes in local and abroad industry and institutions  
7. Frequent teaching seminar and workshops  
8. Permitting sabbatical leave |
| Better use of infra structure farm, research, teaching. | 1. Common facilities for instruments and analysis  
2. Centralisation of infra structure and facilities  
3. Free access for students to use/observe field, lab, computer, farm facilities  
4. Purchase teaching aides and train staff to use them  
5. (conduct a) stock take (of equipment, and then devise a system of efficient use)  
6. Pooling facilities  
7. Conditioning (upgrade?, maintenance?, familiarity?, skills training?) |
| Farm/industry connection communication relationship professional and personal | 1. Involving industries (in programme design?, curriculum design)  
2. Collection of needs (survey?, interview?, symposium?, conference?)  
3. Identify, develop relationship involve them in curriculum preparation, (and the training of students)  
4. Allow staff to move freely into industries (in order to earn?, to consult?, to advise)  
5. (Construct an) outreach directory of village stay programme |
Table 4.15: (Cont.)

| We are not connecting the curriculum to the workplace | 1. Involve progressive farmers, entrepreneurs, old students, for information on curriculum change (survey convocation, hold a convocation/institution/industry conference about reorientation of the curriculum) 
2. Tnau staff - industry 
3. Documentation unit 
4. Survey/contact old boys system 
5. Annual convention (involving uni/old boys/industry) 
6. Off camps demonstration, group workshop, with farmer and extension staff 
7. Man power advisory programme for feedback and study (survey curriculum viability i.e. its ability to produce viable graduates.) |

Table 4.16: Forest College Roadblocks and the Actions.

| FOREST COLLEGE CAMPUS WORKSHOP ROADBLOCKS AND REMEDIAL ACTIONS |
|---|---|
| ROADBLOCKS | ACTIONS TO OVERCOME THE ROADBLOCKS |
| Lack of student self confidence for self employment | 1. Promote commercial forestry 
2. Attitudinal change for self employment 
3. Educating financial institutions university/student prospects |
| Need to restructure syllabus to become more vocational | 1. Staff student ratio 
2. Out dated syllabus norms 
3. Restructure the education for skill improvement |
| Training of resource persons | 1. Limited practical exposure 
2. Lack of vocational training teachers and students 
3. Teachers to be trained for making students self employable |
| Reallocate funds and resources for new training needs | 1. Lack of facilities 
2. Resource crunch lack of support |
| Lack of forest industry campus link | 1. Linkage problems, university/industry/college/private sector |

Discussion: Roadblocks

Staff identified the following issues or roadblocks to achieving the mission of increasing the self and private sector employment opportunities of graduates. There seems to be a severe lack of esteem and confidence in staff about their ability to manage any vocationally orientated curriculum. The Staff were very negative about the university leadership’s lack of vision and ability to manage human resources. They complained about centralised power bases and a general lack of competence on the part of the university leadership. They freely admit that the current curriculum is not at all vocationally orientated but needs to change. Staff mentioned the Village Stay Programme suggesting that in its current format it is not vocational but it could be modified to serve as an outreach activity. There is very little if any, contact between the university and agri-industry other than through research. Lack of contact indicates that staff have very little idea about what happens in industry and private enterprise. Staff feel that the lack of understanding of employment opportunities is a major constraint to curriculum changes.
Staff regularly mention the need for training programmes and in-servicing in order that they build their competence as educators in entrepreneurial approaches, financial management and small business operations. There seemed to be an overwhelming admission that the individual values, beliefs, customs, hierarchies, psychological constraints and power bases are influenced heavily by internal and external political interference. There was a mention of ‘empire building’ as a constraint and that this was linked with the research process that ‘dominates all levels of university life’. Teaching is very low in the university hierarchy and attracts low priority with regards to funding for teacher/human resource development. The staff suggested that students generally lack confidence to engage in self-employment. There is a strong suggestion of isolationism and even competition between campuses and within campuses and between institutions. This isolationism and competition affects teaching quality in that ideas are very rarely exchanged at the teacher level.

Discussion: The Actions to Over Come the Roadblocks

Staff presented an extensive list of actions that they believed would overcome the roadblocks and assist with achieving their mission statements. There was however a thread of frustration winding through the workshop results because, despite the excitement of participating in the workshop resulting in an opportunity to imagine a better situation, a small group of staff believed that nothing could be done to change things. They believed this because of a number of reasons, including a lack of political will to change the status quo due to long term government policy relating to university structure and function. Universities are strictly governed and therefore lack a certain freedom and autonomy to make the kinds of changes advocated in this workshop. Another more pertinent reason for a lack of optimism is the entrenched mind-sets of members of the university leadership, the more conservative staff and students, and some members of the professions who believe that universities should not become vocational.

Those staff that believed that change should happen seemed to ignore or bypass the small group’s ‘pessimism’ and offered the following actions to overcome the roadblocks:

• Consult with staff, students, parents, farmers, industry, the professions, the wider community, graduates and all related government bodies about any curriculum change proposals.
• Survey industry, finance, public service, government agencies and NGO’s about the current and future knowledge, skill and attitudinal needs of TNAU Graduates.
• Establish and maintain ongoing mutually beneficial partnerships between the university the workplace and community.

Significant financial and resource investment should be made in the developing appropriate knowledge, skills and educational approaches for staff, that will support the agreed to curriculum changes. Strategies need to be developed that will address current, conservative and traditional mindsets of academics, university leadership and students. Students’ mindset is often calcified with the notion that the ‘government owes them a job’. Some staff believe that all they need to be
is an expert in their field and therefore have no interest in changing the curriculum. Many staff however conveyed strong messages about the leadership improving the overall status of teaching in the culture of the university and allocate appropriate resources, funding and eminence with regard to promotions. Workloads of both the staff and the students should be considered in the curriculum research, design and implementation phases. The staff/student ratio should be lowered. There should be increased flexibility for staff to change according to their interests and professional needs.

**Self-Employment Workshop Conclusion**

Generally Staff were very motivated by both the workshop process and the outcomes. They have a reasonable sense of their situation and that of the overall university culture, structure and function. There was a atmosphere of ambivalence in that many of the staff saw themselves as scientists and researchers not trainers or facilitators. Many of the younger staff realised that the workshop was an opportunity to rethink the purpose of the university and the courses and were enthusiastic about this. The outcomes of the workshop laid the foundation for future effective action in moving the courses more towards capacity building in the graduates. The workshop only progressed to the actions stage in each campus; however, it opened the issue considerably and gave structure to the subsequent planning and applications stages.

One of the most effective outcomes is the overwhelming predilection for evidence-based change. What has been proposed would be in my opinion a severe confrontation to the status quo however, public service employment opportunity is evaporating rapidly and commercial forces will increase their impact on the tertiary system to the point where TNAU may have no choice but to change their curriculum towards a vocational model in some form.

**3. The Farmer/Student/Staff Relationship Questionnaire Analysis and Discussion**

This questionnaire focuses on the Village Stay Programme (VSP). The VSP is an ‘Off Campus Experience’ for final year students. Like the name suggests, students actually leave campus for a period of a month and stay in a village. The programme has two main purposes:

1. For students to interact with local farmers in order to understand first hand, the agricultural production processes and
2. For students to advise and transfer production optimising technology to the farmer.

The programme is designed and managed by the Extension Staff on each campus. Groups of 5–8 students are formed into same gender groups and allocated to a farming district. They are billeted in research station hostels and each one is provided with a small stipend for food and expenses. The extension and research staff assigned to that district manages the student farmer interaction and to a certain extent, assist with student activities. Staff members are allocated to a number of these groups in an overseer role. They are expected to regularly visit their student groups in their
village accommodation in order to assist with the student reporting activities. Staff are also expected to regularly visit with students as they interact with farmers. Host farmers appear to be selected by the local extension and research staff and range from ‘progressive farmers’ to moderate production establishments.

TNAU Kumulur students have not yet engaged in the VSP because they are a new campus and the senior year is third year. Students participate in a week-long preparatory programme prior to the VSP commencement. Students are expected to complete a 32-page questionnaire during their month in the village. The questions all focus on the production systems that the students’ encounter with their host farmers and in the district in which the farms are located. Students are to complete a lengthy report following the conclusion of the VSP. The VSP is one component of a group of activities known as the Rural Agricultural Work Experience Programme (RAWEP) other activities include ‘Earn as You Learn’ and ‘Lab to Land’.

Tension exists because the university leadership view the VSP as an experiential process whereby students engage in the experience as learners. The extension staff and some general staff see the exercise as a culmination of the students’ course in which they are expected to apply their knowledge in the field. A proposal was made to increase the length of the VSP from 1 month to 3 months. Another suggestion was to move the whole programme from the final semester of the student’s course, to the beginning of their second year. The questionnaire was designed around four main themes:
1. Exploring the nature and degree of relationship between students, staff and farmers.
2. Exploring the notion of learning as an interactive process.
3. Determine the attitude to the VSP by staff and students.
4. Obtain feedback about the feasibility of a proposed VSP collaborative model.

Table 4.17: The Farmer/Staff/Student Relationship Questionnaire, Staff Respondent Details.

<table>
<thead>
<tr>
<th>STAFF RESPONDENTS</th>
<th>CAMPUS</th>
<th>DATE</th>
<th>STAGE ANALYSED</th>
<th>NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kuttapattu</td>
<td>1/9/95</td>
<td>Q. 1, 2a, 2b, 3, 4</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Madurai</td>
<td>8/8/95</td>
<td>Q. 1, 2a, 2b, 3, 4</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Coimbatore</td>
<td>6/9/95</td>
<td>Q. 1, 2a, 2b, 3, 4</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Forest College</td>
<td>9/9/95</td>
<td>Q. 1, 2a, 2b, 3, 4</td>
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<tr>
<td></td>
<td>Periyakulam</td>
<td>14/8/95</td>
<td>Q. 2a, 2b, 3, 4</td>
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<tr>
<td></td>
<td>Killikulam</td>
<td>23/8/95</td>
<td>Q. 2a, 2b, 3, 4</td>
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<tr>
<td></td>
<td>TOTAL STAFF QUESTIONNAIRE RESPONDENTS</td>
<td></td>
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<td>91</td>
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</table>
Table 4.18: The Farmer/Staff/Student Relationship Questionnaire, Student Respondent Details.

<table>
<thead>
<tr>
<th>STUDENT RESPONDENTS</th>
<th>CAMPUS</th>
<th>DATE</th>
<th>STAGE ANALYSED</th>
<th>NUMBERS</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Coimbatore</td>
<td>6/9/95</td>
<td>Q. 1, 2a, 2b, 3, 4</td>
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</tr>
<tr>
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<td>Madurai</td>
<td>8/8/95</td>
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<td>Killikulam</td>
<td>23/8/95</td>
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<tr>
<td>TOTAL STUDENT QUESTIONNAIRE RESPONDENTS</td>
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</table>

In Tables 4.17 and 4.18. Question 1 was only partly analysed in both the staff and student responses.

There are six main questionnaire results:

1. The staff and students’ perspectives of the roles and activities of the Staff, Students and Farmers.
2. Staff and students’ perspectives of the learning opportunities available between the Staff, Students and Farmers.
3. Q.2a. A staff and student poll and explanation of the level of interaction of the three groups during the VSP.
4. Q.2b. A staff and student poll and explanation of the level of satisfaction with the current VSP organisation.
5. A staff and student poll and explanation of the utility of the proposed model (3 overlapping circles) for designing the VSP.
6. The staff and students’ perception of what is produced in the emergent region created by the three overlapping circles.

These results will be presented as tables, graphs and discussions. Only result précis ‘winnowed along thematic and issue lines’ with relevance to the purpose, design, structure and function of the undergraduate curriculum, are presented. This is done in order to serve the needs of the research question.

Farmer/Staff/Student Relationship Questionnaire Results

1. The Roles and Activities of the Staff, Students and Farmers (Question 1)

This question establishes a basic perception by the staff and students of the other triumvirate (staff, student, farmer) members’ roles and activities. Results of this question could form a framework of relationship that can help explain other research results.
Q.1. Think about and record the roles and activities for the 3 groups below.

- TNAU staff, what do these people do?
- TNAU students, what do these people do?
- Tamil Nadu farmers, what do these people do?

**Staff Perception of Students and Farmers**

The TNAU staff propose that their main roles are reading, preparation and teaching, conducting research trials and publishing and broadcasting the results, engaging in extension and consultancy with farmers and manage the campus farms and administration work. In performing these roles staff run meetings and seminars, train departmental staff, deal with students’ personal problems, manage stock and stores and operate the VSP. Staff consider farmers primarily as agricultural producers. In order to optimise this, farmers should become ready recipients of university research and technology by attending training activities, field demonstrations and seminars.

Farmers are regarded as poorly educated and resist advice from the staff and Government field officers favouring collaborative learning with neighbours. VSP farmers serve to help students understand the practices and problems farmers’ face. Staff indicated that students’ attend lectures learn knowledge and skills about agricultural production by teacher’s theory, listening, reading and writing.

They also engage in extra curricular activities. Students’ visit farmers in order to know their problems, their cropping patterns and farming practices and also to learn and conduct needs based research. By interacting with village people students can learn their livelihood difficulties and potentials. Students learn many practical skills and farming techniques and are encouraged to develop new ideas.

**Students’ Perception of Staff and Farmers**

Students agree with staffs’ perception that staff members do teach but they do it generally by dictating notes with some lectures. They also assess by examination and assignment. They research new crop varieties and technologies that are designed to increase yield. They also publish their research findings. Students agree that staff engage in extension but rarely meet farmers. Students see farmers as the nations’ food producers. There is a polarising of opinion regarding the effectiveness of the staffs’ extension practices.

There are rich farmers who optimise production for profit and keep getting rich. The majority of farmers are marginal and poor farmers who grow food to survive and occasional cash crops, but have a poor understanding of marketing. Students are of the opinion that the majority of farmers don’t follow university advice and/or adopt new technology. Money drives the farmers’ thinking. Farmers are illiterate.
Students agree with the staff perception on the students, that they learn theoretical knowledge from teachers and indigenous knowledge from farmers. Their main role in the course however is to memorise notes, study to get through exams in order to get a good name and marks from the university. There is some emphasis on field training and practical classes however these are considered less important. One of the students’ roles is to transfer latest technologies to farmers. Students generally study the night before exams in order to comply with the requirements.

2. Learning Opportunities Between; Staff, Students and Farmers (Question 2)
This question can reveal the level of learning relationship between the three members of the VSP triumvirate.

Q.2. Think about, and then record, your ideas about what these groups can learn from each other?
- staff/students
- students/farmers
- staff/farmers

What Could Staff and Students Learn from Each Other?
Staff indicate that students can learn subject matter; innovations; practical knowledge, including research methods, and in some cases identify their area of interest from staff. Staff can learn about the standard of instruction, the level of education achieved, who are the weak students and the individual’s capabilities from a relationship with the students. The staff can also use the students as conduits to learn the farmers’ field problems, their socio-economic status and their difficulties.

Some staff admitted that they can learn nothing from students. Students suggest that they learn subject matter, approaches to interacting with farmers, current technologies, some job opportunities, skills and occasionally about their experiences from the staff. Students propose that staff can learn about students at a variety of levels such as, their problems, the psychology of the student, their weaknesses and their potential from students. Staff can also learn via student interaction and research, farmer related problems, and issues and needs from students. They can learn from students which educational approaches are effective and which are ineffective. Staff could learn new ideological thinking from students. Staff can also learn what areas of the curriculum are working and what needs changing from students. Several students suggested that staff could learn nothing from students. Students’ unanimously expressed a desire for staff to have a closer relationship with them and recognise their needs.

What Could the Student and Farmers Learn from Each Other?
Students’ suggest that they could gain a great deal by just experiencing the village and the farming situation and observing and interacting with the farmers and understanding their experiences. Some students expressed dissatisfaction with attitudes that do not solve the real problems of farmers such as reliable marketing systems, all weather roads and consistent power supplies.
There was a desire in some students for a process of mutually solving problems by exchanging ideas and approaches. Students generally believed that they could learn a range of things from the farmer including production knowledge and skills; indigenous/traditional technologies; the problems, difficulties and issues that farmers’ face; a range of attitudes and expectations expressed by farmers; as well as the psychological, socio-economic and sociological problems faced by farmers.

Students believed that by engaging in the farmers’ agricultural production situation they could learn about the marketing and price structures of their products. Some students suggested that they have limited contact with farmers. Most students indicated that farmers’ could learn modern cultivation technologies and scientific approaches to agricultural production from students through demonstrations and explanations. Farmers’ could be taught farming techniques by the students who could simultaneously practice their extension skills, transfer the staff/research scientists’ findings and transfer gleaned opportunities for research back to the staff.

**What Could the Staff and Farmers Learn from Each Other?**

Staff indicate that the farmers learn the latest technologies for optimising production from them. The farmers’ problems are solved not just directly by the staff through KVK activities, exhibitions, demonstrations and seminars, but often indirectly through extension advice given by the students. Staff rarely visit the village but they seem to believe that there is opportunity for mutual relationship and experience sharing however this is limited by the low contact between staff and farmers. Low numbers of farmers take up technologies advocated by staff. Only small numbers of progressive farmers follow staff and students’ advice.

Staff can learn why farmers do not follow the their advice and use this information to design more effective extension processes to overcome this situation. Staff are generally not inclined to learn from farmers but they do learn about their effectiveness and influence on farming practices in the form of needs based research. Staff can learn about social problems in the village and location specific practical problems and solutions ‘lab to land, land to lab’. It is the staffs’ view that the farmers’ status is improved by association. Staff, by visiting the village, learn more about the farmers socio-economic conditions and therefore the ability of the farmer to pay.

**3. Staff/Student/Farmer, VSP Interaction (Question 2a)**

This question helps to validate the results of the previous question about the roles of each member of the triumvirate . It focuses on the degree to which each of the groups actually interact during the one month VSP period. Staff are required to visit students regularly. Students are required to engage in the host farmers’ agricultural production activities, daily and farmers are supposed to interact with staff and students when they are present. There is also a presence of the local Department of Agriculture field agents.
Table 4.19: Responses to Question 2a.

<table>
<thead>
<tr>
<th>STAFF &amp; STUDENT RESPONSES</th>
<th>YES</th>
<th>NO</th>
<th>PARTLY</th>
<th>NA</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Staff</td>
</tr>
<tr>
<td>Coimbatore</td>
<td>4</td>
<td>6</td>
<td>1</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Periyakulum</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Forest College</td>
<td>14</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Kuttapattu</td>
<td>5</td>
<td>8</td>
<td>4</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Madurai</td>
<td>8</td>
<td>13</td>
<td>3</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>KILLIKULAM</td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>TOTAL</td>
<td>41</td>
<td>42</td>
<td>13</td>
<td>36</td>
<td>91</td>
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</tbody>
</table>

Fig. 4.6: Comparing Staff and Students’ Responses to Question 2a.
### Table 4.20: Précis of Staff and Students’ Comments Qualifying Responses to Question 2a.

<table>
<thead>
<tr>
<th>STAFF &amp; STUDENT EXPLANATIONS FOR QUESTION 2A</th>
<th>YES</th>
<th>NO</th>
<th>PARTLY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STAFF</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• All interact with each other during VSP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• One contact farmer is fixed for each student facilitating the technology transfer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ordering of priority staff/students,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>students/farmers, staff/farmers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Interact but for a little period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Student and farmer relationship is</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Effective through staying in the village</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Only students and farmers interact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• VSP has been viewed not seriously due to indifferent attitude by all 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Staff do not have the field level confidence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Interaction is not sufficient - full involvement is not so far attained</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Interactions in limited way due to farmers' inhibitions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• They interact only for a few day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• VSP offers good scope for intermingling only for a short period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>STUDENTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• We conduct meetings, demonstrations etc where the student group coordinator &amp; farmer interact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• information from staff to farmers through students and from farmers to staff through students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Frequent surprise staff visits produced healthy interaction between 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Farmers give more information to the students than staff</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Always a one way programme student and farmer only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Student should live with farmer (family) do all operations with farmer,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Students presently go to the farm like a supervisor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Little time spent with farmer - once in 2/3 days, 24 hours in one month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Duration of programme should be 3-6 months - one cropping season</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• No we have to be completely engaged with all the operations what they do normally</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Staff interact with students and farmers when students conduct demonstration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• We stay too far from farmer's house</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Farmers' not interested in listening to students</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

It is clear that there is a discrepancy in perception of the degree to which the staff, students and farmers interact during VSP. Almost half (45%) of staff and students indicate that the three groups interact, whilst 14% of staff and 38% of students say they don’t interact. The staff’s ‘partly’ response is almost three times that of the students. Students’ indicate in their explanatory comments that the staff/farmer interaction is minimal, irregular or token. There seems to be a general reliance by the staff, for the students to interact with the farmer. The results of this interaction are twofold; firstly to convey optimising production technologies to the farmer, and secondly to convey research issues to the staff.
There is substantive feedback by both staff and students that the VSP period should be extended to one cropping season 3–6 months. Students seem to indicate that they are too far from the farmer both physically in their hostel accommodation as well as intellectually, emotionally, socially and in some cases culturally. Staff express similar sentiments. Some students believe that the farmers do not take the students seriously. Students generally approach the relationship as an extension exercise. Generally there is a sense of futility in the VSP programme, possibly because of its limited strategic length, possibly because students lack the confidence to fulfill their required extension role or cultural differences or according to the staff, the three ‘players’ have an indifferent attitude to the VSP exercise.

4. Current VSP Organisation, Staff and Student Satisfaction (Question 2b)
This question requires staff and students to make an overall judgement about the current organisation of the VSP. This is somewhat difficult as a closed question requiring a yes/no; however, both staff and students can qualify their choice with an explanation.

**Table 4.21: Responses to Question 2b.**

<table>
<thead>
<tr>
<th>STAFF &amp; STUDENT RESPONSES</th>
<th>YES</th>
<th>NO</th>
<th>PARTLY</th>
<th>NA</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>staff</td>
<td>stud</td>
<td>staff</td>
<td>stud</td>
<td>staff</td>
</tr>
<tr>
<td>Coimbatore</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>Periyakulam</td>
<td>1</td>
<td>0</td>
<td>7</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Forest College</td>
<td>6</td>
<td>2</td>
<td>14</td>
<td>9</td>
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</tr>
<tr>
<td>Kuttapattu</td>
<td>7</td>
<td>6</td>
<td>9</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Madurai</td>
<td>6</td>
<td>3</td>
<td>10</td>
<td>21</td>
<td>2</td>
</tr>
<tr>
<td>Killikulam</td>
<td>7</td>
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<td>13</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>30</td>
<td>13</td>
<td>57</td>
<td>71</td>
<td>3</td>
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</table>

Fig. 4.7: Comparing Staff and Students’ Responses to Question 2b.
Table 4.22: Précis of Staff and Student Comments Qualifying Responses to Question 2b.

<table>
<thead>
<tr>
<th>PRÉCIS OF STAFF AND STUDENT RESPONSES TO QUESTION 2B.</th>
<th>YES</th>
<th>NO</th>
<th>PARTLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAFF</td>
<td>• During the 1 month stay, students can know all the problems, techniques, and know how, cultivation process and marketing</td>
<td>• One month is not enough students should be placed in village for 6 months e.g. One season</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• VSP is designed to give students experience for a post as agricultural officer</td>
<td>• Students contact farmers then staff give instructions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Students understand the application of theory in a given situation</td>
<td>• Contact with ‘agricultural dept set up’ from top down</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Students learn things themselves</td>
<td>• Learn difficulties such as input procurement, labour management, marketing of products</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Students gain confidence and acceptance in rural areas</td>
<td>• Students should be allowed to go to and get training with the farmer/agro-based industries of their choice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Farmers should realise the superiority of the scientist and technological support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STUDENTS</td>
<td>• One month period is enough to know about the villages, learn from the farmers and spread or give information and technologies to them</td>
<td>• VSP is done at the final stage of degree it should be in our 3rd year which allows further interaction with farmers and follow up initial analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• VSP is designed to give students experience for a post as agricultural officer</td>
<td>• 1 month not enough, should be a semester</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Students understand the application of theory in a given situation</td>
<td>• stipend provided to do some creative work in the village</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Students learn things themselves</td>
<td>• Student is restricted to a prescribed ‘modus operandi’ - no distinction for opening up</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Students gain confidence and acceptance in rural areas</td>
<td>• Students spend time during VSP studying for exams</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Farmers should realise the superiority of the scientist and technological support</td>
<td>• Present day student community of agricultural universities has no need/interest to learn from farmers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Group coordinators and teachers should stay with the students</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Students stay in the village for getting grades,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Filling in questionnaire (often filled in without consulting farmers) this should be changed and students must be let alone to collect facts, solutions available at different places</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• More guidance from non participating staff</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Students presently go to the farm like a supervisor, there is no deep contact with farmers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Prior introduction would help to establish good faith and relationship</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Other social and economic problems not addressed we do not know what happens in the farm house</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Farmer should find problem, analyse it, and find a solution</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• There is no innovation about agro-based industries</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Students should study problem based projects on VSP</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Farmers are already bored with similar visits</td>
<td></td>
</tr>
</tbody>
</table>
Discussion

One third of staff and 14% of students are satisfied with the current organisation of the VSP. Staff satisfied with the current arrangements generally take the approach that the VSP is a ‘capstone’ experience for the course. Staff generally assume that the VSP is ‘field applied preparation’ for a position as an Agricultural Officer yet almost two thirds (63% - ‘no’) of staff are dissatisfied with the current VSP organisation. Staff that are satisfied indicate the benefits of the VSP to the students are increased confidence, they learn themselves and ‘see’ the theory in practice. Those staff dissatisfied with the programme’s organisation believe that ‘top-down’ associations with supervising Department of Agriculture Staff, disadvantage the students. They also believe that students should have more choice in the location and type of host (production). Some staff draw attention to the cultural issues surrounding female students in the VSP situation.

Other staff suggest that some villages are so underdeveloped that students cannot adjust. Some staff believed that the level of funding was insufficient to satisfactorily conduct the programme. Students who are satisfied believe that one month is sufficient to complete the programme. Other dissatisfied students believe that the programme should be shifted from the final year to the third year so that issues identified with the farmers could be followed up after returning to campus. Some dissatisfied students revealed that the VSP period is used to study for exams and that some students fill out the required questionnaire without consulting the farmers. Some dissatisfied students wanted more to be made of the experience by having assignments that focused on the knowledge gained by engaging with the farmers.

Many believe that in order to make the programme effective more time and effort should be made to establish a closer relationship with the farmers and their families. Some students were quite disillusioned with the programme indicating that the same farmers are utilised each time and that they are not interested in interacting with students and a basically bored with the same or similar formats. Many students strongly suggested that the supervising TNAU staff should interact more frequently and more intensively with the students to the extent that some believe that staff member should live with them in the village.

One issue by staff and students relates to the perceived relationship between the university culture and the community. One staff comment suggested that the VSP would make farmers realise the superiority of the scientists and the technological support. The student’s comment suggested that the modern university student isn’t interested in learning from farmers. There were indications that the general curriculum and approach designed for the VSP was far too restrictive for students to explore and innovate as they engaged.
5. Proposed Model for Designing the VSP (Question 3).

This question asks students to consider the utility of a proposed systems model portraying an action learning triumvirate between the staff/students/farmers and other agricultural personnel, for designing the VSP.

**Table 4.23: Responses to Question 3.**

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
<th>YES/NO</th>
<th>NA</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>staff</td>
<td>stud</td>
<td>staff</td>
<td>stud</td>
<td>staff</td>
</tr>
<tr>
<td>Coimbatore</td>
<td>4</td>
<td>15</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Periyakulam</td>
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<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Forest College</td>
<td>17</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Kuttapattu</td>
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<td>13</td>
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<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Madurai</td>
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<td>3</td>
<td>3</td>
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<tr>
<td>Killikulam</td>
<td>16</td>
<td>4</td>
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<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>70</td>
<td>73</td>
<td>9</td>
<td>6</td>
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</tbody>
</table>

Fig. 4.8: Comparing Staff and Students’ Responses to Question 3.
Table 4.24: Précis of Staff and Student Comments Qualifying Responses to Question 3.

<table>
<thead>
<tr>
<th>PRÉCIS OF STAFF &amp; STUDENT EXPLANATIONS FOR QUESTION 3.</th>
<th>YES</th>
<th>NO</th>
<th>YES/NO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STAFF</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• The relationship between the student, staff, and farmer are depicted well</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Relationships help to understand present situation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Relationships create chances to plan for their prosperity exposure to practical problems</td>
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<tr>
<td>• Enriched academically from the staffs and library</td>
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<tr>
<td>• Students learn from both teachers and experienced farmers</td>
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<tr>
<td>• The design brings out knowledge for each group to increase individual efficiency</td>
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<tr>
<td>• The best model provided students are matured to understand and analyse things</td>
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<tr>
<td>• Students can translate theoretical knowledge into practical skills</td>
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<tr>
<td>• All three groups at both ends giving and receiving</td>
<td></td>
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<tr>
<td>• The world around can be experienced with this model</td>
<td></td>
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<tr>
<td>• Everybody's needs is considered</td>
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<td></td>
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<tr>
<td>• 3 components have equal role to play and equally benefited</td>
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<tr>
<td>• Have access to gain knowledge whilst they are doing the course programme</td>
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<tr>
<td>• Situation improvement process can be hastened</td>
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<tr>
<td>• Mutual learning and development</td>
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<td></td>
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<tr>
<td>• Participation should be in equal levels to quicken the communication process</td>
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<tr>
<td>• In our indian scenario the relationship is neither mutual nor a strong bond</td>
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<tr>
<td>• Students may not have enough to contribute to the learning of the staff</td>
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<tr>
<td>• Motivation of students is critical to the interaction</td>
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<tr>
<td>• Interaction between forest officer and forest industry workers should be included</td>
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<tr>
<td>• Students' get knowledge from agri-industry workers, they learn through experiences</td>
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<tr>
<td>• Possibility of bringing together all 3 personnel of VSP</td>
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<tr>
<td>• We don't train students for this kind of activity</td>
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<tr>
<td>• In the short run it requires a lot of reforms in the education system</td>
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<tr>
<td>• Requires re-orientation of the teachers and farmer host</td>
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</tr>
<tr>
<td>• Farmers have less faith in students</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>STUDENTS</strong></td>
<td></td>
<td></td>
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<tr>
<td>• Student alone cannot do much he is new to that place</td>
<td></td>
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</tr>
<tr>
<td>• Interaction between all 3 more ready to accept views</td>
<td></td>
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<tr>
<td>• In this model the 3 way interaction is more than the existing one</td>
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<tr>
<td>• This is the only way that students, staff &amp; farmers can be touch with reality</td>
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<tr>
<td>• A triangle of technologies between the three enriching all three groups</td>
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<tr>
<td>• Basic extension principle - source, medium, receiver-staff, student farmer</td>
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<tr>
<td>• We come to know what farmers actually need</td>
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<tr>
<td>• Job opportunities/job oriented</td>
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<tr>
<td>• This is a facsimile of an integrated farming system</td>
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<tr>
<td>• This model would lead to the successful learning of the individual</td>
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<tr>
<td>• Model suggests importance is given to all three</td>
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<tr>
<td>• In our country there is no basic understanding between the farmers-scientist-student</td>
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<tr>
<td>• Farmers consider students untrained to solve their problems</td>
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<tr>
<td>• Our scientists never look into the practical basic problems of the farmer (esp poor farmers)</td>
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<tr>
<td>• Our regional and poor farmers hardly get any benefit from our scientific technologies</td>
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<tr>
<td>• All three interactions may not be simultaneous</td>
<td></td>
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<tr>
<td>• Students from outside would be wholly involved in the project that we designed and contribute to</td>
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<tr>
<td>• The majority of students has no need/interest in the course</td>
<td></td>
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<tr>
<td>• We are here just to get the so called professional degree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• We will spend a life at tnuv environ or get a 'good' job</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• An ideal concept - a utopian way of VSP learn all and know all</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Hard to learn everything</td>
<td></td>
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</tr>
</tbody>
</table>
Discussion
Staff support for the model is 77% and student support is 78%. Staff suggest that the model implies a generally mutually beneficial learning relationship, an opportunity for students to build confidence and learn from both teachers and farmers, students can also experience theory in practice. Staff also suggest that this model would facilitate a situation improvement as everybody’s needs are considered. Some staff indicated that the model could help plan for prosperity. Students’ indicate that the model would help to equalise views from the three members because it represents and integrated farming system. Some suggested that this model is more effective than the current VSP design, because it is more aligned with extension principles and enriches each member of the triumvirate by putting them in touch with reality and focuses on individual learning. Students believe that this approach would allow them to know the actual needs of the farmer. Others could see opportunities for jobs.

Staff opposition to the model is 10% whilst student opposition is 6%. Staff indicate that the model is inappropriate for the given the lack of student motivation and the cultural norms that exist between the triumvirate. Some staff suggested that the labelling of the triumvirate members needs adjustment. Those staff who chose the Yes/No alternative (8%) present the following qualifying explanations ‘we don't train students for this kind of activity, in the short run it requires a lot of reforms in the education system, requires re-orientation of the teachers and farmer, host farmers have less faith in students’.

These responses would indicate that the model is useful but is a conceptual framework for an educational approach that is vastly different from that currently used. Students in opposition to the model indicate that currently no such triumvirate relationship exists. They suggest that the rank and file poor farmers are not included in the extension area of interest by scientists. The final condemnation focuses on the poor regard for students as problem solvers by the farmers, therefore projecting an equal standing of the students in the triumvirate would not be realistic.

One critique by students who chose the Yes/No alternative (16%) is that the three may not interact at the same time. Other students suggest that this approach is unnecessary because the students are just at TNAU to get a degree not to engage with farmers in this way. One student in support of the model indicated that it would allow them to design and contribute to projects that had some effect or made some difference. Some students are still of the opinion that an academic or public service job/career awaits them as graduates and are resolved to the traditional view of a degree without any need for this kind of interaction.
6. Perception of the Model's Emergent Central Region (Question 4)

This question is at the heart of the research. Question 4 asks the respondents to describe what is produced at the synergism of the staff, student and farmer learning triumvirate. The model suggests that the learning triumvirate coalesces in area (a) of the model. The staff, students and farmers worlds’ intersect and become shared. As the three members increase their interaction and their representative circles progressively collapse into each other, area (a) grows and theoretically so does the learning between the triumvirate members.

Q.4 In your opinion, what is produced in region (a) in the model?

Table 4.25: Précis of Staff and Student Comments Qualifying Responses to Question 4.

<table>
<thead>
<tr>
<th>PRÉCIS OF STAFF &amp; STUDENT EXPLANATIONS FOR QUESTION 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STAFF</strong></td>
</tr>
<tr>
<td>• Fulfilment of VSP, mutual benefit</td>
</tr>
<tr>
<td>• An optimising zone good for agriculture, where everyone knows their role, limitation, capability, and requirement</td>
</tr>
<tr>
<td>• Practical learning at the village level, learning by doing</td>
</tr>
<tr>
<td>• Better agricultural growth in the region</td>
</tr>
<tr>
<td>• Solving problems increasing productivity</td>
</tr>
<tr>
<td>• Staff will get ideas of needs based research</td>
</tr>
<tr>
<td>• A bottom up plan for rural development</td>
</tr>
<tr>
<td>• Understand more about socio-economic aspects of the farm and less about application of technical knowledge, towards prosperity of the nation and world as a whole</td>
</tr>
<tr>
<td>• If happens = solution to farmers problems, self confidence to students, job satisfaction for staff</td>
</tr>
<tr>
<td>• Zone 'a' is result of holistic approach to resource management</td>
</tr>
<tr>
<td>• A new technology could be formulated for the improvement of the present practice</td>
</tr>
<tr>
<td>• Students gain confidence in starting self employment</td>
</tr>
<tr>
<td>• Staff are getting an insight about the learning process</td>
</tr>
<tr>
<td>• Results in publication</td>
</tr>
<tr>
<td>• Half baked students</td>
</tr>
<tr>
<td><strong>STUDENTS</strong></td>
</tr>
<tr>
<td>• This has more intricacies with it politico-cultural-economic-ideological issues</td>
</tr>
<tr>
<td>• Change from an existing undesirable to a desirable, thereby developing 'each and every man'</td>
</tr>
<tr>
<td>• The whole model is a 'search for reality'</td>
</tr>
<tr>
<td>• Solving of the problems faced by the three groups</td>
</tr>
<tr>
<td>• It leads to a discovery, discovery of truth, the people become wise</td>
</tr>
<tr>
<td>• Essential for improvement of agriculture in the country</td>
</tr>
<tr>
<td>• Healthy interaction, not force other to accept views - weigh pro's &amp; con's</td>
</tr>
<tr>
<td>• A complete forester</td>
</tr>
<tr>
<td>• Students get employment opportunities</td>
</tr>
<tr>
<td>• A need based agriculture</td>
</tr>
<tr>
<td>• Emergence of more numbers of agro-industries</td>
</tr>
<tr>
<td>• Optimistically better communication of technology</td>
</tr>
<tr>
<td>• A cooperation that brings maximum benefit</td>
</tr>
<tr>
<td>• Improvement in the living standard of farmers</td>
</tr>
<tr>
<td>• All our technology transfer and research programmes are aimed at achieving region 'a'</td>
</tr>
<tr>
<td>• Pessimistically a bit of confusion</td>
</tr>
<tr>
<td>• A big 'vacuum'/'blank'</td>
</tr>
</tbody>
</table>
Discussion
An overwhelming majority of staff and students describe the model positively. Staff suggest that area (a) is where the VSP is fulfilled. Others take a bigger picture perspective and believe that area (a) is an optimising zone good for agriculture, where everyone knows their role, limitation, capability, and requirement, better agricultural growth in the region. Many staff believe that the intersection of the three will solve problems, increase confidence, increase job satisfaction and maximise learning for all involved. A few staff view this relationship as an opportunity for needs based research leading to lauded journal publications. Some staff believe that area (a) provides a window into the socio-economics of the village as well as a focus for production optimising. One or two staff did not share this positiveness and described area (a) as producing half baked students.

Students were also positive. They seem to view the synergism as producing mutual benefit. Many suggested that the intersection, has more intricacies with it politico-cultural-economic-ideological issues, and that thinking this way was a change from an existing undesirable to a desirable, thereby developing 'each and every man' resulting in an improvement in the living standard of farmers. One student pronounced that, the whole model is a 'search for reality'. Students’ generally viewed area (a) as a generative and emergent collaboration producing jobs, solutions, increased programme effectiveness. Several students felt that area (a) would produce confusion and a big ‘Vacuum-blank’.

Conclusion
This chapter presented the results of the primary research. It presents the data for:
- The Gainen Inventory applied to TNAU Staff and Students as well as UC Davis Students.
- The TNAU Staff, ‘The Self Employment Workshop’ and
- The Farmer/Student/Staff, relationship Questionnaire.

The Gainen results indicated a dominance of the A/B responses in the current curriculum, and the C/D responses in the preferred curriculum, by staff and students at both institutions. Staff and students indicated a change from the current - theoretical fractionalised, didactic/instructional, comprehension, outcome-based curriculum approaches in a pedagogical schooling style environment to a preferred - relevant, developmental, applied, curriculum-based approach in an adragogical, developmental style environment.

The Self Employment Workshop revealed a desire by staff for the curriculum to become more relevant. This conclusion was supported in observations and informal interviews with students. Staff wanted closer connection between the curriculum and industry and a closer relationship between the institution and the professions. There was a clear requirement for staff in-servicing in order to accommodate changing roles perceived by a career orientated curriculum.
The Farmer/Student/Staff relationship Questionnaire revealed in one instance; a chasm between staff and students’ perceptions of the operational success of the Village Stay Programme (VSP), and a significant convergence of perception about, and action learning approach to, rural development. The relationship between staff, students and farmers was generally detached. The male agriculture students, especially, saw their role as technology conduits and as a kind of surrogate arm of the Extension Department. The female Home Science students from the Madurai campus were extremely effective because they quickly established rapport with their hosts and improved their hosts situation by developing a praxis based on action research.

The results generally support a need for change in curriculum towards an individual student-centered, undergraduate teaching and learning curriculum with a focus on relevance to both community and student career development. These results, in association with secondary literature review discussions, will form the basis for an attempt to answer the research question.

‘What are the conceptual framework design properties for an undergraduate, agricultural, core curriculum that is grounded in community?’

Chapter 5 will further discuss and extend the primary research results; then draw upon selected theoretical ideas in Chapter 6 integrating primary and secondary research into a more comprehensive answer to the research question. The development of the UG Core Curriculum Schema incorporating properties identified through the research is the focus for the next part of this thesis.
CHAPTER 5
PRIMARY RESEARCH ANALYSIS AND DISCUSSION

Introduction

This chapter draws together the primary data into themes and issues that are relevant to the research question. The choice of an Indian University when exploring conceptual framework properties for an undergraduate agricultural curriculum grounded in community, might seem misplaced at first, however the case study university seemed typical and traditional given Hemmings et al. (2000) description in Chapter 2. TNAU is ‘typical and traditional’ (Phillips 2005, Weaver 1994) because it has a science paradigm at the core of its agricultural curriculum, structure and function, it is obsessively hierarchical and departmentalised in organisation and is committed to a priority of basic research and publication. The TNAU undergraduate agricultural curriculum generally focuses on the scientific basis for optimising agricultural production. Students are regarded as passive recipients and conduits of knowledge into the farming community via extension processes and from that community into the staff research arena via the VSP. Students are filled with facts and concepts about the agricultural production process and this process culminates towards the very end of their course when the students are sent into the community in order to test out how much they know. Periodically through their course they engage in practical sessions designed to mimic production processes.

UC Davis is generally similar in paradigm, structure and function to TNAU. However, the financial burden on the student is more pronounced; the administrative complexity is certainly more evident, and the pressure on students to comply with what seems like a monolithic and insensitive bureaucracy is a feature. These institutions should be viewed as representative of institutions with a ‘traditional approach’ to undergraduate curriculum design delivery assessment and reporting. The research has highlighted many aspects of that traditional paradigm and exposed a mood for change from both staff and students.

Chapter 5 attempts to partly answer the research question and is at the heart of this thesis. This chapter not only converges arguments and ideas presented in Chapters 1, 2, 3 and 4 but also lays the foundation for part of the design of emergent models and schemas identified in Chapters 6, 7 and 8. The research question is:

‘What are the conceptual framework design properties for an undergraduate, agricultural, core curriculum that is grounded in community?’
I am interested in the properties of a core curriculum that will connect the student with the reality and challenges of on and off campus community in order that they develop the capacity to work effectively and professionally in their chosen career. Currently the scientific basis for comprehending and optimising agricultural production processes seems to be the premise for agricultural curricula design. The arguments presented in Chapters 1 and 2 challenge this premise and question the validity of a single dominant science paradigm as the basis for agricultural curriculum design. Assimilating the Gainen Questionnaire, the Self Employment Workshop, the Farmer/Student/Staff Relationship Questionnaire, primary research results can provide clarity, ideas or properties that can be used to inform a core curriculum conceptual framework that is consistent with this challenge.

It is my thesis that a conceptual framework, grounded in community, will inform a core curriculum in agriculture that requires continual challenging and developmental engagement in and with reality. This style of curriculum provides many opportunities for the professional practice development of the individual staff, student and community members involved. It would be invalid to propose that the results of this research could be considered definitive and universal. The research results are only indicative or symptomatic; they contain trends and embedded theories that, when assimilated with the secondary research, present a compelling argument for change. I have deliberately focused on a core curriculum, conceptual framework or schema, rather than a complete curriculum design with this fact in mind. A core curriculum conceptual framework provides enough design latitude to become more universally functional for a wider variety of approaches, contexts and needs. However, the fundamental tenet of ‘community grounding’ is paramount. I will discuss in this chapter a number of secondary research aspects related to the thesis.

‘We Make the Road by Walking’

The following narrative helps to establish a theme for this chapter. Peseschkian’s (1981, pp. 84-86) book of oriental stories from which the story has been taken, serendipitously ‘leapt out’ at me in an obscure Kodaikanal Hill Station bookstore during one of the many sojourns made whilst conducting my thesis primary research. It is from this literary encounter with the overloaded traveller that I realised that ‘we make the road by walking’ (Horton & Freire 1991). This means that the design of the UG Schema as a curriculum conceptual framework, emerged from a variety of sources some theoretical some experiential. Peseschkian (ibid.), in his tale ‘A Story on the Way’, describes the traveler who made assumptions and plans about the journey yet to be taken and loaded himself up with many seemingly anomalous items:

A heavy sack of sand hung on his back; a thick water hose was draped around his body. In his right hand, he carried an oddly shaped stone, in his left hand a boulder. Around his neck an old millstone dangled on a frayed rope. Rusty chains, with which he dragged heavy weights through the dusty sand, wound around his ankles. On his head, the man was balancing a half-rotten pumpkin.
As the man travelled he encountered a number of local farmers who firstly enquired about the purpose of the items and then facilitated the traveller’s realisation about their uselessness of the items:

‘Awfully dumb,’ replied the wanderer, ‘but I hadn’t noticed it before.’ And then ‘I am very glad you pointed it out to me, I didn’t realise what I was doing to myself.’

The farmers’ then raised the traveller’s awareness of the more appropriate, surrogate resources available all around him. The traveller, having eventually learnt to question his own assumptions, decides to discard an item himself. The traveller was freed of more than his physical burdens. He began the journey within the journey that he was on, that involved questioning current assumptions and planning behaviour accordingly. This to me is making the road by walking it.

‘A Story on the Way’ as a Metaphor

There are several metaphoric overtones and points of convergence in the story of the traveller that relate directly and indirectly to my thesis. The main precept in the story is that the traveller obviously overloaded with apparent useless articles, is helped to see another reality about these objects by a group of local farmers. Obviously when the farmers’ pointed out the imprudence of his actions the traveller relieved himself of his burdens and travelled on with a sense of relief, a new found freedom and a new regard for his surroundings. The traveller to me, represents a graduate who has been traditionally educated with facts, content, concepts and principles in anticipation of his university’s understanding and worldview of his professional life’s journey. If interviewed, the traveller may admit that some of the items that he carried might seem foolish, excessive and even pointless given the terrain and conditions.

A series of farmers’ point out abundant resources nearby and that carrying some of those objects is redundant. It is apparent that the traveller lacked the will or capacity to firstly question the intrinsic attributes of his predicament or even realise he was in a predicament and secondly he lacked the capacity for strategically deciding, planning and acting, given the environment in which he was travelling and thirdly he seemed lacked the will or capacity for building rapport establishing relationships and accessing local knowledge during the journey planning process.

The ‘Capability Manifesto’ (1980, in Capability, vol. 1(1) 1994) suggests a higher educational dichotomy of education and training. This treatise argues that UK university graduates have acquired vast knowledge about the field or context of their degree through a scientific lens, but generally lack the ability to apply the knowledge.

Stephenson (1994) suggests that a graduate educated towards capability produces a much more comprehensive professional and advocates that the curriculum be designed in such a way so as to facilitate the development of such a graduate. In ‘A Story on the Way’, (Peschckian 1981) the traveller appears to be quite knowledgeable about what they consider to be essential to take on a
journey only to be proven both ignorant of what the journey actually requires and also what the
journey is actually about. Current university graduates may need a curriculum that challenges and
develops both their ‘being and becoming’ in the world as well as about the world.

Assimilating the Primary Research Results

The primary research results constituents are:
1. The Gainen Inventory Analysis and Discussion.
2. The Self-Employment Workshop Analysis and Discussion.
3. The Farmer/Student/Staff Relationship Questionnaire Analysis and Discussion.

1. The Gainen Inventory Analysis and Discussion

The following tables and graphs portray the combined TNAU Staff and Students and the UC
Davis Students’ responses to the Gainen Inventory current and preferred questionnaire format.
There are eight themes in the Gainen Inventory. For each of these themes there are four
alternatives or categories—A, B, C, D. The 8 themes are as follows:
i. The purpose of the instruction.
ii. Who decides what topics are covered?
iii. Who decides what instructional methods are used?
iv. The degree of complexity in the content organisation.
v. The approach taken in analysing and critiquing the topic.
vi. The choice of mode of pedagogy or educative process.
vii. The purpose and method of assessment.
viii. What students are required to do in order to succeed.

Table 5.1 portrays the research results as a combined staff and students’ description of the current
and preferred curriculum. The assimilated results are presented as current and preferred curriculum
trend graphs and as AB and CD category trend explanations. The current and preferred
descriptions are supported by theories that underpin their design, structure and function.
### Table 5.1: Analysis of the Staff and Students’ Current and Preferred Curriculum.

<table>
<thead>
<tr>
<th>Gainen Theme</th>
<th>Current Curriculum Description</th>
<th>Preferred Curriculum Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current and Preferred Results, Trend Graphs</td>
<td><img src="image1" alt="Current Curriculum Trend" /></td>
<td><img src="image2" alt="Preferred Curriculum Trend" /></td>
</tr>
<tr>
<td>Staff and Students</td>
<td>A &amp; B 80%, C &amp; D 20%</td>
<td>A &amp; B 34%, C &amp; D 66%</td>
</tr>
<tr>
<td>Results as Gainen Categories A&amp;B C&amp;D.</td>
<td>The current curriculum is predominantly designed around categories A &amp; B</td>
<td>The preferred curriculum should be designed around categories C &amp; D</td>
</tr>
<tr>
<td>% Change Current Curriculum Design to Preferred Curriculum Design Category A, B, C, D.</td>
<td>A -50%</td>
<td>C +17%</td>
</tr>
<tr>
<td>% Change Current Curriculum Design to Preferred Curriculum Design Category A, B, C, D.</td>
<td>B +4%</td>
<td>D +29%</td>
</tr>
<tr>
<td>The magnitude of change from current to preferred indicates that staff &amp; students want significantly less of the style of curriculum represented by Category A responses and slightly more of the style of curriculum represented by Category B responses.</td>
<td>The magnitude of change from current to preferred indicates that staff &amp; students want much more of the style of curriculum represented by Category C responses and significantly more of the style of curriculum represented by Category D responses.</td>
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</tr>
</tbody>
</table>

1. **The purpose of the instruction.** (précis)
   - Conveying facts, concepts, skills or standardised procedures.
   - Explaining and evaluating theories and/or issues, sharing and clarifying ideas experiences and opinions.

2. **Who decides what topics are covered?** (précis)
   - Teacher/instructor selects standardised topics from limited sources.
   - Joint selection of topics to reflect student interests

3. **Who decides what instructional methods are used?** (précis)
   - Teacher/instructor selects a variety of instructional methods for each topic to be used by all students with some choice.
   - Collaborative approach to selection some student autonomy and self determination, instructor becomes a facilitation/mentor.

4. **The degree of complexity in the organisation of the content?** (précis)
   - A single unified approach to all topics, sometime 2 or 3 themes or perspectives are introduced.
   - Comparing and contrasting major perspectives on a topic.

5. **The approach taken in analysing and critiquing the topic.** (précis)
   - Most widely accepted view. Sometimes equal treatment given to a variety of perspectives
   - Critically analytical and multi-perspective approach to eclectic topics. Facilitate individual student capacity development.
Table 5.1: (Cont.)

<table>
<thead>
<tr>
<th>6. The choice of mode of pedagogy or educative process. (précis)</th>
<th>Lectures, examples, visual aids, possible time for questions. Sometimes students can discuss issues and can express opinions.</th>
<th>Discussion or exercises that encourage students to explore conceptual relationships and problem solving scenario implications in the field.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. The purpose and method of assessment. (précis)</td>
<td>Achieve highest grade by objective exams that include multiple choice and/or short answer format along with assignments in which students’ express their opinions.</td>
<td>Assignments or exams requiring students to demonstrate depth in understanding of an aspect or a topic in general, or to synthesis course material into a unique proposition.</td>
</tr>
<tr>
<td>8. What students are required to do in order to succeed.</td>
<td>Memorise facts skills and concepts or memorise two or more theoretical perspectives.</td>
<td>Summatively or formatively demonstrate capacity to argue for a position, design a system, develop a new approach, solve a problem or improve a situation in the field by integrating course concepts and perspectives.</td>
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The Gainen Inventory Analysis Discussion

**Précis of Gainen Category A Curriculum Design**

In the Category A curriculum design, staff select and use a unified, single, standardised approach in conveying facts, concepts, skills and/or procedures, within a staff-determined a set of topics from a single text book to all students. Staff teach using formal lectures, sometimes incorporating examples and visual aids with possible time for questions. The taught material is assessed by multiple choice or short answer, objective examinations. In order to succeed students should learn important facts, skills, procedures and/or concepts that have been taught.

Curriculum components in this category are indicative of a simplified, didactic, dualistic (Perry 1970) paradigm. It endorses the teacher and their selection of books and other resources as sources of knowledge and that there is an ‘absolute truth’. It idealises the fact that important knowledge is already ‘known and is knowable’. There is a sense that approaches and answers to problems are either right or wrong. The role of the student is to receive the knowledge issued by the teacher. The teacher has a set way of distributing selected knowledge that is typically in an instructional format. The teacher is in charge of teaching and most often, the level of student learning.

Assessment is based on the testing of long-term memory as recall, requiring students to know the ‘correct answer’ that originated from a number of established and recognised authorities. Student success focuses on them being passive and reliant on authorities and the authority’s resources for their education. Students depend on authorities as the source of the student’s opinions (Woods 1994, pp. 1-6). Further to this description, students’ learning exists primarily in a ‘theoretical world’ of tacit learning.

**Précis of Gainen Category B Curriculum Design**

In the Category B curriculum design, the staff member focuses on sharing and clarifying ideas, experiences and/or opinions covering two or three themes or perspectives relating to topics they have selected. Staff members vary the instructional options with each topic and students have
some choice with these options. Staff teach using lecture and discussion and students can express their opinion. Taught material is assessed by examination however student opinion is assessed through short assignments. In order to succeed students should fully understand two or more theoretical perspectives.

This category represents a move away from a dualistic paradigm, towards a more multiplistic (Perry 1970) paradigm. Assumptions that all knowledge is knowable and most solutions to problems are black and white are tempered with some problematic situations containing confounding ‘grey areas’. There is a shift from the teacher being not only a source of knowledge, but also as a means to understand how to obtain knowledge for ones’ self. The students’ role apart from memorising facts, is also to develop personal opinions related to topics presented. Success is based on exhibiting the ‘process’ of finding out as well as solving the problem or ‘getting the right answer’ (Woods 1994, pp. 1-6).

**Précis of Gainen Category C Curriculum Design**

In the Category C curriculum design, staff members select topics and instructional methods in consultation with students in order to reflect their preferred learning modes. Staff explain theories and/or issues and systematically compare and contrast various perspectives in order to identify their strengths and weaknesses. Through discussion or exercises, students and staff explore conceptual relationships and implications. Assignments and/or examination assess the depth to which students have pursued an aspect of the subject. In order to succeed, students should demonstrate their ability to compare, contrast, analyse and evaluate a range of theories or methodologies or issues or use course concepts to solve unfamiliar problems.

This category represents a more confirmed multiplistic (Perry 1970) paradigm. The interpretation of ideas underpinning the ‘C’ alternatives include recognising the individuality and independence of the staff and student. There is a collaborative approach to the teaching and learning environment by staff and students. Teachers are seen as models yet can be respectfully challenged. Students are assisted in developing life long methods for developing approaches that help crystallise their own perspectives. Assessment becomes a means of acknowledging the pursuit of reasoned ideas and propositions in depth. Success is based on analysing situations (Woods 1994, pp. 1-6).

**Précis of Gainen Category D Curriculum Design**

In the Category D curriculum design, staff members assist students in choosing topics that reflect the student’s interest. Staff facilitate the development of the student’s ability to analyse and evaluate theories and/or issues in order for them to develop their own perspectives. Students supported by staff, solve problems or deal with issues ‘in the field’ by applying and synthesising course concepts. Students are assessed on their capacity to demonstrate their application and synthesis of course materials. In order to succeed, students should integrate concepts and
perspectives from the course in demonstrating their capacity to present arguments for a position, innovate or design a system, or develop a new approach to a problem in the field.

This category represents a strong multiplistic paradigm and a significant move towards contextual relativism (Perry 1970) as well as a desire for constructed knowledge Belenky, et al. (1986). The interpretation of ideas underpinning the ‘D’ alternatives includes evaluating the worth of theories for some other purpose. Students’ interests become the centre of, and focus for, the teaching and learning environment. Exploring the differences, variations, peculiarities, individuality and contextual relevance of phenomena and issues becomes a preferred mode of action. Students are helped to learn how to analyse as an individual, life long learning process. Success is based on individuals arguing for a valid, preferred position. New knowledge can be created, information, concepts and processes are synthesised into individual explanations. The field or ‘real world’ on or off campus is seen as the arena for learning and practical engagement is the stimulus for learning. This category is much more applied and experiential (Woods 1994, pp. 1-6).

Gainen Inventory Analysis General Conclusion
The results indicate a clear message that students and staff want significant curricular change. By comparing the combined current and preferred curriculum trends, it appears that staff and students wanted to move from passive, surface, theoretical modes to applied and practical modes of lesson design, delivery and assessment, with acknowledgement of individual choice and self determination. In other words staff and students were seeking ways of bringing practical reality into a current theoretically based situation, but appeared unsure of the best way to do this. The dilemma was how to conduct a meaningful lesson that has less lecturing and more field experience. Lessons that generate discussions about real circumstances that require exploring concepts, relationships and implications of decisions in order to possibly improve the situation. One solution might be by developing methods of dealing with actual real world problems and complex situations in the field rather than as theoretical processes or even ‘case studies’ in the classroom.

Staff and students were in agreement that they wanted less examinations or objective assessment as performance indicators. They seemed to be struggling with the notion of performance indication, yet were confined by the wording of question in their response. My interpretation is that they wanted a mix of subjective and objective assessment approaches. They seemed confused however, as to what format these performance indicators would take, how to manage the assessment process and how would this thinking be accepted in terms of the status quo. Staff wanted assessment formats and techniques that required students to apply and critique material from the course. Students wanted fewer assessment formats that involved objective exams and tests, and more assessment formats in which they could express their opinions and demonstrate their learning.
A curriculum with the capacity to facilitate an individual student’s capacity to develop meaningful opinions would need to allocate substantial time and effort to design. One of the overwhelming themes in the results was the demand by the students to be recognised as individuals. Having opinions is one thing and certainly desirable for undergraduates and most students are capable of proffering an opinion within a conversation. However, developing the capacity to generate a credible, meaningful and persuasive opinion that the student would have to defend by rhetoric, is much more difficult and would require strategic inputs and staff training.

The students are basically saying that ‘we have a mind, we have opinions on issues, want to be heard but there is little or no mechanism in our current course which values this’. The staff are saying ‘we want you to do more than reiterate information, we want you to think about what you are learning, we also want you to be able to perform in the field and even innovate but the requirements of the current situation restrict this’. This kind of approach to curriculum has emphasis on the personal and professional growth and development of the individual. The problem for staff is how do you assess or measure the subjective, personal and professional growth and development of students in a tangible and replicable form?

The results are reasonably conclusive. All of the staff and student responses except two, one staff deviation and one student deviation followed the same trend, they merely varied in degree. Staff and students agree that change is needed in the undergraduate curriculum and have specified to some extent, what that change should be. Staff and students in their preferred curriculum, want change towards:

- a student needs based approach to selection of wide variety of course materials,
- more emphasis on critical thinking, analysing, integrating, synthesising and innovating,
- adopting both subjective as well as objective processes in assessment methods and performance indicators,
- a closer more collaborative and interactive relationship between staff and students, students and students and other personnel resources,
- a variety of formal and informal, interactive and instructional, audio-visual and literary, educational methods depending on the situation but all encouraging the student to value their own thinking and develop the capacity to formulate and justify opinions about their world,
- professors who are skilled in helping students discover and find their way through by incorporating a variety of educative processes,
- more challenging practical, field orientated, real world problem solving, educative environments rather than those that are theoretical, and
- more developmental process-based learning than theory based teaching.
Chapter 5—Primary Research Analysis and Discussion

2. The Self-Employment Workshop Analysis and Discussion

Staff indicated ambivalence as a result of engaging in the workshop. On one hand they exhibited a real enthusiasm for possible changes in the curriculum towards students’ developing self-employment ability through the course whilst on the other hand, they exhibited reticence because of the stasis of the leadership vision and the system in which they work. They also expressed some hesitation about their capacity to facilitate student development in this domain. Melding the individual campus mission statements provides a suitable set of guiding principles for moving forward towards a more vocationally focussed curriculum.

The Workshop Melded Mission Statement:

‘Guided by feedback from industry, current students and graduates, we should establish mutually beneficial industry partnerships, improve staff development, campus resources and infrastructure, in order to reorientate the curriculum towards a dynamic vocational education system.’

The melded mission statement indicates a general agreement that an evidence-based vocationally orientated curriculum should be designed including at least the following features:

- It should be based on the needs of society.
- It should be a response to the industry/community/other/relevant research.
- It should include the basics of agriculture production concepts and processes.
- There should be more emphasis on practical, small business and vocational training for both students and staff.
- It should be practically orientated so students learn ‘know how’ and ‘do how’.
- Students’ should engage in practical experience in which they can learn:
  - how to learn,
  - problem solving,
  - analytical skills,
  - to build their self-confidence, and
  - to develop appropriate competence, capability and capacity.
- Adopt a project-based approach to learning development, incorporating industry and community issues in a commercial, agricultural setting.

The mission statement could form the basis of a revitalised undergraduate curriculum that emphasises self-employment and job creation. These ideas would present a significant challenge to the worldview of the staff at most levels and also to the students who indicated their satisfaction with the current system. The workshop suggests that the university conduct an extensive research project with agri-business, agri-finance, agri-commerce, small business management and accounting, government and private industry international trade organisations, employers, farmers, communities and graduates. The results of that research should provide general guidance for the
design of the undergraduate curriculum. It should also identify both the qualities and attributes needed by graduates as well as possible current and future self-employment opportunities in the workplace.

The research results could also form the basis for a database of industry/community contacts or a network that could be used in a variety of ways to connect staff/students and industry/community in a mutually beneficial action learning relationship. This network would need to be coordinated within the structure and function of the university in conjunction with industry/community. The workshop also stressed that the staff and students should also be recognised in the research process. They should be consulted regarding the viability of the current curriculum and given opportunity to comment on any changes. Some staff felt that the three levels of government should also be included in any curriculum development. Rather than restrict the research to an administration or staff level, with results filtering through to departments and eventually student, I suggest that the career research methodology be incorporated into the general undergraduate curriculum. This means that students themselves get first hand experience and information by regularly engaging with employers, the community, agri-business and commercial agriculture, as researchers.

They could do this through action learning action research projects that have been designed into the undergraduate curriculum. Individual students could identify their interests and determine career opportunities by critically reflecting on the challenging experiences that have been created by those projects. Through these experiences students may also develop innovative approaches to job creation and self-employment. If such industry/community engagement projects, were a regular feature of the undergraduate curriculum then resources of the university could be used to assist students practice and rehearse their competency, capability and capacity development, well before graduating.

Image 5.1: Mango harvest Periyakulam District.

An example of the current staff mind set regarding the role of the university in developing students with self-employment and job-creation capacity. Image 5.1 was taken in a mango plantation near the Periyakulam Campus. The picked mangoes on this plantation were being accumulated on a tarpaulin then loaded basket by basket as a pile, into the back of a truck.
The truck’s destination was the fresh fruit market at Mumbai—3 days drive away, this was necessary because Periyakulam was reasonably isolated as a population centre. The nearby TNAU Periyakulam Campus focuses on education in the field of horticulture. There was currently a 25% unemployment rate in the district. On the same road but some way beyond the mango plantation, was a massive dam project that would ensure fresh water supplies and copious amounts of hydroelectric power in the district for many decades. My guide for this excursion was a Periyakulam Campus’ staff member who was extremely proud of the fact that the district mango production was competitive and that the crop was later maturing than other districts.

This later maturing phenomenon was due to climate, soil, aspect, altitude, etc. He could name a wide variety of mango cultivars and comprehensively outlined the production requirements for this fruit. I pointed out that it was late summer and that by the time the fruit reached Mumbai much of the fruit would be ruined. The staff member agreed and said the losses would be about one-third, but even so, because these mangoes are almost out of season, the price would be a premium.

It occurred to me that a significant opportunity was being missed. The shelf life of a fresh mango is a few days. This limited the options for marketing. The Indian Government announced a programme encouraging entrepreneurial small business activities supported by grants of up to one million rupees. As a systems thinker I quickly put the elements together for a perennial, profitable and socially responsible disposal of the late maturing district mango crops that would be ideal as a graduate commercial venture. The fresh water supply, the 25% unemployment, the small local fresh fruit consuming population, the thriving, district, mango, raw material resources, the government entrepreneurial small business grants formed a system that could be managed as a mango chutney or cordial enterprise each with a shelf life of many months.

These ideas were a total revelation to the staff member and it became obvious that the very idea, was not part of ‘what a university does’. The importance of the workshop could be summarised by the following quote that emerged from one group’s suggestion of ‘ways to overcome the roadblocks’:

(to) motivate staff and students by establishing a university and campus ‘culture’ of mutual, need, benefit, involvement, commitment, partnership, hope and destiny.

(Self-Employment Workshop comment)
3. The farmer/student/staff relationship questionnaire

The VSP is the flagship experience for TNAU undergraduate students—it is the primary connection between the staff/students and farmers. However, the university does have other community connections such as the KVK – Krishi Vigyan Kendra (the Farm Science Centre). This is a university research/extension ‘shop front’ that researches production focused farming issues and conducts demonstrations and training workshops for farmer groups. They also conduct farm-based production optimising field trials within a designated group of villages. My impression is that villages close to a campus rely on the institution to help them, in other words there is an established relationship between them however, for the purposes of this thesis I will restrict my community relationship discussion to the VSP.

I was invited to attend a local village ceremony with an audience of over 2000 people. The village was located in close proximity to the Madurai Campus. Academic officials from the campus and village leaders occupied the stage area.

Image 5.2 portrays a group of musicians performing at a village festival. They followed the village leader who spent at least 15 minutes shouting and gesticulating at the crowd over a microphone in Tamil. I became concerned and enquired as to the subject of the village leader’s tirade. The Dean replied he is angry at what the University is not doing for his village. Despite the KVK and the VSP, the relationship between the village and the Campus is apparently not professionally, developmentally or even socially close.

‘To a Cat with its head Stuck in a Pot the Whole World is Black!’

Traditionally, the VSP was designed by the extension staff at each campus as a ‘capstone’ experience whereby students could transfer technology from the staff and extension/KVK, research projects to the farming community. This has caused significant problems because the current senior management want the students to engage in the VSP as experiential learners not extension personnel. Despite the grand designs of the senior management, the VSP programme has little scope for an experiential approach because it has been rigidly designed by the Extension Department for technology transfer. Any information gathering is based on recording answers to a
In a few short visits to local farming situations and after many interactions with students, I realised that the rural community situation was much more complex than a simple agricultural production focused exercise might imply. There were enormous threats to farmers from such things as labour shortages, corporate plantation farms, secondary industry enticing away farm labourers, market ‘booms and busts’ transport irregularities, marketing inconsistencies, unreliable electricity supplies, pollution of waterways and lowering of the water table and well water depths caused by irrigation. Communities were concerned about things like; a lack of a flood free road, unreliable electricity, not being on a bus route; all are integral issues to rural community life yet because they were not directly linked to agricultural production based on a science and technology focus, they were generally ignored. None of these issues were given much credence in the students’ questionnaire booklet. The university curriculum acknowledged these issues but only on the periphery of the more science based and technical subjects. Within the whole ‘climate’ of the VSP both on and off campus, there was a tacit acknowledgement of university ‘authority’. There was a perception that the university had the answers and the students were to convey, not only the knowledge and technology, but also to foster that image of authority. This paradigm paralysing, mind set seemed to generate a foundation for rigid, hierarchical structures and stereotyped processes resulting in ‘top down’ methodologies, which seemed to dis-empower the students, the farmers and the rural community and ironically the staff as well.

The extension staff appear to be threatened by the senior management’s desire to change the VSP paradigm. There seems to be a paralysing situation in that maintaining a technology transfer paradigm locks students into a curriculum journey that has increasingly limited employment opportunities. It is my opinion, given the Farmer/Student/Staff Questionnaire results, my participant observations and semi-structured interviews with staff and students, that the extension staff need to maintain the current VSP format in order to maintain their status, position, power base, their ability to exert influence and control in the university culture, structure and function. In my opinion, this kind of political struggle would not be out of place on any campus or in any organisation.

The VSP Programme and the Staff Student Farmer Relationship Questionnaire
The research indicated that the VSP programme is not successful in terms of either the espoused learning or actual technology transfer paradigm. The results showed that the general relationship between the farmers, students and staff is cordial but not very productive. Even if one were to argue that staff and students increased production as a result of their VSP interaction; that increased production would be with a group of farmers who are already successful. Many such farmers are specifically selected for the VSP programme because of their ability to understand
agricultural production concepts and principles. Some host farmers had been in the programme for 10 years. In a typical farming district there would be 50 such farmers available out of a farming population of 30,000, so they are hardly representative and may not be truly representative of the rural community and therefore not really challenge the students in a realistic way.

There are many reasons why the programme is not working but generally the research indicated the following:

- The programme does not cover one cropping period (3–6 months).
- Stipend funding for staff and students was inadequate and needed to be increased significantly, in order to cater for student and staff needs.
- There seemed to be an overpowering; isolated, sometimes sceptical, cultural issues ridden relationships, between the three ‘players’ (staff, students, farmers).
- Students’ expressed futility in the purpose of the programme because it was situated at the end of their course leaving no time for problem-solution or situation improvement or even ‘follow up’. This indicated the experience was a lesson confirming exercise.
- Students experienced other overwhelming non-production imperatives affecting the farmers quality of life that were not covered in the course.
- Staff viewed students as incapable of adjusting to the village/farm environment.
- Many students did not generally comply with the spirit of the programme.
- The programme would be improved by locating it much earlier in the curriculum, adopting a *triumvirate action learning approach* (staff, students and farmers form a learning partnership to mutually explore, identify and improve issues of concern as an action learning project) to the overall design and allowing the students to individually learn from the experience, not merely act as research and extension conduits for the Extension Department.

Overall the programme seemed to be conducted in an extremely vague environment. It was overtly a traditional, top down model of extension yet the staff” were very aware of current theories about bottom-up and even collaborative models of extension and often extolled the virtues of this framework. Students were generally non-committal and some optimistic students saw an idealistic opportunity for rural development but were frustrated by the nature of the programme’s requirements and restrictions. Others saw an opportunity to use the VSP period to study for exams. The programme has many advantages in that students can explore the reality of commercial agriculture first hand and engage and experience the agricultural production cycle with the farmers in their wider community. Students can critically reflect on their course to date, in light of this applied experience. If positioned early enough, students could learn from this experience what gaps exist in their professional practice and use their remaining course time to close those gaps.
Home Science Department, The VSP, Praxis Development and Community Relationships

Home Science has a unique version of the VSP. A group of ten or so girls ‘live in and experience the village’ for a period of time. During that time they observe the quantity, variety and quality of food used to prepare meals for a variety of family members including adult males, lactating mothers, children, infants and babies. They conduct an audit of the quantity, quality and availability of food sources. Students’ also conduct what seems to be a systemic analysis of the family and villagers’ approach to general day-to-day health practices, by participant observation. They then ascertain in conjunction with the villagers, what (nutritionally, or health practise wise) are issues of concern.

Upon return to campus, students and staff bring university resources into play to design ways to deal with the identified issues of concern in order to improve the situation. They then collaboratively and critically apply the improvement. Students return to the village some time after the implementation of the regime and get feedback relating to the viability of the recommended system. Students utilise village-friendly extension methods such as puppetry, drama, song, dance, to convey important messages across nutrition, health practices, child rearing, managing domestic processes etc. This approach is very successful, I recall how well regarded the Home Science students were in the villages the agriculture students were not so well regarded.

Image 5.3: Home Science Students Madurai Campus.

In this picture the author is shown discussing, with the Dean of the Madurai Campus, staff and female students from the Home Science Faculty, their approach to managing the field workers’ lunch routine. The students’ research indicated that field workers in a particular village, were suffering from significant intestinal problems. Further inquiry revealed that the field workers prepared a hot lunch or ‘tiffin’, as is the culinary custom for this region, before travelling to their allocated field for their days’ work.

The lunch remained in its metal container for a long period before consumption. Tests revealed a high bacterial count caused by the cooling of the food over the morning. Students designed ways to insulate the food using indigenous materials, but incorporating scientific and technological; concepts, principles and practices. The containers were simply modified to maintain a higher
temperature for a longer time than previously. This somewhat solved the bacterial proliferation problem. Generally, by critically researching ideas and applying a strategically designed regime for improvement in an atmosphere of striving for mutual benefit is a praxis process.

The Home Science students’ approach of ‘working with the farmers and the village’ to identify the needs and then critically reflecting on the causal relationships to identify the actual need is a learning approach. Then by using course concepts they design contextually relative technology that fulfils the need or at least improves the situation. The students use a collaborative, universal approach yet their learning is unique for each situation. Each learning episode develops their capacity to deal with unknown situations. This approach personifies the Triumvirate Action Learning Model. This approach is very different from the approach used by the agriculture students which is basically a ‘top down’ extension process whereby students ‘work on or for the farmers and the village’ by identifying opportunities for transferring established production optimising technology as a problem solving exercise. Praxis development is an individual capacity development process that generally requires not only the critical identification and strategic application, of theory in context but also accessing theory to explain and improve professional practice. Praxis, as a core learning process and fundamental curriculum design conceptual framework property, will be discussed at length in Chapters 6 and 7. I believe praxis development to be an essential process stemming from the research. The three primary research instruments indicate room for change in approach to curriculum design. There was a shift in focus towards relevance for the individual that required a shift in focus for curriculum. My regret in this process was not being able to directly canvass the farming community. However, I did indirectly achieve a significant impression of their needs. This impression only reinforced the need for graduates to develop universal attributes consistent with working effectively with community.

**Assimilated Primary Research Results as a Description of the *Current Curriculum*.**

Students are viewed as stereotyped dependent, passive, surface learners, and acquiescent recipients of facts and concepts. They study in a program that is essentially determined by the instructor or authorities other than the student. Staff tended to work in an orthodox, competitive, departmentalised, fragmented, hierarchical and singularly focused workplace, bounded by a science paradigm and the scientific method generating Mode 1 Knowledge (Kerr 2005). The instructor delivers didactic, disintegrated, abstract and theoretically based lectures; they occasionally outline one or two perspectives on a topic and they conduct practical sessions in which a pedagogical approach to education dominates. Staff manage a largely, competitive, aloof educational classroom and field practical environment, in which they occasionally ask questions in the Socratic manner (Vlastos 1983, Benson 2000) in seeking answers from students.
The focus for learning appears to focus on developing long-term memory about the content of the lessons. Knowledge and comprehension are the products of study with some analysis and application as confirming observations during practicals case studies, field trips, work experience and practicum. Success is behavioural, normalised, cumulative and progressive and therefore objectively measurable. Overall desirable student performance is measured by them attaining consistent high grades associated with consistently high grade point averages (GPA) or other similar administratively convenient, measuring device. High grades are equated with ability. Grade Point Average’s are generally determined from the results of regular examinations and tests requiring candidates to recall and discuss concepts and facts delivered in class, or acquired, or observed, in the practical or through reading. Employment opportunities for graduates are vague, traditional and static, focusing on academia, research, extension and government agencies.

**Assimilated Primary Research Results as a Description of the Preferred Curriculum.**

Students are viewed as individuals with unique histories, experiences, worldviews, aspirations, attributes, qualities and learning styles. The curriculum is reasonably eclectic but bounded and guided by the course field of study. Students and staff enquire in a systemic, integrated and emergent framework, focusing on personal and professional learning development. They heuristically, subjectively and strategically collaborate in order to generate Mode 2 and Mode 3 Knowledge (Kerr 2005). Students also generate Mode 1 Knowledge.

The course concepts, processes and principles are developed experientially as individual student learning. Students can be dependent, independent and/or interdependent in association with selected others, relative to their needs. Students are active, deep learners and self-efficacious generators of their own contextual knowledge informed through accessing and then critically and strategically applying ideas sourced beyond their own experience. They study autonomously in a pedagogical, and/or andragogical and/or heutagogical and/or partagogical educational framework, whereby the program is either designed by staff and self-directed by student, designed collaboratively between staff and student, or self-determined and managed by the student with the assistance of various staff and significant contextual others including members of the community.

Staff work in a heterodox, collaborative, interdisciplinary and egalitarian workplace. Staff facilitate students in developing their own opinions and perspectives, their own approaches and responsibilities for managing their own learning towards their own identified goals and evidence based competence leading to increased employability and meaningful employment. Evidenced based graduate attributes guide curriculum design, structure, function and assessment. Staff collaborate with students as well as significant contextual others, both on and off campus communities, in proactive mutually beneficial learning projects.
The focus for learning projects is to both improve situations and evolve mutual capacity for effective social engagement, meaningful community development, economic change management and environmental sustainability and conservation. Projects are essentially action learning and action research based. Students, staff, and community, manage various forms of dissonance through co-reflection and critical reflection both on and in, experience. Directed by the outcomes resulting from critical reflection on and in experiences, students design and engage in individual or group learning projects. Analysis, synthesis, evaluation, problem solving, situation improvement, as well as self-management and competency, capacity, and capability are the products of situated learning. Success is achieved in a constructivist paradigm through individualized, transformative and developmental processes.

Overall student performance is determined by the demonstration of learning development in terms of the contextually relative, critical and strategic application of critically sourced theory in practice (praxis) involving relevant, constructed knowledge. Progression is generally determined from the results of formative and summative assessments that validate student claims for their praxis development. Employment opportunities are reasonably unbounded, eclectic and relative, based on student employment opportunity research connected with professional practice development throughout the course. Students can work in both public and private industry, entrepreneurial and, self-employment situations, advisory and consultancy as well as pure and applied research, locally nationally and internationally.

**Integrating the Primary Research**

The purpose of the research is to identify some properties that will assist with the design of an undergraduate curriculum conceptual framework. Integrating the outcomes of the three primary research instruments can assist in this process by creating a synthesis of curriculum themes that can inform the next stage which is the secondary research themes.

Fig. 5.1: Integrating the Primary Research Instrument Outcomes.
Figure 5.1 shows the integration or synergy of the outcomes of the three primary case study research instruments. The emergent curriculum themes are an individualised, engaged and career focused learning process.

**Related Professional Experiences as Adjunct Thesis Primary Research**

I am presenting some of my professional experiences that have enlightened the schema design by embellishing the primary research outcomes and providing a “map and compass” for identifying some secondary research themes.

I was an agriculture science, secondary teacher from 1975–1990, and university lecturer from 1991–2005. In India from 1995–2000, I worked on a Ford Foundation Project, with Staff, Students from The Tamil Nadu Agricultural University and local Farmers in developing an undergraduate, experiential learning curriculum. I worked with staff from the University of Natal, South Africa and the Eastern Cape Province East Griqualand Kei region community service professionals in “The Links Programme” in particular, facilitating a residential week-long workshop called “Desegregating The Help”. In 1995, I visited the Sustainable Agricultural Research and Education Program (S.A.R.E.P). This is a break away group in the University of California at Davis USA. The staff at SAREP, conduct “bottom up rural development programmes” with the local rural community. I observed the “Fresno Farmer Group Workshop” and interacted with UC Davis - Agriculture students about their courses and career options. I interacted with staff at Alverno College USA in the year 2000, about the structure, function and assessment of their competency based curriculum. In the year 2000 I also interacted with staff of the School of Complexity and Change at the Open University UK, about assessing subjects offered by distance mode. I discussed the introduction of experiential learning as a curriculum design feature with staff in the Methods and Projects section of The Royal Veterinary and Agricultural University (K.V.L.) Copenhagen, Denmark in the year 2000.

I was part of a research team in 2002 comprising university staff, extension staff, and a comprehensive strata of town representatives including school students, that collaboratively built a ‘Rich Picture’ of an Australian country town. The town was Condobolin NSW with a population of 3000. The project was called “A Snapshot of Condo” and was designed to help the whole community understand how it viewed itself, to identify themes and issues for concern and provide ideas for community development and to collaboratively decide on options for improvement and design a way forward.

In 1999 I worked with a team of staff in facilitating a series of workshops focusing on relationship building skills for improved production, with Oil Palm Industry Extension Officers at Kimbe Rabaul, PNG, I have run several professional development workshops, for staff the National Livestock reporting service. Between 1991 and 2005 I was a Lecturer in Learning Systems Design at the University of Western Sydney - Hawkesbury Campus, NSW Australia. I contrived.
designed, co-designed, delivered and assessed the following undergraduate and postgraduate subjects:

- Professional Practice 1, 1B, 2, 2A, 3A (Undergraduate Core Units)
- Systems Thinking and Project Design (Undergraduate Core Unit)
- Agricultural Systems Project (Undergraduate Core Unit)
- Farm Practice, (Undergraduate Core Unit)
- Learning (Post Graduate Core Unit)
- Agriculture Method (Bachelor of Teaching)
- Developing an Education Praxis (Undergraduate Elective)
- Professional Praxis-Learning in Context (Core Unit, Master of Public Health – Hong Kong)

Each year from 1991 until 2005, I engaged with and assessed, undergraduate students who were living, working, co-learning and co-researching with farm families in rural N.S.W. Australia. The assessment process involved students firstly presenting the results of their research to the staff and farm family in the form of their version of the functioning farm as a multi-perspective and systemic “rich picture”. This graphic was supported with an extensive analysis and explanation of “how well” the farm was functioning in relation to the farm families’ goals, hopes and dreams. Secondly the farm family would give feedback as to the validity of the student’s version of the functioning farm. The student would be expected to subsequently respond to the feedback in order to bring their version of the situation in line with the farm family’s. Once this convergence had occurred the student could co-research with the family to identify concerning themes and issues and then subsequently focus on co-learning with the farm family to address the issues and improve the situation.

**Conclusion**

In this chapter I have presented an analysis of the case studies’ primary research results. There is an attempt to partly answer the research question by presenting some emergent themes such as an individualised, engaged and career focused learning process. The results of the three research instruments The Gainen Inventory, The TNAU Staff ‘Self Employment’ Workshop and The Staff/Student/Farmer Relationship Questionnaire, are discussed in detail with explanations and participant observational anecdotes that enhance the thesis argument. The author’s related professional experiences are included as part of the primary research. Traditional professional relationships between the university and its community are challenged as is the traditional science paradigm used to inform agricultural curriculum design. The assimilated current curriculum emerging from the research is critiqued and an alternative design of a preferred curriculum is presented as a roadmap for informing the UG schema. There is a strong argument made for a move towards a more vocationally orientated curriculum.
Chapter 6 will review secondary research literature relating to the emergent themes and issues in order to both compliment and extend the primary outcomes and more fully inform the properties of the U.G. Schema, curriculum design.
CHAPTER 6
SECONDARY RESEARCH ANALYSIS, THEORY DISCUSSION AND EMERGENCE OF THE SCHEMA DESIGN PROPERTIES

Introduction

This chapter draws together the secondary research into themes issues and theoretical frameworks that are relevant to the research question. In the concluding paragraphs the primary and secondary research outcomes are assimilated in order to identify the community grounded undergraduate curriculum, conceptual framework design properties. Although a comprehensive list of secondary research themes emanating from the primary research is presented in ‘Secondary Research and Theoretical Frameworks', ideas outlined in Chapters 1 and 2 are also eventually incorporated into the UG Schema design milieu.

Secondary Research and Theoretical Frameworks

The following secondary research and theoretical frameworks have emerged from, and are guided by, the analysis and assimilation of the primary data (Gainen, Career Workshop and The Staff/Student/Farmer Questionnaire) with regard to the research question:

1. Intellectual and Ethical Development.
3. Active and Passive Learning.
4. Taxonomies of Educational Objectives.
5. Situated Learning, Experiential Learning, Action Learning and Action Research.
7. Personal Constructs Theory.
8. Memory.
12. Mode 1, Mode 2, Mode 3 Knowledge and Transformative Learning.
13. Developing On-Campus Learning Communities.
14. The Engaged University & Off-Campus Learning Communities.
15. Student/Graduate Attributes.
1. Intellectual and Ethical Development


William Perry’s research concluded that as students progressed through their tertiary studies they moved through a variety of intellectual stages. Perry suggested nine ‘positions’ in all however they could be summarised into three categories. The categories represented the student’s approaches for developing knowledge, exploring, understanding and explaining ‘their world’ or ‘the world’ at large in order to make meaning.

Belenky (1986) and Gilligan (1982) have critiqued Perry’s work in regards to gender. Their studies indicate that males and females view moral and ethical development differently. Males tend to favour development towards autonomy and individuality and females tend to make judgements based on relationship and connectedness. Rapaport (2005) acknowledges this difference and includes the fourth category ‘Commitment or Constructed Knowledge’, in Perry’s schema.

Category 1—Dualism or Received Knowledge

According to Perry an early stage in the student’s intellectual development is known as dualistic. This means that simplistically, situations are; good or bad, ideas are right or wrong, the world is metaphorically, black or white with no shades of grey. Students rely on an authority to decide and tell them which of two conflicting viewpoints is correct.

Category 2—Multiplicity or Subjective Knowledge

A more advanced system is that of multiplicity. This means that there are a variety of reasons why things are like they are, and one can form arguments from a number of points of view, each of which is valid. The skill is to focus more on the outcomes of a process of researching ‘around, through and between’ the situation rather than seeking an ‘absolute truth’ or relying on the authorities opinion, as in dualism. The results should be a variety of points of view, for and against. These are assimilated into personal point of view that is presented as a validated argument.

Category 3—Relativism or Procedural Knowledge

The most sophisticated system in Perry’s schema is called contextual relativism. This means that the context determines the situation. As the context changes so does the situation. There are many truths and the validity of a viewpoint is dependent upon or relative to, the context of the situation. In other words, a single explanation may be valid in one circumstance yet invalid in another.
Category 4—Commitment or Constructed Knowledge (Belenky et al. 1986)

In this stage, the student combines latent personal knowledge and experiential knowledge gleaned from critical reflection with knowledge learned from others to form an integrated, committed strategy for understanding, making meaning and moving forward in their world. This process is subject to evaluation and adjustment.

A Process of Attitude Development in the Individual

Normally the Perry stages develop in from early to late years and from simple to complex. These stages relate to the students relationship with their learning environment, and their changing learning preference. Not all students would be at the same stage at the same time, and not all students reach a point of development known as Relativism/Procedural Knowledge or even Commitment Constructed Knowledge however reaching these stages as a graduate would be extremely advantageous in terms of employability and meaningful contribution to the community/workplace. Baxter and Magolda (1992) have also conducted separate studies with tertiary students their results are tabulated.

Table 6.1: Baxter Magolda Longitudinal Study on Intellectual Development in College Students

<table>
<thead>
<tr>
<th>Stage of Course</th>
<th>Proportion of Student Cohort</th>
<th>Construction of Meaning, Ways of Knowing</th>
<th>Description of the student's attitude to knowledge</th>
<th>Students' role in developing knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entering College</td>
<td>68% Absolute knowing</td>
<td>Knowledge is certain or absolute and conceiving their role as learners to be limited to obtaining knowledge from the instructor</td>
<td>Students depict themselves as passive recipients of their professors' wisdom.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>32% Transitional knowing</td>
<td>Knowledge is partially certain and partially uncertain; their role was to understand knowledge.</td>
<td>Student’s role was to understand knowledge.</td>
<td></td>
</tr>
<tr>
<td>Senior Year</td>
<td>84% Absolute Knowing</td>
<td>Considering knowledge to be certain or absolute and conceiving their role as learners to be limited to obtaining knowledge from the instructor</td>
<td>Students depict themselves as passive recipients of their professors' wisdom.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16% Independent knowing</td>
<td>Everyone has his or her own beliefs</td>
<td>Students are expected to think for themselves, share views with others, and create their own perspective</td>
<td></td>
</tr>
<tr>
<td>Year After Grad'n</td>
<td>57% Independent knowing</td>
<td>Everyone has his or her own beliefs</td>
<td>Students are expected to think for themselves, share views with others, and create their own perspective</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12% Contextual knowing</td>
<td>Knowledge is judged on the basis of evidence in context,</td>
<td>The student's role is to think through problems and to integrate and apply knowledge</td>
<td></td>
</tr>
</tbody>
</table>

Baxter Magolda Longitudinal Study 1992 ‘Changes In Students’ Construction Of Meaning or Ways of Knowing’
Table 6.1 portrays a tabulated form of the Baxter Margolda (ibid) study relating to the development of ways of knowing by college students. The study indicates support for arguments presented in Chapter 2. This argument based on research by the AC Nielsen Research Services (2000) suggests that students do not begin to develop the intellectual capacity required by employers (contextual knowing) until well into the first year after graduation. According to the Baxter Margolda study only a very small proportion (12%) achieve contextual knowing even then.

This may indicate that the courses in which these students have studied, did not affect to any great extent, their ability to construct individual meaning and ways of knowing beyond the ‘absolute’ and ‘transitional’ ways. It suggests, given the low ‘independent’ knowing development figures (16%) in the student’s senior year, compared with the significant increase (57%) the year after graduation, that the challenge of the reality of the world outside the course has a greater affect on development. Why can’t this powerful effect be incorporated into the undergraduate curriculum design, delivery, assessment and reporting by requiring students to regularly engage in the workplace throughout their course?

2. Deep and Surface Learning


Deep and surface learning describes attitudes that students adopt to a learning experience.

‘Simply stated, deep learning involves the critical analysis of new ideas, linking them to already known concepts and principles, and leads to understanding and long-term retention of concepts so that they can be used for problem solving in unfamiliar contexts. Deep learning promotes understanding and application for life. In contrast, surface learning is the tacit acceptance of information and memorization as isolated and unlinked facts. It leads to superficial retention of material for examinations and does not promote understanding or long-term retention of knowledge and information.’

(Bransford et al 2000 p. 234-239)

These descriptions cannot be singularly allocated to a student because the student can adopt either style depending on the context. Atherton (2005a) argues that surface learning is more commonly invoked through extrinsic motivation whilst deep learning characteristics emerge from intrinsic motivation. Extrinsic motivation might be analysing a teachers’ preference for assignments and only complying with those preferences. Intrinsic motivations might be identifying a formal or informal curiosity, a passion a goal or a need and working diligently towards them.
Biggs (1999), Entwistle (1988) and Ramsden (1992) suggest that ‘deep’ learning is about ‘looking for meaning’, ‘making connections’, ‘relating new and previous knowledge’ and ‘linking course content to real life’. The characteristics of surface learning are ‘relying on rote learning’ adopting a formulaic approach to problem solving, ‘failing to distinguish principles from examples’, seeing course content as material to be learnt for the exam.

Entwistle (2001) suggests that surface learning is arranging unrelated bits in order to memorise them whilst deep learning is consciously rearranging, reorganising, making personal patterns and recognising the logic behind the organisation of material, in order to achieve understanding. There would be a strong relationship between surface learning attitude development and a behaviourist educational environment and a strong relationship between deep learning approaches and a constructivist educational environment.

During one of my visits to the Madurai Campus, escorted by a group of senior students, I climbed ‘Elephant Rock’. Elephant rock a striking sandstone monolith backing onto the campus boundary. Upon reaching the summit, I became aware that the students had their final exams the next day. They had planned to take me to the cinema that evening. I became concerned that I might, as a guest, be the cause of them not achieving their best because they chose to entertain me the night before and exam. They informed me that they do nothing between exams and it was common practice to study or not study the night before.

There are many factors that influence whether students adopt a deep or surface approach to learning such as the teachers’ planning, demeanor, skill and relationship with students; the curriculum design; the assessment format and requirements; peer pressure and campus culture. In terms of Bloom’s Taxonomy the deep learner would employ ‘higher order thinking skills’ (Bloom 1956), to move the information deeper and deeper into their personal perception. The depth of the assimilation and integration of the experience will depend upon how actively the learner engages.

**Critical Thinking**

Critical thinking is closely related to deep learning and is an essential learning process according to Howe and Warren (1989). They suggest that thinking critically is a higher order skill and
indispensable in a changing world. Ennis (1987) argues that critical thinking is a process that people use to decide what to do and what to believe. Costa (1985) suggests that critical thinking is a problem solving procedure involving three steps: identifying the problem, judging the validity of information related to the problem and solving the problem and drawing perennial conclusions. Howe and Warren (ibid.) propose that real-life experiences stimulate critical thinking. Glaser, (1984) and Carey (1986) argue that students require a certain level of background knowledge in a particular field in order to more effectively think critically.

3. Active and Passive Learning

Active and passive learning theories have both deep and surface as well as behaviourist and constructivist connotations. Whether the system is passive or active depends on the approach taken by both the teacher and the student in relation to the curriculum. Passive learning as the name suggests, describes a situation whereby a student plays an inert part in the educative process. In a passive learning environment, the student is treated as a receptacle to be filled and the staff member orchestrates the filling. In a passive learning curriculum the student has very little say in the content, delivery, assessment and learning activities.

Learning is not a spectator sport. Students do not learn much just by sitting in class listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences, apply it to their daily lives. They must make what they learn part of themselves

(Chickering & Gamson 1987, p. 3, in Bonwell & Eison 1991)

Active learning is student centred and incorporates programmes such as project based learning experiential learning self-directed learning and self determined learning. Both the Gainen inventory and Student University Satisfaction Questionnaire results indicated that the current curriculum is passive in design and that the preferred curriculum should be ‘active’.

4. Taxonomies of Educational Objectives

(Bloom 1956; Anderson & Kratwohl (eds), 2001; Kratwohl, Bloom & Masia 1964; Dave 1975). Benjamin Bloom devised a taxonomy of learning objectives that is hierarchical. The above model recognises Bloom’s work yet organises the components of the taxonomy into a more cyclic relationship. In the above model Bloom’s 6 levels have been grouped into three levels: ‘knowing of or about something’, ‘making sense by doing’, ‘judging, deciding and implementing’. These have been interrelated through a ‘nested spiral’ configuration. The Gainen inventory has elements that are consistent with Bloom’s schema. A continuum from Gainen Category A responses to Gainen Category D responses is evident. Staff and students’ rejected knowledge and comprehension as the total objective of their educative process in favour of more complex and challenging aspects, such as application, evaluation and synthesis. In other words staff and students’ want more from their
course than ‘knowing of or about something’, they did want more of both ‘making sense by doing’ and in particular to develop the ability and practice of ‘judging, deciding and implementing’.

Fig. 6.1: A Model for Demonstrating the Integration of Bloom’s Taxonomy

Bloom’s Taxonomy is probably the most familiar; however, there are several other taxonomies relating to educational processes and student development. According to Anderson and Kratwohl, (2001), a person can also develop, like Bloom’s Taxonomy in the ‘cognitive domain’, according to a schema that involves remembering, understanding, applying, analysing, evaluating and creating. Kratwohl, Bloom and Masia (1964) suggest an alternative taxonomy focusing on the ‘affective domain’ whereby the learner engages in receiving, responding, valuing, organising and conceptualising; characterising by value or value concept. According to Dave (1975), the psychomotor domain can be served by a taxonomy that incorporates the following stages, imitation, manipulation, precision, articulation, naturalisation. All of the above four taxonomies are useful in describing both the current and preferred curricula and also the development from lower to higher order thinking, feeling and acting.

5. Situated Learning, Experiential Learning, Action Learning and Action Research

(Lave & Wenger 1990; Shor 1987; Stein 1998; Kirshner & Whitson 1997; Tennant 1997, 1999; Dewey 1938; Kolb 1984; Lewin 1942 [1951],)

Tell me, and I will forget.

Show me, and I may remember.

Involve me, and I will understand. (traditional, Confucious 450 BCE).

Confucious introduces this section with his experiential learning quote. In this citation, Confucious echoes the covert responses and aspirations expressed by staff and students in the Gainen Inventory.
**Situated Learning**

Situated Learning (Lave & Wenger 1990) is a conceptual framework that describes aspects of curriculum associated with the experiencing the challenge, motivation and application of theory in reality. Kirshner & Whitson (1997) suggest that situated learning is a socio-cultural phenomenon and that situated learning is about creating meaning by taking advantage of opportunities to engage in everyday contextualised activities. Shor (1987) suggests that curriculum should be designed to present the challenges of reality that students are, or will face, in order that they learn to cope in an atmosphere of support. The subject matter should be focused on student development needs and concern.

According to Stein (1998), situated learning allocates the pivotal role for the learning process to the student. Situated Learning involves problem solving, meaning making and mastery development with community, in day to day contexts in supported by resource persons (Brown, Collins & Duguid 1989; Lave 1988; Shor 1987). Tennant (1999, p. 170) presents four propositions relating to situated learning. Firstly; Tennant asserts that everyday workplace, community or family experiences, can yield ‘high level or even expert knowledge’. Secondly; Tennant argues that ‘domain specific knowledge is necessary for the development of expertise’ and that expertise relies upon ‘detailed local knowledge’. Thirdly; he asserts that ‘learning is a social process’. Fourthly; Tennant proposes that ‘knowledge is embedded in practice and transformed through goal-directed behaviour’. Tenant (1997, p. 77) also argues that ‘Knowledge is, thus, located in the community of practice’. This means that learning is subjective and contextual, it requires complete involvement in the situation, involvement of social fit or non-fit, consciousness of mind, being and physiology.

Many of the ideas relating to situated learning are similar to informal learning. There seems to be a student focus in the situated learning framework, that is consistent with the current to preferred curriculum change, apparent in the Gainen results. One might imagine that following Shor’s (1987) statements that a situated learning curriculum would be designed collaboratively between the staff and students. This arrangement was flagged in the preferred curriculum.

**Experiential Learning**

Experiential learning as a movement has its roots with John Dewey, Kurt Lewin, David Kolb and others. Dewy believed that education and experience are synonymous. Many educationists have built on Dewey’s philosophies and models. All of them see learning as a continuous and/or iterative cycle, of doing and thinking, the net result being learning. The purpose of the learning resides in the needs or otherwise of the learner and can be as diverse as the experiences in which they participate. This section will contain a number of versions of a learning cycle.
In Dewey's experiential learning model he portrays a series of interconnected cycles. It is reasonable to expect that $K_3$ (knowledge in cycle #3) is superior to that in $K_1$, because of the learning that has taken place. It is interesting that Dewey initiates his cycle with an 'impulse', this may have been the vernacular ‘action taking word’ of the day or he really meant a sudden desire or whim. After several considered cycles the learner finally arrives at a purpose.

Experiential learning (Dewey 1938, Lewin 1942, Kolb 1984) suggests that students’ learn from their experiences. The nature of that experience and the relevance of the learning emanating from its analysis is the key. In the current curriculum, the relevant formal experiences were determined by the staff and in the case of the VSP, the Extension Staff. Dewey, Lewin and Kolb would argue that the learning emanating from experiences is personal. Dewey, Lewin and Kolb (ibid.) assume that the analysis of the experience is a subjective process. In a traditional curriculum the student’s subjective learning seems to be by-passed, overlooked or even discouraged, in favour of a curriculum design that elevates the objectiveness of the experience. Assessment of objective outcomes is the priority for curriculum design. This approach relegates experiential learning to the student’s imagination, their journals, diaries and the ‘hidden curriculum’ (

2) (Jackson 1968).

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2 The hidden curriculum is what is learnt despite what is taught and will be discussed in more detail in chapters 6 and 7.
Kolb and Lewin provide a process for converting experiences into understanding, or as Kolb (1984) suggests, experiences are apprehended when concepts are applied and experiences are comprehended when they are conceptualised. Likewise, knowledge is transformed by intention when tested out, observed and reflected upon. Likewise, comprehension is generated by extension when testing out concepts. These are conscious learning processes, that require the student to allocate time and seek assistance to find out, make sense, contrive a plan and to test out and apply the plan, in order to generate knowledge and/or skill applicable to their needs.

Fig. 6.3: A Stylised Model of an Experiential Learning Cycle.

Fig. 6.4: A Series of 3 Graphics Depicting: 2,3,4,5 & 6 Stage, Learning Cycles.
Although Figures 6.3 and 6.4 appear to involve significant complexity, the process of experiential learning has a distinct pattern. The pattern involves iteration between experience, reflection analysis and action taking. The result is always another different and hopefully better, experience. A cycle in this case indicates succession; the learner either develops knowledge and/or is transformed by it, they do not merely accumulate knowledge.
**Action Learning and Action Research**

Action learning was an expression coined by Revans (1980), who concluded that learning involved action taking. Revans originally applied action learning to business and management but its applicability gradually diffused into educational theory. Action learning describes a natural process of engagement and exploration, sense making and adaptation leading to improved engagement and exploration. According to Weinstein (1995, p. 95) action learning is the opposite of chalk and talk, it is a process that requires the application of developed understanding in order to truly declare that something has been learnt. The traditional ancient Chinese proverb, *I hear and I forget . . . I see and I remember . . . I do and I understand* supports Revans’ ideas. Action learning according to Weinstein (ibid.) is a process that requires more than a case study approach it requires real world issues to be worked through in a critically reflective dialectic by engaged and supportive groups or ‘sets’.

Weinstein (ibid. p. 37) categorises real world issues into two enigma related concepts; puzzles and problems. She then separates the two concepts by definition the puzzle is a dilemma for which the one right answer exists and the problem is a dilemma for which no solution yet exists and each solution will be contextually relative. Weinstein (ibid.) suggests that action learners should consistently question expert knowledge for its legitimacy in the learner’s context. One of the difficulties in effective action learning is gaining sufficient life experience in order to know what questions to ask. This chicken and egg situation is ameliorated as the learner engages in more and more critical experience. An action learner should engage in a series of critically connected cycles that involve action, observation, reflection, planning etc. The following is the author’s portrayal of an action learning cycle based on that of Ortrun Zuber Skerritt

![Figure 6.5: An Action Learning Cycle.](image)

**Figure 6.5** portrays an action learning process. Drawing on Weinstein (1995) and Zuber Skerritt (1982) the model suggests a general movement from left to right. Action taking occurs above the central line and learning below this line. Beginning with a need or purpose the learner experiences, observes, reflects plans and then re-experiences. The learning cycles involve a process of strategic adjustment incorporating researching and applying appropriate ideas that may have been presented as insights by members of the ‘set’. As the student engages more deeply a student/client relationship may begin and an action research (Zuber-Skerritt 1982)/action learning (Weinstein. 1995) process may emerge.
Chapter 6—Secondary Research Analysis, Theory Discussion and Emergence of the Schema Design Properties

Action research builds on action learning concepts and processes to become a methodology for improving situations often with others. Action research is an expression originated by Kurt Lewin (1946) to address post-second world war social problems. The methodology was adopted by educational theorists in the 1960s and 1970s according to Riding et al. (1995). One modern evolution of the action research methodology is that it not only can it be used to help improve situations but it can also be used to improve the way people learn to improve situations. Carr and Kemmis (1986) suggest that there are three forms or modes of action research:
1. Technical-expert helps others’ to develop their professional practice
2. Practical-facilitator helps others develop understanding of their situation.
3. Emancipatory-a collaborative discovery group positively transform the situation.

Regardless of which form of action research is conducted, the emergent learning and the improved situation is the critical focus. According to Zuber Skerrit (1991, p. 12) ‘Action Research is an alternative approach to social science research in that it is’...

Practical—the results and insights gained from the research are not only of theoretical importance to the advancement of knowledge in the field, but also lead to practical improvements during and after the research process.

Participative and collaborative—the researcher is not considered to be an outside expert conducting an enquiry, but a co-worker doing research with and for the people concerned with the practical problem and its improvement.

Interpretive—social enquiry is not assumed to result in the researcher’s positivist statements based on right or wrong answers to the research question, but in solutions based on the views and interpretations of the people involved in the enquiry. Research validity is achieved by certain methods.

Critical—the ‘critical community’ of participants not only search for practical improvements in their work within the given socio-political constraints, but also act as critical and self-critical change agents of the constraints. They change their environment and are themselves, changed in the process.

Fig. 6.6: A Model for Demonstrating Learning Development.

The purpose of this model is to illustrate the developmental relationship between the student’s experience and their learning learning
1. Take actions to satisfy the need or requirement.
2. Reflect on the effectiveness of the action.
3. Seek inputs, adjust and learn.
4. Plan for the application of the learning .
5. Take improved actions to satisfy the need or requirement.
6. Reflect on the effectiveness of the adjustments .
7. Seek inputs, adjust and learn.
8. Plan for the application of the learning.
9. Take improved actions to satisfy the need or requirement.
10. Reflect on Learning development related to the original need or requirement.
Kurt Lewin occupies a special place in the learning theory section. He introduced the concept of ‘feedback’ to behavioural sciences and coined the expression Action Research (Smith 2004). Feedback is an essential component of the student’s learning development cycle. In terms of the results of the Gainen Inventory, there was a clear desire for a closer personal and professional relationship between staff and students, presumably for the purpose of giving and receiving feedback. Lewin’s contribution to learning development is discussed in more detail in Chapter 8.

Fig. 6.7: A Feedback/Response Loop Focusing on Learning Development.

1. Propose / discuss some ideas, submit a project / assignment, present action plans, etc.
2. Receive feedback from: staff, peers, other resource persons, significant others.
3. Corroborating feedback giving approval and support for ideas, claims, propositions, plans, etc.
4. Reflect on feedback, continue and improve or complete the same task, and / or initiate a new task for which a proposal is made beginning the cycle.
5. Ameliorating suggestions for major or minor areas of improvement.
6. Reflection on feedback, apply and proceed with remediation.
7. Propose adjusted ideas, re-submit adjusted project, re-submit an adjusted learning document, re-present an adjusted action plans, make adjusted claims for competency development, make other adjustments as per.

Figure 6.7 portrays a feedback response model that relates to an educational situation. The process begins when a student presents an idea or proposal about some issue or project plan. The staff member or other suitably informed resource person, critiques the student’s ideas in terms of content and process and gives feedback resulting in either the ‘go ahead’ or suggestions for remediation. If remediation is required the student should reflect on the feedback identify specific changes and adjust accordingly and represent starting the cycle again. This continues until the presentation suits the student’s objective or the activity requirement etc.

Outward Bound as a Model for Experiential Learning

Bacon (1987) provides an interesting corollary on experiential learning in his treatise on ‘The Outward Bound Curriculum Model’. He outlines three evolved models for the programme. Bacon argues that the ‘first generation model’, in the beginning of the Outward Bound Programme (1960s and early 70s), relied solely on the ‘challenges of the experience’ to achieve the programmes goals. This model was critiqued and in the ‘second generation model’ a series of discussions before and after the experience were included focusing on group process, observations and expression, analysis and validation of feelings. Bacon (ibid.) describes a ‘third generation model’ that embraces elements of the first two, however now the programme includes ‘experiential metaphors’ that provide contrived ‘hero journeys’ enhancing the focus of the experience to the level of ‘rite of passage’ (van Gennep 1960) in certain instances. Fletcher’s (1970) research indicates that the Outward Bound Programme had a significant perennial, and in some cases, life changing effect on the participants.
6. Gestalt Theory

(Clark 1999, Blosser 1973, Driscoll 1994)

Gestalt theory proposes that the response to stimuli will be different in each person (Clark 1999). The response will depend upon the person’s frames of reference that have been generated by their culture, family, religion, ‘class’, location, socio-economic status and history; and have an influence on their attitudes, values and beliefs. Each person’s worldview or Weltanschauung (meaning a ‘look onto the world’ (Wikipedia Worldview 2006) has an enormous effect on their ability and degree of making sense and responding. Clark (ibid.) argues that an individual compares past experiences with new experiences in order to form patterns of understanding and make sense of what they are seeing, this process of sense making informs and somewhat directs, their response.

Clark (ibid.) describes ‘The Law of Pragnanz’ as an organising principle producing a ‘good Gestalt’. In this process a person, when faced with a disorganised situation, will organise it in a predictable way to produce regularity, simplicity and stability. Clark (ibid.) argues that a ‘good Gestalt’ can affect the way a person sees their environment, causing a transformation in their worldview. Blosser (1973, p. 44) proposes 5 laws of Pragnanz:

1) Similarity - similar items tend to grouped,
2) Proximity - items are grouped according to the nearness of their respective parts,
3) Closure - completed items are grouped together;
4) Good Continuation - an example would be that straight lines appear to continue as straight lines, and curves as curves;
5) Membership Character - a single part of a whole is defined by the context in which it appears.

Driscoll (1994, p. 84) refers to the concept of ‘trace elements’ in relation to Gestalt. Trace elements are encoded residues or significant remnants of memories. Meaning making is made easier when new information is readily compared and analysed against encoded trace elements (Driscoll, 1994). Gestalt Theory helps explain firstly the importance of recognising the individuality of each student and secondly, how each student forms and reforms, their worldview. Each student’s worldview is the metaphoric ‘glass pane’ (Bawden & Valentine 1984), through which they filter information in and out of their consciousness. Gestalt Theory helps to explain some of the preferred curriculum trends exhibited in the Gainen Inventory. Students and staff valued the notion of discussing opinions about relevant and topical issues in their preferred curriculum – this is a Gestalting process.
7. Personal Constructs Theory

(Kelly 1955, Banister and Mair (1968), Bannister and Fransella (1986), Scheer and Catina (eds 1996), Candy 1981)

Personal Constructs Theory helps explain how the learner designs patterns, associations and recognisable systems, in order to anticipate experiences. Banister and Mair (1968) proposed a ‘repertory grid’ that helps to organise and interpret the constructed patterns. In other words the learner construes situation before engaging.

According to Scheer and Catina (eds 1996), the learner attempts to anticipate the event in order to gain some control over it. The learner’s construction of reality is either then validated or invalidated, during and following the experience. Banister and Fransella (1986) draw attention to the notion that constructs theory requires a more conscious introspection by the learner in order to understand the processes they undergo in order to identify their constructs. They infer that we really should, not only ‘make the road by walking’ (it), but anticipate it and understand the nature of the journey.

Personal constructs are according to Scheer and Catina (ibid.), the characteristics that make in individual and individual. The desire by the staff and students to be not only recognised but acknowledged as individuals and to have their curriculum designed to facilitate further development of that individuality, is at the core of the Gainen results. Construct Theory is important to the design of both the students and staff’s preferred curriculum because it requires a conscious consideration of both the anticipated experience and the associated worldview. Candy (1981) argues that it is often the strategic role of the instructor to provide opportunities and guidance for identification, challenge and development and validation/invalidation or otherwise, of constructs.

8. Memory


Converting content into long term memory appears to be a desired quest for the TNAU/UC Davis undergraduate curriculum. Johnson (1997), Atkinson and Schiffrin (1968) and Miller (1956) have all contributed to the understanding of how students turn information into short and longterm memory. Squire and Kandel (1999) argue that memory works best when we have more reason to study. In other words, we remember the things that have some meaning to us. This thinking has resonance with deep and surface and active and passive and behaviourism and constructivism theories. Figure 6.8 captures Atkinson and Schiffrin (1968) and Johnson’s (1997) ideas about how information is converted into long term memory.
In Figure 6.8 Johnson (1997) suggests that information is sieved through a ‘perception filter’ and what prevails enters the ‘working space’. In the working space the information is converted into useful ideas or are held for a period of time unchanged. Eventually the useful ideas are converted into concepts that become part of the long-term memory. There are several issues affecting the efficiency of this system. Tulving (1985) suggests that there are three components of long-term memory:

1. Semantic memory which is a store of concepts and ideas.
2. Episodic memory containing memory of events.
3. Procedural memory that focuses on developed and developing, ability.

Atkinson and Schiffrin (1968) have suggested a similar model for describing the development of short and long term memory. In their model, there is a filter known as the ‘sensory buffer’ that sieves information much of which is lost and some of which enters the short term memory system. According to Atkinson and Schiffrin (ibid.) there is a secondary feedback loop that originates after the short term and before the long term memory and cycles back into the short term memory, this is known as ‘rehearsal’ and seems to help with recall and allocation of previously filtered ideas to immediate work or long term memory, or as Atherton (2005b) suggests:

\[ \text{[Short-term memory} + \text{rehearsal + retrieved Long Term Memory]} = \text{`Working memory`} \]
According to Squire and Kandel (1999) there are several aspects to be considered before something that has been perceived will actually be remembered, such as when it was noticed, the frequency of repetition of the fact, the significance of the information, how easily it relates to what is already known creating ‘meaningful learning’ (Ausubel 1968); or incorrectly linked creating ‘misconception’, or not linking at all creating ‘rote learning’, the number of times the information is practiced after it has initially been perceived. The perception filter plays an enormous part in the journey from information to concepts as does the ‘working space’. Johnstone et al. (1986) and Miller (1956) propose that students cannot process more than seven, plus or minus two, pieces of information in any one problematic scenario or information delivery session.

Fig. 6.9: Johnson et al.’s Research Results Relating to Student Information Saturation.

Teaching for increasing long term memory, rote and recall as well as Johnson’s work on information overload has implications in terms of their educational effectiveness. Staff are generally at liberty to design subjects or units of work. They determine the amount of content in a lesson, the style of lessons in a programme, the layout of the lesson or practical delivery system and the format and intensity of examinations. One way to deal with information overload is to ‘chunk’ it (Miller 1956). Lecture based delivery systems are particularly vulnerable to information overload (Bligh 1972). Lecture, tutorial, practical and examination, is the traditional tertiary educational format (Hemmings et al. 2000). Rowntree (1987) challenges the effectiveness of examination as a worthwhile format for evaluating learning other than students’ learning to conform to the exam process. Nichol (1997, in Moon 1999) argues that learning by rote or memorising information, produces isolated fractionalised pockets of knowledge. The learner according to Nichol (ibid.) by a conscious or unconscious inability or desire to relate new material to old knowledge experiences accrues knowledge through ‘unconnected learning’.
9. Behaviourism and Constructivism

Behaviourism

(Watson 1913 [in Wozniac 1994] Pavlov 1927; Thorndike 1932; Guthrie 1952; Skinner 1968)

This theory relates to a stimulus-response system that disregards or does not recognise, any thought or reasoning process by the individual. A central tenet in this theory is that behaviours can be quantified. Watson’s developed three techniques of classical conditioning to remove the fears.

‘Emotional Flooding’—required presenting the feared object in a safe environment,

‘Counterconditioning’—a desirable reward is offered whilst the feared object is present and

‘Systematic Desensitisation’ which involves the introduction of a milder version of the feared object. Pavlov (1927) coined the term classical conditioning whereby the learned response could result from an interpretation rather than an actuality. Pavlov’s dog salivated when the bell rang, the dog associated one stimulus with another, bell ringing meant food.

Operant conditioning (Skinner 1968), centres around the ‘carrot and the stick’. Skinner had a huge influence on curriculum and teaching practice in the latter half of the Twentieth Century. He developed a set of principles relating to behaviour modification based on ‘reward and immediate feedback’ (positive reinforcement) or ‘punishment and immediate feedback’. The purpose of this process was not so much to educate for compliance with the requirements of the curriculum but to simply make students compliant. Skinner advocated ‘outcomes based education’ and ‘behavioural objectives’ both of these are vernacular in the classroom and lecture theatres today.

The desire by a student to maintain a credit average, is an example of operant conditioning. The student strives for the reward of a credit grade they associate their own success with the reinforcement afforded by the grade achieved. Over time the desire to ‘achieve or maintain the grade’ may be stronger than their need to become educated or to learn in any particular field. In some cases the reinforcement of the credit grade confirms in the student and staff’s mind that learning has taken place whether it has or not. A student who habitually studies the night before an exam as their only consolidated preparation for that assessment exhibits an operant conditioning pattern.

Thorndike (1932) is credited with devising a subset of Behaviourism and in particular operant condition called ‘Connectionism’. It is still based on a conditioning brought about by a stimulus-response however in Thorndike’s theory of learning, there is a close relationship between the stimulus and response. The duration of the behavioural change will depend on the durability of the relationship. The theory of ‘Learning by Trial and Error’ is attributed to Thorndike. Thorndike (1913) proposed the theory of Connectionism which outlined how stimulus and response can be engineered by various interventions.
Guthrie (1952) developed the Law of Contiguity. This law is about the proximity in time and physiology of one stimulus with and event. So a stimulus event and the response event are intertwined in a generated association. Most education facilities conduct exams practice under the same conditions each time and usually in the same venue. Wheeler (2000) suggests that this form of conditioning helps to improve the student’s real exam performance.

**Constructivism**


Constructivism is a learning theory that recognises the intervention of the learner’s mind in making sense and drawing meaning from an experience. Constructivism assumes a critically subjective relationship between the learner and their environment. The meaning is constructed, is subjective and only exists in the consciousness of the learner. According to Atherton (2004) there are two main constructivist streams firstly, cognitive constructivism which relates to the learner’s development through understanding their preferred learning styles and secondly, social constructivism (Vygotsky 1962) which focuses on the meaning made from social interactions.

Vygotsky (ibid.) introduced a concept known as the ‘Zone of Proximal Development’ which describes a transition phase between levels of current achievement and what is yet to be achieved. Vygotsky proposed that children learn faster if they learn in collaboration with an adult.

Piaget and Inhelder (1969) suggested that children develop the means to make sense of their world as a staggered, developmental process or ‘maturation (simply growing up)’ with spurts and plateaux. Marton and Ramsden (1988) suggest that the changes brought about from constructivist learning activities produce qualitative changes in the learner. Brunner (1966) argues that even though learners construct meaning subjectively, the context can be bounded for example by the discipline in which a student is studying. Harri-Augstein and Thomas (1991) describes a learner who can personally design ways to manage their learning process as a 'self-organized learner'.

Fosnot (1996) suggests four epistemologies relating to constructivist learning whereby knowledge is:

- ‘physically constructed’ through action learning,
- ‘symbolically constructed’ through learners representing actions,
- ‘socially constructed’ when learners convey their meaning making to others, and
- ‘theoretically constructed’ when learners attempt to explain their confusion.

I propose that as well as cognitive and social constructivism, there should be another form called Career Constructivism. In Career Constructivism, the student makes meaning of workplace/community experiences in order to design future experiences that bridge the professional practice development gap eventually increasing their employability. The results of the
Staff Self Employment workshop whereby staff suggested ongoing evidence based career research, to inform ensuing staff and student capacity development, supports such a proposal.

10. Pedagogy, Andragogy, Heutagogy and Partagogy


Pedagogy has its origins in the ancient greek language and is associated with in traditional ancient greek culture, ‘the slave who took the children to school’. (Wikipedia Pedagogy, 2006). Pedagogy is a universal term often used as collective noun or as a description of approaches, methods and practices relating to an instructional education process. For the purposes of this section I am restricting my definition of pedagogy to The American Heritage Dictionary (2004) and the wordnet (2001) definitions:

‘1. The art or profession of teaching. 2. Preparatory training or instruction’
‘1. the profession of a teacher. 2. The activities of educating or instructing or teaching; activities that impart knowledge or skill’

I am focusing on these definitions because they assume that there is a teacher and a student in a linear provider/beneficiary, source/sink, powerful/powerless relationship.

Teaching as a process, conjures up and disciplined instructional process in a school-like environment. Gagne (1967) was an advocate of what has become known as ‘Instructional Theory’ although Bloom (1956) was attributed with its genesis. Behaviourist theories particularly Skinner’s ideas, influenced the instructional theorists (Wikipedia Pedagogy, 2006). I would argue that pedagogy is an approach to education that focuses on an instructor successfully or not, applying information transfer strategies and techniques, possibly proceeded by methods of reinforcing the information transfer followed by the application of an assessment system, that validates the acquisition or not, of the transferred information. Students are generally not involved in the choice of information or the method of transfer, reinforcement and assessment.

TNAU staff and students described in the research, the current curriculum in pedagogical terms. Critical pedagogy (Freire 1972) is an extension of the pedagogical approach that encourages students to question the beliefs and practices of those that dominate (Wikipedia, Critical Pedagogy 2006). Critical pedagogy is the techniques for developing in students, critical consciousness. Critical consciousness according Freire to (1972), is the ability to not only perceive the cause and effect of social, political and economic decisions made by authorities who have significant power, control and influence, and subsequently judge the vice or virtue of those decisions, but also the ability to take action in response to that judgement. Critical Pedagogy was evident in the research results as a critique of the current curriculum, censure of the VSP and criticism of the lack of vocational opportunities afforded students from the current curriculum.
Andragogy

Andragogy (Kapp 1833, Lindeman 1926, Knowles 1984) is more associated with adult learning Cross (1981:248). It would not be accurate to say that andragogy is the adult equivalent of pedagogy as both approaches to education share characteristics (Smith 1996, 1999). According to Kearsley (1994-2001) andragogy assumes that in a formal setting, adults need to have a purpose for learning, they need to learn experientially and through solving legitimate problems and they are more effective learners if engaged in a project that is worthwhile to themselves, to others and to the setting in which the project occurs.

In terms of curriculum design, Kearsley (1994-2001) implies that an andragogical approach would mean that the students would collaborate with staff to plan the instruction and evaluation. Mistakes would be seen as learning opportunities in conjunction with other successful experiences. The focus for the education would have immediate and/or future relevance to the learner. There would be a greater emphasis on individuals developing the process of learning than mere teacher-centred, content-based instruction.

Table 6.2: A Comparison of the Assumptions of Pedagogy and Andragogy.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Pedagogy</th>
<th>Andragogy</th>
</tr>
</thead>
<tbody>
<tr>
<td>The learner</td>
<td>Dependent. Teacher directs what, when, how a subject is learned and tests that it has been learned</td>
<td>Moves towards independence. Self-directing. Teacher encourages and nurtures this movement</td>
</tr>
<tr>
<td>The learner's experience</td>
<td>Of little worth. Hence teaching methods are didactic</td>
<td>A rich resource for learning. Hence teaching methods include discussion, problem-solving etc.</td>
</tr>
<tr>
<td>Readiness to learn</td>
<td>People learn what society expects them to. So that the curriculum is standardised.</td>
<td>People learn what they need to know, so that learning programmes organised around life application.</td>
</tr>
<tr>
<td>Orientation to learning</td>
<td>Acquisition of subject matter. Curriculum organised by subjects.</td>
<td>Learning experiences should be based around experiences, since people are performance centred in their learning</td>
</tr>
</tbody>
</table>

In Table 6.2 Jarvis (1985: p. 51) portrays a comparison between a pedagogical and andragogical approach. Pedagogy as outlined in Table 6.2, resembles the description provided from the research of combined Gainen Inventory Current Curriculum responses, and the preferred curriculum description resembles the andragogy characteristics presented in Table 5.1.

Heutagogy

Heutagogy (Hase & Kenyon 2000), is self determined learning. This means that in a heutagogical curriculum framework, the student themselves determine the focus and the process for study. These ideas go beyond Knowles (1970) ideas of self-directed learning. However self-direction would be a developmental step towards self determined learning. Heutagogy, as a conceptual framework or boundary for design, is appropriate for a vocationally orientated curriculum if combined with a capacity building format. Brunner (1966) and Thomas (1991) argue that even if a
student learns in a constructivist framework with a heutagogical educational format, they should be facilitated by a significant other such as a staff member/mentor, towards designing self-determined learning programmes that are consistent with field of study related to their chosen degree. One of the main outcomes of the primary research was the desire by the students to be not only recognised as individuals but also being acknowledged as having individual ideas, opinions and aspirations. The research indicated that currently students study in a pedagogically orientated educational environment yet both students and staff prefer an environment that is more andragogical in design. Results from the staff Self-Employment Workshop indicated that an andragogical educational environment may not be sufficient as a system of learning that can prepare graduates for a complex and evolving world.

Stephenson (1994) argues that in order for learners to cope they need to adopt a more ‘holistic’ approach to their development. This means that they need to develop more than just knowledge and skills in a field of study. Argyris and Schon (1996 ibid.), suggest that graduates should develop a much more critical capacity in as far as being capable of critiquing their own values and assumptions combined with developing a systemic framework for enquiring into and dealing with, complexity (Emery and Trist 1965 ibid.). Carl Rogers (1969) suggests that students should be allowed to pursue learning that interests them. Rogers (1969 ibid.) argues that no-one can really teach anyone anything, all that they can do is facilitate their learning. Given this premise, the learner will only learn material that is personally augmenting. Students will need to make compromises in order to comply with a non student-centred system. Heutagogy presents opportunities for curriculum design.

Graves (1993), Stephenson & Weil (1992) and Stephenson (1994) (ibid.) suggest that institutions should focus not on knowledge transfer, but how to develop capable people. They believe that a heutagogical approach would partly achieve this end. Whilst Cairns & Hase (1996); Hase & Davis (1999); Hase (1998); Hase, Cairns & Malloch (1998) (ibid.) argue that the successive quest to that of developing capable people (graduates), is to develop capability in organisations and communities, they too believe that a heutagogical framework could achieve this.

Splicing the two pursuits together means that universities could use a heutagogical curriculum design framework to develop graduates who were capable of developing capability in the workplace/community. Hase and Kenyon (2000) argue that heutagogical approaches to curriculum design are consistent with action learning (Weinstein 1995), action research (Zuber-Skerritt 1982, Bawden 1989b) and processes associated with lifelong learning. These self determining processes could be incorporated into a tertiary curriculum.
Partagogy

Partagogy is about capacity building. Levinger (1996a) suggests that two forces generate change in our modern world, one relates to information the other relates to economies. Information and economies are intimately linked as economies grow the need for information increases and visa versa. Change is generated when these two forces create synergies of diffusion (Levinger ibid.). Partagogy is methodology designed to respond to this change scenario. As a learning process, partagogy is predicated on the idea that:

‘Human beings have a deep need to have their lives make sense, ... to place their lives in a context of meaning and purpose.’

(Levinger 1996a)

Kanter (1991) suggests that there is a profound shift in the notion of work and security in that just being employed may not present as secure a future as was once the case. Kanter (ibid.) argues that being employable is now the new security characteristic of the future. Employability is enhanced when the individual builds capacity. As a development process capacity building is generative and exponential ‘capacity builds capacity’.

Levinger (ibid.) asserts that partagogy results from an incremental, participatory interaction between the individual and society. She argues that partagogy is a developmental methodology that assists individuals build effective competence to enabled them to participate in what Levinger (ibid.) terms ‘the four core domains family life, livelihood, environmental stewardship, and civil society.’ A combination of pedagogy, andragogy, heutagogy and partagogy as guiding epistemologies or boundaries, would make a considerable contribution to a conceptual framework for ‘an undergraduate, agricultural, core curriculum that is grounded in the reality of community’. The incorporation of all four epistemologies is advocated in a developmental framework.

11. Reflective Practice and Critical Reflection

(Mezirow 1990; Argyris & Schon (1978); Schon 1983; Boud et al. 1985; Brookfield 1991)

Reflective Practice

Reflection is an essential practice associated with learning from experience and developing capability. Dewey, Lewin and Kolb either directly or indirectly incorporated reflection as a pivotal process in their learning cycles. Boud et al. (1985) proposed a form of reflection that connected a personally analytical process with converting experiences into learning. They presented a formulaic approach to the notion of the past analysed in the present could inform the future. There are three parts to the process, the experience, a review process and a post review stage.
Figure 6.10 shows how Boud et al (1985) believe reflections can turn experience into learning. The key transformative component is part 5 Re-evaluating the experience. In this stage the learner compares new insights with old understandings and makes judgements about the validity of both. The outcome will be a confirmation, a challenge and/or a change in meaning resulting from diagnosing current understanding in light of the recent experience.

**Critical Reflection**

Ashby (1960) and subsequently Argyris & Schon (1978) (in Atherton (2005c), suggested that reflection could be performed both ‘in’ and ‘on’ an episode. They described this analytically contemplative procedure as a ‘single and a double loop’ learning process. In a single loop learning process, according to Bawden (1989b), the learner performs four steps:

1. Find out.
2. Make sense.
3. Make a plan.
4. Take action.

There are reflective moments in all of the steps; however, the learner directly or indirectly appraises the situation and influences the reflections through their ‘window on the world’ or ‘worldview’. In a double loop learning process, the learner would complete the single loop steps, then critique both the ‘making sense’ and the ‘taking action’ steps. They would critique the ‘making sense’ from a theoretical, assumptions and values perspective and critique the ‘taking action’ from a tactical, strategic, skills and approaches perspective. Critiquing the sense making and action taking can affect the core validity of the learner’s current worldview and adjustments may need to be made. In a triple loop learning cycle the student would be expected to incorporate single and double loop processes however in addition they would need to understand the epistemological underpinnings (Salner 1986) for all three loop processes.
Chapter 6—Secondary Research Analysis, Theory Discussion and Emergence of the Schema Design Properties

Fig. 6.11: A Model for Explaining a Single and Double Loop Learning Process.

![A Model for Demonstrating “Single and Double Loop learning”](image)

1. A problematic situation, an interest, a project.
2. The learner’s window on the world or “world view” which filters “what they see” and “how they see it”.
3. The learner.
4. Making sense.
5. The learner’s current “Bag of Tricks” or knowledge and skill or competency.
6. The “Different or adjusted Window” through which the learner critiques and evaluates their own world view.
7. The learner’s improved “Bag of Tricks” or competency

A “The basic learning loop” similar to the Kolb Cycle
B. The Secondary or “Learning about the basic learning loop”, loop.

Figure 6.11 portrays a critically reflective learning process. Brookfield (1992) argues that critical reflection is a reasonably sophisticated process and probably more associated with adult learning principles. Brookfield (ibid.) suggests that developmental psychology provides support for adults being capable of critical reflection. He asserts that that constructs such as embedded logic, dialectical thinking, working intelligence, reflective judgment, post-formal reasoning and epistemic cognition provide frameworks for thinking contextually and critically.

Donald Schon was a great supporter of ‘The learning Society’ and ‘learning organisations’ in which he collaborated with Chris Argyris to extol the utility of single and double loop learning. Schon believed that as a society becomes more and more destabilised it should counter the instability by relying more and more on learning its way through. Lifelong learning ideas are consistent with these notions. Schon believed that a person’s ability to reflect and adjust through learning, on a continuous basis was one of the primary organising principles of ‘professional practice’. Critical Reflection according to Brookfield (ibid.), is predicated on three interrelated transformational processes 1. the capacity to identify and rationalise the genesis of current assumptions 2. the willingness and capacity to rationally challenge embedded assumptions and mindsets and 3. the courage and capacity to select from alternatives and apply fundamental changes in personal ideologies, values and beliefs that guide subsequent actions (Kitchener and King 1990). Mezirow (1990) championed critical reflection. He argued that assessing and re-assessing one’s life with the view to re-making it, overtaking the purpose of the learning Critical reflection was in evidence in the responses to the self-Employment Workshop, the Gainen inventory and the Farmer Staff Student Relationship Questionnaire, but not in the Undergraduate Curriculum except for the students engaged in the Home Science Programme at Madurai.
12. Mode 1, Mode 2, Mode 3 Knowledge and Transformative Learning

According to Gibbons (1994) there are two modes of knowledge generation, Mode 1 and Mode 2. Mode 1 knowledge generation, has its roots in Newtonian physics of the seventeenth century. It is associated closely with the scientific method from which knowledge is produced objectively, from an inquiry management system whereby observed problems are reduced and hypothesised, leading to experiments and trials designed around manageable variables and limited treatments that are controlled, standardised, randomised and replicated. Heath (2001) suggests that Mode 1 knowledge needs to be legitimised by; ‘validating it against the test of objective truth or correspondence with an objectively real world’. Mode 2 knowledge generation has its roots in heuristics, experiential learning and subjective, contextually relative problem solving (Gibbons et al. 1994). Inquiry can be done by anyone, anytime and anywhere that an issue or problem arises. A Mode 2 researcher does not have to be a scientist. A person or team simply identifies or agrees on a problematic situation and engages in action learning or other approaches deemed appropriate, in order to solve the problem or improve the situation. The resulting knowledge is legitimised or subjected to social accountability by the solving of the problem, improvement of the situation or by general consensus. Objective truth is irrelevant in Mode 2 knowledge. Gibbons (1994) suggests that not only is Mode 2 trans-disciplinary knowledge production essential if modern higher education is to remain relevant, but also the capacity to generate it in staff, students and community.

Mode 3 knowledge generation according to Barnett (2004), is grounded in closing the epistemological gap between the world as we find it and the world that we create by engaging in it and changing it. The world is constantly being re-created by us just being. So by unconsciously taking actions and occasionally taking conscious actions we become and the world is affected and uncertainty increases. Barnett (ibid.) argues that this constant gap making requires an ontological shift in the researcher. This shift is guided by the desire by the individual to act in a moral and ethically defensible way, to want to do right and to improve situations for the common good. Barnett (ibid.) argues that the capacity to make these kinds of ontological shifts in order to develop Mode 3 knowledge, require specialised approaches and intricate staff and student development processes in a supportive educational environment. Barnett’s Mode 3 knowledge ideas are very applicable to rural development situations and community based research situations in general. Aristotle struggled with ideas relating to generating Mode 3 knowledge, he called the ontological shift phronesis (Aristotle in Grundy 1987).

Transformative Learning

Mezirow (1997) describes transformational learning as a different learning process to mere accumulation of knowledge. Mezirow (ibid.), Imel (1998), Cranton (2002), Taylor (1998), Scott (1997) and Boyd & Myers (1988), all suggest that transformative learning requires a paradigm (Kuhn 1962) shift or a total change in perspective if it is to be truly transformative. In order to
achieve this, the learner has to question current understandings at the assumption level. According to Mezirow (1991) learners can learn to become sensitised to the assumptions that inform current understanding within some focusing experiences. Through a process of critical reflection the learner explores those assumption and confirms, challenges or changes them. Often the learner engages with others including peers and mentoring/facilitatory staff in order to assist with explaining their thoughts and making sense of their experiences. They do this to make their rationalisation more crystalline. Given the evocation of some experiences some students find relating assumptions to others difficult. For many, analysing and challenging the way one thinks and the assumptions one has developed in order to make sense of one’s world, can be very confronting. Many students are unwilling to engage with their own thinking at this level and to this degree out of habit or because of the undesirable emotional provocation and agitation (Scott 1997). Many students lack the vocabulary to sufficiently describe their assumptions however if the educational focus requires this then all students learn in an analytical environment. Transformational learning occurs when values and assumption are firstly identified and then examined for their validity. Cranton (1994) advocates the use of icons, models and graphical symbols and even archetypes to assist the learner express their critical analysis of the experience. Transformative learning is a central tenet in this thesis for two reasons; firstly, education by definition requires a personal and professional transformation from within the individual, and secondly, rural development is well served by agricultural professionals who can facilitate transformational learning in others.

13. Developing On-Campus Learning Communities

One of the central tenets of this thesis is the notion of a curriculum based, university/community engagement. Community can be on or off campus. Matthews et al. (1997), suggests that an undergraduate curriculum should enhance student learning by incorporating experiences that provide a rich experience base beyond the curriculum. They argue that one major problem is how to design significant coherent learning experiences within the part-time nature of the student study patterns.

Learning communities, as a curriculum design began in the late 1920s when Meiklejohn (1932) developed the ‘Experimental College’, in which he proposed a complete integrated course of experience and critique according to Matthews et al. (ibid.) Meiklejohn according to Matthews et al. (ibid.) blamed the undergraduate curriculum for learning problems in the students:

……it was too superficial, too short for meaningful learning. Short, discipline-based courses divided the world into economical units for study, he observed, but they deprived real-world problems of their complexity and interdisciplinary roots.

(Matthews et al. ibid., p. 458).
There have been many learning community colleges and programmes since Meiklejohn’s stand for realism in curriculum according to Matthews (ibid.) These include Tussman’s UC Berlely programme, in the 1960’s, Evergreen Stage College adapted Tussman’s model into an extensive, interdisciplinary theme/problem based programme with four staff and 60-80 students engaged for a year (p. 459). Federated Learning Communities of the 1970’s (Hill 1982 ibid.) were a huge evolution in integrating external public and private industry grants and curriculum design around themes supported by academic teams. LaGuardia’s course connection clusters added to the reshaping of curriculum around community albeit, campus community (Matthews 1986 ibid.).

Tinto et al. (1994, p. 468) confirmed that learning communities improved student engagement and collegiality whilst enhancing their ability to manage personal and professional needs more effectively. Students were empowered by being included recognised and acknowledged in rich atmosphere of intellectual conversations involving multi-perspective views. Motivation and positive attitudes towards their institution, as well as improved quality of learning emerged from engagement in learning communities. One important outcome was that learning communities enhance learning development in lesser ability students as well as more capable ones. (Astin 1993 ibid.) and Tinto (1993, ibid.).

Learning communities can be enormously effective in drawing learners with a wide variety of backgrounds, intellectual capacity, experiences and worldviews into an interdependent environment of hermeneutics, exploration, contribution, experiment, growth development and understanding. Learning communities can motivate, embrace and direct students in ways that are less effective if the student were to work alone or independently.

14. The Engaged University & Off-Campus Learning Communities

On-Campus Learning communities are only part of the rich picture of undergraduate curriculum development. I propose that off-campus learning communities are part of the university/community/workplace, interface that are essential for capacity building in undergraduate students. Community engaged universities, as a notion, is supported by many authors in a number of publications.

‘Higher education in this country has an urgent obligation to become more vigorously engaged in the issues of our day...[by] creating a special climate in which the academic and civic cultures communicate more continuously and more creatively with each other’.

(Boyer 1997, pp. 89, 92)
Boyer advocates a rethink of the values that drive the structure and functioning of higher education institutions. He suggests that universities and civic cultures need to become more connected in order that the community can expose its needs and the capacity of the university can be engaged to help. These sentiments are echoed in the Glion Declaration (Rhodes, 1998), the Kellogg Commission On The Future of State and Land Grant Universities (Spanier [Chair] 2000) and the Academic Service Learning programmes in The Engaged University movement.

The Glion Declaration

The Glion Declaration (Rhodes 1998), an international discussion group consisting of 10 European and 10 North American University Presidents and other eminent academics, supports this proposal. The Glion colloquium (ibid.) asserts that in order to manage increasingly changing and complex tasks, both developed and developing nations need to cultivate an informed, educated and skilled populace. They envision lifelong learning as the means for developing an ongoing educated and skilled citizenry and universities as the provider of that lifelong learning. (after Rhodes 1998)

The colloquium (ibid.) calls upon all universities to acknowledge the traditional, unique and reciprocal relationship with its community, region and larger society and to recognise their responsibilities and the opportunities in that relationship. Furthermore the colloquium called on universities to affirm the important role of teaching in the balanced development of the whole person. It also called on universities to move beyond the traditional one-way pattern of lectures and provide a creative, discovery based learning environment, that is a student centred and student friendly. The outcome of all of this according to the Glion Colloquium (ibid.), are highly skilled, broadly educated, self-motivated, lifelong learners, who are aware of their heritage, conscious of their civic obligations and ethically responsible in their professional careers. (after Rhodes 1998)

In conjunction with the notion of the university engaging in the process of developing an informed, educated and skilled citizenry, the Glion Colloquium (ibid.) calls upon universities to evaluate their traditional discipline structures and functions. Whilst the traditional disciplines maybe powerful engines of scholarship, they seem to incorporate overpowering and intransigent mind sets producing powerful bastion-like departments, rigid disciplinary experts and may impose self created canons. These types of independent faculties service the needs of their staff members and their respective ‘fields’ very well however by concentrating on abstractions, they function in such a way that they can restrict the broader enquiry, limit the score of critical investigation. The colloquium (ibid.) asks universities to consider alternative structures and functions such as institution/agency/industry/community partnerships, that will facilitate exploring broader public issues. (after Rhodes 1998)
The Kellogg Land Grant University Commission

The Kellogg Commission On The Future of State and Land Grant Universities (Spanier 2000) entitled their publication; ‘Renewing the Covenant Learning, Discovering, and Engagement in a New Age and Different World.’ According to Pratt (1980), the Land Grant Colleges of Agriculture came into being in 1862 as a result of the Morrill Act, which was supported by the US President, Abraham Lincoln. The Morrill Act allocated funds and federal land to various states to build Agricultural and Mechanical Arts Colleges, in response to increasing demand by the rural workforce, for day-to-day agricultural and technical knowledge and skill.

_The Morrill Act was intended to provide a broad segment of the population with a practical education that had direct relevance to their daily lives._

(WVU 1999)

The Land Grant Colleges were designed around three basic functions teaching, research and extension (Pratt, 1980). Spanier (Chair, 2000) expresses nostalgia with these origins causing the Kellogg Commission to desire to ‘Renew The Covenant’. The first part of the Kellogg Commission Land Grant Future publication, refers to Renewing The Covenant, not the agreement or the arrangement or the bargain, but the covenant. A covenant is almost a sacred promise that involves extreme security between parties.

Choosing ‘covenant’ to describe what needs renewing indicates that the current arrangements are far from satisfactory. The second part refers to; ‘Learning, Discovering, and Engagement’, suggesting how to accomplish the covenant. The third part of the title is ‘in a New Age and Different World’ indicating why the covenant needs renewing. The original covenant between the public universities and the American people focused on access, curricula, community germane research and public governance and finance, according to Spanier (2000). The university aspect of the covenant renewal includes non-discriminatory opportunity of access to complex and broad-based discovery learning environments that prepare students at all levels of study for leadership and participation in response to public needs. This can be achieved by coherently applying institutional resources and expertise towards state, national and international societal and civic purposes and problem solving in a publicly accountable way (after Spanier 2000).

The Chancellor of UC Davis Larry Vanderhoef (2000), echoes the Glion Declaration and the Kellogg Foundation’s themes and issues. He suggests that UC Davis should ‘rediscover our values and missions’ recommit to discovery, access and engage in our communities and responding to their needs. We must put learning first by nurturing on and off-campus learning environments that permeate all departments.
The Scholarship of Engagement

Jensen et al. (1964) and Brookfield (1983) suggest that there is little difference between formal and informal settings with regard to learning. They propose that people can learn purposefully and deliberately or tacitly (Polanyi 1958, Berry (ed.) 1997, Sternberg & Horvath 1999) anywhere and at anytime yet we seem to traditionally equate learning only with only a formal classroom setting. Brookfield (1983) does distinguish between incidental and accidental learning Smith (2000) argues that the purpose of the engagement can determine its formality or otherwise.

According to the 2001 National Review Board for the Scholarship of Engagement (Furco 2005), the Scholarship of Engagement is a scholarly process that links the curriculum, teaching, research and/or service with meaningful, participatory action in community issues. Community is defined as groups external to campus that collaborate for the ‘public good’. There are many activities that engage students and staff with the off-campus community. There can be a assortment of designed interactions that vary in intensity, proximity, purposes and outcomes.

Figure 6.12 shows engagement activities on a continuum of the level of community contact and the degree of intervention of the student/staff and community. As the engagement activities move to the left the contact and intervention become less and as they move to the right the contact and community intervention becomes greater and more involved. Intervention in this sense means working with community about their issues in order to enact social change.

Academic Service Learning

According to Torres and Sinton (eds 2000), Academic Service Learning as an engagement scholarship exemplar, requires an integration of; service, the experience and the course objectives. This means that the focus of the experience must be consistent with the theme of the programme and the course of study in general. There is an expectation that the community will collaborate with the institution in order to manage the student’s experience. Community need is an important criterion for identifying and locating the experience.

‘Service-learning seeks to engage individuals in activities that combine both community service and academic learning.’

(Furco 2002)
A student engaging in service learning provides service in relation to the identified need and in return is provided with the challenge, complexity and reality of the experience to develop knowledge skills and attitudes. One particularly desirable outcome of the programme is a heightened awareness of the student’s civic responsibility. Another outcome is that students develop a new appreciation of their courses. There is a major emphasis on reflection and critical reflection, in and on the experience.

Fig. 6.13: A Model for Describing Service Learning.

In Figure 6.13 Furco (2005) portrays a continuum for ‘focus’ from service to learning and for ‘primary intended beneficiary’ from recipient to provider. He arranges a series of community service or field style activities along the continua from volunteerism to internship. Astin et al. (2000) has found that service learning has a significant positive effect on academic performance, values, self-efficacy, leadership, choice of a service career, and plans to participate in service after college.

Astin (ibid.) suggests that, service learning participation as opposed to community service participation, motivates students to co-reflect with peers and it also garners faculty support, partly explaining the resulting positive effects. Astin (ibid.) also found the 80% of participants admitted that they had learnt from the experience and that it had ‘made a difference’. He also found that as a result of the experience, students’ viewed their studies with renewed interest. Qualitative and quantitative findings suggest that service learning can bridge the service experience/academic material, gap and therefore should be included in curricula.

**Community Based Research**

Peterson (2004) suggests that Community Based Research (CBR) is a programme that can connect faculty, students and community members in meaningful and generative partnership that is designed to collaboratively explore and enact social change. CBR can enable faculty, students, and community members to engage in effective social change by identifying problems to be studied, locating available resources for response, and implementing a coordinated plan of action. Peterson (ibid.) asserts that CBR causes is not favoured by university administrators who prefer staff and students to engage in more abstract non-committal research.
The Washington University School of Public Health and Community Medicine (Washington University 2006) suggest the following Effective Community Based Research principles. Effective CBR Projects are predicated on close collaborative planning with community members who should be the eventual beneficiaries of the research even though the staff, students and university benefit in distinctive ways as well. The aim, objectives, methods and general project direction, should be influenced by the needs of the community partners. Community Partners should be engaged in the analysis, interpretation and reporting of the research findings. Partnerships established for a particular project and learning generated from the project should be such that they endure and extend beyond the project boundaries. Community partners should be empowered through CBR Project co-learning so as to be able to conduct their own research. Other individual competency development learning projects, can precede and proceed the CBR project (Tough 1973, Woods 1994).

According to Strand et al (2003) CBR can fulfill Boyer’s idea of the Scholarship of Engagement by providing a methodology for generative community interaction that becomes the text and context for learning. He asserts that CBR extends the process of experiential and/or service learning because of its focus on the application of discipline-specific learning. Strand et al (ibid.) argues that in CBR the roles of the staff student and community member are blurred and all three become a teacher a learner, a researcher and a neighbor as the setting for learning shifts from the classroom to the community.

15. Student/Graduate Attributes

Hemmings (2000) suggests that there is a widening gap between the requirements of employers and what graduate level employees are capable of providing. This gap is affecting national productivity and international competitiveness. He argues that massive changes in the workplace, exacerbated by the challenges of an overshadowing global market place and the enormous pressures placed by industry on environments, has spotlighted graduate capability in terms of their graduate attributes. These attributes can be classified as generic and specific. Generic attributes can also be called core, essential, key, transferable and employable attributes (Gonczi, Curtain, Hagar, Hallard and Harrison 1995) and are those associated with professional practice, whilst specific attributes are usually associated with subject, technical knowledge and skill.

Generic attribute development causes the most controversy in terms of curriculum design because the development of generic graduate attributes, requires a significant challenge to the pedagogical curriculum design patterns and the disciplinary based subject delivery formats that dominate university undergraduate education. Bishop and Anderson (1990) and Hewson and Hewson, (1988), suggest that the didactic instructional methods (Bezi 1996) that form the basis for recent and current agricultural curriculum design and educational processes, are ineffective in developing conceptual and motivational graduate attributes required by the workplace. They argue that a dominating and classical, pedagogical approach sidelines the essential humanitarian and social
science aspects of agriculture. Bishop and Anderson (1990) support this view and further assert, that a didactic educational format restricts student engagement and therefore limits deep and critical thinking, cooperative behaviour and the development of effective communication competence. Fraser and Deane (1998) argue that a singular pedagogical approaches to curriculum; design, delivery, assessment and reporting, evolved in universities in earlier times of lower student numbers, higher student homogeneity and closer staff/student relationships.

Harvey and Green, QHE study (1994), Gordon (1983), the NBEET study (1992) and Harvey and Knight (1996) all concluded that the 4 cardinal reasons for employing graduates are:

- the knowledge and ideas graduates bring to an organization; their willingness to
  learn and speed of learning; their flexibility, adaptability to deal with change; their
  logical analytical, critical problem-solving and synthetic skills and the impact they
  have on innovation (Harvey and Knight 1996, p. 46).

Otter (1992) Ramsden (1985) propose that critical thinking, problem solving, testing of hypothesis against evidence, synthesis and organisation of complex ideas and subject specific knowledge are essential graduate attributes. The Secretary of the Commission on Achieving Necessary Skills (SCANS, 1991, 1992a, 1992b) categorises attributes three ways, the thinking skills (reason, solve problems), the personal qualities (take responsibility maintain and develop self esteem) and work competencies (use resources, practice interpersonal competence, think and act in systems and operate a range of technologies).

The Wingspread Conference (1994) later supported by Czujko (1994) determined that undergraduates should develop qualities and attributes that will better prepare them for the workplace. The attributes identified in summary focused on:

- the ability to gain and apply new knowledge and skills as the context required,
- the ability to find out make sense and take action from an informed position,
- the ability to function in a global community,
- the development of a range of flexible and adaptable attitudes and dispositions,
- the development of ethical and civil worldviews, approaches and behaviours
- the development of initiative, creativity, resourcefulness, motivation and persistence,
- the ability to work effectively in groups and teams,
- acquiring technical competence in a given field, and
- the ability to apply the above attributes in real world settings in order to solve problems and/or improve situations.

Harvey et al. (1997) concluded that employers value graduates with the ability to synthesise, analyse, critique, adapt, be flexible, be self-motivated, be self assured, interact, innovate, inspire, anticipate and lead change. West (1998, p. 47) suggests that; critical, conceptual and reflective thinking in both intellectual practical contexts, expertise in a specialised field, systemicity,
effective reading, writing, speaking and listening, curiosity, information research, retrieval and utility, multi-faceted problem solving, teamwork, ethical practice and self direction should be attributes acquired by every Australian first degree, graduate. Marshall and Tucker (1992) argue that graduate attributes such as the capacity for application of abstract, conceptual thinking-in-realistic and evolving contexts, effective interpersonal and electronic communication, working effectively in groups and teams, working independently in a relatively unsupervised environment, are essential for powering up the modern economy. Stasz (1997) suggests that attributes should be developed through experiences in the workplace. Harvey and Knight (1996) argue that generic graduate attributes, are valued highly by employers in conjunction with specific attributes. Hemmings (ibid.) proposes that the goals of agricultural and related studies education, based on science education goals (Hodson 1996) are inadequate for the needs of graduates in the modern workplace and therefore require a major rethink.

The purpose of this thesis is to not just rethink the attributes in order to make another list, but elevate the attributes so they become the primary reason for curriculum design, delivery, assessment and reporting. I call the attributes—‘Student Attributes’ because I am asserting that the development of attributes happens in the individual student during the undergraduate course because strategies for that development are designed into the curriculum. I propose this intimate relationship between student development and curriculum design, in order to guarantee that the students’ are not just ‘job ready’ when they graduate, they will be contributors to nation building.

**Conclusion**

In this chapter, I have drawn together the primary data as well as a range of secondary research and underpinning theory into a description and explanation that contains properties for an undergraduate core curriculum conceptual framework that is grounded in community. I have chosen to describe the relationship between each of the components as the integrated process. This approach allows for a sense of emergence that suits my design approach.

**Fig. 6.14:** The Integration of the Primary and Secondary Research with Theoretical Frameworks.
Figure 6.14 describes the core curriculum conceptual framework genesis as the integration of the primary research, secondary research and my own related professional experiences.

The assimilation of the primary research revealed the following UG Schema design properties:
- Individualised learning development guided and facilitated by supportive staff.
- Relevant community engaged learning.
- Career development learning.

Assimilating the secondary research and my own associated experiences, revealed the following UG Schema Design properties:
- Praxis development as the central educative process.
- On and off campus learning communities that benefit from a relationship between: self, others and the setting.
- Universality, provision for generic and specific outcomes that are summatively and formatively assessed.

Assimilating the Schema Design Properties into a Statement

The conceptual framework design properties for designing the core curriculum schema are:

> individualised personal and professional transformative learning cultivated within relevant on and off campus community engaged environments and facilitated by concerned academics, that incorporate mutually beneficial relationships between self, others and the setting using praxis development as the central educative process resulting in the development through action learning and action research projects of generic and specific attributes that are periodically formatively and summatively assessed.

These properties will inform the design of the UG Schema outlined in detail in Chapters 7 and 8.
CHAPTER 7
TOWARDS SUSTAINABLE LEARNING COMMUNITIES

Introduction

This chapter draws upon and extends ideas established in Chapters 5 and 6. Discussion focuses on designing a conceptual framework as a schema or model for an undergraduate core curriculum that is grounded in community. The conceptual framework design properties for designing the core curriculum schema are:

* individualised personal and professional transformative learning cultivated within relevant on and off campus community engaged environments and facilitated by concerned academics, that incorporate mutually beneficial relationships between self, others and the setting using praxis development as the central educative process resulting in the development through action learning and action research projects of generic and specific attributes that are periodically formatively and summatively assessed

One key feature of the schema is the notion of engagement, transformational learning with on-campus and off-campus communities. By way of explanation of the importance of these properties, the results of the Gainen inventory clearly indicated a preference for the “C and D” curriculum responses. The theoretical underpinning of Woods’ (1994) design of the Gainen Inventory is Perry’s (1970) paper on Intellectual Development. Embedded in the “C and D” responses is the notion of “contextual relativism” (Perry ibid), this means that the learner engages with and is challenged by the context in order to learn and develop. Learning in context is therefore at the heart of the research results and forms a major theme in this thesis.

Setting the Design Scene

There is something encouraging in working with agriculture as a vehicle for individual and community transformation. Agriculture is a fundamental process whose central tenet is the relationship between the human world and the natural world. This relationship historically, has helped to develop human food security systems. Food security has been a primary cause for civilisation on this planet. Along with mining, agriculture is known as a Primary Industry. It is the original source of a nation’s wealth. I am proposing that a conceptual framework grounded in community, can help to design a core curriculum in agriculture that can build capacity in undergraduates for rural and regional development. I am also proposing that in order to build this capacity there needs to be a wholesale change in the educative process. This change involves a shift from a dominance of teaching to an emphasis on learning.
Learning as an alternative focus to teaching is at the heart of my thesis. I am advocating that the process of learning be at the centre of the undergraduate agricultural curriculum conceptual framework. Learning in and with community, community both on and off campus. The grounding for the learning is the community. Learning is the domain of the individual. No one can learn exactly what somebody else has learnt exactly the way that they have learnt it. They can receive the same information, they can be present with the other person during a common experience, but what is learnt is in the dominion of the individual. No two experiences therefore, are the same.

Figure 7.1 presents three zones formed by two overlapping circles. This Venn diagram portrays a zone of pure teaching a zone of pure learning and a zone made up of a blend between the two. Atherton (2003) describes in arrangement of the three zones, the causal relationship between teaching domain and the learning domain. The teaching domain is smaller in comparison to that of the learning zone because according to Atherton (ibid.) students are learning from a variety of sources some of which are outside the influence of formal instruction.

Atherton’s (ibid.) Venn diagram describes a relationship between teaching and learning. The profound corollary for the teacher is that not all that is taught is learnt, in Atherton’s words; (a) ‘wasted effort’ and for the learner not all that is learnt is taught or in Atherton’s words; ‘for better or for worse’. He acknowledges the eclectic nature of learning and presents examples of the variety of sources of learning other than the teacher. The focus for my thesis is on the learner and their learning. In Atherton’s (ibid) model, students’ are portrayed as learning material not taught. He refers to this as the Hidden Curriculum (Snyder 1971). An extension of the concept of informal or un-programmed learning is ‘The Shadow Curriculum’, which in one context refers to unassessed, auxiliary programmes that supplement mainstream programmes. According to ULSF (1996) the shadow curriculum is about processes and practices that actually happen despite what is meant to happen.

Pierce & Paulman (1999) argue that the shadow curriculum has a huge effect on medical students because they learn from incidental experience, unintentional observations and role models and often these accidental lessons can be detrimental. The shadow curriculum must be an enormously
influential informal learning force that could be incorporated into the formal curriculum. I propose
an alternative or even an adjunct to The Hidden and Shadow Curricula I have named The Twilight
Curriculum. I am proposing The Twilight Curriculum because there seems to be a gap in the
curriculum literature whereby student personal and professional interests (beyond mere elective
and project choice, etc) are formally incorporated as the curriculum into learning based
professional praxis development. This format along with the assimilated primary and secondary
research results will be used to guide the development of an undergraduate core curriculum
schema, which will be introduced in this chapter and discussed further in Chapter Eight.

Carl Rogers writes about two types of learning ‘cognitive and experiential’. Rogers refers to
cognitive learning as ‘meaningless’ or syllabic (Rogers 1969). Rogers extols the virtues of
experiential learning. He believes that the focus of the learning process should be on the needs of
the learner. Evaluation of the process should also be by the learners themselves, Kearsley (1994-
2001). Roger’s beliefs are grounded in the Humanist Theory of Learning. He is passionate about
the ‘self’ and its development. Rogers (ibid) believed a classroom should be so arranged that
students ‘wish to learn, want to grow, seek to find out, hope to master, [and] desire to create’
(Rogers 1959). Rogers contended that learning should be for and about the individual he saw
education as a means for personal growth and development. The student should have control over
the learning process and direction.

‘I want to talk about learning. But not the lifeless, sterile, futile, quickly forgotten
stuff that is crammed in to the mind of the poor helpless individual tied into his
seat by ironclad bonds of conformity!’

(Rogers 1983, pp. 18-19).

Designing Curricula
Seller (1985), in suggesting 5 principles as approaches for curriculum construction. Hansen
suggests that The Essence of Curriculum Design begins with the need for a conceptual framework.
He then suggests that the designer conceptualise the attitudes and beliefs about learning. Hansen
(ibid.) proposes that the third principle requires the designer to identify an epistemological
rationale. A development and planning then follows. Lastly Hansen (ibid.) argues that designing a
curriculum is a ‘political process’ and many factions and persuasions should be considered and
often need to be appeased.

Curriculum Design
Willwerth & Paugh et al. (2001), present a comprehensive study of a five curriculum theorists,
Kliebard (1989), Schiro (1978), Klein (1990), DeMarrais & LeCompte (1994) and Marsh & Willis
(1995), in a form called heuristics. Heuristics (Phelan 2001) in this context means an arrangement
or procedure for organising a number of alternatives. They (ibid.) outline four curriculum
heuristics including curricula design that is, supports, challenges and is indifferent to, the prevailing educational system. Wilwerth et al.’s outline suggests that curricula theorists and their designs can be summarised into four main groups; those favouring the purist traditional schooling approach, those viewing education as a conduit for social transmission and social transformation, those who recognise the individual learner and their development and the applied experientialists.

Hansen (1995) suggests that there are five principles for designing curricula. These could be summarised as:

• the need for a conceptual framework,
• the need to embed particular attitudes and beliefs about learning into the design e.g., transmission, transaction, transformation (Miller & Seller 1985),
• the need to ground the design in an epistemological rationale e.g. academic or utilitarian (Goodson 1987),
• the need to recognise in the planning process the big picture considerations pertaining to design such as; centralised/decentralised control of curriculum with generic application across a sector, course of study or degree and also the small picture considerations pertaining to design such as; lesson structure, activities, assessment and evaluation with specific application in a subject or unit, and
• the need to recognise the social, economic, political, gender, racial, realities of lobby groups with vested interest in particular formats

Hansen (1995) argues that the traditional curriculum design pattern that starts with behavioral learning objectives, proceeds with content decisions, and finishes with instructional methods, may not be appropriate in an eclectic educational environment. I have taken Roger’s curriculum design ideas into account when considering the UG Schema and added more developmental processes and layers of achievement.

Kneller (1964, pp. 108-119) suggests that there are four main theories underpinning curriculum design, Progressivism, Reconstructionalism, Essentialism and Perennialism.

‘Progressivism’, according to Kneller (ibid.) is a democratic, educational philosophy that utilises an active, collaborative, problem solving project design, focussing subject matter on the interests of the learner. The role of the teacher is a guide or advisor.

‘Essentialism’ according to Kneller (ibid.) is a curriculum philosophy situated between Perennialism and Progressivism. Kneller asserts that essentialism developed out of a backlash against the ‘liberal’ application of Dewey’s educational ideas. Essentialism allocates authority with the teacher who prescribes and delivers indispensable subject matter (the basics) in a traditionally rigid environment of work and disciplined mental application.
Kneller (ibid.) describes ‘Perennialism’ as an educational philosophy grounded in the notion that ‘the basic principles of education are changeless’. The focus for development is rationality and the pursuit of universal truths. Essentialism prepares students for life outside the educational domain by inculcating the basics from ‘the great books’ and other ‘classic’ sources.

Kneller (ibid.) asserts that ‘Reconstructionism’ is a plebiscite driven philosophy, that focuses educational structure and function on social and economic, values laden, democratic social reform. The role of the teacher is to facilitate the reform through the students’ education. Kneller emphasises the school/child/culture intersection. When considering Willwerth & Paugh’s (ibid) heuristics and Kneller’s treatise on curriculum theory, I am struck with the general impression that all of the ‘isms’ etc, are too restrictive. My schema would incorporate some of all of these ideas and approaches. I would call my approach to curriculum design ‘Eclecticism’ because it draws from all of Kneller’s categories.

Atherton (2005d) in his four-way curriculum model describes four basic curriculum approaches or epistemologies. According to Atherton (2005d) an Academic (Expressive) approach to curriculum design has the highest currency in schema. Material is deemed important because it is a given that it is essential. The utility of the material is inconsequential to its inclusion. Often authorities outside the influence of the teacher can control the curriculum content and indirectly the design. Students and even staff may express a sense of frustration as to the relevance of the material. Bloom’s (1956) lower order taxonomic levels essentially describe student development.

In Fig. 7.2, Atherton (ibid.) suggests that the Vocational/professional (Instrumental) curriculum approach, emphasises utility. In other words material is selected and presented in such a way that individual meaning can be made. Importance is placed on reasoning, analysis and deduction for application. Remembering instructional material is no longer the focus for student success. Students’ developing the capacity for explaining how and why things have happened is extremely important. Atherton (ibid.) expresses concern that the education pendulum may have swung too far towards training in this approach to curriculum design sacrificing coverage of background material. According to Atherton (ibid.) the purpose of the Mastery/Induction educational approach is to produce a skilled graduate who has mastered a body of essential knowledge and skill. That
knowledge and skill may be extended in their course to become competence. Competence in this context is determined and validated as set of ‘standards’ by internal and external bodies and authorities. Atherton argues that graduates having mastered context specific competency standards may be excellent practitioners in a particular field of application, but may not have necessarily learnt to interpret and adapt to changing circumstances and this can be a problem. According to Atherton (ibid.) a Developmental/Constructive curriculum design approach is more concerned with development in the student. The context, nature of and focus for the individual’s development is open but presumably it occurs within the field of study of the student’s chosen degree. Curriculum focuses on ‘maximising the potential’ of each student. Success is measured in the degree of improvement of each student. The improvement is eclectic and not based on set levels against which development can be measured other than those agreed to in the assessment process. Atherton (ibid) asserts that this curriculum approach is concerned with ‘sophisticated understanding’.

Features of the UG Core Curriculum Schema Design

Integrating the components of the primary and secondary research along with critically reflected components from my own experience into a cohesive set of guiding principles for curriculum design will not be easy. I wish to emphasis that the product of the research is not a core curriculum as such it is a conceptual framework that could be used to inform the design of a core curriculum. The design will need to be universal and dynamic enough to cater for various contexts. An overarching epistemology emerged from the research. Findings indicated an overt and/or covert desire by both staff and students for individuals to develop in an atmosphere of reason and emancipation incorporating new ideas, theories and approaches from sources outside the individual’s experience in order to critically improve their practice (praxis). They wanted a career development focus grounded in reality. A basic tenet of the model is the iterative relationship between the student’s development and their engagement in community. The notion of application and relevance was very pronounced in the research results. There was a strong desire for evidence-based development regarding the self-employment opportunities.

In Figure 7.3, the learning development world of the student is connected to the experience world of the community. The community in this context is geographic, institutional, organisational and professional both on and off campus. The relationship between the ‘two worlds’ is iterative in that the student constantly interacts in, with and for community then makes sense and derives personal meaning.

Fig. 7.3: Learning in the Community’.
Meaning has a fourfold purpose:
1. Making sense of experience.
2. Planning future community engagements as an action-research action-learning loop.
3. Developing action-learning plans for professional practice development.
4. Applying current professional practice, testing out personal and professional development.

Connection with community as a primary experience base was a fundamental precept emanating from the research. Secondary research indicated that the professional community especially was interested in the student professional development. I have represented this relationship extremely generally however what is required to make that relationship relevant to both the community and to the student is extremely complex. There are many aspects to ‘the world of community experience’; likewise there are many aspects to the ‘world of student development’. The three fundamental components of the schema are professional practice development, community engagement and praxis.

This is about learning from and learning to - characteristics that are symptomatic of critical theory (after Van Manen 2000). Soucek (1993) draws upon the work of Habermas (1971) and Arato & Gebhardt (1978) as well as other critical theorists in identifying the importance of the interaction of ‘Lifeworld’ and the ‘Systems World’ to educational processes involving student development. Praxis as a developmental process is central to this schema because it integrates the student’s professional practice learning with the challenge of community engaged research. Praxis involves a critically reflective and strategic relationship between theory and practice in an atmosphere of ethical judgement. These notions are consistent with student personal and professional practice development. In order to assimilate the components of the primary and secondary research in a comprehensive and integrated arrangement I have decided to turn to the philosophies of the East and back in history for inspiration.

I Made the Road by Walking It—Who Owns the Learning?

Pesechkian’s (1981) ‘A Story on the Way’ presented in Chapter 5 (p.141), describes the revelations experienced by a man on a journey. It was the challenge of the journey and the wisdom of significant others who helped the man realise that often the best preparation for a journey is an effective approach to learning. Metaphorically, the physical road on which the man walked became the catalyst for the more important road being constructed as he walked. The UG Schema evolved from the primary and secondary research assimilated with perspectives developed across the journey of my professional life. In this section I will extend these ideas incorporating more south Asian and eastern philosophies as I develop an argument for the eventual UG Schema design.

‘Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime’.
Chinese proverb Tripp (1970) attributed to Lao Tzu. Lao Tzu’s aphorism is very common. I have seen it used in many circles but mainly in educational and life management environments. I have chosen Lao Tzu’s quote because it contains some appropriate concepts at this stage of my argument for the UG Schema development. My thesis is that there has never been a greater need to rethink higher education curriculum and in particular curriculum relating to undergraduate agriculture.

Lao Tzu lived in ancient China during the 6th Century BCE. He is associated with the Taoism and is also associated with the teachings of Confucius. This quote focuses on a teacher, a man and a situation. The initial message extols the advantages of being taught a skill that will sustain a basic need, *give a man a fish and he eats for a day*. The second part of the Lao Tzu’s saying involves the man being taught to fish so that you can ‘feed him for a lifetime’. The assumption is that he can ‘eat for a lifetime’ if he knows how to fish.

The interesting aspect of the second part of the saying is that the teacher is still the feeder after the teaching has taken place. The parable actually says ‘teach a man to fish and you feed him for a lifetime’. Nowhere does it say; ‘teach a man to fish and he *eats* for a lifetime’. Nowhere does it say; ‘teach a man to fish and he *feeds himself* for a lifetime’. It says ‘you feed him for a lifetime’! This would indicate that the man is in some way, still dependent on the teacher despite being taught how to fish. The man is supposedly better off because he has been taught knowledge and skill that should increase his quality of life. However he does have to now catch fish for the rest of his life. So to teach a man to fish disengages him from relying on someone else for food. Being taught the skill of fishing makes the man independent of the fish giver. The teacher made that assumption and therefore has acquired a degree of power over the man who appears to have no say.

Having the power to decide whether to give or to teach limits each subsequent man to the whim of the teacher, this source/sink relationship could suggest that knowledge always comes from a higher source. It may suggest that the only way to gain knowledge is from another more knowledgeable person. There is no doubt that teaching can be useful as a tool for development but it is in the domain of learning that greater and more useful things are possible. Even the teacher is a learner. Teaching even as an effective practice gives no guarantee that planned knowledge skill or attitude has been transferred. Learning on the other hand is controlled by the learner and certain guarantees regarding what has been learnt can be made. This scenario of who owns the learning and therefore who should determine what is learnt is an interesting question and relates directly to the nature of curriculum design. Lao Tsu’s wisdom, in my opinion, does not stand up well to critique in modern times, however it does highlight the limitation of two educational alternatives, ‘giving or teaching’. Lao Tzu’s parable might be extended providing more choice and diversity:
‘Help a man learn how to fish, farm and hunt and he choses what, where and when he eats’.

Modifying the saying in this way implies that the giver or teacher is now required to help the man to determine what they need. Recognising choice, shifts both the power base and the educative process from teaching by the teacher to someone helping the man to learn. The relationship is more independent and facilitatory. The subject is no longer just fishing but identifying, exploring and deciding on alternative sources of nutrition. The outcome is that the man now has choice and variety and diversity and some power to decide. This would be a reasonable place to stop in a critique of Lao Tzu’s parable. However in this version the subject is still food for assumed need and the man is still dependent on the teacher to help him learn how him fish, farm and hunt. The focus has shifted from teaching to learning. And the man has strategic, tactical and operational choice. The issue is that the focus is still about assumed need made by a person other than the learner. What if the relationship shifted from dependence beyond independence and on to interdependence. This would create a whole new way of thinking about the subject, relationship, purpose, power and possible outcome of this scenario. Given these conditions, a critique of this saying could then be:

‘Help a person determine their interests, then facilitate their learning and development in that direction.’

Implied in this critique, are ideas that are very pertinent to my thesis. In this version there are two main characters, the person and the helper/facilitator. The process starts when the ‘person’ is helped to determine their interests. Once this is done the helper then facilitates the person’s ‘learning so the person can develop in that direction’.

Unlike the previous version by Lao Tzu, the power has clearly shifted to the person in both determining what is to be learnt and the subsequent learning and development that follows. The act of teaching is the facilitation of learning. A subliminal or ‘twilight’ aspect of this approach is that the facilitator builds their own capacity by becoming part of a learning community. This describes a self-determined learning or an andragogical (Knowles 1984) heutagogy (Hase & Kenyon 2000). It is about capacity building or partagogy (Levinger 1996). This capacity is not only about achieving but also learning how to learn to achieve. These sentiments echo the fundamental outcomes of the primary research.

Helping a person to determine what their interests are opens that person to multiple options and eventually to decisions that give purpose, direction, meaning, relevance and empowerment. Both staff and students in the research expressed a fundamental desire that their courses be relevant. Admittedly in an andragogical/heutagogy/partagogy learning format a facilitator no longer
completely controls the direction of the development (albeit given the context in which the student is studying) but they have influence and can assist the pace and depth of the process.

**The Struggle Between Light and Dark and the Search for the Centre**

Lao Tzu was credited with founding the philosophy known as Taoism. He lived in China in approximately 600 BCE and struggled with some of the great issues of life like *How does it all work?* What is the purpose of being human? How should a person live? He gradually developed a philosophy called ‘The Tao’. This word literally means ‘the path’ or ‘the way’. The path or the way means ‘how’ to do things, how to approach situations, how to understand circumstances. Lao Tzu’s teachings gradually developed into a religion called Taoism or Daoism and these teachings, in my opinion are very prevalent today and have influenced the UG Schema development. Taoism is a religion without a deity. It is based on a critically reflective relationship between the individual and their world eventually leading to degrees of wisdom.

A fundamental canon in Taoism is that of surrender to the circumstance. This however does not mean that the person does nothing but wait for wisdom to overtake them. Taoism is about finding the way. In essence, this means that a person’s journeys through life should include a conscious effort to find out, make sense, make a plan and take action. The philosophy of The Tao centres initially on dualism. Dualism is an approach that presents two opposing viewpoints or standpoints in a loose or dependent relationship. Descartes (1641) struggled with the notion of the mind and the body acting both independently and dependently. Hegel (1807) also presented arguments about dualities, but as dialectic. In a dialectic the two original arguments or positions eventually disappear being consumed by their own emergent reasoning as a synergy. Often referred to as ‘thesis, antithesis, and synthesis’ Hegel presents a schema whereby the opposites - thesis and antithesis are transformed and emerge as a new entity called the synthesis. Lao Tzu’s *yin and yang* as dualism has resonance with Descartes and Hegel. Hegel’s proposition of ‘being, not being, and becoming’, is very pertinent to a thesis lauding the ontology of self-determined development.

In religious circles the opposing view of good versus evil, god and the devil is also interesting in that the opposites co-exist and in fact exist because of the other. The interesting feature of dualism is that of interdependence. This means that each component of the dualistic relationship needs to be like it is, for the other to exist. We can know good because we understand that it is not evil and visa versa. The yin/yang model presented in the Taoist tradition shows two fish one light the other dark, circling each other. Dark becomes light and light becomes dark in a never-ending struggle for harmony and balance. Captured in the static yin/yang model there are two frozen light and dark entities but the dynamic model would portray the light and dark not existing at all but constantly transforming into its opposite. The small opposite colour circle in each area attempts to portray the transformation in transition. Balance is achieved if both opposing light and dark elements are

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3 This is a different interpretation of dualism to that of Perry’s (1970) ideas about intellectual development
equal in force and no longer exist as entities but exist as a synergy. By this I mean that the struggle in life for meaning according to Lao Tzu is trying to find the harmony between the opposing light and dark forces at the centre or point of balance. LaoTzu’s philosophy presents ‘the world’ as a series of opposing forces such as light and dark, male and female, good and evil, happiness and sadness, love and hate, wealth and poverty, sickness and health, friend and enemy etc. The great journey in life according to the Tao, is to find the harmony of these opposites by achieving the centre.

**Yin and Yang**

Typically, the symbol for the balance of dualism or ‘harmony of opposites’ is the Yin and Yang model. The following figure is a rendition of this model. It would appear that the light and dark follow each other around for eternity however the intention is that the light force eventually becomes the dark force and visa versa. So the light is transformed into the dark and the dark becomes the light. The main quest is to be neither light nor dark at any one time but to find the harmony of opposites in the centre. Abraham Lincoln once said ‘I destroy my enemies when I make them my friends.’

**Fig. 7.4: The ‘Symbol of Creation’**

Figure 7.4 consists of a central circular figure that is divided into two parts by a longitudinal sigmoid shaped equator. There is speculation that this ‘s’ shape represents the path of the shadow of the sun around the earth. Some say that the two parts resemble fighting fish circling each other. One hemisphere is dark coloured the other is light coloured. The two parts seem to travel clockwise around the centre. Each hemisphere contains a portion of the opposite hemisphere. In this model ‘yin’ represents the dark forces and ‘yang’ represents the forces of light. This circular model is known in Taoism as, ‘the symbol of creation’ Kelley (2000). The Symbol of Creation forms the centrepiece for a more complex Taoist’ schema.
Fig. 7.5: The Taoist Schema Consisting of Eight Trigrams

Situated Around the Symbol of Creation. Surrounding the yin/yang, Symbol of Creation in the Taoist schema (Figure 7.5), is a series of eight diagrams. These are made up of three sets of parallel lines. The lines are either broken or unbroken. The unbroken lines relate to the yang and the broken lines relate to the yin. These diagrams are known as the trigrams and are positioned on the eight cardinal compass points around the Symbol of Creation. The Taoist schema consisting of the symbol of creation surrounded by eight trigrams, bounded by the octagon, provides a useful and interesting and inspirational structure for my core curriculum conceptual framework. Each of the trigrams is symbolic. There are four dark female trigrams and four light, male trigrams. The trigrams represent 'cabalistic signs' (Williams 1974) whose origin goes back to 2852 B.C. Williams (1974) describes how markings resembling the trigrams were found on the shell of a tortoise. Using the word cabalistic allocates an atmosphere of mystery and hidden meanings to these symbols.

Cabalistic also means esoteric. This means that their meaning is only revealed to a select few. Cabalistic signs emanate from the Kabbalah an ancient study of biblical texts usually associated with Judaism (Stern, 2004). Incorporating cabalistic notions into my argument allows for ideas relating to individual interpretations of written material and experiences ideas consistent with the notion of the learner owning the learning.

The Yin and Yang schema can get very complicated and can include multiple trigrams known as the hexagrams, mathematical nuances not to mention ‘feng shui’. I have selected this model in its most basic form because it suits the needs of my schema design principles. The Yin Yang schema has at its centre a symbolic representation of a black and white fish circling each other. The notion is that change and harmony can occur simultaneously. Surrounding the central symbol are eight trigrams. These represent aspects that have an impact on and are impacted by the harmony. The yin/yang essence (dark-female, hidden and receptive and light-male, illuminated and active) of the central model, is transferred into the trigrams and the essence of the trigrams is transferred back to the centre. In other words the centre and the periphery are interlinked in an iterative, generative and causal relationship.
This model has in my opinion, many useful features for a curriculum conceptual framework. Poon (2000) has also utilised the yin yang symbolism in a proposed framework for curriculum in Occupational and Environmental Safety (OES) conference paper presentation. Poon discusses the objectivity/subjectivity dilemma and connects this with the notion of duality. He describes how the Yin Yang is an appropriate conceptual framework for designing curricula.

Fig. 7.6 Poon’s Duality of Theory and Practice

Figure 7.6 (Poon 2000) equates theory with yang and practice with yin. Poon captures the yin/yang practice theory connection in the following model. He describes a cyclic process in which research and development, thinking, learning, experience etc., is converted into knowledge, new ideas and new designs and actions and application are transformed into concepts, models and principles. In Figure 7.7 Poon overlays the cyclic process outlined in Figure 7.6 schema, onto the traditional Yin Yang model.

Fig. 7.7: Poon’s Duality of Theory and Practice. (Related to Yin and Yang)

Poon’s models are useful in describing the duality of theory and practice. The notion of theory and practice interacting is similar to Aristotles concept of praxis. However, Poon’s model and explanation does not go far enough for my purposes, nor is the schema immersed in a boundary that will give the theory in practice, a sense of overall purpose. Praxis is much more complex than merely theory applied in practice and practice, seeking theory. Praxis portrayed by the ‘The Symbol of Creation’ could be useful because the model contains two seemingly isolated elements yet they are notions consistent with the concept of praxis.
Praxis development is at the heart of the schema. Grundy (1987, 1993, pp. 116, 117, 118) draws on Freire’s (1972b) work to outline a mosaic of guiding principles for praxis development. Freire (ibid.), suggests that praxis develops is a dynamic, reflexive, learning relationship between action and reflection augmented by theory (Freire ibid. p. 96). The environments for praxis development are actual, contemporary and existential (Freire ibid. p. 68). Praxis development involves interacting with the worlds of people and cultures (Freire ibid. p. 66). Praxis development emerges from a conscious process of critical construction and reconstruction of the individual’s perception of their world (Freire ibid. p. 96). The focus and orientation for interpretation and meaning making (as a pivotal praxis development process), are the needs, aspirations, concerns, issues and interests of the learner (Freire ibid. p. 90). There is a clear focus on the learner, the learner’s world and the learner’s needs, interests and issues. Praxis according to Aristotle in Grundy & Kemmis (1981) is ‘process focussed action. I am proposing that it is equally important to learn by the process one is undergoing or the transformative power of the journey, as it is to achieve a result or outcome.

Figure 7.8 portrays Wilson’s (1991) simplified model of praxis development. In this model there are three ‘zones’: practice, theory and the zone in between that is not named. Two lines with arrowheads pointing to the right partition the three zones of the model. The overall movement is apparently from left to right. The connecting spiral starts in the practice zone and arcs downwards to the theory line, it then arcs upwards crossing itself to join the practice line. This coiling continues until the line curves upwards and enters the practice zone. Whilst this model is symbolic and contains two of the basic elements of praxis arranged in a rudimentary developmental model, it is extremely simple and lacks the kind of sophistication required for a more complete explanation of the praxis development process. Mezirow (1991) argues that neither theory nor practice dominates the praxis relationship.
In Figure 7.9 I have extended Wilson’s praxis model considerably. By drawing on ideas from Grundy & Kemmis (1981), I have designed a model that is much more comprehensive. Like Wilson’s model there are three zones, practice, theory and now a named, reflection/subjective reasoning/designing/planning zone. There is still a general movement from left to right. However unlike Wilson’s model, two straight lines do not partition the three zones. In this model a line tracing the learner’s developmental path interconnects the three zones. The process is bounded in the Aristotelian tradition with a disposition or ‘hexis’ that creates a ‘guiding mindset’ for the journey. The guiding epistemology for praxis is ‘phronesis’ or ‘practical wisdom’, meaning that personal and ethical judgement will prevail and ‘true justice might be served’.

The development process begins with a purpose, goal, need, interest, curiosity or angst that motivates engagement. Unlike Wilson’s model, the learner can begin the process with either an experience, plan or idea. This description begins with an experience. Transformation is cultivated as the learner identifies and assimilates relevant, internally (intuitive) or externally (reading, observing, interacting) researched theories, ideas, concepts and principles, by critically reflecting in and on the experience. Pertinent ideas are incorporated into a design and plan that will address aspects of inadequacy identified from the critical reflection. Acting in a magistratate like manner (Grundy & Kemmis 1981), the plan is applied and an iterative process of, action seeking theory, theory modifying practice, and practice critiquing theory, continues until the situation is improved.
or development has reached a satisfactory stage. A goal may have initiated the process but it does not necessarily have to be achieved for praxis to be developed.

Fig. 7.10: Poietike as a Linear Application of Theory.

In Figure 7.10 I have presented a model for describing Poietike an alternative theory and practice interaction. Drawing again on Grundy & Kemmis (1981) I am attempting to differentiate between two approaches to professional practice development. The poietike process could be loosely compared with the scientific method. In the poietike model there are three zones comprising a zone focusing on technical knowledge, principles and rules; a zone that focuses on reasoning and objective analysis; and a zone that focuses on practice and rote application. Like Figure 7.9 one line connects the three zones as it weaves from left to right through the model. Once again the process is bounded by an Aristotleian hexis. However in poietike the hexis or disposition is ‘techne’ or ‘practical output’ there is an overwhelming desire that production of results or an outcome will be achieved and a problem will be solved. The desire to achieve an outcome seems to consume the process.
The process begins with a need, curiosity or hypothesis. Relevant current knowledge is accessed and applied in an objective way. This process continues until the need is fulfilled the problem solved or the hypothesis proven or disproved. Praxis could be described as process focussed action taking whilst poietike could be described as outcomes focussed action taking. Both praxis and poietike involve theory being applied critically. However in poietike the learner is somewhat separated from the process and therefore should undergo little or no transformation whereas praxis focuses on the transformation of the learner because of their critical engagement. In Poietike the learner is subordinate to the theory in praxis the theory is manipulated by the learner for theor purpose.

Poietike is useful as a process for generating Mode 1 knowledge (Gibbons et al 1994). Praxis development focuses more on generating Mode 2 and Mode 3 knowledge (Barnett 2004) in the form of professional practice. Poietike however can generate Mode 1 knowledge that can be used as a resource for praxis development. The praxis process can transform the learner’s capacity for doing, knowing and understanding and heighten their sense of being and becoming. This model helps to validate praxis as an integrating component of UG Schema.

**Simplifying the Praxis Process**

In the following model (Figure 7.11) praxis is portrayed as a figure eight. It is as if the previously discussed Figure 7.9 were turned through 90 degrees and simplified. Two main cycles (knowledge and practice) are connected by research, experience and personal resource (or an individual’s being and becoming). In the figure 8 praxis process a learner by reflecting on and in experience, critically seeks new ideas to inform action. In other words ideas are strategically applied and the learner has a clear understanding of their development pathway. Praxis is a more superior learning process than trial and error or intuitive learning and is a more pertinent learning process than merely developing comprehension or knowing about something Bernstein (1971). A praxis development cycle can begin at any one of the three points.
Fig. 7.11: A Simplified Praxis Model.

Figure 7.11 portrays a simplified version of Figure 7.9 and is loosely inspired by Senge’s (1992) feedback model. In this version there are two main cycles, The Knowledge Cycle and the Practice Cycle. The Knowledge Cycle (1, 2, 3, 7), could describe the conventional approach to a student preparing and submitting an assignment. The student researches ideas related to the assignment question, they interpret and personalise, critique and analyse and finally after several circuits, acknowledge that they understand something about the topic, they submit and receive a mark. The attributes developed however might be more consistent with achieving the “mark”. The Practice Cycle (3, 6, 4), could describe a trial and error or even an intuitive learning episode. In this version the student tries out something, reflects on the outcome realises a shortfall in their performance by reflectively comparing their performance with their previous similar performances, or the performance of others, or possibly a benchmark. They then plan another intuitive approach and try again. The Taoist yin and yang model is called “the symbol of creation” drawing inspiration from this I have decided to call my figure 8 praxis model, “the origin of personal meaning”.

1. RESEARCH, use primary and secondary research methods and techniques to critically accumulate informing ideas,
2. INTERPRET & PERSONALISE, assimilate the ideas into your own meaning, “determine the significance for me”.
3. PERSONAL RESOURCE OR ATTRIBUTES, establish your own version of the theory and ideas to inform professional practice development - and modify approaches once they have been critically applied - these become your attributes
4. DESIGN & PLAN, construct an action plan to ensure the effective application of the critically interpreted ideas.
5. REHEARSE, apply the plan, test out the ideas.
6 REFLECT, critically analyse and evaluate the validity of the applied ideas
3. ATTRIBUTES what has been confirmed, changed or is still challenging you ?
7. ANALYSE & CRITIQUE Analyse and evaluate the modified theory’s efficacy in developing your professional practice.→ 1

Knowledge Cycle + Practice Cycle = Praxis Development
(“complete the figure 8” as many times as needed)
Figure 7.12 extends the explanation of praxis development. There are three praxis development figure eight models portrayed, each is a copy of the other. The top model has the 'need issue' component darkened. The central model has the 'experience' component darkened and the lower model has the 'primary and secondary research' component darkened. These three darkened components signify an alternative starting point for praxis development. A student could begin by having read about or observed some phenomenon and begin the figure eight journey towards developing professional practice from that idea.

A student may have had a motivating experienced and wanted to know more about what, how and why it happened. They embark on the figure eight praxis development journey from an experiential start. A student may have a need or an unresolved issue so they engage initially with their current professional practice and decide to either pursue ideas to inform their development or test out their current professional practice then move on around the figure eight model from there. This model allows for a description of ‘trial and error learning’ by only utilising the practice cycle as the ‘learning journey map’. It also can describe a more traditional learning journey by only
utilising the *knowledge cycle* as the ‘learning journey map’. Once the knowledge and practical cycles begin to inform each other however—praxis is developed.

Wisdom is at the heart of the UG Schema. Wisdom has a number of concepts essential to the proposed UG schema. In researching the notion of wisdom several themes are consistent. Wisdom is an attribute or quality of an individual. It is based on an ability to apply appropriate knowledge judiciously and ethically. In other words one should decide on actions according to a variety of perspectives and with due regard to the context. Ackoff (1989) presents the notion of wisdom as the culmination of a series of attributes that include gathering data, researching information, generating knowledge. He proposes a relationship between connectedness and understanding.

Bellinger Castro & Mills (2004) have represented Ackoff’s relationship as a linear graph. Bellinger et al. (2004, after Ackoff 1989) presents an interesting explanation of wisdom in which they draw upon higher order and esoteric influences to suggest that wisdom usually emerges where no wisdom was before. In other words it is a special kind of judgement and understanding that permeates ones being rather than just a process of increasing ones awareness. Wisdom emanates from ethical and moral domains and requires a learner to deeply contemplate circumstances in order to explore in philosophical way as well as others.

Wisdom according to Bellinger, Castro & Mills (2004) is the pinnacle of a linear relationship between connectedness and understanding. In other words to acquire wisdom one should engage fully in the world and in doing so, make sense of that world. The struggle therefore in developing wisdom is to develop personal meaning through understanding relationships, patterns, concepts and principles. Once learnt these approaches become personal and professional universal qualities that can be applied to any setting. Figure 7.13 falls short of the depth of description that Ackoff (1989) may have required.

Aristotle who was a student of Plato and mentored Alexander The Great also struggled with the concept of wisdom. Aristotle developed a philosophy based around reason. At the heart of this philosophy was the notion of understanding change. According to Noyd (2006), Aristotle suggested that a person could learn wisdom or practice wisdom until acting wisely became a natural course of action. Part of the foundation of this learning is knowing the difference between virtues and vices. One of the ‘great quests’ in ‘getting wisdom’ is to struggle to develop virtues that emanate form the middle ground between the extremes of vices. Aristotle (Noyd, 2006)
suggests that in order to develop moral virtue one should seek to understand the complexity of the ‘middle ground between the extremes’ for example courage can often be found ‘between’ cowardice and foolhardiness. Courage is neither one but has attributes of both and attributes that belong to neither. This discussion, based on Aristotle’s ancient teachings resonates directly with Lao Tzu’s harmony of opposites.

Soll (ibid.) uses the word ‘mean’ to indicate the ‘middle ground or synthesis between the two extremes. To use Soll’s example, courage is neither cowardice nor foolhardiness, however these two extremes could easily be considered relative to courage. If one were to act foolhardy one might engage in an activity that may be similar to that expressed by an extreme act of courage. Likewise if one were to exhibit cowardice one might be considered in the extreme to lack courage. Courage in this instance is not made up of those extremes it is a synthesis or a emergent property of the thesis and antithesis. A virtue such as courage is knowable because we know about vices like cowardice. Another useful way to consider the relationship is to consider them on a continuum. Cowardice at one extreme, foolhardiness at the opposite extreme and courage situated along the continuum somewhere. Conversely one could consider the relationship as a Venn Diagram.

Fig. 7.14: The Emergent Virtue of Courage.

Figure 7.14 portrays a synthesis of cowardice and foolhardiness as courage. Synthesis in this discussion refers to an emergent property rather than a blend. Cowardice is not a combination of the other two it is the resultant. In other words in order to know what courage is one must understand completely what it isn’t therefore it has a relationship with the two extremes but is not made up of them. Plato considered wisdom, courage, temperance or self-control and justice to be predominant virtues. Aristotle extended Plato’s list to include friendliness, generosity, gentleness, truthfulness and wit (Noyd 2006).

The quest for the middle ground is evident in many ancient religions it is central to Buddhism. In The Song of The Lute, Siddhartha gained enlightenment whilst sitting under The Bodhi Tree near a river. He overheard a musician teaching a pupil how to play a stringed instrument. The teacher explained to the student; ‘If the strings are too loose the note will not play and if the strings are too tight they will break, only when the strings are tensioned correctly will the sound be harmonious’. Like the story of the lute, Siddhartha had experienced the extremes of extravagance and
deprivation. He realised that neither of those extreme approaches to living, could bring ‘enlightenment’. Enlightenment for Siddhartha was achieved between the extremes.

Enlightenment is not a blend of the two extremes it is an emergent property of those extremes. The UG Schema contains elements of a proposed undergraduate core curriculum in Agriculture grounded in community. This conceptual framework is designed to produce graduates who can work with on and off campus communities in managing change. Graduates who can re-invent themselves as required and who have incorporated managing change into the development of their personal and professional practice. Elements of the middle ground discussion inform the UG Schema.

**The UG Core Curriculum Schema Design—Mysticism with Scholarship**

I have incorporated praxis development in constructing the schema. The figure eight praxis model Figure 7.15 assisted in the schema design process by informing the generic structure and the specific structural elements. The development of the schema is guided by the results and analysis of the primary research, curriculum theory, education theory, community engagement ideas, rural development ideas, my secondary teaching experiences, my tertiary teaching experiences, my professional development experiences and my interest in ancient history and eastern philosophies. I began the schema design by deciding that the model had to have an interactive, light half-community engagement and a dark half-professional practice development. I then identified the desirable student attributes emerging from a need to both engage in community and become professionally capable. These attributes were tempered and informed by critically reflecting on the primary and secondary research and my own experiences as an educator. Why eight attributes? The tao Schema had eight components around a central yin / yang feature. Inspired by the Tao Schema, I realised that I could adequately cover the aspects of effective community engagement and personal and professional development with that number. Once I had decided on the student attributes I worked backwards to identify the processes needed to develop them and the epistemology that would guide that development. The mandala structure emerged and this breakthrough combined with the Tao schema gave me a suitable conceptual framework to work with and develop.
Figure 7.15 demonstrates the genesis of the UG Core Curriculum Schema. Praxis is a critically informed and generative integration of theory and practice. In this model the knowledge cycle is critically informed by primary and secondary research ideas, whilst the practice cycle is critically informed by my own experiences.

Some of my ideas were confirmed, challenged and changed when reflectively analysed in light of the primary and secondary research concepts, principles and assumptions. Some primary and secondary ideas were adapted in light of the context and my experience. The schema emerged as a consequence of a series of strategic and creative ‘figure 8 cycles’. What has been developed will now be explained in much more detail. Like the yin yang in the Lao Tzu model, the UG Schema is designed so that half of the components are dark (twilight) and the other light. Half of The UG Core Curriculum Schema focuses on the development of personal and professional learning and the other half on applied learning in, with and for community. Practical wisdom results as the two halves meld. Triple Venn Trigrams surround a central praxis development model as in the Taoist schema. Both the praxis and Triple Venn layers are all guided by phronesis.

Studying in, with and for, the community is represented on the left or ‘light’ side of the outer Venn Trigram layer and studying in, with and for self, is represented on the right or twilight side of the outer layer. The overriding guiding ‘atmosphere’ or ‘principle’ for this learning engagement and study is ‘to act in an ethically defensible way’. To learn to do this, or even to unlearn in order to do this, would set the learner on a path towards acquiring ‘practical wisdom’ not just knowledge or skill. In the light side, students would engage in community projects both on and off campus. In
the dark or twilight side, students would focus on professional practice development. By iterating between light and dark through a praxis development process, students build practical wisdom.

In the very centre of the Figure 7.16 is the yin/yang inspired praxis model, portraying the light and dark elements interacting with each other, just as in Lao Tzu’s model. Lao Tzu called this model ‘the symbol of creation’. The light/dark interaction has been portrayed by Poon (2000) as a theory/practice interaction. However unlike Lao Tzu’s ‘symbol of creation’, the central praxis model in my schema portrays an interactive process about the ‘origin of personal meaning’ for the learner based on ‘praxis development’.

Praxis is the critical and strategic interplay of theory, practice, reflection, interpretation, analysis and planning in an atmosphere of ‘engagement, reason, meaning and purpose’. Critical reflection on practice seeks theory to clarify, explain and account for experience. Whilst analysed, interpreted and personalised theory strategically applied, informs a possible improvement in practice. Freire (1970) suggests that theory cannot exist without practice and vice versa, he refers to practice being ‘soaked in theory’.

I have deliberately placed praxis in the centre of the core curriculum schema because to me, it is the ‘origin of personal meaning’, a catalyst for development and a vehicle for transformation’ (after Freire, 1970, Stage & Muller 1998 and Bawden & Packham 1993). Praxis allows experience to be both explained and eventually informed by ideas beyond the learner’s experience. Freire described the transforming power of praxis in the learner as ‘Conscientisation’.

‘Conscientisation refers to the process through which students achieve a deepening awareness of the sociocultural reality that shapes their lives and of their capacity to transform that reality through action upon it.’

(Freire 1970)
This does not diminish in any way, the power of intuition, trial and error and reflection as sources of meaning. Paolo Freire incorporated praxis into his processes for social change and rural development in Latin America. Marx referred also to praxis as a means to influence the direction of society. In developing a praxis process, Freire believed that students should engage fully in community.

Stage et al. 1998 (p. 56) outlines Freire’s four stages of ‘conscientisation’. The four stages of consciousness, begin with student inertia about both their need to understand and their ability to take action. As they explore the reality more deeply they become conscious of their self-efficacy, they develop a more accurate ‘picture’ of the situation they and others are facing and eventually realise the options for taking action. Freire (ibid), attributes this transformation in consciousness to praxis. Freire is describing the awakening of a person to themselves to others and the setting in which they are living. His four stages appear as almost a natural transition of thought and deed yet Freire implies that the capacity of the ‘people’ who have undergone this process is not progressive it is transformational. He emphasises the power of praxis as a catalyst for this transformation.

The Venn Trigrams

The Venn diagram was named after John Venn (1834–1923). Venn developed these models from work originally conducted by Gottfried Leibniz. The Venn diagram allows a study of singular and related elements (Dickey & Coward 2000). A simple Venn Diagram might originate as two circles presented side-by-side each representing related or unrelated ideas. If the two circles were to be overlapped then a relationship between the circles is formed. This could be described as a distinct synergistic relationship revealed in the overlapped area. The overlapping produces emergence that has discrete characteristics yet still has a relationship with the original components from which it is derived.

By distinct synergistic relationship I mean that the resulting blended or melded area is ‘different’ from either of the two original circles. Three overlapping primary coloured circles provides a suitable explanation of this synergy. One is red, one is blue and the other is yellow. Where red and yellow overlap an orange colour emerges, where blue and yellow overlap green is produced, red blended with blue produces purple. Overlap all three primary colours and the emergent centre is white. Each of the secondary colours is not either of its ‘genitor’ or ‘gentrix’ The synergy or emergence, is an important quality of the Core Curriculum Schema and helps to generate a model that allows for emergence, transformation and development of student attributes consistent with the thesis argument. I have chosen to include three originating components only for each of eight epistemologies. The three components are presented as three separated circles. Each group of three circles is bounded by its guiding epistemology. This eight-by-three structure is similar to the Tao model that also has eight symbols called trigrams consisting of three light or dark parallel solid or broken lines. My symbols equivalent to the three parallel lines are three circles or venn trigrams.
Fig. 7.17: The Eight Venn Trigrams and Their Epistemologies.

A Triple Venn diagram has been chosen to represent the Tao trigrams in the UG Core Curriculum Schema, because it is a unique geometrical model and serves the intended purpose well. As the three circles of a triple venn diagram gradually overlap and come together they produce three new emergent zones making six in total. Further overlapping reveals a seventh emergent central area. The total collapse or integration of the three circles allows the central zone to emerge completely subsuming the original three circles and three overlapped areas. Each Venn Trigram has an epistemology. These correspond with eight epistemologies assimilated from the primary and secondary research and from my own professional experiences. The thematic epistemologies in the light side guide the community engagement experiences and attribute development and the epistemologies in the dark side guide the professional practice attribute development. There are two epistemologies that straddle both light and dark sides. The straddling epistemologies guide both community engagement and attribute development and professional practice attribute development. The function of the boundary theme is to provide a defining purpose, a foundation and a rationale for development. Each theme contains three components or sub-sets that emerged from critically reflecting on the each theme. It is from these components or sub-sets that the student’s development originates.

The venn trigram components emerged from a synergy created by both critical analysis of the primary and secondary research results and critical analysis of the theory inherent in each epistemology. Admittedly I may be accused of ‘force fit’ however I am satisfied that the eight themes embrace all that is needed to substantiate my thesis argument. In trying to decide upon eight suitable epistemologies I started with eight desirable student attributes that emerged from the primary and secondary research. I then worked backwards eventually identifying a suitable developmental and guiding foundation or epistemology for each attribute. I critically analysed the developmental pathway and designated the A, B, C, D generative connecting steps from epistemology to attribute. The results of that critically analytical journey are discussed in more detail in Chapter Eight.
The entire schema also has an overarching epistemology of phronesis. The eight Venn Trigram epistemologies are Career Constructivism, Ontology, Partagogy, Heutagogy, Phenomenology, Heuristics, Holism and Autopoiesis.

Fig. 7.18: The Four Development Levels.

A Triple Venn Model for Showing Development

1. one component
2. second component
3. third component
4. emergent product of: one and two
5. emergent product of: one and three
6. emergent product of: two and three
7. emergent product of one, two, three, four, five, six,
7. the autonomous emergent product

Figure 7.18 portrays the four levels of development:

- In Level A, the three original components (1, 2, 3) are separate.
- In Level B, the three original components each overlap with their counterparts (1&2, 2&3, 1&3) to form three new emergent zones (4, 5, 6).
- In Level C, the three original components (1, 2, 3) overlap further subsuming the emergent zones (4, 5, 6), to produce a singular composite emergent zone (7).
- In Level D, the singular composite zone subsumes all others.

In Figure 7.19 levels A, B, C, and D, as outlined in Figure 7.18, are superimposed on the schema. Level A consists of three foundation components – 1, 2, 3. In Level B the three Level A components overlap to generate three new areas 4, 5, 6. As these overlap further a single area - 7, is generated in Level C. By the gradual integration of the original three circles, area 7 or the student attribute in Level D emerges. Students begin their attribute development in level A with praxis development of the 1, 2, 3 components. They continue this development as praxis development of components 4, 5, 6. Finally praxis development of component 7 completes the attribute development.
There are eight such developmental processes, one for each epistemology – attribute. The process driving the student’s development is praxis development. Like the Tao model it assumes a ‘quest for the centre’ through a compelling, significant, and transformative journey. In the complete schema there would be eight A, B, C, D, development ‘wedges’ surrounding the ‘origin of personal meaning’.

**The Student Attributes**

As the Venn Trigrams completely integrate they produce the eight student attributes. These represent the characteristics of practical wisdom in my proposed UG Core Curriculum Schema. Many would argue that it is not possible to assign characteristics to wisdom because the concept is too esoteric however I have argued for an Aristotelian version of wisdom and I assert that what I have presented is consistent with that version.

**Fig. 7.20: The Emergent Student Attributes.**

Figure 7.20 shows the eight attributes. In terms of design, iterating between the eight thematic epistemologies and the eight evolved attributes helped to gradually critique and crystallise both.

What was even more difficult was threading the ‘top and tail’ with a credible process. I wanted to avoid being overly prescriptive as the schema is conceptual. Most universities have identified generally desirable student attributes and generally list them along with mission statements and guiding values etc. There are common threads such as developing lifelong learning, improved communication, etc. The emergent student attributes for the UG Core Curriculum Schema are Professionalism, Competency, Cognizance, Autonomy, Synergism, Perspicacity, Persistence, and Expertise.

Alverno College has since the 1970s, been recognised as a centre for their student centred learning this approach. Alverno’s mission statement focuses on ‘The student—her learning and her personal and professional development’. (Alverno College, 2005a). In conjunction with the student focused mission statement Alverno has identified a suite of eight abilities Communication, Analysis, Problem Solving, Valuing in Decision-Making, Social Interaction, Developing a Global Perspective, Effective Citizenship, Aesthetic Engagement, that all students are required to develop (Alverno College 2005b). The mission/abilities and their application across all programmes is guided by four
purposes (Alverno College 2005a: Creating a curriculum, Creating a community of learning, Creating ties to the community, Creating relationships with higher education. Alverno’s curriculum situation is quite unique because they have achieved agreement, compliance and policy development from administration and university governance as well as departments that incorporate the mission and the eight abilities into all programmes. Not only has Alverno College focused their mission and ability based curriculum on student personal and professional development but they have also designed an assessment system to evaluate each student’s learning development of the eight abilities. It would be interesting to follow the curriculum design process that led to Alverno’s mission and the eight abilities.

**Venn Trigram Epistemologies Evolving Into Attributes**

‘Career Constructivism’
Professional performance is constructed by identifying a career interest area, locating and learning from and with that interest area, in community. Learning is supported by benchmarking and performance gap analysis, learning projects and strategic elective choice.

Table 7.1: Career Constructivism to Professionalism.

<table>
<thead>
<tr>
<th>EPISTEMOLOGY</th>
<th>CAREER CONSTRUCTIVISM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level A</td>
<td>Situated learning</td>
</tr>
<tr>
<td></td>
<td>Community milieu</td>
</tr>
<tr>
<td></td>
<td>Career interest area</td>
</tr>
<tr>
<td>Level B</td>
<td>Benchmarking, gap analysis, action planning</td>
</tr>
<tr>
<td></td>
<td>Elective choice and learning development projects</td>
</tr>
<tr>
<td></td>
<td>Networking and integration</td>
</tr>
<tr>
<td>Level C</td>
<td>Emerging Professional Character</td>
</tr>
<tr>
<td>Level D</td>
<td>PROFESSIONALISM</td>
</tr>
</tbody>
</table>

‘Partagogy’
Partagogy describes ‘capacity development’ however it is the starting point towards compotency development. The word ‘Compotency’ has been coined by hybridising concepts such as capability, capacity and competency. This has been done in order to reflect more complex, synergistic, systemic and emergent properties of the attribute, such as demeanour, approaches to engagement and worldview.

Table 7.2: Partagogy to Compotency.

<table>
<thead>
<tr>
<th>EPISTEMOLOGY</th>
<th>PARTAGOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level A</td>
<td>Ability</td>
</tr>
<tr>
<td></td>
<td>Self-efficacy</td>
</tr>
<tr>
<td></td>
<td>Values</td>
</tr>
<tr>
<td>Level B</td>
<td>Demeanour</td>
</tr>
<tr>
<td></td>
<td>Approaches</td>
</tr>
<tr>
<td></td>
<td>Worldview</td>
</tr>
<tr>
<td>Level C</td>
<td>Capability, Competency, Capacity</td>
</tr>
<tr>
<td>Level D</td>
<td>COMPOTENCY</td>
</tr>
</tbody>
</table>
‘Ontology’
Ontology focuses on an individual’s being and becoming. I have drawn on Bawden’s (1995 pp. 8-9) work in order to articulate a complex process related to being and becoming. Bawden suggests that integrating propositional, practical and experiential knowledge, assists in this process. Emergence of aptitude, insight and acumen assists the process towards cognizance or developing ‘knowingness’ or sensitised awareness.

Table 7.3: Ontology to Cognizance.

<table>
<thead>
<tr>
<th>EPISTEMOLOGY</th>
<th>ONTOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level A</td>
<td>Propositional knowing</td>
</tr>
<tr>
<td>Level B</td>
<td>Aptitude</td>
</tr>
<tr>
<td>Level C</td>
<td>Emerging Consciousness</td>
</tr>
<tr>
<td>Level D</td>
<td>COGNIZANCE</td>
</tr>
</tbody>
</table>

‘Heutagogy’
Heutagogy is about self-determined learning. This is more demanding than self-directed learning. Heutagogy requires students to identify their interests and organise appropriate people and resources to assist with the pursuit of those interests. The process is designed to inculcate students with proactivity and eventually autonomy of purpose.

Table 7.4: Heutagogy to Autonomy.

<table>
<thead>
<tr>
<th>EPISTEMOLOGY</th>
<th>HEUTAGOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level A</td>
<td>Resources</td>
</tr>
<tr>
<td>Level B</td>
<td>Motivation</td>
</tr>
<tr>
<td>Level C</td>
<td>Emerging Personal Proactivity</td>
</tr>
<tr>
<td>Level D</td>
<td>AUTONOMY</td>
</tr>
</tbody>
</table>

‘Phenomenology’
The interaction of self with others in a setting, reveals the need to develop personal and professional relationships, suitable enquiry methods and effective interpersonal, written and presentational communication methods in order to interchange findings. Deeper and deeper enquiry reveals a situation. The resulting professional quality or attribute is a Gestalt and is called Synergism.
Table 7.5: Phenomenology to Gestalt.

<table>
<thead>
<tr>
<th>EPISTEMOLOGY</th>
<th>PHENOMENOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level A</td>
<td>Self</td>
</tr>
<tr>
<td>Level B</td>
<td>Developing Rapport &amp; Effective communications</td>
</tr>
<tr>
<td>Level C</td>
<td>Emerging Situation</td>
</tr>
<tr>
<td>Level D</td>
<td>SYNERGISM</td>
</tr>
</tbody>
</table>

‘Heuristics’

Heuristics relates to dealing with the situation as it happens. The prevailing conditions will determine the method. In this context professional support is drawn into the process and creative possibilities may be incorporated depending on the decision makers attitude to change and risk taking. Emerging from this process are the qualities and attributes of critical thinking and persistence.

Table 7.6: Heuristics to Persistence.

<table>
<thead>
<tr>
<th>EPISTEMOLOGY</th>
<th>HEURISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level A</td>
<td>Prevailing Conditions</td>
</tr>
<tr>
<td>Level B</td>
<td>Professional Support</td>
</tr>
<tr>
<td>Level C</td>
<td>Emerging Sustainability</td>
</tr>
<tr>
<td>Level D</td>
<td>PERSISTENCE</td>
</tr>
</tbody>
</table>

‘Holism’

Holism is a multi-perspective approach to managing complexity in order to gain a more complete picture of the situation. (Conway 1985). In this context; social, economic and environmental perspectives initially guide the enquiry. Emergent perspectives such as stewardship, agro-ecosystems and appreciation guide the enquiry and development. In an agricultural context juggling perspectives requires critical judgement.

Table 7.7: Holism to Perspicacity.

<table>
<thead>
<tr>
<th>EPISTEMOLOGY</th>
<th>HOLISM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level A</td>
<td>Social Perspective</td>
</tr>
<tr>
<td>Level B</td>
<td>Stewardship</td>
</tr>
<tr>
<td>Level C</td>
<td>Emerging Critical Thinking/Judgement</td>
</tr>
<tr>
<td>Level D</td>
<td>PERSPICACITY</td>
</tr>
</tbody>
</table>
“Autopoiesis”

The three fundamental stages in the improvement process Pressure, State and Response, makes each situation unique. These three stages apply just as well to the student’s professional practice development, as they are to a community project situation. (Tharp & Gallimore 1988; Blumenfeld et al. 1991; Chard 1992). Identifying and dealing with the emergent pressure the system is undergoing and its response to the pressure producing its current state, lays the foundation for an improvement framework. This form of enquiry is very complex and specific to each situation. Engaging in this level of complexity through to an improvement develops persistence as an attribute of the improvers and an outcome of improvement.

Table 7.8: Autopoiesis to Expertise.

<table>
<thead>
<tr>
<th>EPISTEMOLOGY</th>
<th>AUTOPOIESIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level A</td>
<td>Pressure</td>
</tr>
<tr>
<td></td>
<td>State</td>
</tr>
<tr>
<td></td>
<td>Response</td>
</tr>
<tr>
<td>Level B</td>
<td>Describe</td>
</tr>
<tr>
<td></td>
<td>Analyse</td>
</tr>
<tr>
<td></td>
<td>Improve</td>
</tr>
<tr>
<td>Level C</td>
<td>Emerging Improvement</td>
</tr>
<tr>
<td></td>
<td>Framework</td>
</tr>
<tr>
<td>Level D</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EXPERTISE</td>
</tr>
</tbody>
</table>

This completes the development descriptions of the eight themes. These will be discussed in much more detail in the schema deconstruction in Chapter 8.

**Connecting the Trigrams and Guiding Student Development**

The final structural components of the UG Core Curriculum Schema are The Developmental Modes. The Venn Trigram boundaries and student attributes have their own built in development process. This relates to the emergence of more complexity as the original three components integrate. There is an assumption and design characteristic of the schema, that it is more difficult to achieve proficiency as one operates closer to the centre. This presents a problem in the dynamics of the model. The original tenet from the Taoist Model was ‘finding the harmony of opposites and the quest for the centre’. This means that there may be a conflicting design features in the model as presented because as the trigrams collapse into a circle the centre is reached but the assumption is that the collapse was brought about by praxis development.
In Figure 7.21 a generic developmental mode shows three nested ellipsoids of increasing size. The ellipsoids represent three development pathways in each of four modes. The outer layer suggests a relatively easy process of development, the middle layer a more difficult process and the inner layer a very difficult process. They have a conflux at a point that is located in the centre of the schema. This point is extremely important in the development process because in this model it acts like a switch, allowing the development path to move to any of the three pathways. The student would determine which of the pathways they would take based on their stage of development, motivation and aspirations to improve. Development through Levels A, B, C and D do not allow cross development between the attributes. I have added four other “modes of development” in order to integrate development across the eight themes. There are four modes of development:

1. Learning.
2. Intellectual and Ethical Reasoning.
3. Temporal Considerations.

By “mode” I mean ‘the way’ to make it possible.

Fig. 7.22: A Generic Development Mode.
This level should also be consistent with the notion of development in that the student should be ‘striving’ to improve their professional practice and move through the layers. A student who is only capable of operating at the outer layer should not be disadvantaged however they should be encouraged to improve and supported when they try.

There is a distinct attempt in the design of this model to avoid portraying the notion of ‘progress’, ‘accumulation’, ‘collecting’ and ‘advancing in steps’. I have clearly tried to portray the concept of ‘development’ or “transformation” rather than a ‘step ladder’ approach. Development is used in the sense of systemic transformation, evolving and maturing rather than systematic progress or making methodical increments. There is also an inferred relationship between the four modes and the eight Venn Trigrams. Cycling through the four modes allows for contact with the eight Venn Trigrams. Each of the modes is connected at the ‘choice, challenge and change point. It is at this point that the student strategically chooses the direction and level of their study. It is also at this point that they direct their overall development.

A student could begin earlier in their course, operating according to descriptors in the outer layer of the mode. They may have a disposition for or are developing an uncomplicated approach to intellectual and ethical reasoning. They may have scant regard for the temporal perspective in their own lives and that for others and the setting other than what happens “right now”. They may not be aware of themselves as learners and may tend to react to some circumstances and interact with others. Their capability may be at an operational level where they are reasonably good at solving problems with appropriate direction from others. Each of the four modes has the same structure. This structure and function will be explained in more detail in Chapter Eight.

The UG Core Curriculum Schema as Mandala

The schema has been constructed as layers of circles. In ancient India circles were considered sacred. According to Brown (1991) ‘mandala’ is an ancient Sanskrit word for circle. A mandala is an appropriate historical metaphorical device for representing the complex nature of my proposed schema, considering the region in which the primary research was conducted. Mandalas are still common in many tribal cultures and in the Indian culture today. In India, I often saw mandalas as elaborate pictures made from coloured sand adorning the entrance to buildings in which a ceremony or significant religious ceremony was taking place. They were always a series of overlapping circles. It is fitting that the UG Core Curriculum Schema resembles a ‘mandala’ given the origin of the research and the references to ancient religions and cultures during the development of this model.
Conclusion

This chapter has focused on the construction of the UG Core Curriculum Schema. I have drawn upon eastern philosophies and ancient wisdom ideas to inform the model’s development. The schema is an attempt to portray the assimilation of the primary and secondary research results as well as my own professional experiences, as a conceptual framework from which other programmes could be designed. This is not a curriculum in its own right—it is a conceptual framework from which curricula could be informed and eventually designed.
CHAPTER 8
A CONCEPTUAL FRAMEWORK FOR AN UNDERGRADUATE CORE CURRICULUM IN AGRICULTURE THAT IS GROUNDED IN COMMUNITY

Introduction

In this chapter the UG Core Curriculum Schema is ‘reverse engineered’ or deconstructed in a similar way in which the schema was constructed to show the theoretical underpinnings and design features in Chapter 7 reverse engineering deconstructs the model and provides much more design detail and theoretical underpinning.

The Mandala, The Hidden Curriculum, The Shadow Curriculum and The Twilight Curriculum

The proposed Core Curriculum Conceptual Framework Schema, features numerous circles and Venn diagrams. Circles in the schema are designed to set boundaries, demarcate and enclose, essential elements of the core curriculum. Within these circles are carefully thought out concepts, processes, principles that form the ingredients for the overall Conceptual Framework. Whilst expressions such as boundaries and demarcation sound permanent and impenetrable, the circles are meant to be permeable. In general, the Schema is made up of layers of concentric circles. Within the epistemology of phronesis, the outer layer consists of a series of Venn diagrams composed of another series of circles each of which has an epistemology.

Located in the very centre of the model is The Tai Chi diagram, the Yin/Yang – the fighting fish, one dark (Yin Fish) representing Heaven, one light (Yang Fish) representing Earth. In the Taoist tradition this symbol is known as ‘the symbol of creation’ and represents a way to wisdom. In the UG Core Curriculum Schema, the Tai Chi/Yin Tang diagram has been called ‘the origin of personal meaning’. The Yin Fish (Heaven) has been replaced with ‘theory’ and the Yang Fish (Earth) has been replaced with ‘practice’. Theory interacting critically and strategically with practice could also be considered as a way of developing wisdom.

A pattern of circles in ancient Sanskrit are called mandalas. Mandalas are prevalent in many cultures including Tibetan, Hindu, Buddhist, Japanese and North American Indian (Navajo). In Gothic Architecture the Rose windows of European cathedrals are mandala-like. These cultures incorporated sacred circles into their daily and spiritual lives for a variety of purposes. Some mandalas were drawn purely for self-expression others for transformational self-development, some for healing and some to represent elements of the spiritual world (Brown 1991). Brown (ibid) discusses ideas relating to the mandala’s ‘centre’ and the quest to understand that point and
the pathway that leads to it. Brown (1991) asserts that many ancient cultures including the ancient Greeks and Romans referred to finding the centre as a spiritual quest. The ancient Greeks referred to the centre as the ‘inner daemon’. Brown intimates that in the Sanskrit symbolism of the circle the further from the centre one finds oneself the more chaos is experienced. The closer to the centre one operates the more peace tranquility and enlightenment one has. The further from the centre the more chaotic congested and uncontrolled it is the closer to the centre one is more ‘centred’ and in control.

I have employed a range of these ideas into the design of my UG Core Curriculum Conceptual Framework Schema. The entire schema is my version of a ‘mandala’. The overarching epistemology of the mandala is phronesis. Moving closer to the centre is a layer of Venn Trigrams, one half in light and the other half in twilight. The Venn Trigrams in the light half, relate to a ‘project based engagement in the community’, ‘contextual relativism,’ ‘community experience’, ‘practical exercises in community’ or ‘applied plans and designs’. Whilst the Venn Trigrams in the twilight half, relate to professional practice learning development. There are two Venn Trigrams, ‘Career Constructivism’ and ‘Synergism’ that are located in both light and twilight. They are located in the half way position because ‘Career Constructivism’ focuses on developing ‘Professionalism’ in a career area of the student’s choosing. ‘Synergism’ emerges from the students learning about themselves as they interact with others in a contextual community setting. In the centre of the schema is the praxis model, the dark yin fish (theory) fighting with the light yang fish (practice) producing ‘the origin of personal meaning’ for the learner. Praxis is used to build wisdom focusing on the Venn Trigram epistemologies as the genesis for the student’s transformation. The following is a series of diagrams that breakdown or ‘reverse engineer’ the Conceptual Framework Core Curriculum Conceptual Framework Mandala.
Figure 8.1 represents the complete schema. It consists of a series of concentric, radiating and integrated layers. The focus is the central praxis diagram or ‘origin of personal meaning’. There is a ‘light’ and a ‘twilight’ side to the model. Four large ‘mode’ circles (Learning, Performance, Intellectual and, Ethical Reasoning and Time) connect and integrate all eight Venn Trigrams and student attributes with both the ‘origin of personal meaning’ and each other.

**Reverse Engineering the Schema as a Layered Integrated Mandala**

In this section the UG Core Curriculum Mandala is deconstructed in order to present a more detailed outline of its features. In chapter 7 the Mandala was constructed according to curriculum design principles, in this chapter it is reverse engineered in order to portray the inherent theoretical and procedural characteristics. Phronesis and the light and twilight halves are explained. An explanation is given for each of the eight transformations from Venn Trigram Epistemology to Student Attributes, but not all components of the development process are discussed in the same detail. Finally the four integrating Modes are generally discussed again—some in more detail than others.
The Epistemology of Phronesis

Phronesis is a term used in Ancient Greece where it meant, ‘to act prudently and use good judgement’. It has been associated with Plato and Aristotle who, according to Grundy (1987), suggests that it means ‘Practical Wisdom’ and is associated with the process of praxis. Developing wisdom is not easy, according to Aristotle being able to decide the ‘right’ course of action is a learnt trait. Part of the learning process is to learn to deal with the ethics of a situation (Barnes 1984). To do this a person would have to engage fully, developing methods for identifying and giving due consideration to a variety of causal relationships, effects and outcomes. In other words ‘find out, make sense, decide, based on what is ethically defensible for the context and take action’. Wisdom would not just be an exercise of decision making but the ‘prudent capacity to make that decision’.

Fig. 8.2: The Epistemology of Phronesis.

Phronesis forms the whole schema’s epistemology. In Figure 8.2 an epistemology in this sense means the guiding principle or archetype for all cognitive, practical and affective activities contained within. Phronesis means ‘practical wisdom’ or ‘the capacity to act in accordance with the good of humanity’ (Aristotle). This is the driving impetus for the schema and has useful resonances for rural communities, rural regions, rural professions, as well as each student’s own professional practice development.

Aristotle, according to Giardina (2004), believed that there was an ultimate state of being for humans, he called this ‘Eudaimonia’. Eudaimonia is a state mind and body producing ‘universal good’. Giardina (ibid.) suggests that the way to achieve Eudaimonia is by developing virtue, guided by phronesis. Giardina goes further to say that Aristotle used the word telos to describe an object’s or a person’s purpose. The telos of humans is to strive for universal good or to achieve eudaimonia or ‘happiness’ according to Giardina (ibid.).

Ethical practice is essential according to Aristotle, for a person to achieve eudaimonia and virtue is the catalyst for ethical practice. Virtue can be achieved by struggling to find the ‘middle ground’ between ‘excesses and deficiencies’. According to Aristotle in The Nicomachean Ethics, virtue is also defined as ‘...a state of character concerned with choice...a mean between two vices, that
which depends on excess and that which depends on defect’ (Melden 1967, p. 102). So virtue is a disposition, demeanour, temperament or inclination—not a pursuit (Keirsey 1998). To achieve Eudaimonia one should pursue virtue. Struggling to develop and maintain virtue by ethically searching for ‘the middle ground’ or ‘centre’, augmented by the revelations exposed by a challenging journey could be a way to develop practical wisdom and thus eudaimonia. It is assumed that the requirements in the quest for the centre, will become more difficult the closer one gets to it. This philosophical approach has guided the development of the schema.

The Light Side and the Dark Side

The Core Curriculum Conceptual Framework schema has two sides the ‘light’ side and the ‘Dark’ side. Building on ideas expressed by various authors relating to the Shadow Curriculum I have called the dark side of the mandala ‘The Twilight Curriculum’. The Twilight Curriculum focuses on student personal and professional development. It is designed to legitimise and individualise student learning.

In Figure 8.3 the ‘light’ side represents curriculum components that focus on learning: from, with, within and for, ‘community’. Learning is generated through research and development projects that are grounded in engagement with community. The ‘Dark’ side of the Core Curriculum Conceptual Framework Mandala represents curriculum components that focus on learning for individual professional practice development. Students would prepare themselves and their approach for community engagement experiences, guided by frameworks from both the light side and the twilight side.

The Origin of the Twilight Curriculum

The Twilight Curriculum evolved out of ideas relating to both the Hidden and Shadow Curricula. Neither of these frameworks adequately described a legitimate and formalised curriculum that focused on what the student intentionally learns. A ‘shadow’ can indicate form without substance it can imply a sinister, clandestine, dark side of something. It can also imply the action of coming after, following or tailing something. Historically and figuratively speaking, the light or illuminated side has more legitimacy than the dark or shadow side. Being in someone’s shadow implies a lessor status or inferior position. In political terms a Shadow Cabinet is one that is the impotent mirror image of the ‘real one’. The light half of the Core Curriculum Conceptual Framework Mandala could be said to relate to a more to a ‘challenging engagement’, whilst the
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twilight half could relate more to learning from that engagement in order to facilitate the ‘professional development’ of the individual in order that they may engage more effectively at some future time.

Consider a person attending the cinema, a musical performance or the theatre. There would be a stage on which the performance or orchestra would perform, or the movie screened. An audience would be positioned so that they could view the stage. When the lights go down the stage would be illuminated, the audience in relative darkness, and the performance/movie in the light. Members of the audience have chosen to be there for a multitude of reasons. They bring to that seat, memories of their lives, judgements, opinions, experiences, assumptions, attitudes and worldviews (Kearney 1984; Cobern 1991). Many of them would be in a variety of emotional states that are sympathetic and non sympathetic to the author, actors and the subject of the play of musical theme. Within the audience, there would be a range of tastes, a variety of levels of sophistication and an array of levels of intellectual and ethical development. Audience members may also bring to the performance some expectations, preconceptions or a completely unfettered mind.

Audience complexity of this nature seems to balance itself despite a range of perspectives. The imagery, sound, movement and atmosphere or ‘ambience’ or the theatrical experience affects each individual differently. This individual reaction is dependent on the relationship of that which is presented to the life experience of the audience member. Audience members may share similar interpretations of what they saw and felt, exemplified by spontaneous applause. Each person’s life experience ‘colours, filters and transforms’ episodes within the performance and the overall performance in such a way, that it is unique to them alone. Taking the metaphor of the cinema/theatre further, the performance is usually in the light and the interpretation is in the darker, twilight environment. The Light half of the Core Curriculum Conceptual Framework Mandala focuses on structures and functions designed to facilitate strategic learning engagement with community.

The Twilight half of the Core Curriculum Conceptual Framework Mandala, focuses on structures and functions designed to generate strategic professional practice learning development. Bertolt Brecht (1898-1956) was a playwright who wanted his audiences to be so provoked by the “veracity and power” his plays that they would go out of the theatre and change society. He designed his plays so that the audience was not merely entertained but engaged with the issues so deeply that they would challenge, change and/or confirm their own assumptions and beliefs relating to issue presented. Brecht designed his theatre in a style that encouraged the audience to separate themselves from the actual performance and wander ‘into and around’ their own interpretation to the point where they actually challenged their belief systems.

According to Goosens (1997), Brecht introduced a concept that he called ‘verfremdung’ or ‘estrangement’. Estrangement here means to lower the terminal effect of the immediate character...
Chapter 8—A Conceptual Framework for an Undergraduate Core Curriculum in Agriculture that is Grounded in Community

development, plot and sub-plot portrayal all concluding in three acts in order to increase critical thought about the issues presented by these aspects of the play. Brecht wanted his play to influence audience future attitudes and behaviours beyond the confines of theatrical time and space. He wanted the audience to separate the character and setting in the play and transpose it to any setting preferably one familiar to the audience member. By requiring the audience to think about the relevance of the themes and issues portrayed in the play, Brecht hoped to eventually transform society. There are some very useful resonances in this line of thinking as a metaphor for the Core Curriculum Conceptual Framework Mandala. Brecht’s approach to theatre is interesting and useful in conveying the meaning of the light and twilight. The Core Curriculum Conceptual Framework Mandala has a light half – the participation or engagement, and a shadow/twilight half or the ‘estrangement’, interpretation, appreciation change, challenge and confirmation. Like Brecht’s plays, the Mandala is so designed that the iteration between light and twilight produces possibilities for positive change in both for the student as a learner and for the community they will encounter. Iteration between light and twilight aspects of the Core Curriculum Conceptual Framework Mandala can be equated with an audience member engaging with the provocation of the play illuminated before them, then in the privacy of the darkened seating, critically identifying and analysing the issues in their mind.

They may extend that critical analysis into the ‘their world beyond the boundaries of the theatre’ and decide to act accordingly in development in the world at large. Brecht may assume that actions provoked by his works would be in the general interest of the world at large, however he has no guarantees other than to rely on his competence as a playwright. In the Core Curriculum Conceptual Framework Mandala, the epistemology for thought and action is phronesis – practical wisdom applied for the good of all humanity. Light and twilight in this sense is a useful way of designing for development. I do not wish at this point in my thesis, to touch on the nature of the messages that Brecht was ‘proposing’ in his plays. Likewise I do not want to prescribe the community and professional practice developments as set outcomes, suffice to say these outcomes are guided by the phronesis and are designed for professional practice development of the individual by the challenges of the community grounded experiences. Brecht was guided by socialism and a desire to ‘make a difference’. In Brecht’s schema for change, he emphasised that the audience should be so provoked by what they experienced, that they would question their core beliefs and assumptions in order to go out of the theatre and act differently. In the Core Curriculum Conceptual Framework Mandala/Bertholt Brech analogy, the student iterates between being an actor in the play and an audience member. Performing in both roles engaging in community and critically transforming ones professional practice, presents complexities for programming, assessment and managing personnel and material resources.

on America's Campuses’, take the idea of ‘The Shadow’ one or two steps forward by allocating this description to an entire university system not just a curriculum. Kors & Silverman (ibid.), argue that free speech, diversity and multiplicity of opinion has been marginalised and replaced by political conformity and in some cases has been eradicated from American University campuses. Concepts relating to ‘The Shadow Curriculum’, evolved from ideas originating in ‘The Hidden Curriculum’. According to Jackson (1968) and Snyder (1971), the Hidden Curriculum includes concealed, unscheduled, subjective, inconsequential, tacit and often diversionary, student learning in Primary/Secondary settings. Jackson (ibid.) viewed education as a ‘socialising process’.

Although Jackson is considered the originator of the expression Hidden Curriculum, Eisner (1985) suggests that William Waller used the expression in the 1930’s. Regardless of who coined the expression it is referring to the process whereby students learn despite the structures and functions of their formal curriculum and despite being taught anything by anybody in designated authority.

So for a typical educational setting, there appears to be at least two ‘curricula’, the formal or overt and the informal, covert or hidden. The formal curriculum is designed, delivered, assessed and reported, according to prevailing paradigms, resources, traditions, a diversity of approaches and is usually designed and managed by academic staff. This overt curriculum would have elements of accountability, it would be timetabled to fit with calendar/academic; weeks, terms semesters etc. Outcomes of the ‘overt or formal curriculum’ are often stated and able to be measured and compared against performance benchmarks such as statements of attainment, outcomes or affirmed competency levels. Results of this assessment approach can be plotted on a normal distribution curve indicating an individual’s performance in comparison with their peers or other declared benchmarks. Conversely, the hidden curriculum seems on the surface generally unplanned and certainly unwritten. Hidden curriculum lessons focus on whatever is important to the individual and is often about, as Dreeben (1976) puts it, ‘coping with the day to day’. In the Hidden Curriculum, a staff member may be the actual subject of the curriculum not its originator. However for those students or staff experiencing the rigors of the hidden curriculum there would be hard and fast social rules, powerful sanctions for non-compliance and penetrative life changing lessons to be learnt. Longstreet & Shane (1993) suggest that the hidden curriculum originates in students learning not only from the institutional organisation of schools but also the social and political behaviours of staff. The Hidden Curriculum implies learning for ones self within and despite, being immersed in a more formal educational environment.

The Shadow curriculum seems to imply the alternative informal learning systems that students encounter whilst they are engaged in a more formal educational process. Uhrmacher (1997) refers to the ‘Curriculum Shadow’ which is the author suggests, the alternative approaches to curriculum delivery that would normally be disregarded. This would include the personal effect that certain topics have on students and how they actually respond to what is presented by the teacher. Eisner (1985) refers to ‘The Null Curriculum’. This describes the elements of the educational programme, deemed unimportant by implication, neglected and allocated minimal attention by the teacher. In
all of these definitions of various curriculum alternatives, the starting point for legitimacy is the teacher and the formal curriculum. I am arguing that these alternatives are immensely powerful and are grounded in realism and therefore are as legitimate as the ‘formal curriculum’.

The Twilight Curriculum in the context of this thesis focuses on incorporating ideas about learning for self, by self and about self, into the mainstream formal curriculum. The UG Core Curriculum Schema Twilight half, has been strategically designed to cater to these ideas. Twilight is the period before both sunset and sunrise. I recall spending an evening in a stone circle on Orkney, waiting for sunrise on the summer solstice. It was a most eerie experience watching the sun dip slowly below the horizon only to appear a couple of hours later. Between sunset and sunrise a dull light permeated the sky spreading an unusual and perplexing atmosphere, the locals call this atmosphere ‘the Glim’.

It was this experience that inspired me to call the dark side of the Mandala, the Twilight Curriculum because I required a descriptor that was beyond ‘Hidden’, beyond ‘Shadow’ and was not already ‘earmarked’ or yet referred to in the literature. Both the Hidden and Shadow Curricula seem to be clandestine after thoughts that seemingly describes what is actually learnt yet not formally acknowledged or formally assessed. I suggest that there is room in curriculum theory for another expression that articulates a purposive process of learning that has been determined by the learner and collaboratively managed by both staff and students. I propose that the expression be ‘The Twilight Curriculum’.

The Twilight Zone

Spady & Marshall (1991) refer to a ‘twilight zone’ in relation to curriculum, but only as a non-descript planning process. There are several other references to the expression ‘Twilight’ in regards to the timing of the school delivery sessions, i.e. late evening. There were no references to a Twilight Curriculum as such, with the same intention as I have outlined in this thesis.

The Eight Venn Trigram Epistemologies—Rationale and Explanation

Eight Venn Trigrams form an outer layer of the Mandala. Each Venn Trigram has an epistemology. Like ‘Phronesis’ the overriding epistemology for the Core Curriculum Schema, the epistemology for each Venn Trigram, guides and sets limits for the processes contained within. Goodson (1987) suggests that a significant design property is epistemology the nature of my design requires eight each beginning a transformative learning journey. A second layer epistemology in the confines of the model has been included in order to provide integrity for each Trigram linking them to the epistemology of the overall Mandala. Phronesis remains the overarching epistemology for the schema, however for each Venn Trigram I have, guided by the research, selected an appropriate mixture of professional practice development frameworks and project based research frameworks as boundaries.
In Figure 8.4 each Venn Trigram has an epistemology. The epistemology is significant to the evolution of the components within. Three Venn Trigrams ‘function’ in the Twilight Curriculum, three in the Light Curriculum and two in both the Light and Twilight. Each of the Venn Trigrams has been carefully selected and designed to portray both light and shadow developmental activities. By this I mean that the light Venn Trigrams focus on portraying processes related to community engagement and application of development projects and the Shadow Venn Trigrams focus on portraying professional practice and practical wisdom development processes. Two Venn Trigrams that straddle both the Light and Twilight sides of the model (Phenomenology and Career Constructivism), represent the interface.

Partagogy Evolving Competence

Table 8.1: The Evolution of Competency

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<tr>
<td>EPISTEMOLOGY</td>
<td>LEVEL A</td>
<td>LEVEL B</td>
<td>LEVEL C</td>
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<tr>
<td>Partagogy</td>
<td>Humans capacity development</td>
<td>Ability</td>
<td>Approaches</td>
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<td>Self Efficacy</td>
<td>Demeanour</td>
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<td>Values</td>
<td>World View</td>
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Table 8.1 portrays a partagogical development process relating to components of the community grounded Core Curriculum.

The process begins at a relatively uncomplicated level focusing the student on the formation of their ability (knowledge and skill), values and self efficacy. A number of approaches to research,
interacting, problem solving, situation improving etc., emerge in this model when the student considers their ability in light of their self-efficacy. Ethical and moral considerations emerge in this model when the student considers their ability in light of their values. The students’ worldview crystallises or is modified as the student considers their self-efficacy in light of their values. As the six components integrate their capacity, capability and competence emerges as their ‘compotency’.

Partagogy is an expression describing human capacity development Levinger (1996b). Levinger (ibid.) is mainly concerned with improving the human capacity of community members in developing countries. She has also presented some very useful ideas that are especially appropriate for community members in the developed countries of the world. I have chosen to incorporate Levinger’s ideas about human capacity development in the Core Curriculum Mandala because as a graduate attribute it is essential for creating desirable futures for rural people. Levinger (ibid.) takes economists to task when arguing for a change in paradigm about humans and their role in development. She makes a fundamental shift in her thesis, from viewing people dehumanised as the quasi-indentured ‘workhorses’ or ‘human resources’ or even ‘human capital’ of an economy controlled by others to endowing them as individuals with the means or capacity to improve their own situation. She (ibid.) emphasises the nature of what it is like to be human. Her idea of development resides in generating power in the owner of each situation. Helping the situation owners build the capacity to do the developing themselves empowers them not to have development done to them, on them or for them. This focus on the individual as the architect of their own situation improvement has resonance with the light and twilight essence of the Core Curriculum Mandala. In building a better graduate I am proposing that one should start with building capacity in the undergraduate student. Participation, flexibility, adaptability, collaborativeness, problem solving, higher levels of thinking and creating new opportunities all have resonance with partagogy.

A student who has developed Compotency has learnt how to regenerate their personal and professional attributes and qualities according to the changes and challenges that they encounter. Drawing on the works of Stephenson & Weil (1992), Stephenson (1994) and Bandura (1997); and guided by the epistemology of partagogy, I have evolved the three fundamental personal and professional ‘capability’ components of ability (knowledge and skill), self-efficacy and values into a Venn Trigram format to generate compotency.
Ontology Evolving Cognizance

Table 8.2: The Evolution of Cognizance.

<table>
<thead>
<tr>
<th>Dependent, supervised, autonomous - learning development.</th>
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</thead>
<tbody>
<tr>
<td>Present, past, future - temporal considerations.</td>
</tr>
<tr>
<td>Dualistic, multi-perspective, contextual - ethical reasoning.</td>
</tr>
<tr>
<td>Operant, leadership, generative - performance</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>EPISTEMOLOGY</th>
<th>LEVEL A</th>
<th>LEVEL B</th>
<th>LEVEL C</th>
<th>LEVEL D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontology</td>
<td>Understanding self as a learner</td>
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<tr>
<td></td>
<td>1. Propositional Knowing</td>
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<tr>
<td></td>
<td>2. Practical Knowing</td>
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<td></td>
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<tr>
<td></td>
<td>3. Experiential Knowing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Aptitude</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>3. Insight</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>4. Acumen</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>5. Emerging Consciousness</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Cognizance</td>
<td>As a transformed state of ‘being and becoming’</td>
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</tbody>
</table>

In Table 8.2 the epistemology for this development is the student’s ontology or their ‘being and becoming’.

This developmental pathway allows the individual to more consciously participate in their world. Students initially learn to access, comprehend, process and apply, ideas from propositional, practical and experiential sources. Their aptitude or talents emerge when propositional knowledge is applied in light of practical knowledge requirements. As the student learns to manage their practical knowledge in light of the contextual demands of their experiences, their insight, acumen or capacity for judgement improves. Managing experiences informed by propositional knowledge, helps students to understand current experiences, explain past experiences and inform future experiences for a given purpose. As the six components integrate, the student’s ‘conscious competence’ (Freedman et al. 1951, Dubin 1962 and Howell & Fleischman (eds) 1982), emerges as the attribute ‘cognizance’. Cognizance in this context is self-awareness for effectiveness, in short self-confidence.

Ontology has a range of definitions, some relating to taxonomies and semiotics, others to the nature of existence. A framework for this component of the Mandala deals with an existential element. Being aware of oneself and the potential for oneself and understanding ones uniqueness and individuality was the brief for the selection of this epistemology. Ontology provides a framework whereby the student can evolve into a more conscious being—one that is sentient, responsive, perceptive and awake to more than the obvious around them. Some students are self-aware before entering formal studies. I propose that developing self-awareness should be designed into their studies. Ontology, as a process of being and becoming, is made overt for that field of
study within the Twilight Curriculum. It is my contention that a person conscious of their ‘being’ can then ‘become’. ‘Being’ is about realisation, consciousness and apprehension; whilst ‘becoming’ is about evolution, mutation, transition, development and transformation towards an improved or different state.

Being and becoming are intimately related, in that as one improves one’s knowledge of one’s ‘being’ one embarks on a journey of ‘becoming’. As one travels on that journey of ‘becoming’ one becomes more familiar and can express their ‘being’ more effectively. This epistemology suggests that the student ‘lives’ and is conscious of ‘being alive’. Students operating within this epistemology in the Twilight side of the Schema, can develop more and more sophisticated ways to understand the nature of their ‘aliveness’ and develop ‘awareness’ of the existential nature of their being. Marton & Booth (1997) suggest that awareness is a relationship between ‘discernment, simultaneity and variation’.

‘Being’ means ‘I am aware that I exist’. ‘I am an individual’. ‘I can develop the capacity to know myself more intimately’. I can learn to make useful judgements, I can learn to effectively hold and manage many different concepts in my mind at once as I experience complexity in my surrounds. I can learn to know myself better as I learn skills to become more self-aware. Students may come to know that they have a range and depth of qualities and attributes. Students may utilise other people, places, experiences, and information to understand aspects about themselves. Many may realise that their personality may not be fixed, that their disposition and compotency is ever changing. By learning how to focus inwards, a student can learn to determine the efficacy of their current performances for the type and level of engagement required outwardly. Being, infers awareness and sensitivity, it indicates a heightened perception of needs of self, others and the setting. Becoming infers development or a journey of change, discovery and revelation and in this context is strongly aligned with a sense of purpose.

Heron (1992) outlines four ways in which we ‘participate in and articulate our world.’ I have included three of Heron’s ways of knowing, propositional, practical and experiential (Bawden 1995) in the Triple Venn. Heron writes about the ‘subjective-objective’, ‘intrinsic extrinsic’ notion of reality emerging from participation in the world. This to me means that a learner can know the world through both internal and external stimuli, provocation, motivation and sources of meaning making. This is consistent with Heron’s classification of ways of knowing. These ways of knowing range from propositional, impartial or objective ideas from beyond the learner’s own experience to experiential, empirical or subjective ideas generated from the learners own experiences. One could briefly argue about the nature of knowledge i.e. does knowledge exist outside the consciousness of the individual? Can knowledge be freely transferred intact from one person to another? Is knowledge just other people’s interpretations of information ideas and phenomena? If so then everyone is open to their own interpretation of information and stimuli and thus would construct their own knowledge. I take the constructivist side in that only the individual
can generate their version of knowledge. Consciousness is an emergent property of critical reflection. Mezirow (1991) emphasises the importance of critical reflection as a means to identify and evaluate one’s assumptions, attitudes and beliefs. According to Mezirow (ibid.), as one critically reflects both in the experience and on the experience, one comes to understand how one thinks. This ‘romance’ with one’s own thoughts and the critical discourse with one’s own being is central to raising one’s consciousness and eventually one’s cognizance of one’s world. Reflection as a tool for development will be discussed at length later in this thesis.

**Heutagogy Evolving Autonomy**

Table 8.3: The Evolution of Autonomy.

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<tbody>
<tr>
<td><strong>EPISTEMOLOGY</strong></td>
<td><strong>LEVEL A</strong></td>
<td><strong>LEVEL B</strong></td>
<td><strong>LEVEL C</strong></td>
</tr>
<tr>
<td></td>
<td>2. Interests and passions</td>
<td>5. Change Management</td>
<td>Autonomy</td>
</tr>
<tr>
<td></td>
<td>3. Engagement</td>
<td>6. Opportunity</td>
<td>As a transformative state of ‘heutagogy’</td>
</tr>
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Table 8.3 portrays the evolution of the students autonomy in a epistemology of heutagogy or self-determination.

Self-determination in this context is about personal interest choice and direction. Autonomy in this context means self-governing, having freedom of choice, being self-regulating but not self-sufficient. Motivation is strengthened when interests and passions are crystallised by the provision of suitable resources. Resources in this sense can be physical and/or human. Physical resources or ‘artefacts’ (Vygotsky 1978) could include, books, computer tools, and scientific instruments guided and supported by facilitation and mentoring in the form of advice. Advice could be in the form of; approaches for moving forward, intellectual signposts, wider resource networks, ways of thinking and even emotional and spiritual counselling. Other possible advice could direct students towards other resource personnel and other settings for alternate exploration.

Heutagogy is about self-determined learning (Hase & Kenyon 2000). Determined in this context, heutagogy can be interpreted two ways, firstly, the learner identifies a definite purpose, direction
or course of action and secondly the learner adopts or develops an unwavering, indomitable willpower to achieve something. Self-determined learning is similar to ‘self-directed learning’. (Lindeman 1926; Dewey 1916; Houle 1961; Tough 1967; Knowles 1975; Candy 1991; Brookfield 1986, 1987, 1991, 1992; Maslow 1987; Hiemstra 1988; Brockett & Hiemstra 1991; Rogers & Feiberg 1993). One could argue that these two paradigms are similar yet differ in that self-direction describes a situation whereby the student manages their development within the context of a provided topic, approach and learning pathway, whilst a self-determined student would identify the topic, identify, access and engage appropriate assistance, organise the learning pathway and collaboratively determine the value of the development to their needs.

Once the student takes responsibility for their learning programme they express their autonomy. In the context of the Venn Trigram presented, autonomy does not mean to act independently, in isolation or by one’s self. Autonomy in this context means to act inter-dependently. Inter-dependence means self governing, having freedom of choice, being self-regulating, mutually supportive, collaborative; but not totally self-sufficient. In this schema, it is essential that significant, supportive others would need to be identified and accessed in order to assist the student in their inter-dependent learning. Tough (1967) coined the expression ‘self teaching’. According to Hayes (1998) self-teaching as concept and educational process has been revived in recent times. Hayes (1998) and Tough (1967) both advocate students taking charge of their learning as a desirable focus for education. Hase & Kenyon (2001) separate a heutagogical or self-determined approach from a self-directed approach. They cite Knowles (1970), who wrote widely about self-directed learning and used the term andragogy as a descriptor of such processes. Knowles process for self-directed learning, according to Hase & Kenyon (ibid.), is linear and learning is generally accepted to be non-linear. They go on to describe a traditional education system based on a ‘Lockean’ model whereby the mind is considered a ‘clean slate’ onto which order and meaning are supplied by others. Hase & Kenyon (ibid.) describe a heutagogical approach as being ‘non linear’, it recognises the individual as having already established degrees of capacity, it incorporates ‘double loop learning’ (Argyris & Schon 1974) as a means of ‘challenging current values and assumptions’ and integrates ‘action learning’ (Weinstein 1995) and ‘Systems Theory’ (Bawden & Valentine 1984) as a conduit for developing ‘proactivity’.

Heutagogy has resonances with adult learning in that adults are basically self-directed. Their learning is based on their interests, their needs and their purpose. Knowles writes about the expression ‘andragogy’ (‘Andragogik’ Kapp 1833, Lindeman 1926) in which he separates it from pedagogy. Pedagogy is basically the science and craft of teaching, whereas andragogy is more aligned with learning by the individual. Moving from a teacher/student pedagogical relationship to an andragogical teacher/student relationship is as King, A (1993) suggests, like moving ‘from the sage on the stage to guide on the side.’ Knowles (1984, cited in Hiemstra & Sisco 1990) clearly articulates pedagogy as a teaching process with the teacher in the centre of decision making about context, content, format, delivery, assessment and reporting of what is to be taught and learnt.
Knowles (ibid.) suggests that andragogy as an alternative to the pedagogical or traditional teacher/student/classroom relationship because the emphasis shifts from content delivery to learning process management. In andragogical process the learner selects, directs or determines the topic and the teacher guides, assists, facilitates or mentors them in achieving outcomes, developments and or transformations. Andragogy is synonymous with adult learning. Knowles (1970) identified certain characteristics of adult learners such as a need to act autonomously, to be self-directed, to express goals and see relevance for activity.

Cross (1981) makes the following observations about adult learning programmes that the programs should, recognise the experiences of the learner, be challenging to the individual’s personal development and provide individuals with wide choice and variety. Both Cross and Knowles outline characteristics relating to both how adults learn and the design of the programmes that facilitate that learning. It is clear that the emphasis is on choice and the individual and relevance for the individual. There is a focus on development and also the need for the student to participate in the organisation of the learning process. Self-determination requires the student to identify ‘In what am I interested? For what do I have passion? What excites me? Where is it happening? How do I explore it? Who is involved? How do I engage and meet them? What am I trying to find out when I participate? What kind of person is effective in these experiences and how are they effective? How do I relate to that kind of person? What can I do to become an effective person?’

**Motivation**

One of the key frameworks in heutagogy, andragogy and self-determined learning, is motivation. Motivation sustains self-directed and self-determined learning in the student. Kreitner (1995) suggests that motivation is about purposive behaviour. Buford, Bedeian & Lindner (1995) argue that motivation is about fulfilling unsatisfied needs. Bedian (1993) asserts that motivation is about achievement-will. A student needs to be focused and motivated in order to remain on task. Motivation is heightened when the student has ownership of the initiation, design, management and evaluation of the learning process. Curiosity is also a strong motivator as is the expression and pursuit of passions and interests. The difference between a learner being purposeful, or having clear aims, goals, objectives and them being purposive or just being passionate and determined is critical. Both of these personal agendas are motivators but a heutagogical approach is more about being purposive rather than purposeful. That is not to say that the learner as they engage more fully, does not become purposeful.

A learner in being purposive expresses their interest, curiosity or even passion about something and pursues it as a learning project. Part of the ongoing motivation is the sense that the student originated this project and is managing it themselves inter-dependently with a facilitator and other resource persons. Brookfield (1983, p. 15) suggests that learning in this paradigm may not be well served by setting clear and specific goals. Smith (2005) suggests *While much of the learning may*
initially appear to be incidental, it is not necessarily accidental. This would suggest that the learner is guided initially by an interest but as the engagement unfolds the purpose becomes more and more crystalline.

Lieb (1991) suggests that sources of motivation for adult learning are social relationships in making new friends or a desire to belong, external expectations in complying with someone else in authority, social welfare as a desire to serve humanity and the community, personal advancement in seeking qualifications, status increasing competitiveness, escape and stimulation, cognitive interests in learning for interests sake. Lieb’s (ibid.) ideas resonate well with heutagogy in that he suggests that there are multiple reasons why undergraduates learning as adults, ‘get involved’. Traditionally they may just comply with the system or they merely see their studies as a means to an end as a credential, (P’s mean Degrees) with no deep relationship. By adjusting the curriculum to a more heutagogical approach, the student can express their motivation and engage in their studies more deeply and effectively.

**Engagement**

Another major framework in heutagogy is engagement. Engagement means the student is actively participating in processes that challenge and stimulate them to learn. Kearsley (1997) and Shneiderman (1988, 1994, et al 1995), propose an ‘Engagement Theory’. They write about students’ collaborating to solve problems, manage projects and generally engage in ‘reality based learning experiences’. Although their teaching experiences have related mainly to distance and electronic modes, the principles espoused relate directly to the focus of heutagogy in the Core Curriculum Mandala. Kearsley and Shneiderman (1999) ground their Engagement Theory indirectly in theoretical frameworks for learning such as constructivism and self-directed learning. Engagement theory implies that the student engages in collaboration with others, in a meaningful process around the theme of developing a project that incorporates both planning and discovery and culminates in a desirable and feasible learning outcome. I propose that the notion of a ‘foreground and a background’ is a useful way to capture the essence of ‘engagement’. The students are engaged in the foreground with trying to achieve a project outcome, a solution to an identified problem or an agreed improvement in the situation. In the background each individual student is making their own meaning of the experiences they undergo. The foreground – like the light component of the Core Curriculum is the project activities, the background – like the Twilight component of the Core Curriculum is the Professional Practice learning development that emerges.

Kearsley & Shneiderman (1999) assert that the three principles of Engagement Theory are ‘Relate, Create and Donate’. Relate implies that students collaborate in teams to initiate, design, manage, conduct, conclude and report a project, Create, means that the students themselves identify the purpose, setting, need, approach and format of the project, Donate, suggests that the students engage in realistic and meaningful community, industry or workplace projects with a ‘client’ or customer. Realistic means that the project will achieve some feasible and desirable outcome or
improvement for the ‘client’ and the client’s setting. Relate, create and donate are very useful frameworks for understanding engagement. Kearsley & Shneiderman’s (ibid.) theory of engagement emerged from their experiences in computer aided learning and distance education. Self determined learning would be well served by students learning through projects as advocated by Kearsley & Shneiderman (ibid).

However, whilst I support the notion of projects as a vehicle for self-determined learning I would not restrict the students to only working in collaborative teams. I agree that collaboration and group and team experiences are essential in the modern work place, a blend of team and individual projects would be more advantageous to the notion of heutagogy. Helping students make a paradigm shift from a dependent to an interdependent learning framework requires considerable effort. Interdependence in this context means that the student works as an individual but not by himself or herself. This means that the student as an individual would become responsible for such decisions and organisational matters relating to the project’s initiation or choice of the focus and or purpose, design or structure the conceptual framework, methodology, action plan’s timelines, etc., management or application of the action plans, conduction or engagement to achieve the purpose, conclusion and reporting in whatever form is required. They would however do all of this in collaboration with a facilitator, mentor and probably peers not as a project team but as stakeholders in the student’s project. This interdependent approach would also include negotiating with the project’s ‘client or customer’ and other stakeholders relevant to the project’s purpose. Academic Service Learning is organised this way. Community Based Research, however requires a more collaborative relationship between the student and the client. This closer relationship is more consistent with applying phronesis—the epistemology for the mandala.

**Change Management**

Personal and professional change management is another important component of heutagogy. As students engage and are challenged by their project experiences, they will undoubtedly consider and reconsider the efficacy of their current; assumptions, attitudes and perceptions and performances. Change is inevitable and ongoing. It happens to us, it happens because of us, it happens regardless of us, it happens to others around us and it happens beyond our consciousness. Change can be orderly and regulated or random and chaotic. How individuals manage change is a primary factor in the efficacy of their Professional Practice. Understanding change mechanisms and processes like cause and effect is important but understanding how to pro-act desirable change is more important.

Students’ can learn about change. They can learn to consider themselves in a ‘flux’ environment or ‘life space’ (Lewin 1951) with options and opportunities for understanding intervention and improvement. They can also learn to become not a passive victim or object of change, but a catalyst, conduit and pro-actor of change. It may be prudent at this stage of my dissertation to re-assert that the overall epistemology for the Core Curriculum Mandala is phronesis—‘practical
wisdom’ or ‘the capacity to act in accordance with the good of humanity’ (Aristotle). Change for the better is the focus. Lewin (ibid.) proposed a three-step model for describing the actual change process. This referred to as ‘unfreeze-change-refreeze’ and has also been described as ‘square-blob-star model’. Lewin (ibid.). Square-blob-star, symbolises the three stages as three distinct icons. I am drawn to the second stage image ‘blob’, because it captures the amorphous nature of change. From square through blob, to star is a masterful piece of imagery capturing a change process in such a crystalline way. According to Neill (2004), Van Gennep presents a similar framework for change to Lewin in his ‘Rites of Passage’ model. Van Gennep (1909) again presents a three-stage process of separation, transition and reincorporation.

Lewin’s first stage in the change process is ‘unfreeze’. This would indicate that the person undergoing the experience has suspended their current perceptions. This condition of indecisiveness, would possibly have been brought about by a challenging, confused and even confronting ‘inner picture’ of the situation being experienced. Lewin emphasised the need for this complete picture. It is essential that the level of engagement by the student is comprehensive for this to occur. This stage equates with van Gennep’s (ibid.) ‘separation stage’. The second stage in Lewin’s process is ‘change’.

Having suspended current perceptions the person moves beyond this to make adjustments and alterations in thinking and frames of reference, based on an analysis and evaluation of the situation in light of needs, requirements, purpose or none of those. This stage equates with Van Gennep’s ‘marginal or liminal period (transition)’ stage. Lewin’s third stage is ‘refreeze’. Having made the seemingly appropriate adjustments, adaptations and alterations, the person crystallises their change and returns to world and continues on. This stage equates with van Gennep’s ‘Reincorporation’ stage. The new state would provide a new status but recognition of that status would vary. Recognition may come when the effectiveness of the change was evaluated intrinsically when a personal; or professional goal is achieved, or extrinsically by acknowledgement of a changed performance. Schein (1995) suggests a process of unlearning.

Unlearning might imply removing certain ‘givens’ from one’s knowledge, comprehension or efficacy. It may suggest that previously held beliefs, values and attitudes no longer have relevance or have less relevance. It may even suggest that certain personal and professional practices once considered appropriate and even essential, no longer fit or are outmoded by current and future requirements. Unlearning seems to be a process connected with revelation. What would it take for a person to question their compotence to a degree whereby they realise that they must change. This kind of change is an example of proactivity and an expression of one’s autonomy.

Change management emerges as a required process when resources are applied through student engagement and challenges to current compotence are experienced. The suggested emergent property or professional practice attribute, from further development of motivation change and
opportunity is ‘proactivity’. As proactivity is sustained as a quality of performance, then the student constantly expresses their autonomy.

Career Constructivism Evolving Professionalism

Table 8.4: The Evolution of Professionalism.

|--------------------------------------------------------|---------------------------------------------------|----------------------------------------------------------|--------------------------------------------------|

<table>
<thead>
<tr>
<th>EPISTEMOLOGY</th>
<th>LEVEL A</th>
<th>LEVEL B</th>
<th>LEVEL C</th>
<th>LEVEL D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Situated Learning</td>
<td>4. Benchmarking and Gap Analysis</td>
<td>7. Emerging ‘Professional Character’</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Community Milieu</td>
<td>5. Elective Choice &amp; Competency Development Projects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Career Interest area</td>
<td>6. Networking &amp; Integration</td>
<td>Professionnalism</td>
<td></td>
</tr>
</tbody>
</table>

**Career Constructivism**

Learning in a targeted community to build professional practice

In Table 8.4 networking opportunities emerge when students explore the Community Milieu in light of their career/interest area.

Benchmarking and gap analysis leading to identification of competency development needs, emerge when Community Milieu is researched from a situated learning perspective. Elective choices are clarified and potential competency development projects are crystallised when Career/interest areas are explored from situated learning perspective.

Professional character and overall professionalism develops as the result of the student firstly identifying their career interest area and secondly, guided by research-based benchmarks, students close the gap between their actual and the optimal competence through elective choice as well as personal and other learning projects.

Career Constructivism is an evolved perspective of ‘constructivism’. This epistemology draws on ideas from Dewey (1916, 1929, 1933, 1938), Kelly (1955), Bruner (1986) and Vygotsky (1978, 1985). According to Atherton (2004), there are two main constructivist perspectives, Cognitive Constructivism, which explains an individual’s learning development and Social Constructivism, which explains learning emerging from interactions. Constructivism is a philosophy of sorts that
combines subjective reasoning with experience. There is a sense that the person engaging in constructivism does so for a purpose however making sense of a situation is entirely in the realm of the thinker and their thoughts.

The degree to which sense is made, is probably determined by the relevance of the experience, the purpose for which the person engaged and the capacity of the person to make sense. Bruner (1996) suggests that constructivism is non disciplinary. Brooks (1984) indicates that constructivism is a learning theory. Howard et al. (2000) suggest that constructivism is a model for learning. Ornstein and Hunkins (1998) propose that constructivism is a branch of cognitive philosophy. Regardless of its classification, constructivism is concerned with how personal understanding or knowledge is developed.

Constructivism is associated with subjectivism and experience-based learning. Hodgins (2000) suggests that constructivism may be a necessary framework for generating effective education and training programmes. The expression Career Constructivism has evolved from these roots. I have coined the term ‘career constructivism’ in order to more appropriately describe a four stage perspective of individual ‘construction of understanding’. Through this career constructivist perspective, the four stages are 1. learning from . . . ., 2. learning about . . . ., 3. learning to . . . . and 4. learning for . . . .’. These have emerged as guiding approaches for exploring a career interest area. Learning ‘from …, about …, to … and for …’ relate directly to students preparing for eventual employment and the rigours of the changing workplace. ‘Learning from… and learning for…’ relates to identifying interests, passions, learning needs and developing a sense of purpose, based on an identified industry/community setting. Learning from… and learning about… relates to workplace experiences and learning to… and learning for….. relates to attribute development.

This is achieved through a process of engagement and participant observation combined with critical reflection ‘on and in’ experiences in order to extract meaning. There would be many such engagements in various aspects of the community milieu, over the life of the student’s studies. Some experiences earlier in the student’s course could be contrived and organised by staff but eventually the students themselves, design, organise and manage them acting in a heutagogical way. A student may engage in a staff initiated programme such as Work Experience, a Case Study, an Industry Service Learning Project, a Community Based research Project and a Field Study. As their career/interest area crystallise, students become self-determined.

Career Constructivism goes beyond just making sense, or developing understanding as pure constructivism might suggest. Career Constructivism is a process of renewal and development for each student. By renewal, I mean that the student chooses the context according to their interest and explores it in a way relevant to their personality (Turnbull 2003) with the view to using what they find as guiding principles for their own development. They then activate learning processes to develop in areas relevant to their purpose. The aim of career constructivism therefore, is to build
professionalism, not theoretically, not by ‘being given a fish, or even being taught how to fish’, but as the result of individual proactive research.

Students guided by the results of that research, then design and plan their own development journey. ‘Help a person determine their interests, then facilitate their learning and development in that direction.’ In a career constructivist approach, students should identify and be aware of their own learning style (Honey & Mumford 1982, Kolb 1984, Smith & Kolb 1986) as a research method in a community milieu of their choosing. Students should engage in a framework of ‘situated learning’ (Kirshner & Whitson 1997). Situated learning is a framework of experiential learning that focuses on individuals learning in a targeted context featuring day-to-day events. According to Anderson, Reder & Simon (1996), situated learning exposes relevant content that becomes embedded in action taking.

Learning in this context, results from interactive engagement involving problem solving or dilemma management. Lankard (1995) suggests that what is learnt can be applied elsewhere. Anderson et al. (1996) focus their attention on situated learning as an instructional process. In other words they view situated learning as a pedagogical process. However, their list of premises resonate with career constructivist notions in that learning is contextual and results from a social process. Wilson (1993) suggests that students during situated learning engage at a deep level by being ‘in’ the experience rather than merely reporting ‘on’ the experience. Career constructivism should result in universal concepts and principles in the form of improved student compotence. In a career constructivist process, the student initially identifies the community milieu assisted by the facilitator by reflecting in and on experiences related to career interests. Together they construct the means to engage, explore and make sense in the form of an approach, framework and action plan. The community milieu should be representative of their career/interest area. Students learn from such engagements what is actually required by a person professionally engaged in such a community/interest area.

By benchmarking current performance against that required or even that researched secondarily and in evidence in an ideal performance, students can analyse the ‘gaps’. Gaps in the student’s professional practice form when the student realises that in order to participate in the level required improvements in compotence must occur. The students then design ways to close the gaps through accessing opportunities throughout their course. They can also access opportunities in their extra curricular activities. Benchmarking is described by ‘The Higher Education Academy’ as:

’a process to facilitate the systematic comparison and evaluation of practice, process and performance to aid improvement and self-regulation.’

(Ramsden et al. 2005)
According to Jackson (2002, pp. 4-5) there are several types or characteristics of benchmarking, such as independent or collaborative approaches to gathering implicit and explicit, quantitative and qualitative information from internal, single enterprise or external, multiple similar and dissimilar organisations about vertical or whole institutional process versus horizontal or individual unit function, focusing on inputs process and outputs. Jackson’s (ibid.) descriptions are useful even though they refer mainly to an organisational and lean heavily towards only the economic performance approach. Benchmarking in a career constructivist sense is about the individual determining what is required then comparing that as a standard or benchmark against what they currently know, can do, understand and feel. By regularly engaging in a targeted community milieu, the student can develop a workable network of professional contacts. They also become known, in and by the industry.

This process reveals areas for their professional practice development. Over time they proactively develop professionalism consistent with that required by the work place/interest by making strategic, tactical and operational use, of their course and other learning opportunities. Part of the development process involves the strategic selection of course electives consistent with both the students’ general career interest area and with the gaps identified from field research. University ‘majors’ and ‘minor’ are designed around similar processes. However, in a career constructivist approach, elective selection and subsequent competency development activities are guided by community/workplace requirements identified from evidence based research. By adopting a constructivist approach, the student uses the stimulus of the community milieu experience to identify effective, ineffective and absent personal and professional attributes. They then design ways to; consolidate ‘what works’, change ‘what doesn’t’, ‘introduce new attributes’ and eliminate ‘what has been revealed to have become outmoded’. By taking a dynamic role, in this dynamic process, in a dynamic environment, I am suggesting that the student increases their chances of developing ‘character’ and eventually ‘professionalism.’ Lave (1997, p. 21) suggests that knowledge is obtained as a ‘way in’ or a period of observation and preliminary problem solving steps followed by ‘practice’ which is a period of application fine tuning and remediation.

Lave’s (ibid.) ideas on how to create knowledge differ slightly from those proposed in the career constructivist process. Lave proposes that the student learns from an expert in the field, and builds knowledge gradually by solving problems like that expert would. In a career constructivist approach, a student would learn from various sources by engaging with them in a targeted community milieu but the student would then generate competence not by direct mimicry but by benchmarking, gap analysis, action planning and learning development. The experts facilitating that development may also be those from the community/workplace, but they could also be academics and others or even peers not from that locale. The student chooses the most appropriate ‘vehicle’ such as elective, project, reading etc, for their development based on the outcomes of their individual gap analysis and benchmarking. In this context community (from community milieu) could be conceptual as well as physical. I use the term milieu to allow a breadth of focus
and because milieu can indicate a two-way influence between the environment and those engaged. The people, structures and functions could define community. People will be a common thread in the definition no matter what divergence is discussed in this thesis. This means that community could be an organisation or a business, a group of people with shared values and allegiances or a network of influences. A community could be a town within a regional centre or the regional centre itself. A community could be defined by an environmental epistemology such as a river catchment or a particular ecosystem that contains a population of people. A group of farm families located in a valley or who produce the same or similar produce dispersed otherwise. A community could be classified as an agricultural profession or organisation marketing a particular product. Community could also be defined by ethnicity, religious beliefs, sexual orientation and preference. Historically the first references to ‘community’ as a ‘social study’ according to Smith (2001) were made in 1915 by C J Galpin and was in reference to rural communities.

Communities can come about voluntarily, by birthright by employment, or chance. Frazer (1999:76) suggests that community can be organised around ‘value’ for example ‘fellowship, solidarity, commitment, mutuality and trust’. The community milieu such as an appropriately targeted rural or urban community, work place or industry, could provide a suitable ‘environment’, ‘climate’, ‘challenge’ and ‘stimulus’ for ‘constructed learning’. Willmott (1986), Lee & Newby (1983) and Crow & Allen (1995) suggest that community originates because of; place, interest and communion. All of these approaches to defining community are interesting however for the purposes of this component epistemology, the learner will select the most appropriate community for their career constructivist needs.

**Phenomenology Evolving Synergism**

Table 8.5: The Evolution of Synergism.

<table>
<thead>
<tr>
<th>Phenomenology</th>
<th>Praxis Development</th>
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<tr>
<td>Learning to know in context, What, how, why; I am/we are/they are, ‘experiencing.’</td>
<td>A setting is the time, place and events which are identified by interest, enquiry and curiosity and which initiates a collaborative research towards revealing the situation.</td>
</tr>
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</table>
In Table 8.5 effectively managing causal relationships between self, others and the setting lead to the emergence of contextually relative situations for improvement.

Managing the relationships in conducting primary and secondary research, reveals the unique and true nature of the situation. The situation is comprehended from the perspective of its owner. Developing a more complete understanding of this kind of situation produces synergism. Focusing Learning how to develop effective rapport and written, spoken, interactive and presentational communications assists in building meaningful professional relationships.

Phenomenology is the study of one’s experience. It literally means to make sense of what you are seeing. I have chosen phenomenology as the epistemology for this component of the Core Curriculum Mandala, because the process is pertinent for the wider epistemology of Phronesis. Phronesis means both ‘practical wisdom’ and ‘the capacity to act in accordance with the good of humanity’ (Aristotle). Smith (2003) has written widely about phenomenology he suggests that it is the structure of the experience. According to Smith (2003), phenomenology historically owes much of its character in the first half of the 20th century to Edmund Hussel, Martin Heidegger, Maurice Merleu-Ponty, Jean-Paul Sartre who viewed it as a ‘philosophical tradition’. In fact they proposed that phenomenology was the ‘foundation of all philosophy’ (Smith 2003). More recently phenomenology has been associated with what is seen and what is heard. However, many would view such processes as merely reporting, which constitutes a ‘surface’ like approach (Marton & Säljö 1976b, Ramsden 1992, Biggs 1987, 1993 and Entwistle 1981). Phenomenology is viewed as ‘richer in content than mere sensation’ (Smith 2003). Smith suggests that ‘phenomenology is given a much wider range, addressing the meaning things have in our experience, notably, the significance of objects, events, tools, the flow of time, the self, and others, as these things arise and are experienced in our ‘life-world’.’

Deeper understanding (Marton & Säljö 1976a, Ramsden 1992, Biggs 1987, 1993 and Entwistle 1981) by the participants is a characteristic of phenomenology in the modern tradition. Marton & Saljo (1976a); Entwistle (1981); Biggs (1987, 1993); Entwistle (1981); Ramsden (1992); Ramsden, Beswick & Bowden (1989), might argue that deep and surface learning is about the approach students apply in class to their studies. I am arguing that deep versus surface learning is an appropriate framework for describing a phenomenological study of a community circumstance by a student or group of students. Marton (1975) describes deep and surface level processes relating to a process he calls phenomenography. Marton (1992, p. 253) suggests that phenomenography is a research method that focuses on gathering individual qualitative accounts of how a phenomenon is experienced, understood and conceptualised. So phenomenography is more about arriving at a complete description of the experience using multiple sources and interpretations and phenomenology is more about understanding the experience or ‘knowing the experience’ existentially. Phenomenology could incorporate phenomenography. In the context of
this thesis, the focus for phenomenology is a process whereby the students comes to understand themselves more professionally by interacting with others in an agriculturally related setting.

Working with people about their issues can help build ‘practical wisdom’ and the ‘capacity to act in accordance with the good of humanity’. There has been a massive shift in extension services over the past 30 years to reflect this desire to more realistically service rural community needs (Dunn, Hildebrand & Friend 2003). Dunn, Hildebrand & Friend (ibid.) suggest that there are a wide variety of programmes that are termed ‘bottom up’ whereby rural professional advisory and consultancy, work with rural communities about issues of concern facing them.

Bottom up is an expression that inverts the traditional research practitioner relationship with the farming community. This means that the trend over the last 30 years is for a shift in the starting point for research towards the farmer and away from the scientific/academic researcher. The emergence of the Learning Community and Learning organisation has shifted the rural development process away from direct transfer of technology to a focus on learning. Traditionally an extension officer was engaged to bridge the gap between the scientist and the farmer. They would literally ‘extend’ the research into the field. Dunn et al., discuss the changes in approaches to extension and name programmes that originate with community. Programmes such as, Farming Systems Research (Hildebrand 1990, Collinson 1981 & 2000), Rapid Rural Appraisal and Agro-ecosystem Analysis (McCracken et al. 1988 and Conway & McCracken 1990), Farmer-First (Rhoades & Booth 1982, and Chambers & Ghildyal 1985) and Farmer Participation (Ashby 1990), have had an enormous impact on professional approaches to rural development, (in Webber & Ison 1995 and Vanclay 1992).

Programmes such as Farming Systems Research, Rapid Rural Appraisal, Agro-ecosystem Analysis, Farmer First and Farmer Participation, all operate from the perspective of the farmer or situation owner. Historically, more traditional programmes operate in origin, from the perspective of the researcher. Traditionally a researcher conducts research on topics of interest to themselves or topics that draw the most research funds or topics required by funding bodies. An Extension Officer transfers any practical outcomes that research or technology offers to the farmers. The change in research practice from reductionist to holistic, over the last 30 years to which Dunn et al. (ibid.) refer, has placed the farmer or farmer group in the centre of attention to the point where they are often seen as the researcher/co-researcher not the subject of research. This does not mean that the traditional researcher is no longer viable. It does mean however that the farmer and the rural community’s needs are now serviced by researching in the setting.

Dunn et al. (ibid.) have proposed that the focus and even the roles in rural community research, have been almost inverted over the past 30 years. This has huge ramifications for training rural professionals. This system of farmer/community centred research requires specialised support. Specialised support in terms of advisory, consultancy, facilitation. These are essential approaches...
for professional practice in modern rural development situations. This means that a professional working with rural people about their issues would require special competence in order to be effective. Engagement by farmers, farmer groups and rural community is highlighted in ‘A typology of participation: A continuum of approaches.’ (Cornwell 1995, cited in Dunn et al. 2003). In his typology, Cornwell portrays a continuum of community participation that ranges from passive or flaccid engagement to owned and committed, he calls it The Mode of Local Community’s Participation. Cornwell uses the following terms in a continuum to describe the degree to which community members participate Co-option, Cooperation, Consultation, Collaboration, Co-learning, Collective action. In this continuum Cornwell builds a stronger ‘community of action’ as the roles coalesce.

Fig. 8.5: Relationship Between Community Participation, Leadership and Ownership.

![Diagram](image)

**Figure 8.5** portrays Cornwell’s (1995) relationship between the mode of community participation and their opportunities for sustaining the focus on local action and their agenda.

Cornwell suggests that a low potential for sustaining focus on local issues and the rural community’s agenda when there is a distant or co-opting relationship. He also suggests that that potential increases when the relationship is closer or when collective action is taken. Co-learning is an interesting relationship when considering this could be farmer-to-farmer, farmer to other stakeholder, farmer to facilitator and/or facilitator to other stakeholder. Each of these parties has the potential to offer their perspective to the others in order to increase the overall understanding of what is actually happening. Obviously, this amount of information and variety of perspectives can create enormous complexity. However it is realism that is required in the quest for ‘the situation’ so methods and techniques to manage this complexity should be part of the students’ competency. This may be seen as a challenge to traditional roles whereby the facilitator/Extension
Officer or even the Researcher, are seen as the expert. Co-learning is an integral part of the framework for phenomenology as a component of the Core Curriculum Mandala. Co-learning in my opinion leads to collective action.

Cornwell (ibid.) also equates those previously mentioned participatory terms with terms describing the ‘Role of Local Community in Research & Action’, these range from ‘being researched on’, to ‘initiating and directing the research’. Cornwell uses the following terms in a continuum to describe the roles that community members take in the research Subjects, Employees/Subordinates, Clients, Collaborators, Partners, Directors. Cornwell goes on to describe the ‘Type of participation’, however I would suggest that he is describing a power, control and influence relationship.

Cornwell’s continuum begins with Tokenism in which representatives are chosen but have no real input or power and ends with Local community set & implement their own agenda. Cornwell presents a wide range of approaches to intervention by outsiders and a broad range of relationships between those outsiders and the community. Cornwell’s Typology of Participation is useful when considering the phenomenological focus for this component of the Core Curriculum Mandala.

There are basically three parts interacting, the outsider, the farmers/community and the locale of interest. I have conceptualised these three factors as self others and the setting. These three elements interact to form a ‘situation’. Primary and secondary researching, exploration and interaction, reveals this situation.

Fig. 8.6: Relationship Between Community Research Role and outsider Control.

Figure 8.6 represents Cornwell’s (1995) relationship between the research and action, role of the community and the control expressed by outsiders.
Obviously, as the role of the community becomes more empowered, the control by outside influences decreases. In theory this may be desirable but in practice it may take a cohesive and efficacious and assertive community group and/or an empathetic facilitator practicing phronesis. A focus for modern community development is to work with people about their issues with the view to collaboratively improving their situation. One critical approach for success in this regard is to build rapport (Boe 2005).

A student learning in this environment needs to hone their practice through working with people and researching their issues for the purpose of improving their situation. In order to do this a student would need different approaches, qualities and attributes than a traditional scientific research based curriculum might offer. All of the rural development approaches suggested by Dunn et al. have these things in common a facilitator, stakeholders and an issue based circumstance. I have termed these self others and the setting. Self is the student, others are the circumstances’ stakeholders and these could range from the farmers, the community, other professionals utilised by the farmers, the student’s academic supervisor or mentor, setting is the context. Emerging from this system is the situation, the actual situation – unique to that group and that circumstance so the facilitator must also be exclusive in their approach. A student can learn to become contextually relative (Perry 1970) i.e. be able to effectively adjust their approach according to the prevailing conditions.

**Fig. 8.7: Student & Client Learning to ‘See’ Together.**

*Figure 8.7 portrays a symbolic interactive process between a student and a client.*

This process is directly related to rapport building, but extends rapport to empathy. This model is based on a premise of how we see determines how we act. In this model both student and client eyes are shown looking in various directions. The eyes of the client and student go through five stages. Eventually both client and student ‘see as one’. Theoretically it is at
this point that the student understands fully what the client is experiencing. This evolving process mirrors a student working with a client in order to build empathy. A student who has consciously and strategically developed empathy is more likely to be able to work with a client to achieve an improvement, than one who has not and who tends to work on or for a client and remains aloof.

According to Encarta (1999) rapport is defined as ‘an emotional bond or friendly relationship between people based on mutual liking, trust, and a sense that they understand and share each other’s concerns’

This definition has at its core, ideas about mutual liking, trust and understanding. The definition suggests that ‘a friendly relationship’ is central to rapport building. These qualities are essential if strangers are to become friends and friends collaborate to improve situations. The idea that empathy with others is a professional quality is probably at the heart of phronesis. Empathy means in this context:

‘the ability to identify with and understand another person’s feelings or difficulties.
Whilst sympathy means: the ability to enter into, understand, or share somebody else’s feelings.’

(Encarta 1999)

It would be desirable for a student to actually sympathise with the others with whom they are dealing but rapport can be built on empathy and in time sympathy may follow.

**Gestalt**

Lewin (1942), in his Field Theory, draws on Gestalt theory to propose ideas relating to how individuals make sense of their experiences in order to bring about change. According to Clark (1999), no two people experience the same situation. Experiences are individually and uniquely interpreted. The uniqueness stems from the person’s past experiences, their values and beliefs and worldview. Lewin believed that a person’s life experiences determine how they would organise their response to stimuli.

He proposed that in order for change to occur, the person should consider the totality of the situation. Their consciousness, containing previously organised; events, ideas, knowledge and perceptions will dominate if the ‘complete picture’ is not presented. If only part of the ‘life space’ (ibid.) is considered—no change will occur. If the ‘complete situation is considered against which current perceptions can be compared and evaluated then the possibility of change occurring is heightened. Designing ways to generate as complete a picture as possible of the situation, whether it concerns a client and their circumstance or the student and theirs, is the key to developing gestalt.
Gestalt is inherent in synergism. By synergism I am not referring to the theological interpretation but the notion of the whole, being greater than the sum of the parts. I am referring to a person who can determine a situation completely and accurately having gone through an exhaustive and thorough research process will have acquired synergism - a very useful attribute and approach to managing complexity.

**Holism Evolving Perspicacity**

Table 8.6: The Evolution of Perspicacity.

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<tbody>
<tr>
<td>EPISTEMOLOGY</td>
<td>LEVEL A</td>
<td>LEVEL B</td>
<td>LEVEL C</td>
</tr>
<tr>
<td>3. Stewardship</td>
<td>6. Appreciation</td>
<td>6. Appreciation</td>
<td>As a transformative state of ‘Holism’</td>
</tr>
</tbody>
</table>

**Holism**

‘The whole is greater than the sum of the parts’

In Table 8.6 students learn to appreciate and understand complexity by critically integrating social, economic and environmental perspectives of a situation.

By learning to develop a critical approach, students can learn to suspend current assumptions in order to more fully, accurately, thoroughly, contextually and effectively appreciate the situation. Perspicacity is an expression describing the attribute whereby a student learns to detach their bias, prejudice, partiality and favouritism from their quest for meaning. Perspicacity is not a commonly used word in today’s context. It means ‘to have the quality of thinking deeply and with perceptive, to be discerning, to think critically, to use insight and express wisdom in making decisions’ (Encarta 1999). Holism implies rising above the situation in order to gain as wide a perspective as possible. Developing within such an epistemology that requires consideration of the whole system as a general approach before decisions are made supports the notion of perspicacity.

I have chosen the three perspectives (social, economic and environmental) of the triple bottom line to begin the development towards perspicacity. Ikerd (2004) suggests that the modern approach to farming has evolved an almost factory like process whereby economies of scale are sought and commodity consumer driven markets move from local to national to international. World trade
determines agricultural production and productivity. Ikerd (ibid.) argues that the journey towards and industrial model for modern agriculture has standardised, specialised and centralised control, all of which has had a detrimental effect on environments and society. Many of the arguments supporting Ikerd’s proposition have been outlined in Chapters 1 and 2. Ikerd (ibid.) advocates a focus on farming for the triple bottom line in order to infuse the current market/industrial farming model with a sense of ecological sustainability. Ecological in this context refers to the relationship of organisms with their environment. The long-term sustainability of farming enterprises, farm families and regional communities is threatened if the current model is not modified towards a triple bottom line focus. Farms need to be profitable; landscapes are the source of farming wealth, yet are fragile and can be irreparably damaged by non-holistic agriculture. Savory (2006) supports Ikerd in that he also advocates a sustainable agricultural programme. He calls ‘Holistic Management’ that which incorporates sustaining biodiversity, economic security and improves quality of life.

**Stewardship**

Practicing stewardship may be a more effective framework for managing economies, environments and societies. A steward is a person who becomes responsible for taking good care of the resources to which that have been entrusted (Wikipedia Stewardship 2006). Block (1993) suggests that stewardship is ‘holding something in trust for another.’ Servant Leadership is even more profound in terms of the community engagement notions embedded in this thesis. Servant Leadership, a term coined by Greenleaf (1977) and extended by Block, Covey, Senge and Blanchard, is a form of stewardship in which leadership responsibility, power, control and influence focuses on responsible management of human, environmental and economic resources. Miller (2002, pp. 67-77) suggests that effective servant leadership depends on honesty, trust, a willingness to risk vulnerability, exhibiting good will and a predisposition for change from both internal and external influences. To me there is an innate sense of sacrifice in the notion of stewardship – ‘I am for the other’. By sacrifice I mean the kind of worldview that sponsors a personal attitude that elevates the needs of others over ones own for no other reason than it is right to do so—this is phronesis!

**Appreciative Systems**

According to Vickers (1984), the word ‘appreciation’ describes the mental processing in which meaning is attached to communicated ideas and the coding we use to classify that appreciation as its ‘Appreciative System’. Vickers, according to Varey (2003) then located that code in an ‘Appreciative Setting’. Varey (ibid) suggests that this process is the genesis of norms or agreed patterns of behaviour between and amongst community. Vickers according to Varey (ibid) asserts that culture and communications are interchangeable leading to the potential for shared understandings between peoples. The deeper version of this understanding development is the interplay of assumptions.
Vickers (1984) suggests that the Appreciative System is a subjective pattern or mental construct generated by shared judgement and constantly revised and validated or not with experience. One fundamental requirement of an appreciative system is trust. Vickers (ibid) proposes a seven stage overlapping, coexisting, ascending and interactive continuum from least trust situation involving violence to a most trust situation involving dialogue. Varey (ibid.) draws on ideas from Bohm (1996) and Ballantyne (1999) to qualify dialogue being Vickers ultimate appreciative level of trust means to reason together. Vickers (1995) outlines three forms of judgement. The first of these is Reality Judgement whereby the veracity of presented information is appraised. The second is Value Judgements whereby information presented is evaluated against other related and unrelated imperatives. Value judgement incorporates subjective impositions such as self and group interests, moral restrictions and what could, should or ought, to be etc. The third is Instrumental Judgement whereby responses to what could, should and out to be, are enacted.

Appreciative Systems are the sieves through which we pass what we are experiencing, in order to reveal what we understand so that we can understand we can do about it. The sieve is constructed from our life histories, our cultures and what sense we made of our life experiences. Our assumptions beliefs, values and attitudes stem from these things and are extremely important as parameters for judging what we are presented. Acting in an interdependent relationship was important to Vickers, according to Varey (ibid.), because it strengthened the community connection. However, according to Mulgan (1997), interdependence can also constrain activities accordingly. Recognising appreciative systems is important in both building meaningful relationships and also working collaboratively to generate sustainable improved situations with the situation owners. According to Bawden (2001), Vicker’s Appreciative System builds social capital by the conscious act of engagement. That is to say, by engaging in the process establishes and modifies norms and standards as the appreciation unfolds. This will evolve both the individuals and the communities in which they are engaged Bawden suggests. Bawden asserts that community development from an Appreciative Systems perspective is generative. In other words, community initially appreciate the norms and standards associated with the original situation yet in improving it they learn to appreciate new norms and standards. This might be considered as learning ones way through. In learning one’s way through, students and community could develop the ability to think critically. Critically in this context does not mean negatively it means analytically and thoroughly.

According to Ennis (1987), critical thinking is an ability to rationally decide what to do and what to believe. Borsari (1999), Altieri & Yurjevic (1991), Francis & Altieri (1992) suggest that agricultural curricula would be considered innovative if it included a focus on stewardship and resource management. Francis, et al. (2003) and van de Bor, et al. (2000) suggest that stewardship and resource management form the core of programmes in sustainable agriculture. Van Crowder (1997) suggests that stewardship and resource management are overtaking production and profit optimising, as the focus for agricultural professional training programmes. This shift has been due to a recognition by society of environmental concerns. Elkington (1998) asserts that
curriculum design should reflect these trends and that for institutions to incorporate mutual understanding they should re-establish meaningful connection with their communities. I am not advocating one regime over another, I am suggesting that students develop a holistic/multi-perspective approach to sustaining; economies, environments and communities and in doing so concentrate on formulating their own contextually relative worldview. Developing a ‘second nature’ multi-perspective approach to inquiry, as advocated in this section, is consistent with also developing an appreciation for critical thinking. I am proposing that consistent critical thinking, as part of the character matrix of the student, eventually attributes them with perspicacity.

**Heuristics Evolving Persistence**

Table 8.7: The Evolution of Persistence.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Present, past, future - temporal considerations.</td>
<td>Dualistic, multi-perspective, contextual - ethical reasoning.</td>
<td></td>
</tr>
<tr>
<td>Operant, leadership, generative - performance</td>
<td>EPISTEMOLOGY</td>
<td>Heuristics Contextually relative situational improvement</td>
</tr>
<tr>
<td>LEVEL A</td>
<td>LEVEL B</td>
<td>1. Prevailing Conditions *</td>
</tr>
<tr>
<td>LEVEL C</td>
<td>LEVEL D</td>
<td>2. Production Systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Human Activity System</td>
</tr>
<tr>
<td>Persistence</td>
<td></td>
<td>4. Professional Support</td>
</tr>
<tr>
<td>As a transformation of Heuristics</td>
<td></td>
<td>5. Possibilities / Opportunities</td>
</tr>
<tr>
<td>PRAXIS DEVELOPMENT</td>
<td></td>
<td>6. Attitude to change and Risk Taking</td>
</tr>
<tr>
<td>*Bio-Chemical-Physical, Agro-Climatic, Socio-Cultural, Marketing-Economic, Polito-Legislative, Enviro-Ecological, Production-Productivity, Research/academic, facilitation/educative, ethical/morality, considerations.</td>
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Table 8.7 shows that in a heuristic change atmosphere, sustainability emerges when professional support assists community members manage risk and take advantage of available opportunities.

By integrating the influence of prevailing conditions, the productivity of production systems and management of human activity systems. Persistence evolves out of experiences related to rural development. Heuristics, as a research method (Jackson 2001), allows for individual and group discovery by learning from individual and shared experience. In this context heuristics as an epistemology, allows for students, farmers and others to explore issues related to problematic situations as a generative and evolving process as in ‘learning their way through’. Heuristics allows for the selection of methods and techniques as required and as revealed as the discovery
process unfolds. According to Ulrich (1983, 1987), heuristics is inductive in that the process of engagement reveals the issues and identifies the actual problem despite what may have first appeared to be the problem. Further inquiry generates solutions or at least situation improvements.

Ulrich (ibid.) called his framework ‘critical systems heuristics’; critical, because this approach has no unitary right way for exploring the complexity of the day to day. This is a different approach to a well-defined deductive problem solving process. These ideas are consistent with the general tenets of this chapter. It is proposed that by learning how to manage complexity involving people and their problems, a student can not only learn to assist rural people to become more persistent but also to build compotence in persistence as a personal quality. So heuristics can also be a personal and professional development methodology. Using systems in an heuristic approach helps to validate problems, understand flows of information, materials, resources, help in effective decision making, resource allocation sequencing events etc., manage, measure and monitor transformational processes, design feedback loops and in general present complexity of reality in a clearer way. There is one other significant approach in the evolution of persistence and that is systems thinking and practice (Ulrich 1987, 1988; Bawden 1989a, 1989b; Bawden & Packham 1993). It is vital that researchers learn to view and eventually manage situations from a systems perspective (Churchman 1971, Forrester 1968).

**Autopoiesis Evolving Expertise**

Table 8.8: The Evolution of Expertise.

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</thead>
<tbody>
<tr>
<td><strong>Autopoiesis</strong> action learning and action research</td>
<td><strong>LEVEL A</strong></td>
<td><strong>LEVEL B</strong></td>
<td><strong>LEVEL C</strong></td>
</tr>
<tr>
<td>2. State</td>
<td>3</td>
<td>5. Analyse</td>
<td></td>
</tr>
<tr>
<td>3. Response</td>
<td></td>
<td>6. Improve</td>
<td></td>
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**PRAXIS DEVELOPMENT**

_in Table 8.8 expertise results from the challenges offered by engagement in community client based development projects. Students both develop and apply professional practice compotence as they implement action learning/action research processes._
Students, challenged by identified competency gaps as they describe, analyse and improve with their client forge more relevant course directions involving elective choice. Clients’ in a co-learning relationship, improve both their situation and their competence to improve situations by accessing the developing expertise and resources of their researcher/facilitator students.

According to Whitaker (1995), autopoiesis is an approach to studying ‘enterprise’ complexity that focuses on the interactivity of their inherent human and social systems. Whitaker (ibid.) argues that an autopoietic approach is suitable for building knowledge because it focuses on analysing the relationship between the social systems and the enterprise function. Autopoiesis as an expression has origins in the Greek language and is an attempt at describing an emergent relationship between structure and function—it literally means self-originating or self-organising. The term was coined by Maturana & Varela (1980, 1987) and has since undergone extensive renovation from a cognition and linguistic focused process to an intricate systemic, interactive, social framework for describing people managing complexity.

Autopoiesis in the context of the UG Core Curriculum Schema, is an epistemology that focuses on client/host and researcher/student co-learning within, about and for situation understanding and improvement. Each circumstance encountered is different however the process and frameworks for situation understanding and improvement are similar as an action learning/action research, methodology. It is envisaged in the UG Core Curriculum Schema, that students would engage in agricultural community based development projects that required that student to adopt the role of a researcher/facilitator with a client/host owner of a problematic situation. In the early parts of the development process, Levels A and B are loosely based on a Kolb Learning Cycle (Kolb 1984) as a research approach that attempts to identify the state of the situation, the pressures that brought that situation about and the effect of any responses to those pressures (OECD 1991, 1993).

Further research leads to a description of the situation, multi-perspective analysis of that situation leading to scenarios for Improvement. This means that the researcher/student works with the client/host in order to establish their circumstance. A deeper exploration of self in relation to others and the setting reveals the situation (see 3.5 in this chapter). Improvement at this stage is not so much an answer to a puzzle or a solved problem as an increase in production/productivity. Improvement in this context, means a clearer grasp of how the situation arose and is maintained, why it is like that, is it how it should or ought to be and how else could it be. Action learning and action research project experiences could identify competency gaps that could be closed by elective choice and other professional practice development projects etc.
The Eight Student Attributes

Student praxis development through Levels A, B and C in all eight trigram epistemologies evolve into eight emergent personal/professional qualities or attributes at Level D. There is a loose relationship between the evolutionary Level A, B, C, D system proposed in the schema and the A, B, C, D, response format of the Gainen Inventory. The Perry (1971) Development Schema was imbedded within the structure of the A, B, C, D, Gainen responses. Perry’s schema proposed a continuum from simple to complex approaches to understanding and practice i.e. from dualistic approaches to much more complex contextual relative approaches. Similarly to the Gainen A and B responses, Level A and B in the schema would indicate a fundamental yet effective, but ‘mechanistic’ level of praxis development and professional performance. Whereas the C and D Gainen responses would align more closely with the C and D U.G. Schema praxis development levels in that students would be much more organic and adaptable to changing situations and changing people.

In Figure 8.8 there are eight attributes, three are developed within the professional practice, practical wisdom or twilight curriculum, three in the community engagement, research project or light curriculum and two in both shadow and light.

I am proposing that these eight attributes fulfil the needs as outlined in the research question, the attributes are Professionalism, Cognizance, Compotency, Autonomy, Synergism, Perspicacity, Persistence and Expertise. Eight collapsed merged or developed Venn Trigrams materialise as Level D circles close to the ‘centre’ of the mandala.

If praxis development of these eight attributes were to become second nature to the student, as they constantly iterate between professional practice development and community engagement in an atmosphere of phronesis, then by the argument already established in this thesis, they will approach acquiring practical wisdom. These attributes are designed to cater for needs of the practicing agricultural professional. I have carefully selected the developmental pathways, keeping in mind the assimilated primary and secondary research results. One of the main features of these attributes is that they were learnt not taught. However, the teacher role has now become a facilitator of learning and a mentor of development.
Fig. 8.9: ‘The Foundation of meaning’

Central Praxis Development Model

Figure 8.9 ‘the origin of personal meaning’ or praxis development is portrayed complete with boundary and cycling arrows. In the more complete schema the model is simplified and presented as research attributes and experiences linked by the knowledge and practice cycles. Phronesis becomes the epistemology for the entire schema.

At the very heart of the mandala is the ‘origin of personal meaning’—the praxis model. At the heart of the praxis model is the great quest for wisdom. There is an iterative relationship between praxis development, community engagement and professional practice development and the emergence of individual student attributes. Praxis development in the context of the UG Core Curriculum has been explained at great length in chapter 7 however it is essential that the Foundation of Meaning is integral with the development of the eight student attributes. In

An Explanation of the Four Integrating Modes

Four modes connect student development across all eight trigrams through to attributes:

1. Learning Mode.
2. Temporal Mode.
3. Intellectual and Ethical Reasoning Mode.
4. Performance Mode.

Figure 8.10 shows four developmental modes, ‘Learning’, ‘Performance’, ‘Intellectual and Ethical Reasoning’ and ‘Time’. These connect and integrate the eight Venn Trigrams their boundaries and emergent attributes, with the Foundation of meaning and the light and twilight components of the Core Curriculum Conceptual Framework Mandala. There is a point where all four Modes meet this is known as the point of choice, change and challenge.

This choice, change and challenge point allows
the learner to ‘move both between between the modes and within the modes’ as needed allowing for multiple attribute development. A student for example can ‘track their learning development over time. A student can become conscious of the development of their intellectual and ethical reasoning by the level of engagement in a community based project. Past, present and future considerations can influence the improvement of a community based project situation. They can also influence the student’s professional practice development.

Each of the four modes has three layers that are meant to portray an increase in complexity, rigor and requirement the closer the layer is to the centre. This is a recurring theme in this thesis. This is likened to a centrifugal force that tends to resist the travel of spinning object moving towards the centre or origin of the spin. In reality this component of the model is trying to convey that it is more difficult to engage in the activities at layers closer to the centre than further from it. This to me conveys a critical essence of development that is, as the journey unfolds both the challenge and the requirements to meet the challenge increase. Proactively speaking, the learner would need to transform their professional practice in order to be capable of performing in increasingly more complex situations. Each Mode is presented in the same format three nested ellipsoids converging as a point.

Fig. 8.11: The Learning Mode.

Figure 8.11 portrays a learning development process. There are three layers in this model that correspond with Level A in the outer to Level D in the inner layer.

The outer layer represents instructed/directed, active/reactive, dependent/independent, recursive/reflexive learning approaches. Students’ ‘learn about what is there and how to do something about it’. They generally function at level A and at Level B in the outer layer. The middle layer represents supervised/facilitated, active/interactive/proactive, dependent/independent/interdependent reflective/critical learning approaches. Students’ ‘learn from what is there and about what could be—they learn how to learn’. They operate at Level B and at Level C in the middle layer. The inner layer represents autonomous/mentored, interactive/proactive/creative, interdependent critical/generative learning approaches. Students’ ‘learn for what could, should and must be. ‘Students learn how to critically evaluate the assumptions that have been made.’ They operate at Level C and at Level D in the inner layer.
Learning development influences the individual’s capability to build intellectual and ethical reasoning over time. The individual student can argue their development by comparing the compotency of the past with the capability of the present and the emerging needs of the future. It would be naïve to claim that learning development is linear. What I have tried to do is show a range of four learning approaches joined so that they can be ‘aligned with a series of descriptors. Each of the approaches is grounded in theory. Learning development in this model culminates in an oscillating separation of experience and learning. I have done this to show a distinction between that which is experienced and that which is learnt. An experience in itself is not learning, the experience is merely a catalyst for learning and must be converted into learning by critical reflection. An experience is a vehicle or conduit for learning. Learning is what remains after the experience has passed.

Focusing on learning from a community engagement experience includes both learning for community development and learning for professional practice. This is different from achieving a tangible result from that particular project or community engagement. Achieving a tangible result such as solving a problem, improving a situation or an outcome or product, is a separate issue from the development of the student’s compotency to conduct projects and their subsequent improved professional practice. Professional practice development may include improved enquiry methods, career networking, communications or personal organisation.

This model represents the learner’s perspective only. The experience merely provides a means to learn. The nature of the experience is critical to the type and degree of learning. Learning for ‘professional development’ is managed on the ‘twilight side’ of the Core Curriculum Conceptual Framework Mandala. Learning for improved project management from community engagement is dealt with on the ‘light side’ of the Core Curriculum Conceptual Framework Mandala. Separating learning for doing projects and developing professional practice from achieving a result requires student to be conscious of their learning process. In other words in this approach, the learner should be able to explain the learning process that they have undergone in improving both their ability to conduct projects and their overall professional practice. They should also be able to explain the causal relationship between the experiences that initiated the learning. Subsequently they should be able to explain how the learning generated, will be applied to new experiences. They would have truly ‘learnt how to learn if they can do this. Not only would they be conscious of their competence but also as a result of that consciousness they would be able to demonstrate how it developed.

Once again the second line like in Lao Tzu’s adage, there seems to be a need for someone to teach somebody something. There seems to be a common thread in ancient philosophy that everyone should be knowledgeable and that teaching is one of the main ways to become this way. They do not describe what it is that ‘He’ should know, likewise we are not allowed to judge whether what it is that ‘he’ does know, is worthwhile. Just knowing seems to be enough. Regardless of this ancient
power struggle being conscious of what one knows and how one came to be knowledgeable is important to my argument and again is supported by reference to ancient wisdom.

Fig. 8.12: The Temporal Mode.

Figure 8.12 portrays a time mode incorporating the past, the present and future.

The outer layer represents the present as the assimilation of information into patterns and understanding that a learner uses to make sense of and determine what, how, why, what could/should, must be of the current problem or situation. Students operate at Levels A and B in the outer layer. The middle layer represents the past. Students can manage the present and also account for its generation. The past is deliberately out of sequence because it is harder to research the causal relationships that evolved situations. It could be the student’s past as much as the history of the community, organisation, other individual, or the ‘setting’. The student learns ways to critically explore the past in order to comprehend the ‘trends, the impact of critical incidents, defining moments, decisional points and critical points of development. Students operate at Levels B and C in the middle layer. The inner layer absorbs the past and present in order to deal with the future. Students learn to research, design and implement scenarios for development and also generate and unprecedented sustainable renewal. Students operate at Levels C and D in the inner layer.

In Figure 8.13 portrays the student’s intellectual and ethical reasoning development from simplistic to complex.

The outer layer represents processes whereby students develop simplistic views and simplistic methods of exploring the world. Authorities and experts are ‘right’ and have the ‘right answers’. The world has problems and those problems can be solved. A student has to learn the right solutions. Right and wrong is ‘obvious’ and is the same for everyone. These students operate at Levels A and B in the outer layer. The middle layer represents process whereby students
develop multi-perspective approaches for reasoning about multiple kinds of problems some of which are unsolvable. The world is much more complex than first thought. There can be multiple solutions to the same problem. There are multiple perspectives for viewing and understanding situations. Everyone has a right to his or her own opinion. A student should learn how to find a suitable solution and this can be difficult and can take time and thought. Determining right and wrong using multi-perspective approaches is also very complex. Students operating in this kind of dilemma are performing at levels B and C. Improving situations sometimes requires much more intellectual and organisational effort than merely solving problems. Problems can be solved but situations can only be improved. Students who have learnt to deal with complexity and the uniqueness of each situation and work collaboratively to improve the situation, operate at levels C and D.

Fig. 8.14: The Performance Mode.

Figure 8.14 portrays the development of the student’s performance level from a simple operant to a more sophisticated generative level.

The outer Operant/Adaptive Layer, students are capable of effective professional performance involving self and others in the setting by developing competency by focussing on operating, co-operating, adapting and ‘fitting in’ in order to solve basic problems. Students operate at Levels A and B. In the middle section of the model, Leadership / Facilitatory / Persuasive Layer, students can perform at the ‘operant / adaptive level’, however they have developed competency beyond this for collaborating with others to create and manage visions and opportunities, facilitate, direct and guide others to achieve improved situations. They can also persuade others towards their ideas. In the Generative/Transformative Layer, students can perform at the operant/adaptive as well as the leadership facilitatory persuasive level, however they have developed competency beyond these, for co-learning with others to achieve unprecedented creativity, design, innovation, invention, renaissance and sustainable renewal in transforming organisations and communities.

Conclusion

This chapter portrays the Undergraduate Core Curriculum Mandala as a reverse-engineered discussion. Its structure and theoretical underpinning is outlined in greater detail. Ancient wisdom, and in particular Eastern philosophies, form a central theme and scaffolding for the Undergraduate
Core Curriculum Schema to the point where it is called a Mandala. One of the key features of the model is the introduction of the Twilight Curriculum, which is an attempt to legitimise frameworks inherent in The Hidden and Shadow Curriculum. The Twilight Curriculum attempts to describe personal and professional development processes that have been initiated from critical reflection by the individual student, on experiences grounded in community. The Light Curriculum attempts to explain meaningful personal and professional experiences grounded in community. Phronesis is the overarching epistemology for the schema requiring staff, students and farmers to act in an ethically defensible way towards each other, towards the land and towards their respective on and off-campus communities.

The UG Core Curriculum Schema is not a curriculum as such; it is a conceptual framework that has been designed by critically analysing the primary and secondary research, in conjunction with my related educational and rural development experiences inherent in this thesis.
CHAPTER 9
THE THESIS CONCLUSION

Introduction

The world today is a much more dangerous place the gap between rich and poor is widening; climate change is forcing pessimistic forecasts for agricultural production for the next century; world trade systems seem to favour certain groups and disadvantage others; secular and sectarian unrest is increasing. Cortese (2000a) and Glasser & Nixon (2002a) quote Chet Bowers - ‘The world has problems, and the universities have departments.’ In my opinion a university should be the intellectual flagship of any nation, it should be as much a product of its community as that community is developed by the university’s engagement. Its responsibility should be to produce agents of positive change who can improve situations by working with the people who have identified contextual change situations.

Rural producers and the regional communities they support are particularly vulnerable because of their reliance for their very existence, on forces often beyond their control. Forces such as climatic patterns, consumer preference, the fickle market place, government legislation, favourable; local, regional, national and international trade arrangements, widespread effective transport infrastructure and empathetic professional assistance. Graduates should be the ambassadors of a tertiary educational system that generates leadership in local, regional, national and international communities. By assisting rural people to develop their own version of quality of life, that includes applied hope. This might be called nation building but is certainly is practicing phronesis.

The Kellog Foundation (Spanier 2000) recently called for a return to a community focus for universities in doing so it asked that universities take responsibility for proacting a better world as was the charter for the American Land Grant Universities of the nineteenth century. These ideas have profound resonance for today as global communications and trade barriers shrink and one of the last ‘unleashed’ economies China, takes its place on the world stage. Agro-climatic regimes and consequently food production and supply security is threatened by climate change. Agriculture Graduates and indeed all graduates, need to be prepared for these and other yet unidentified situations. The last twenty years has seen an enormous threat to higher education—the reduction of public funding. This situation has caused a massive leadership, administrative and managerial crisis resulting in a ‘closing of ranks’ leading to a general focus on maintaining the research orientated status quo. This has sanitised and stereotyped undergraduate course design. Universities need to recruit undergraduates so an espoused and actual chasm has emerged.
I have argued that the modern commercial university is undergoing rapid adjustment brought about by reduced funding and changed sources of funding. This adjustment has seen an atrophication of curriculum design and innovation. In response to the massification of undergraduate education, curriculum design, delivery, assessment and reporting has become conveyor-belt like. These processes have reduced the quality of graduate workplace and community performance. I propose that universities have lost their way. I propose that a rethink be made of the importance of curriculum as a vehicle for student personal and professional development. I propose that the grounding of that curriculum in community be the fundamental premise in any curriculum re-design. A community as a concept in this thesis is more than a geographic locale it should include the professions and other groups identified as sharing a common purposes, norms and value systems.

Analysis of the primary and secondary research integrated with the author’s related personal and professional observations, experiences and insights revealed the following UG Schema design properties:

- individualised personal and professional transformative learning cultivated within relevant on and off campus community engaged environments and facilitated by concerned academics, that incorporate mutually beneficial relationships between self, others and the setting using praxis development as the central educative process resulting in the development through action learning and action research projects of generic and specific attributes that are periodically formatively and summatively assessed.

An undergraduate agricultural curriculum designed and informed using the schema proposed in this thesis could develop:

- Graduates with little or no “shelf life” the capacity to reinvent themselves as required—a quality highly sought after by employees,
- Graduates who could ascertain quickly and accurately what is the actual situation by researching with the situation stakeholder/owners,
- Graduates who can imagine preferred and sustainable futures and have the capacity to collaboratively design and plan the means to achieve those futures.
- Graduates who have sufficient empathy to service the current and future needs of rural communities.
- Graduates who have a sense of stewardship and who have developed a variety of ethically defensible approaches that are consistent with notions of sustainability and persistence.
- Graduates, who have developed an entrepreneurial capacity to build and manage viable small-businesses.
- Graduates, who have the capacity for expressing practical wisdom by having developed attributes such as Professionalism, Cognizance, Competency, Autonomy, Synergism, Perspicacity, Persistence and Expertise in a field of their choice and interest.
Such graduates would serve the community the professions and the workplace well. In my core curriculum schema these attributes would have been attained through a praxis development process. This means accessing theory to inform practice, critical reflection in and on practice, an individualised process of needs identification, and designed and planned improvement in performance. This process would now be ingrained as a process of learning in the student. Praxis development is a process of learning how to learn an attribute universally lauded across the tertiary institutional world. Learning is the primary focus of the proposed Core Curriculum Mandala.

The Curriculum Mandala may appear at first to be a strange choice as a model for an agricultural core curriculum conceptual framework. Identifying, assembling integrating and presenting, appropriate conceptual components, based on primary, secondary and personal insights, not to mention embedding a developmental and transformational function into a single design is no simple task. I sought ideas from other cultures and other times in order to achieve this. It may seem presumptuous and even provocative to include the yin yang symbol as a design influence in a modern tertiary curriculum model. By using alternate frameworks for representation and description I am seeking to evoke the imaginative and value laden almost mysterious, informative power associated with this tradition. I am doing this to perhaps reduce a reactive conservative and traditional response that has long characterised curricular discourse, theorising and innovation. The design of the mandala is informed by the research findings but its artistic, diagrammatic qualities connect with a more ancient and enigmatic method of raising consciousness. In doing this I am seeking to evoke the power of both traditions.

I have argued strongly throughout the last few chapters of this thesis for the appropriateness of this choice. Drawing upon the power of the hidden curriculum theory and other related studies, I have developed a number of innovative concepts, models, expressions and processes; such as:

- The Twilight Curriculum—the individual student’s self-initiated personal and professional development,
- The concept of ‘comptency’—a hybridisation of concepts such as capability, capacity and competency,
- A model for Praxis Development—incorporating a figure eight loop that integrates research, experience and competency.
- The notion of Career Constructivism—building effectiveness initiated through critical on and off-campus community experience,
- Presenting a curriculum model as a Mandala—an ancient Sanscrit geoglyph style based on intricate, interconnected and convoluted circles with priority positioning towards the centre.
- The notion of a Venn Trigram as a model for describing epistemic source to a personal and professional attribute student development.
- The notion of three stage development modes.
In Chapter 1 I have argued that universities are undergoing massive change in response to mainly economic imperatives. I also suggested that universities are somewhat duplicitous because they appear to espouse one undergraduate educational format focusing on student centredness, choice and career opportunity in their promotions and recruitment, yet tend to deliver another one size fits all, cost effective, conveyer belt style of schooling. This arrangement seems to support the primacy of research and sidelines the importance of teaching and learning in the organisational hierarchy. Learning in this current schema would be considered a by-product. The Veblen & Flexner (1968) model of the university academic as a researcher first and reluctant teacher second, in my opinion restricts undergraduate curriculum creativity, innovation and development. Staff, by design of default, are generally compelled to compete for grants, publish and present for prominence and generally comply with the Veblen & Flexner (ibid.) university traditions in order to be promoted, this leaves very little professional time, aspiration and developed capacity, to devote to student professional development.

The UG Core Curriculum Mandala in Practice

Utilising the UG Core Curriculum Mandala, which is the principle outcome of this thesis, to actually design and develop an agricultural curriculum will be difficult. Not because of its complexity, not because it incorporates foreign motifs, not because it proposes radical ideas, but simply because the system in which it might operate resists change. Despite the primary and secondary research findings that overwhelmingly support a shift from teaching to learning in university curriculum design, delivery, assessment and reporting, making the change is fraught with two huge obstacles. The first is a significant stasis in university academic culture causing both a chasm between the high status and high priority of research and the lower status and lower priority of teaching, resulting in intransigence in curriculum change. The second is the resistance of the students themselves to unfamiliar curricula that requires them to engage deeply and overtly in a personally managed process resulting in their own learning development.

Teaching and Learning; Status, the Status Quo and Change

Elevating the prowess of teaching and learning within a research dominated higher education culture will not be easy (Marcy 2002). In recent times, universities have introduced broad systems that recognise teaching as a career pathway for academia. Many governments, accrediting bodies and universities themselves offer awards for teaching. Most universities have established curriculum development departments and related sections devoted to improving university teaching and learning. There is also some evidence of a shift towards student centred curriculum change and increased student support systems in response to the perceived needs of the ‘contemporary student’ (Marcy 2002). Despite this, teaching as a primary university career pursuit compared with researching remains lower in status and priority. Dearn (2006) argues that there are two reasons for the low status of teaching, professionalism and scholarship. Dearn (ibid.) suggests that scholarship is different from research in that it is related to effort for a ‘higher purpose’. He also argues that scholarship is different from the term academic, which he suggests ‘seems to have
become associated with a dysfunctional remoteness from practical issues’. Dearn (ibid.) suggests that in order to improve the status of university teaching, it should be based on scholarship. Scholarship he infers in the teaching and learning context requires teaching to be informed by research, in this thesis research is the premise for praxis development which is the core learning process in the proposed schema.

Making a valid case for promotion based on innovative teaching or innovative curriculum design or innovative assessment of learning development, places enormous pressure on promotions committee staff to be familiar with the innovative theories, concepts and processes being presented (Sword 2005). This situation can produce profound professional exposure that few promotions committee members may like to experience. Stereotyping, prejudice and eventually discrimination in academic roles (Banaji & Greenwald 1994 and Devine 1989) eventually creep into the covert culture. It is far easier for promotions committee members to gravitate towards the status quo and make a decision for or against promotion, based on the extent and quality of a list of refereed publications and the dollar amount of successful grant applications than possibly expose their own inadequacy in educational theory and process. Under these circumstances, it would take a brave and dedicated staff member to devote their professional life to teaching and the facilitation of student learning. Ridgeway (1992) and Vescio, Gervais, Snyder, & Hoover (2005) support this view and suggest that favourable career prospects and sympathetic resource allocation can be linked to visible compliance and conformity with the status quo, they argue that this situation becomes self-perpetuating.

Weil (1994) and Slowey (1995) argue that change in higher education is not easy because a single-minded culture is so entrenched. They suggest that ensconced academic attitudes and institutional paralysis hamper challenges, penetration and even questioning of autonomic and hierarchical discipline based university structures and functions. The other aspect of university culture that limits change is that of the competitive desire for power, control, influence, the proliferation of small ‘p’ politics (Buchanan & Badham 1999) that creates power bases, hierarchy, ranking, a quest for status, a desire for recognition and the resulting field of study based citadels. Croker et al (2005) refer to this culture as an ‘egosystem’ and argue that this form of intrinsic, impulsive worldview is divisive and often destructive yet it seems to prevail in universities. This makes universities easy targets for jealous administrators and non-sympathetic economically orientated governments. Change does not come easy to a system that has become so ingrained and introspective.

Blackwell & Preece (2001) suggest that any change in higher education should be based on Lewin’s (1958) organisational development theories. In this change model, participatory action research and action learning (Revans 1980; Zuber-Skerritt 1982, 1991, 1993; Weinstein 1995) is recommended as the transforming process, that all stakeholders form a learning organisation in order to maximize the range of ideas, focus energy from a variety of sources to achieve and build ownership in collaboratively generating a desired future. Lewin (ibid.) suggests that an overarching generic and
specific systems approach would ensure sustainability and thoroughness to the change process and that the needs of both the individual and the culture (Scott 1987) would be recognised. Fullan (1991) suggests that in order to bring about change in curriculum that improves the professional capacity of students, staff would be required to become familiar with new and different teaching materials, approaches, technologies, techniques and processes, they would need to make significant adjustments in their knowledge, behaviours, and in some cases, beliefs and values. These ideas were borne out in the ‘Self Employment Workshop’ in which Staff supported the notion of a vocationally orientated curriculum yet expressed enormous reservations in their ability to; design, deliver and assess it. Staff could benefit enormously by forming learning communities that facilitated exchanges of ideas, approaches and techniques, relating to teaching and learning (Bland & Bergquist 1997 and Karpiak 1997, 2000). Fullan (1993) also argues that change involves uncertainty, complexity and challenge through a transformational journey involving each organisational member as an agent of change. It is ironic that these are the exact forces of transformational learning development proposed for undergraduates in this thesis.

The Students Themselves Resist Curriculum Innovation

Rhem (2006) outlines research by Thorn (2003) in which she suggests five intensifying stages or ‘flavors’ of student resistance to a pedagogical reform. Thorn (ibid.) reports that student resistance begins with infectious confusion followed closely by demands to ‘stop this’ with threats to affect subject ratings if it isn’t, then comes a collaborative and aggressive attack on the staff’s competence with handling the changed format, then comes individual and group complaints to administration and finally savaging of the subject and faculty in the end of semester student evaluation. Students generally resist curricula that requires them to engage and transform because firstly, the history of their formal schooling required them to just attend, conform, comply and achieve. Secondly, a transformative educative process can be quite challenging, unsettling and exposing when experienced in the student’s formative years. Students, in seeking identity during adolescence may not view their formal education as a means to finding that identity. They may tend to ‘discover themselves’ not through formal educational experiences but through experiences related to the hidden curriculum. One of the strong arguments of this thesis is to incorporate the power of the hidden curriculum into the formal curriculum. Students tend to leave being and becoming outside the classroom.

In my opinion, the current traditional approach to undergraduate curriculum design, delivery and assessment, produces three types of graduates:

1. Those who have attained a credential. These graduates have tended to skirt, or superficially engage in their formal and intensely engage in their informal university experiences and opportunities and are little different professionally, from when they started their course. The university experience has had marginal impact on the student’s scholarship, worldview and approaches to their personal and professional life. Any challenging learning has occurred by
association, compliance and/or just being there (‘osmosis’). Transformation may have resulted despite their formal study experiences (hidden curriculum).

2. Those that have acquired what I call *gradualism*, whereby engaging in university experiences has made a significant, valuable and operative transformation in their values, belief, assumption, worldview and approaches. They have positively and proactively transformed their personal and professional lives. This has made them quite different and immensely more effective from when they started their course.

3. Those that have become educated. By educated I mean that they have committed themselves to a developmental process that encourages them to work from within ‘to generate clarification of interest and direction’ and then from without, ‘to generate competence by learning from experience’ in that direction. This is the literal meaning of the word ‘education’ or its derivative ‘educate’ - *educate* Pronunciation: (i-d00s’, i-dy00s’), [key] — v.t., *educed*, *educing*. 1. to draw forth or bring out, as something potential or latent; elicit; develop. (http://www.infoplease.com/dictionary.html). These graduates have learnt how to learn, they have little or no ‘shelf life’ or ‘use by date’ they can not only adapt, adjust and transform as their circumstance changes, but also improve situations with others in varying contexts.

According to Marcy (2002) the capacity for the current university curricula delivery systems, to produce type two and type three graduates is unsustainable pedagogically and economically, I would suggest also ethically. I have presented an argument in this thesis, for an increase in the numbers of graduate type two and three especially in agriculture and related studies. I have presented a model for achieving this through the use of the proposed Undergraduate Core Curriculum Mandala as a catalyst for generic and specific curricular design. Universities are somewhat the architects of their own destiny—if they are not satisfied with the current and near future prospects for a more independent/autonomous environment, then they should invest now in a different more critical future path for themselves. In Peseschkian’s (1981, pp. 84-86) ‘A Story on the Way’, the traveller was loaded down with a variety of seemingly anomalous and practically useless articles – it was not until the local farmers pointed out to him the imprudence of this arrangement that common sense prevailed. To me metaphorically universities are the traveller and the arguments posed in this thesis are a suggestions and the author is the farmer.

I am advocating in this thesis, that by designing and implementing curricula that will produce graduates who recognise the university not just for awarding their credential, but for nurturing them into a personal and professional state of potentiated career and community readiness, the university could secure their own future. As those graduates enter positions of power, control and influence later in their lives they can express their support for a higher education system that educates its population through empathetic and generous policy and funding. This could become a self-perpetuating, mutual support system.
Universities could well consider the undergraduate curriculum as their general salvation. If universities were to prioritise the development of the individual undergraduate student through a community grounded curriculum that has at its heart the process of praxis development, they would be responsible for graduates who could effectively serve the community, have improved quality of life both during and after formal study provide valuable leadership, contribute to generating an evolving and critical thinking population and support the role of university as the engine room for the development of quality of life for the people of the nation.

**Concluding Reflection**

This thesis has evolved from a lifetime of educational experience in it I am making a generic plea for the rights of the undergraduate. Whilst I bracket agriculture specifically in the discussion I am arguing about universities and their general approach to curriculum design, delivery and assessment. In my rampant naivety I suppose I am presenting a point of view about universities and their role in nation building that is less tainted by tradition. It is my opinion that in their struggle for financial security, their obsession with maintaining the status quo and their desire for eminence and rank, universities are becoming an arm of the government, an instrument of the corporate world and a mechanistic product of the own administrations not on/off campus the communities in which they are located or serve. As Professor Bill Liebhardt, in his review of my thesis says; “Even though we like to think of universities as change agents, they themselves have been particularly resistant to change”.

Such a situation tends to lead to the massification of national and international fee paying students in order to compensate for decreasing state funding, leading to the massification and ossification of their internal bureaucracy, leading to a an economic imperative that drives a perfunctory “function follows structure” operational protocol. Nobody denies that research is essential and that universities have to organise themselves to remain economically viable however it is my conviction that in doing so universities have made education a by-product and learning a cursory and expedient act of conformity. Education in this context becomes a habitual and benign process of forced infusion of facts, concepts and processes from without, rather than an existential generation of individual being and becoming from within. Graduate professionals facilitating sustainable change through critical community engagement and ethical leadership is one agency by which a nation can proact its own worthwhile future. I argue in this thesis that in order to produce a new kind of graduate who can generate preferred futures, curriculum design should focus on facilitating the kinds of graduate attributes such as professionalism, cognisance, competency, autonomy, synergism, perspicacity, persistence and expertise that will be of service to the on and off campus communities in which that graduate studies, lives and works. Curriculum design, delivery, assessment and reporting should therefore be independent from the control and even influence of university administration!
When considering the provocative nature of the arguments presented here, I sometimes feel like Arthur Stace (1884-1967) who wandered the streets of inner Sydney Australia eloquently writing “Eternity” in chalk and crayon on the footpaths. Stace had a deprived upbringing and was so illiterate that he could barely write his own name. However following a spiritual epiphany he developed a passion for quintessence, realism and no-nonsense announcements and selected and wrote “Eternity” on the streets over 500,000 times. His persistent message struck home in the Sydney community because “Eternity” was chosen as the iconic Sydney Harbour Bridge illuminated herald for the millennium’s New Year’s Eve celebrations and featured at the Opening Ceremony of the 2000 Olympic Games, watched by 4 billion people. So in presenting the arguments in this thesis and understanding that these ideas will not sit well in academia, I am saying that the “Emperor is naked” and as the lighthouse I am asking the battleship to change course (Koch in Covey 1989) and finally if all else fails I am writing “Learning” on the cloister’ cobblestones.
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Appendix 1: A Depiction of the Gainen Inventory Used By Staff and Students.

**THE GAINEN INVENTORY**

**INSTRUCTIONS**
This questionnaire is based on a test devised by J. Gainen (1987) "Instructional Strategies Inventory,". The questions and answers relate to aspects of the undergraduate curriculum. Each question has four alternatives. Respond twice to each question, once for current curriculum and again for your preferred curriculum. Designate your current curriculum response by circling the letter of your choice i.e. C. Designate your preferred curriculum response by slashing the letter of your choice i.e. X. You should have eight circled letters and eight slashed letters at the conclusion of the questionnaire. If your current and preferred choices are the same in any one of the questions then circle and slash the same letter i.e. C. This must be your only choice for that question.

1. Instruction focuses primarily on:
   A. Conveying facts, concepts, skills and/or standardized procedures
   B. Sharing of clarifying ideas, experiences and/or opinions
   C. Explaining theories and/or issues
   D. Evaluating theories and/or issues

2. The course covers:
   A. A standardized set of topics from a single textbook
   B. Topics selected according to the instructor's preference
   C. Topics selected by instructor with inputs from students
   D. Topics chosen by students to reflect their interests

3. The course uses:
   A. Instructional methods for each topic selected by the instructor and used by each student
   B. A variety of instructional options for each topic (e.g. individualized instruction, media-supported instruction, research papers, group work); students can select the approach they prefer
   C. Instructional methods developed in consultation with students to reflect their preferred modes of learning
   D. Instructional methods proposed and implemented by the students and supervised by the instructor

4. How do you prefer the course content to be organised?
   A. The course covers a single unified approach to the subject
   B. The course covers two or three themes or perspectives on the topic
   C. The course presents a variety of themes or perspectives on the topic, some of which are in opposition to each other
   D. The course dramatizes the differences between major perspectives on the topic

5. Do you prefer instructors who:
   A. Stick close to the most widely-accepted view of the subject?
   B. Give equal treatment to a variety of perspectives, emphasizing that they are all equally valid and important?
   C. Compare various perspectives systematically to identify their strengths and weaknesses?
   D. Show their students how to analyse the material so they can arrive at their own perspectives on the topic?

6. Do you prefer instructors who use:
   A. Formal lectures, using examples and visual aids whenever possible; or lectures with time for questions?
   B. A mix of lecture and discussion with opportunities for students to express their opinions?
   C. Discussion or exercises in which the students explore conceptual relationships and implications of the topic?
   D. Exercises or activities that require students to use course material to address problems or issues in the field?

7. Do you prefer grades to be based primarily on:
   A. Multiple choice or short answer, objective examinations?
   B. A mix of objective examinations and short assignments in which students express their own opinions on the subject?
   C. A few assignments and/or exams that require students to pursue an aspect of the subject in some depth?
   D. Assignments or exams that require students to synthesise material from the course?

8. In your preferred course, what must students do primarily to succeed?
   A. Learn important facts, skills, procedures and/or concepts.
   B. Fully understand two or more theoretical perspectives.
   C. Relate (compare, contrast, analyse, or evaluate) several theories, themes or methodologies, or analyse issues or solve unfamiliar problems using course concepts.
   D. Formulate and present arguments for a position or design a system, or develop a new approach to a problem in the field, integrating concepts and perspectives from the course.

After completing the questionnaire write the tallied A,B,C,D, responses for both current and preferred in this table.

Thank you for time and thought in forming your opinions.

<table>
<thead>
<tr>
<th>Current Curriculum</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<th>Preferred Curriculum</th>
<th>A</th>
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</table>
Appendix 2a: The Staff/Student/Farmer Relationship Questionnaire. Part 1: Q1, 2a & 2b.

Tamil Nadu Agricultural University - Staff / Student / Farmer - Relationship Questionnaire:

Date __________ Campus __________________

Are you - M / F (circle one) Are you - Staff / Student (circle one)

Q 1. Think about and record, the roles and activities for the 3 groups in Figs. 1, 2, & 3.

- T.N.A.U. Staff
  - What do these people do?
  - 1.
  - 2.
  - 3.
  - 4.
  - 5.

- T.N.A.U. Students
  - What do these people do?
  - 1.
  - 2.
  - 3.
  - 4.
  - 5.

- Tamil Nadu Farmers
  - What do these people do?
  - 1.
  - 2.
  - 3.

Fig 1. T.N.A.U. Staff Characteristics

Fig 2. T.N.A.U. Student Characteristics

Fig 3. Tamil Nadu Farmer Characteristics

Q 2. Think about, then record, your ideas about what these groups in Figs. 4, 5, & 6, can learn from each other.

- Staff
  - What can these two learn from each other?
  - 1.
  - 2.
  - 3.
  - 4.
  - 5.

- Students
  - What can these two learn from each other?
  - 1.
  - 2.
  - 3.
  - 4.
  - 5.

- Farmers
  - What can these two learn from each other?
  - 1.
  - 2.
  - 3.
  - 4.
  - 5.

Fig 4. Staff/Student Learning Relationship

Fig 5. Staff/Student Learning Relationship

Q 2.a. In your opinion do these three groups presently interact during the Village Stay Programme? Please explain...

Q 2.b. Are you satisfied with the present organisation of the Village Stay Programme? Please explain...
The Staff/Student/Farmer Relationship Questionnaire. Part 2 – Q3 and Q4.

Q3. CONSIDER THE FOLLOWING SYSTEMS MODEL . . . .

Q3. (CONT.) IN YOUR OPINION WOULD THIS BE A USEFUL MODEL FOR DESIGNING THE VILLAGE STAY PROGRAMME (CIRCLE ONE OR BOTH YES / NO RESPONSES AND PLEASE EXPLAIN)

YES - WHY ?
___________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________

NO - WHY ?
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________

Q 4. IN YOUR OPINION WHAT IS PRODUCED REGION (a) IN THE MODEL ?
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________

Fig 7. model showing the Staff, Students, Farmers and other agricultural personnel in the T.N.A.U. Village Stay Programme as an action learning organisation.