AN INVESTIGATION OF MSC AGRIC COMPLETION TIMES AT THE UNIVERSITY OF KWAZULU-NATAL

by

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DECLARATION

I, …………………………………………………. Declare that

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"Because of the Lord's great love we are not consumed, for his compassions never fail.
They are new every morning; great is your faithfulness"
Lamentations 3:22, 23.

ABSTRACT

There is a pipeline of production of PhD graduates, and any blockages in the pipeline will result in delays in the country achieving the target of about a 5-fold increase in the number of PhD's, suggested by the Department of Science in Technology in their ten year plan to drive South Africa's transformation towards a knowledge-based economy. To increase the pool of students capable of PhD studies, the pipeline issues, such as time taken to graduate by master's students, need to be addressed. Therefore this thesis sought to review literature associated with throughput, dropout and completion times, determine whether any of the available information from graduated MScAgric students could identify factors that promoted or impeded time-to-completion, and determine the views of supervisors of MScAgric students on their role in the supervisory process. While this thesis did not assess "quality" of MscAgric students in any way, it is acknowledged that this is sometimes in tension with time-to-completion and that in order for students to acquire the necessary skills, especially if they are to continue with doctoral studies, time-to-completion may need to be extended. Results showed that between 2000 and 2012, 67% of full time and 56% of part time students took longer than the minimum to complete. The only variable that significantly affected time-to-completion was full time versus part time registration, where, on a full-time equivalent basis, full time students took longer. *Cum Laude* passes were obtained by those who had significantly higher matric score, undergraduate weighted average and final year of undergraduate weighted average, and significantly more White students passed *cum laude*, however they tended to take longer to complete. Supervisors views related well to the guidelines suggested by the University and supervisors appeared to acknowledge responsibility for roles allocated to them Irrespective of post level, experience in supervising MScAgric or PhD students, or whether they had attended seminars or workshops relating to supervision, supervisors viewed their roles in the process relating to the topic, the thesis and the supervisor-student relationship, in a similar way, with no differences in opinion on whether particular responsibilities within these categories were those of the student or supervisor. The exception to this was observed where lack of supervision

experience resulted in differing perceptions on the role of terminating the candidature and initiation of frequent meetings, both of which could result in longer times to completion of MScAgric students.

Contents

CHAPTER 1 – BACKGROUND AND KEY RESEARCH QUESTIONS

A report by the Department of Science and Technology (2007) details a ten-year plan to drive South Africa's transformation towards a knowledge-based economy, which is derived from the government's mandate to accelerate and sustain economic growth. It recognizes the current "inadequate production (in both a qualitative and quantitative sense) of knowledge workers capable of building a globally competitive economy" (p iv). It also acknowledges science and technology as the foundation for improved competitiveness and economic growth in the country and stresses that the government mandate can only ultimately be achieved if South Africa makes progress in becoming a knowledge-based economy, in which science and technology, information, and learning move to the centre of economic activity.

King (2004) demonstrates a correlation between economic and scientific wealth (measured as the ratio of citations per unit to the national per capita GDP). The 31 countries included in this study accounted for over 98% of the world's highly cited papers, with the remaining 2% contribution emanating from the other 162 countries in the world. While South Africa was the only African country to be included in a ranking of the share of the top 1% of highly cited publications from 1997 to 2001, they were ranked 29th. To move up and join the ranks of wealthier countries, South Africa needs to increase its knowledge output (Department of Science and Technology, 2007). To be positioned between developed and developing countries as a knowledge-based economy, the PhD production rate will need to be increased by a factor of about five over the next ten to twenty years (Department of Science and Technology, 2007). The government's goal is to have about 3000 science, engineering and technology PhD's produced per year by 2018 (Department of Science and Technology, 2007). This means the human capital pipeline of 26 000 higher grade maths and science matriculants, 33500 SET undergraduates, 3200 Honours, 2900 Masters and 561 SET PhD graduates in 2007 will need to be improved both qualitatively and quantitatively (Department of Science and Technology, 2007). The growth in post-graduate enrolments to meet enrolment targets, as well as a drive to increase the

number of Post-Doctoral students, is a priority at UKZN (University of KwaZulu-Natal, 2012).

In order to build world-class scientists and researchers, there is a "pipeline" that starts with postgraduate students (Department of Science and Technology, 2007), and any bottlenecks in this pipeline will cause delays in achieving these goals. Lange (2009) reported that between 2000 and 2005, in the Natural and Agricultural Sciences field in South Africa, the average time-to-completion for a Masters student was 2.9 years and 4.8 years for a Doctoral student, which was said to cause a "pile-up" state of affairs (CHE, 2009). The delay to completion also results in a reduction in the subsidy generated per year for the University, which puts strain on the resources of the University because there are increasingly larger numbers of students in the system that require supervision and support, effectively reducing the potential subsidies that could be generated. A large proportion of University funding is obtained from the Department of Education subsidies for graduated students, particularly postgraduate students. The Ministerial statement on university funding 2011/12 states the funding weightings for actual teaching input units in agriculture for each contact FTE to be 3.5 for undergraduate, 7 for honours, 10.5 for masters and 14 for doctoral students, while the funding weightings for research outputs in 2011/2012 are 1 for publication units, 1 for research masters and 3 for doctoral graduates (Ministry of Higher Education and Training, 2010), and bottlenecks in the system will delay the provision of these subsidies to the University.

Jansen (2010) reports that major blockages along the educational route towards a doctorate severely limit the pool of potential PhD graduates, and one of the recommendations of this report is to "address the pipeline issue as a matter of urgency" (p 109) because to increase the level of doctoral entrants, the pool of potential suitable candidates needs to be increased.

There are other implications of protraction or non-completion, besides the reduction in subsidies mentioned and the failure of students to meet their study and career aspirations. These include implications for the research program, where future

funding applications may be compromised, losses to the University which has provided research infrastructure and supervision, as well as implications for the ranking of the university, where postgraduate completions and student satisfaction are important in attracting students (Jiranek, 2010).

However, Mouton (2007), with reference to the NRF, suggests that the concern with inefficiencies in the Higher Education system in South Africa, that were said to lead to too few doctoral students from the pool of all enrolled students at Universities, is a misconception. He shows that from 2000 to 2005, 77% of doctoral students completed their degrees within 5 years, and that this did not vary much across field of study. Although this is longer than the expectation, it compares favourably to international trends, and he states that the real challenge is not the inefficiencies and throughput of the Higher Education systems that were said to lead to high attrition rates, but rather the quality of doctoral students, which impacts on student supervision, research preparation of doctoral students, financial support and institutional attention and resources devoted to post-graduate support. Failure to separate permanent dropout from temporary and/or transfer to other institutions to complete degrees may also lead to the overestimation of dropout in attrition research (Tinto, 1975), and while this may be a loss to a particular institution, it may not be associated with the complete withdrawal of a student from higher education, and their contribution to the national pool of graduates.

One of the objectives of this study is to investigate whether time-to-completion of masters students, the pool from which doctoral students can be drawn, is indeed an issue in the Agricultural Sciences at UKZN, and if so, to identify factors contributing to this.

Due to the nature of many agricultural projects, the time frames required to conduct a research project could be problematic. Field crop trials may rely on seasonal planting and harvesting. Animal cycles of breeding, gestation and parturition could also be lengthy and many may not be suitable for study at the master's level due to the time implications. When relying on environmental factors, it is possible that a field trial

could be destroyed through adverse weather conditions and the experiment could be delayed until the next season, or a disease in an animal experiment could result in the loss of experimental units.

However, besides these limitations, that could perhaps be thought through in the experimental design and choice of project for a master's student, there are many other factors that could contribute to slow throughput times. This thesis aims to identify possible factors from available demographic data and academic records of MScAgric graduates since 2005, as well as to consider perceptions of supervisors in the role they have in supervision of MScAgric students. If the role of a supervisor of a master's student is not clearly defined or understood, it is possible that variation in throughput times due to this may be observed.

Unfortunately the study is limited to information obtained from student records and it is acknowledged that there may be other issues such as student expectations and socioeconomic status that could play a role that are not considered here. It is also unfortunate that the data are from graduated students, and therefore throughput rates cannot be considered.

The thesis will consist of a literature review on factors affecting time-to-completion, including a review of conceptual models that have been developed in an attempt to understand attrition, a study to investigate time-to-completion of MScAgric students in the previous School of Agricultural Sciences and Agribusiness, which formed part of the Faculty of Science and Agriculture until the re-organisation at UKZN in 2012, and a survey on supervisor perceptions on their role in the supervision process. The results and possible recommendations will be presented with implications for the new School of Agricultural, Earth and Environmental Sciences in the College of Agriculture, Engineering and Science.

The key research questions that this thesis aims to answer are:
- What factors identified from UKZN student records promoted or impeded time-to-completion of MScAgric students graduating from 2000 to 2012

- What was the mean time to graduate of MScAgric students during this time period?
- How do supervisors of MScAgric students view their role in the supervisory process in relation to time-to-completion?

CHAPTER 2 – LITERATURE REVIEW

The aim of this chapter is to review literature that addresses issues of completion times and throughput of undergraduates and postgraduates at Universities. "Throughput" is often referred to as the rate of completion, in some cases broken down per minimum years, or minimum plus *x* years. "Throughput rate" has differing meaning in the literature, and when used in the context of this thesis, refers to "the proportion of total enrolments graduating in a given year" and can be equated with a "graduate ratio" which is "the proportion of graduates:enrolments in any year" (University of KwaZulu-Natal, 2010b), and is thus an indication of "time-to-complete" which is defined as "the time taken for a cohort to complete a qualification relative to the minimum formal time" (University of KwaZulu-Natal, 2010b). Underlying problems causing high rates of attrition may be also damaging to those who persist (Golde, 2005), potentially slowing throughput and negatively affecting time-to-completion. Throughput is not the only measure of student "success" and may be considered a reductionist notion given that students may navigate through higher education via a variety of pathways for various reasons such as personal interest and circumstances, academic performance and financial constraints and incentives. However, it remains a useful framing concept in understanding and intervening in the skills pipeline, and is an important factor for higher education institutions as well as to students, their families, the government and employers (Fisher, 2011).

Literature discussing throughput and retention is reviewed at all levels of tertiary study, as there may be common factors among each level, and also because in some cases students' progress to PhD studies directly from undergraduate qualifications. Both South African and International literature is reviewed, even though the different higher education institutes may have different systems, for example, students may transfer from a 2-year to a 4-year college in the USA, which is less likely in South Africa.

The causes of attrition are numerous and complex, and difficult to understand, and understanding student persistence and success does not always point to

understanding of why students leave (Tinto & Pusser, 2006). Some degree of attrition is considered "normal" and is even expected in doctoral education, as students change directions, goals or personal circumstances (Herman, 2011), and may be the result of learning more clearly about the nature and outcomes of the training and in these cases early attrition rather than late attrition is preferred (Golde, 2005). Late attrition incurs a greater financial and emotional cost to both the student and supervisor/institution.

This review presents various factors or themes related to student attrition and throughput rates and these are presented in relation to four categories of barriers to persistence, categorised by Morgan & Tam (1999), who looked at barriers to persistence in distance education of an undergraduate diploma, as *situational*, *dispositional*, *institutional* or *epistemological*.

Although factors have been placed in a certain categories, there is often overlap between categories, for example "lack of time" which was cited as a general situational cause of non-persistence was related to other factors to do with the course itself and the disposition of the student (Morgan & Tam, 1999). Some factors, for example, academic ability, may have arisen from a situational barrier such as socioeconomic status, but also be linked to dispositional factors. Golde (2005) found, in the case of attrition from PhD studies, that each individual story was complicated and the decision to leave was commonly agonised over and well-thought through. Therefore, conceptual models from the literature, which tie together factors associated with student dropout, will be presented in the next section to indicate the interrelatedness of the various factors.

2.1. Situational barriers to student persistence

Students begin their higher education experience with a variety of different attributes, experiences from school, and family backgrounds, which have a direct and indirect impact on academic performance (Tinto, 1975). This section will focus on some of

these factors, considered as situational, that may impact on persistence and time-to-completion.

2.1.1. Student demographic

2.1.1.1. Gender

The ways gender affects completion times and rates are varyied. It was found that in New Zealand, women are more likely to successfully complete a tertiary qualification than men, although at the doctoral level, final completion rates are similar even though women may take longer to complete (Scott, 2005). Men completed faster than women in the Faculty of Sciences at an Australian university (Jiranek, 2010), but there were no gender differences reported in completion times of PhD students at a USA university (Seagram *et al.*, 1998) or a UK university (Wright & Cochrane, 2000), but there were gender differences in the *expected* completion time, with men reporting that they had accurately anticipated completion time while women underestimated the time it would take (Seagram *et al.*, 1998). In Norway data from 1981 to 1996 showed that men are more likely to enrol for a doctoral degree, and although there was no difference in the probability of completion based on gender, men tended to receive their degree's earlier than women (Mastekaasa, 2005). While it is possible that the birth of a child during the period of registration for a doctorate will lead to delays, this study showed a lack of gender effect on doctoral completion if the children were born before embarking on a doctorate.

Student expectations about postgraduate education can influence the way they perceive their experience and this may differ between men and women. Significantly more women than men believed that their gender had a negative impact on their progress, and there was more dissatisfaction expressed with supervision from women doctoral students, but despite this perception, there was no impact on time-to-completion between genders (Seagram *et al.*, 1998).

2.1.1.2. Race

As mentioned by CHE, ethnicity or race is not seen as a biological construct that has any bearing on learning, but "race" is seen as a social construct that due to historical reasons may influence student success.

Berger & Braxton (1998) found that white students in the USA were more likely to feel that they participate in decision-making and likely to relate to their peers, but less likely to relate to faculty than non-white students (analysed as one group as they comprised less than 7% of the students). Because the sample was drawn from a highly selective, private, research university with a very homogeneous population relative to general postsecondary education, the results may be limited to this setting, but a feeling of having less say in the decision-making processes may lead to a lesser degree of social integration, although these students were more likely to turn to faculty for help as a result.

In New Zealand, ethnicity had an effect on completion rate, with Asian students (domestic and international) having the highest completion rates at levels of tertiary qualification (Scott, 2005). In South Africa, significantly fewer African students and more white students regarded academic challenges as obstacles to completion of a PhD, but programme leaders viewed academic challenges almost exclusively in relation to African students (Herman, 2011).

Alon & Tienda (2005) found that in America it is advantageous for minority (in this case, black and Hispanic) students to attend a highly-selective institution as the likelihood of graduation increases as the selectivity of the institution attended rises. This study rejected the "mismatch hypothesis" that minority students with lower credentials than the institutional average are mismatched at selective institutions and being set up for failure because they are academically unprepared.

The problem in South Africa, however, is different, where the inequities may arise not for the minority, but the majority, where apartheid created the need for equity redress. It is essential to provide an avenue for historically disadvantaged students to

achieve higher education qualifications, and this has been achieved successfully through access programmes (Downs, 2010), such as that at UKZN. Although less than a third of enrolled access students completed an undergraduate degree, this programme has successfully enhanced the pool of black graduates in South Africa, and some of these students have continued with postgraduate study. The problem of equity redress is inextricably linked to financial aid, and the National Student Financial Aid Scheme (NSFAS) was set up to impact the skewed student and graduate populations observed in South Africa by providing finance to academically deserving and financially needy students to meet their own needs as well as South Africa's development needs (Jackson, 2002), although as Letseka & Malle (2008) state, the value of the award is a fraction of the cost of a university degree, highlighting the need to further address issues of poverty and inequality. Wangenge-Ouma & Cloete (2008) agree that a change in funding is necessary to ensure the goals in the 2001 National Plan on Higher Education are met. They suggest that tuition fee increases are inevitable as long as government funding and revenue from market sources remain insufficient, and that to avoid aggravating the inequity in access to higher education, concomitant financial aid increases should accompany tuition fee increases, and should favour indigent students regardless of race.

2.1.1.3. Age

Students less than 25 years of age have higher completion rates across all levels of tertiary qualification in New Zealand, probably because more mature students find it more difficult to study part-time and combine study with work and family commitments (Scott, 2005). Similarly in the UK, Wright & Cochrane (2000) found that younger scientists are more likely to finish successfully than mature science students. Significantly more mature students in South Africa cited work commitments to be an obstacle to completion than younger students (Herman, 2011).

2.1.1.4. Socio-economic status

Categorising students into different socio-economic classes can be difficult, but has been done in various ways, such as classifying individuals based on the highest earner in the household, parents occupation, postal code or whether parents attended

university, but these measures however tend to only provide a one-dimensional picture of the socio-economic position of an individual (Wakeling & Kyriacou, 2010).

Nonetheless, socioeconomic status has been used to determine whether aspects of this measure influence measures of success in higher education. In a determination of socioeconomic status through parental income, educational attainment and occupational prestige in the USA, and measuring aspects of cultural, social, economic or academic capital accumulation as a student, and nine years after graduating, Walpole (2003) found that social status origins continue to affect university experiences and outcomes after completing an undergraduate degree. Although many students from low socioeconomic status are upwardly mobile compared to their parents, it appears as though students from higher socioeconomic backgrounds have advantages post-graduation. However, no significant relationship between occupational class background and aspirations to undertake postgraduate study were found by Stuart *et al.* (2008), although a strong predictor of undertaking postgraduate study was whether family members had studied previously. They suggested that because, in this case, students had successfully completed undergraduate study, class did not affect their future aspirations.

It was reported that, in South Africa, 70% of the families of those that had dropped out of higher education in a survey were characterised in the class "low economic status", and many of them indicated that they had added stress and distraction from studies arising from the need to work to support themselves (Letseka & Malle, 2008), again highlighting the difficulties and role that financial status plays.

2.1.2. Ability and skills

Herman (2011) interviewed 16 leaders of "reputable PhD programmes" at 9 South African universities across a range of disciplines to find attributions for attrition. Some programme leaders found South African students' to lack foundational skills necessary to pursue a PhD, especially compared to students from other African countries, with the blame being laid of the schooling system in South Africa.

Interestingly, when students realised that they were the "wrong fit" for the discipline or for postgraduate studies in general, it was related to the lack of motivation to continue because they realised it was not what they wanted to do, whereas the faculty perception was that they were unable to do the work. From the students perspective, attrition was often seen as a positive outlook in that the experience helped them to find out what they really wanted to do, rather than the negative view of faculty that they should never have come in the first place (Gardner, 2009). In the same way, students that had departed from PhD studies in the work of Golde (2005) reported that their graduate work had provided them with good analytical skills and was a positive experience which helped them realise what they wanted to do. Students in tertiary education in New Zealand successfully completed courses at a higher rate than qualifications and many leave with only a few courses to complete (Scott, 2005) and would be considered "unsuccessful" in terms of completion rates due to lack of ability, but they may have learnt a great deal and is not necessarily wastage in terms of the students experiences.

2.1.3. Personal reasons

Personal problems were listed as a reason for attrition from students, but the descriptions of these were vague, and included pregnancy, mental health problems and emotional problems (Gardner, 2009). Some students had an unrealistic view of career trajectories, and they observed a culture of work that was very career driven, stressful and unbalanced from faculty, causing them to question their future in that field. The reality of the scarcity of jobs and fierce competition for available jobs in academia was off-putting (Golde, 2005).

Work and family commitments were reported to take precedence over PhD studies, and more married and part-time students found work commitments an obstacle to completion, although part-time students found it easier to finish timeously if their PhD topic was related to their work focus (Herman, 2011). Seagram *et al.* (1998) found that graduates who switched from full- to part-time registration took significantly longer to complete their degree requirements than those who remained full-time, presumably because it was difficult to keep motivated. However Wright & Cochrane (2000) found

that part-time registered students (amongst other factors) were more likely to submit a PhD thesis, because of a higher degree of emotional and financial investment. They also found international students were more likely to submit, and suggested that students who have either left their country, culture, home and family or those that have taken on a commitment of postgraduate study in addition to existing work and family responsibilities have more to lose than recent graduates registered for full-time study.

Family responsibilities, as a barrier to completion, were noted by students in the context of balancing family life with work and study and especially unexpected circumstances such as sickness, death, divorce or loss of income (Herman, 2011). Personal problems, relating to marriage, children or family responsibilities, in another study, were given as the main reason for student departure by about a third of the students. Mental and physical health problems were also discussed (Gardner, 2009).

2.1.4. Finances/funding
At the undergraduate level, financial status appears to play a big role in attrition in South Africa, and despite the establishment of the NSFAS, students citing dropout due to financial reasons remains (Letseka & Malle, 2008). The biggest cause of stress to new students at eight South African universities was lack of financial support or poor budget to subsist (Bojuwoye, 2002).

Financial/funding problems that were cited by postgraduate students included a lack of funding, coupled with doubts about supporting themselves and families, the perception of discrimination against white and foreign students in funding choices, a lack of transparency in the selection process and in the distribution of funds, and the hidden costs of doing a PhD such as travelling and accommodation costs (Herman, 2011). Financial problems were found to have significant associations with race, age and parents education, with more African students and fewer white students than expected considering financial problems as an obstacle to completion, as did those in the 30-40 age category and those where at least one parent had a postgraduate qualification (Herman, 2011).

St. John *et al.* (1996) suggest that finances are an integral part of the dropout decision process, and that the initial choice of institution based on finances can influence the early institutional commitment and impact the academic and social integration that influences later commitment levels. The choice to remain at an institution is made, perhaps tacitly, through mental calculations of whether the quality of their university experience is worth the cost, and choosing a university because of low tuition fees (rated by students as either a very important factor or not important) was negatively associated with persistence (St. John *et al.*, 1996).

Interestingly, Golde (2005), found neither financial reasons nor intellectual ability to be listed by students as affecting the decision to withdraw (although financial support was available for 4 years and admissions were highly selective). However, in South Africa, these are both attributed to attrition (Herman, 2011) and the lack of financial support for PhD students sometimes results in premature entry into the job market.

2.1.5. SA context

There may be a perception that academia is unattractive for black South Africans, where PhD programme leaders found more black South Africans questioning the value of a PhD as it is not always equated with financial wealth. Racism and an institutional culture that results in alienation of black students were viewed as contributing to attrition (Herman, 2011). The high levels of crime and the experience of traumatic events such as murders and burglaries in South Africa led to a loss of research time. International students also experienced difficulties in relation to being homesick, communicating with home, red tape with visa's and study permits and xenophobic experiences (Herman, 2011).

2.2. Dispositional barriers to student persistence

2.2.1. Suitability for further study

Another reason given for attrition by students was a feeling of under-preparedness, or that their expectations of postgraduate study were inaccurate. With the change in requirements of a postgraduate from an undergraduate student, there is a mismatch between students assuming they will only be admitted if they are prepared (or will be prepared adequately by the university), and departments assuming students are making informed decisions (Golde, 2005). In a study that looked at reasons for dropout from a Master's in Education at an institute in South Africa, all 4 interviewees felt they were prepared and confident for the programme because they had passed their Honours degree and had been selected, but felt uncomfortable to answer whether they would have applied had they known what was expected of them in the Masters programme (Mdyogolo, 2012). The shift in learning style from undergraduate to postgraduate study is discussed further in Section 2.3.1.

Golde (2005) asks the question whether departments should help remedy gaps in student knowledge to reduce attrition. Students that had withdrawn suggested that faculty should patiently help students move to the level of their peers, despite the possibility of a longer time to complete, but it may actually be intellectually irresponsible to nurture and coax a student through such a process meant to develop critical thought and independent thinking.

In the study by Golde (2005) many students interviewed realised they were not suited to being "lifelong practitioners of their discipline" (p 681), so there was a mismatch between their goals and expectations with the practices of the discipline and department. In some cases the skills necessary for their field of practice were not their strengths. Realising this mismatch early is essential as early attrition is less costly (economically and psychologically) than late attrition, and three departments in this study (Golde 2005) ensured early exposure to authentic research experiences so that students could quickly and effectively determine whether they were suited to the

intellectual work of the discipline. In some cases undergraduate involvement also ensures a realistic view of postgraduate work.

Faculty members at an institution in the US felt that some students should not even be there– that they just "drift" into graduate school and are improperly suited or poorly motivated, and are there because they don't know what else to do (Gardner, 2009). This is confirmed in South Africa where only just over half the respondents in a study by Hoffman & Julie (2012) were sure about their chosen academic programme, whilst the others were unconvinced or had doubts.

Some students realise that a doctorate is not for them, some are not prepared for the intensity of the programme while others lack commitment (Herman, 2011) and as Golde (2005) questions – can attrition be equated with failure when it is related to students' learning more clearly about the nature and outcomes of their training, and their suitedness to research? In this case attrition may be desirable. The perception of PhD programme leaders is that students are unaware of the financial, emotional and intellectual commitment required to complete a doctorate (Herman, 2011), and if they are made aware early, it may filter out those ill-suited to postgraduate studies early. Tinto (1982) suggests that dropout due to the discovery of unrealistic expectations about the academic and social life of the institution could be lessened through institutions presenting and marketing themselves realistically and accurately. Golde (2005) suggests that helping prospective students to discern their suitability through appropriate information related to job placements and departmental mission in advance would result in early, rather than late attrition.

2.2.2. Motivation/personality type/psychological reasons

The main reason for student attrition given by each discipline in the study by Gardner (2009), was that students lacked ability, drive, focus, motivation or initiative. Some of this was attributed to students just not being up for the job, or due to a lack of rigorous undergraduate training. One opinion was that students coming in with a weaker background or record would not be able to keep up. Psychological factors such

as procrastination and perfectionism, and lack of personal motivation, were thought to be an obstacle to completion (Herman, 2011).

The university environment can be a source of stress to new students, and first year students at eight universities in South Africa perceived stress mainly through lack of financial support and lack of information to assist in decision-making and early adjustment to the new environment of the university (Bojuwoye, 2002). Undergraduate students (on financial aid) at a South African university that were more intrinsically motivated, with self-determined motivational orientations, were found to be better adjusted to university, and engaged in academic-related behaviour for its value, rather than for the attainment of extrinsic rewards (Petersen *et al.*, 2009). Students that displayed high levels of self-esteem were also better adjusted, while those that reported their lives as stressful, and struggled with the demands of academic work, were less adjusted (Petersen *et al.*, 2009).

Wright & Cochrane (2000) explain that "those who struggle successfully against adversity are often possessed of remarkable motivation and commitment" (p 192) which suggests a personality type indicative of successful students. Robbins *et al.* (2004) found *achievement motivation* (defined as "one's motivation to achieve success; enjoyment of surmounting obstacles and completing tasks undertaken; the drive to strive for success and excellence") to be one of the strongest predictors for grade-point average in a meta-analysis of 109 studies.

It is possible that students with a strong focus on a particular learning style in undergraduate studies may encounter difficulties when moving to postgraduate, where there is a possible shift in learning styles. Miller (1991) presented a personality topology that reflects four learning styles, namely the analytic, holistic, objective and subjective styles. It is implied, in an anecdote of teaching at a small agricultural college, that the students had no idea of the subjective-emotional realm, and that stylistic versatility in specialised students such as these should not be encouraged as long as the research agenda fits the style.

Kearns *et al.* (2008) address "self-sabotaging" behaviours that lead to delays in completion through cognitive-behavioural coaching that teaches students the underlying cognitive strategies and attitudes needed to complete their PhD on time, reduce stress, manage their time and workload better, and generally improve their psychological hardiness and resilience. The premise is that all feelings are determined by our thoughts, not by the situation in which we find ourselves, and that our feelings determine how we behave, so behaviour can be altered by changing underlying thoughts. The process involves setting a measureable time-specific goal, identification of obstacles and patterns of behaviour that may get in the way of achieving the goal, exploring the costs, taking action, and identifying and challenging beliefs that relate to doubts about their competence or ability or other negative, personal attributions. Results indicate that participants developed useful skills and felt more positive about their study, although the results of this on time-to-completion are yet to be determined. Supervisors generally had little understanding of the self-sabotaging behaviours employed by students or strategies to reduce them, such as being more insistent upon seeing regular drafts from a student known to procrastinate.

2.3. Epistemological barriers to student persistence

2.3.1. Transition from undergraduate to postgraduate studies

In the transition from undergraduate to research-oriented postgraduate studies there is a shift in the learning style required. Students have come from a more structured, formal approach and are expected to work largely independently. Undergraduates commented on how having a postgraduate as a mentor was beneficial in their transition to independent work (Dolan & Johnson, 2010). It was found that science students at the University of California – Los Angeles benefited from an intensive primary-literature based teaching program, where, as undergraduates they were exposed to a weekly journal club, worked on research projects, presented seminars as well as career guidance and advice on graduate school admissions (Kozeracki *et al.*, 2006). This helped them to secure admission into postgraduate positions and their research mentors perceived an increase in confidence and ability to present research in these students. It was concluded that this programme can facilitate the transition to

postgraduate study (Kozeracki *et al.*, 2006). In the Faculty of Community Health Sciences at the University of the Western Cape most Masters students indicated a lack of academic preparedness for postgraduate study (Hoffman & Julie, 2012).

2.3.2. Academic challenges

Academic challenges can arise from many spheres including financial problems resulting in the need to work, suitability to postgraduate study, abilities and skills of both the students and supervisors, and these aspects are mostly covered in other sections of this review. However, academic challenges stated to contribute to attrition in the study by Herman (2011) included a lack of research skills or training and the lack of access to equipment and expertise. Attrition attributable to facilities and resources included inaccessible facilities and resources, such as faulty equipment and unavailability of library materials or publications, internet time, computers, working space and telephones, often compounded by a lack of funding. Mostly these appear to be beyond student control (Herman, 2011).

2.3.3. Field of study

Field of study also had a significant association with academic challenges as an obstacle for completion, and in fields where the focus is on individual rather than collaborative work, there is a lower level of integration of students into these disciplines. Gardner (2009) found completion rates to differ widely with discipline at a US university with completion rates of 76.5, 72.7, 70.2, 56.4, 37.6 and 17.6% for Communication, Oceanography, Psychology, English, Mathematics and Engineering respectively. Shorter completion times were found in the Natural Sciences compared to the Social Sciences and Humanities by Seagram *et al.* (1998), and similarly in science-based rather than arts or humanities-based subjects (Wright & Cochrane, 2000). Across all schools in the Faculty of Sciences, students in the School of Chemistry and Physics were more likely to complete their PhD in a timely manner than students from other schools (Jiranek, 2010). Significantly more students in education, psychology, economic and management studies found work commitments an obstacle to completion than in other fields of study (Herman, 2011).

Wright & Cochrane (2000) postulate that because scientific research requires the study of purportedly objective phenomena, which can be seen as being outside the individual, it is easier to separate work from their internal world, thus avoiding its impinging on or challenging issues of identity and self-esteem. This would explain why younger students, who have negotiated few developmental stages in life, in the sciences were more likely to submit successfully than older science students, whereas there was a trend for older arts and humanities students to be slightly more likely to submit successfully than their younger counterparts. These students who have negotiated more developmental stages in life may be more "psychologically robust" in a field of study that requires exposure to judgement of elements of the students' internal world, such as their values and belief systems and even ability to demonstrate and convey emotion, which requires more personal risk and investment (Wright & Cochrane, 2000).

2.4. Institutional barriers to student persistence

The Institution can also impact on the success of students through the entry criteria into the programme. At UKZN this is based on previous academic performance, which may not be the only factor influencing the likelihood of success at postgraduate level. In a study that reviewed the predictive ability of various entry criteria into medical school in the UK, previous academic performance accounted for 23% of the variance in overall performance at medical school, but only 6% of the variance in medical performance of graduated students (Ferguson *et al.*, 2002). Performance could also be monitored and time-to-completion improved, through "forced exclusion" of students taking too long. This could be due to a lack of research infrastructure and supervisory capacity, but Jiranek (2010) argues that more stringent entry requirements and candidature times for domestic students in Australia should be applied to enhance completion rates. The converse is that though such stringent policies, the danger is that a Masters graduation is viewed as a commodity in a market-oriented context and policies that focus on the results rather than the process may deny students a learning process. Such differences in the understanding of research by postgraduate students

and the university, in the implementation of policies and plans, can impede timely completion of postgraduate research (McCormack & Pamphilon, 2004).

Tinto (1982), however, shows that completion rates in American Higher Education remained strikingly constant over a 100 year period, and that the question is not whether we can or should endeavour to reduce dropout (especially considering that not all students are equally equipped in academic, social or other skills and have the intellectual capacity to finish a course of study), but for which type of students, in which types of settings should specific policies be developed to reduce dropout. In fact, he argues that any cultural good (including higher education) will always appeal only to a portion of the population of eligible individuals and that even if higher education could be made appealing to all who enter, this would reduce its value (Tinto, 1982).

Finding practical solutions from research focussed on theoretical concepts may also be difficult, and although having some knowledge, for example, that of a students' family background, may be useful, it may not be possible for an institution to use practically (Tinto & Pusser, 2006). Theoretical models pertaining to this will be discussed in the next section, but there are various recommendations from the literature pertaining to what institutions can do.

Berger & Braxton (1998) demonstrated that students are more likely to want to persist if social rules and policies are communicated clearly, enforced fairly, and if they have some say in making decisions about campus social rules and suggested that institutional leaders and policymakers should be proactive and plan to find ways to foster this. This includes having well-articulated, consistent and clear expectations for assignments and assessment, well-written and readily available codebooks, informative orientation sessions and student participation on campus-wide committees. Morisano *et al.* (2010) found that helping first year students, who were struggling academically, to establish goals resulted in better academic performance, a higher probability of maintaining a full course load and reductions in self-reported negative effect

Students at an institution in the USA discussed departmental issues as their second highest reason for student departure, which included issues such as poor supervision, lack of financial support, faculty attrition and departmental politics (Gardner, 2009). However, in South Africa, students considered obstacles relating to the institution (such as supervision, access to facilities and interaction with academics or other PhD students) to be less limiting than academic challenges, financial constraints and family or work commitments (Herman, 2011).

Herman (2011) observed very little reference to the department, the discipline or the institution as attributions of attrition from both the students and PhD programme leaders perspectives and believes that these external factors have possibly been overlooked as causes of attrition. Herman (2011) also believes that the discrepancy between students perceptions and PhD programme leaders perceptions indicates a lack of understanding of the reasons for attrition and that it is necessary to gain more in-depth knowledge about the actual causes of attrition in South Africa, because with increased understanding attrition can be decreased, which is similar to the conclusions of Gardner (2009).

Academic staff tend to blame non-completion of undergraduates on student-based factors (Taylor & Bedford, 2004), and postgraduate attrition is viewed as a student problem by faculty and a faculty problem by students. While both students and PhD programme leaders consider personal problems to be a major obstacle to completion, the PhD programme leaders view student disposition, their internal, stable and uncontrollable traits, and their lack of capacity to be the reason for attrition, while the students perceived their academic shortcomings to be derived from insufficient training (an external, controllable and transient attribute) (Herman, 2011). Even as far back as the 1970's, a review on dropouts from higher education showed that commonly dropouts will primarily cite fault with the system before their own ability or motivation (Spady, 1970). This is similar to Gardner (2009) who found that the faculty cited students lack of ability, drive, focus, motivation or initiative as the reason for doctoral student departure, while students cited personal problems and departmental

issues as the main reasons for departure. Thus, the faculty did not consider the program or the institution to be at fault, but rather placed the onus for departure on the student, viewed as being unsuccessful, while students pointed to programme, department and institutional issues as being related to student departure (Gardner, 2009). This may stem from the fact that students think they will only be accepted if they are adequately suited to and prepared for postgraduate studies and faculty assumes that accepted students are aware of requirements (Golde 2005).

2.4.1. Social and academic integration

Lack of both social and academic integration has been cited as a major reason for attrition (Golde, 2005; Gardner, 2009). Social life cannot be separated from academic life and students will consider dropping out if they are unable to integrate into the dominant and valued modes of interaction (Golde, 2005). Attrition resulted if there was no integration into the student community, which is viewed as a source of support and an integral part of the education process. The organisation of activities and structures to bring students together, whether by staff or students, can be beneficial, but where isolation stems from aspects not easily changed, such as lab size or size of faculty members and students in a particular field, this may be difficult to change (Golde, 2005). There were many students in engineering at a US University who didn't know of anyone who had left the programme (silent leavers who leave without saying goodbye) and the completion rate was 17.6% (Gardner, 2009), highlighting the high attrition rates coinciding with a lack of relationships between students, possibly due to the isolation of laboratory-based research. In a recent article in "The Witness", McLoughlin (2014) questions the why preferred university choice from students of local private and "good" government schools is often not UKZN, and among answers there appears to be a trend of lack of social integration with quotes of "no social life", "no after-hours functions", "go to a university where there's a vibe", "undergraduate students go to university for more than research" and "I don't think [the rankings] add up to a good academic environment for students or lecturers".

Student engagement, assessed through various measures of level of academic challenge, active and collaborative learning, student-faculty interaction, enriching

educational experiences and supportive campus environment, was linked positively with desirable learning outcomes such as critical thinking and grades, although more so with students that had lower academic standings on admission (Carini *et al.*, 2006). In a review, Reason (2009) states that "the entirety of the research presented affirms that engagement matters to persistence" (p 678).

Pascarella & Terenzini (1977) asked students to indicate the frequency of informal interaction with faculty beyond the classroom and showed that informal student-faculty contact is a significant predictor of college persistence, even after controlling for the influence of gender, academic aptitude and personality attributes. They also showed that not all types of interaction are of equal importance in fostering academic and social integration. Contact between the student and faculty based on intellectual or course-related discussion contributed most to the discrimination between those leaving and those persisting with their studies, and the second most effective form of contact involved discussions related to students career concerns. Contact to get basic information and advice about the academic programme, to help resolve a disturbing personal problem, to discuss a campus issue or problem and to socialise informally contributed less to the discrimination between those leaving or persisting.

Pascarella & Terenzini (1977) acknowledge that students with certain personality needs and orientations are somewhat more likely to search for and develop close relationships with faculty outside the classroom, and as a result achieve higher social and academic integration and are therefore less likely to dropout. However, the way that academics facilitate this early in the academic experience of the student is important, where personal orientations and characteristics of faculty, as well as institutional administrative policies and programmes, particularly student orientation, residence arrangements and faculty recruitment and reward structures may help foster an institutional climate which facilitates student-faculty interaction.

Later, Pascarella (1980) showed that friendship groups can either positively or negatively affect student interactions with faculty. Fellow students were found to have a greater effect on the attitudes of other students than faculty members, and

peer support could positively impact retention (Bean, 1985), but the converse could impact negatively on retention. Heavy involvement in social club activities may also hamper academic performance. Petersen *et al.* (2009) found no significant effect of social adjustment on academic performance of disadvantaged first year students at a South African university, and suggest that with changes in technological resources and university policies, the role of social adjustment in students' academic success may be lessened.

Faculty classroom behaviour was also shown to play a role in student departure, where indices of active learning (class discussions, knowledge-level exam questions and higher-order thinking activities) exert a significant influence on social integration, subsequent institutional commitment and students intent to return (Braxton *et al.*, 2000). Pascarella *et al.* (2008) also suggests that both non-classroom interactions as well as classroom instructional behaviours influence student persistence decisions, where organised and clear instruction had positive effects on retention, and recommend institutional investment in programs designed to enhance teaching effectiveness.

Social and academic integration are seen as important constructs in the development of many models designed to understand dropout and will be discussed in more detail in section 2.5.

2.4.2 Supervision

Issues related to supervision, including the student-supervisor relationship, play a role in timely completions and attrition. Nearly a third of the variance in a multiple regression of factors influencing time-to-completion of PhD studies was accounted for by starting the research of the dissertation early in the program, sticking to the original topic and supervisor, frequent meetings with the supervisor and collaborating with the supervisor on conference papers (Seagram *et al.*, 1998). Both students and PhD programme leaders attributed attrition to poor supervision with PhD programme leaders focussing on a lack of preparedness of novice supervisors, and the students focussing on dissatisfaction with feedback, overdue feedback, disinterested and

unsupportive supervisors, a lack of expertise and a lack of access and lack of communication (Herman, 2011).

The student-supervisor relationship is complicated and diverse, and, if unhappy and stressful, may impact negatively on the outcomes of the research project. Both students and supervisors start the relationship with numerous and diverse expectations of each other, which will vary with each student and supervisor, lending complexity to whether the student will consider the supervisor satisfactory and vice versa (Walford, 1981), which can result in the same supervisory style suiting one student, but not another. The supervisor has a vital role to play in the effectiveness of the relationship (Kearns *et al.*, 2008). Incompatible advisor relationships were listed the cause of much attrition, and sometimes the decision to change institutions. Advising relationships in the Sciences were best made when the student knew both the advisors research interests and supervisory style (Golde, 2005). Seagram *et al.* (1998) found that fast completers of PhD studies seemed to be more involved with their supervisors than their slower counterparts, and significantly more PhD students that completed fast described their relationship with their supervisor as "intimate", and reported fewer delays in obtaining feedback.

Some PhD programme leaders in the study by Herman (2011) attributed attrition related to supervision to be due to supervisors being overloaded, the quality of the supervisors and the nature of the supervisory relationship, as well as lack of equipment for scientific experiment or to general poor facilities such as computer facilities. From the students' perspective, only 20% of the 950 participants from 12 institutions in South Africa attributed attrition to supervision, the obstacles relating to poor communication and access to supervisors, delays with feedback, lack of attention or interest by supervisors and lack of capacity of supervisors.

One of the primary barriers to improving the productivity of PhD programs at South African higher education institutions, among financial constraints, and certain government rules and procedures are the quality of incoming students, pipeline blockages and limited supervisory capacity (partly a consequence of the blockages)

(ASSAF, 2010). In terms of supervision capacity, it was shown that in public higher education institutions in South Africa, only about a third of permanent academic staff members hold a doctoral qualification (ASSAF, 2010).

Caution needs to be made in developing a set of student characteristics that could statistically predict non-completion or slow throughput, as this could lead to generalisations that may disadvantage equity groups, with the institution viewing risk status of applicants as if they were business propositions (Manathunga, 2002). Thus, it may be more useful to explore how expert supervisors identify and deal with early warning signs that students are struggling (Manathunga, 2002), such as the student constantly changing the topic or planned work, avoiding all forms of communication with the supervisor, isolation from the school and other students and not submitting work for review.

However, there is often a mismatch between the perceptions of the role of a supervisor from the students perspective and the supervisors perspective, which can affects the student-supervisor relationship (Mdyogolo, 2012). The concept of research that coursework/research MEd students had in the Educational Management, Administration and Policy programme at the University of the Western Cape affected their understanding of the supervision relationship, with many students finding the open-ended and independent style of work expected from their supervisors hard to come to terms with (Sayed *et al.*, 1998). They suggest that supervisors need to develop shared ideas relating to the purpose and goals of the research component of the programme and the nature of the supervisor-student relationship, with the need to develop consensus on the form, content, frequency and duration of supervision sessions. They also suggest that a forum for supervisors to jointly discuss student progress and to identify common problems experienced by students would be a useful mechanism to formulate strategies, pool expertise and provide support. They suggest that this could help identify and address, poor, inadequate or negligent supervision. Story-dialogue group work allows the possibility for change in supervision through greater depth of understanding of the postgraduate experience and the supervisory relationship if supervisors are willing to let this inform professional practice

(McCormack & Pamphilon, 2004). Walford (1981) suggests that the concept of "classification and framing" of projects with a research group is useful to clarify some of the tensions experienced in the student-supervisor relationship, and that the more the student and supervisor agree on the strengths of classification and framing, initially and throughout the research period, the greater the success of the relationship.

Styles & Radloff (2001) propose a self-regulatory model of supervision as being optimal to ensure students engage with their research work, and to result in personal satisfaction of the supervisor and student as well as the reputation of the staff, department and university. A key concept of this model is that of metacognition, involving awareness of the components of the post-graduate experience (goals, beliefs, strategies and outcomes), with an ability to reflect and regulate them, which is particularly useful if the student and supervisor share similar general values and mutual interests; if there is a shared language about the thesis topic and a shared understanding of the purpose of the research; if there is shared responsibility for the procedural aspects of the project; and if there is a congenial, synergistic relationship with shared commitment to mutual support, trust and respect for each other's ideas, empathy with the constraints and problems presented from various sources, and a strong sense of ownership from the student.

Manathunga (2005) describes an important balance in effective supervision between being compassionate - providing students with support, encouragement and empathy, and being rigorous – in terms of feedback on performance. The programme developed by her is thus called "Compassionate Rigour:Effective Supervision". She believes the judicious combination of compassion and rigour allows students to develop into independent researchers in a safe learning environment. Evaluations of this showed students were either mostly or completely satisfied with this course, although unable to provide evidence that the program went beyond administrative supervision discourses and colonial approaches to education development, sometimes perceived as further instances of the quality assurance agendas imposed by university management and governments.

It would also seem that PhD programme leaders are not fully aware of the practical obstacles faced by students, such as the struggle to find balance in work, family life and studies, the lack of resources and access to facilities, as well as crime and xenophobia that were considered by students as reasons for attrition. These were hardly discussed by the PhD programme leaders in the study by Herman (2011), and yet were provided as reasons for attrition by students. Faculty members in the study by Gardner (2009) also showed little understanding of the nature of personal problems causing attrition, indicating a distance between faculty members and students.

2.5. Conceptual and Empirical Models

The factors listed above are certainly not isolated barriers to attrition or timely completion, and in order to conceptualise the relationship between them, theoretical models have been developed to attempt to explain what causes dropout. In presentation of these some adaptions to the vocabulary were changed such as "college" to "university" and "faculty" to "lecturer" to make relevant to the South African context.

As Spady (1970) states, the variance in dropout rates cannot hope to be accounted for within a single theoretical model, but there are approaches that can be combined within the framework of a single design in order to group relevant variables together. He developed a model which included variables known to be associated with dropping out at the time, with a few others that, in combination, helped to explain attrition as a conditional phenomenon. This model, and a later model developed by Tinto (1975) has roots in Durkheim's theory of suicide, which states that suicide is more likely to occur in those who are not sufficiently integrated into society, and that social conditions affecting dropout would be similar to those resulting in suicide, namely insufficient interactions with others in the institution and insufficient congruency with the prevailing value patterns of the institution collectively (Tinto, 1975). Withdrawal can be voluntary (like suicide) but may also be imposed through issues such as poor

academic performance and breaking student rules, and therefore it is important to acknowledge integration in the academic, as well as the social, domain of the institution (Tinto, 1975). Insufficient moral consciousness (what Spady (1970) calls "normative congruence", which is having attitudes, interests and personality dispositions compatible with attributes and influences of the environment), and insufficient collective affiliation (what Spady (1970) calls "friendship support" which is the establishment of close relationships with others in the system) increases the likelihood of suicide, or in this case, dropout (Spady, 1970).
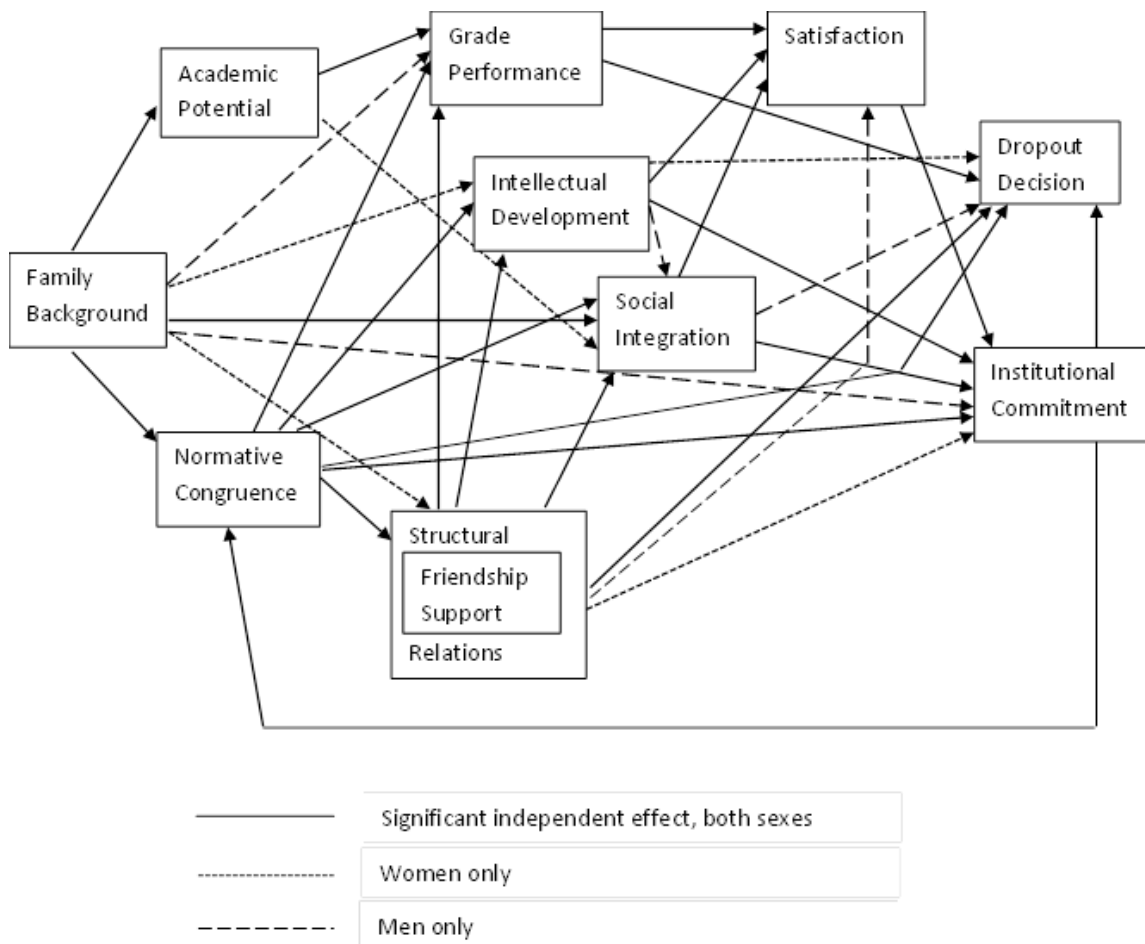
The theoretical model proposed by Spady (1970) consists of independent variables that influence social integration, which then indirectly influence attrition though satisfaction with the college experience and commitment to the social system (Figure 2.1). The model implies a time sequence and assumed direct causal connections between pairs of variables. The model fails to account for a comprehensive measure of family and cultural background variables and a measure of academic performance, but academic potential and the elements that comprise normative congruence are influenced by family background, and this was used as the foundation for the model (Spady, 1970). Although this model is acknowledged to be (necessarily) incomplete, it does provide a theoretical rationale for incorporating social and academic systems simultaneously and for linking the attributes a student brings on entering university to later social and academic outcomes (Spady, 1971).
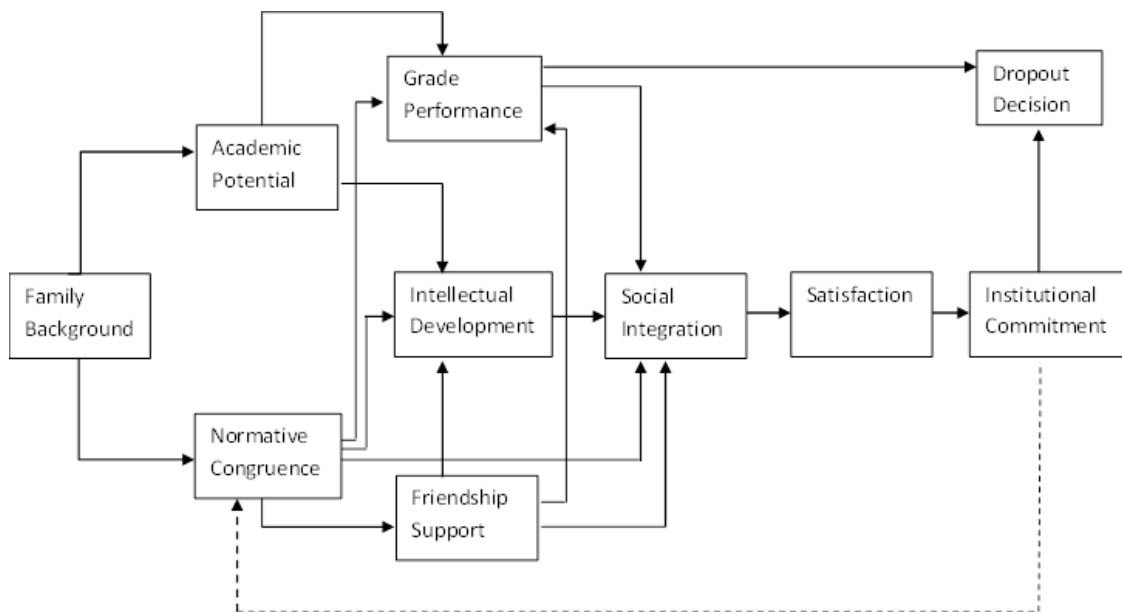
Figure 2.1. The explanatory sociological model of the dropout process developed by Spady (1970). The connection between grade performance and dropout indicates that institutional policy would override the theoretical pattern of the model where student performance is low. The broken arrow implies a flexible and dynamic element to the model, where changes in attitude, interest, goals or motivation could have repercussions later (Spady, 1970).

This model was tested, and a revision presented by Spady (1971), to account for the complex pattern of relationships that emerged empirically (Figure 2.2). Spady (1971) views meeting the demands of both the social and academic systems of the university as important for full integration, which would reduce the chance of dropout. The intrinsically rewarding aspects of participation in the formal and informal curriculum, with the establishment of personal contacts with lecturers and peers are fundamental components of student integration, satisfaction and commitment. Some components had different bearings on the dependent variables based on gender, so for example, friendship support for women was directly dependent on elements in both the family background and normative congruence clusters, while for men there was no statistical, direct link between the family background and friendship support. Student commitment to the institution appears to be generated at the early stages of the dropout process. Academic performance did not appear to have any bearing on loyalty and commitment to the institution, and rather Spady (1971) suggests that greater

commitment can be generated (if at all) by not treating them just as students but providing experiences that affect the intrinsically meaningful spheres of their lives.

Figure 2.2. Empirical model of the undergraduate dropout process developed by Spady (1971).

Tinto (1975) also developed a theoretical model to explain the processes of interaction between the individual and the institution that lead differing individuals to drop out of higher education institutions. Individual attributes (e.g. sex, race, ability), pre-university experiences (e.g. matric score, academic and social attainments) and family backgrounds (e.g social status attributes, value climates, expectational climates), have a direct and indirect impact on university performance, and influence the development of education expectations and commitments that the individual brings. The model depicts the process of how educational goals and institutional commitments (an individual's dispositional, financial and time commitments) are

modified by academic and social integration, ultimately resulting in persistence and/or varying forms of dropout (Figure 2.3).
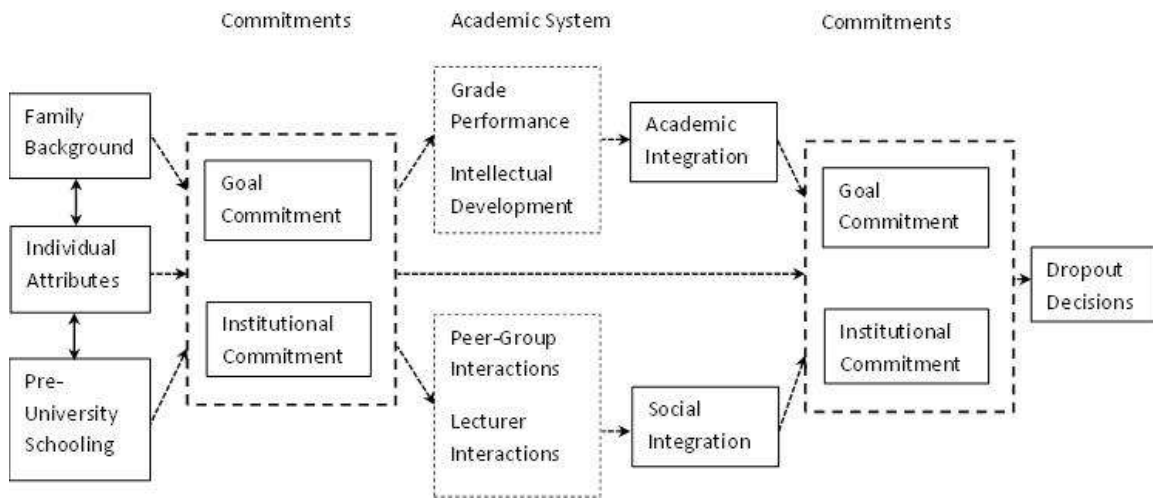
Figure 2.3: A conceptual Schema for Dropout from University from Tinto (1975).

This model also applies cost-benefit analysis theory, where individual decisions with regard to any form of activity can be analysed in terms of the perceived costs and benefits of that activity relative to those perceived in alternative activities. Because costs and benefits are of both direct and indirect types and include social as well as economic factors, the theory states that individuals will direct energy to activities perceived to maximise ratio of benefits to cost over a given time perspective. Therefore a person will withdraw from college when the perception that an alternative form of investment of time, energies and resources will yield greater benefits relative to costs over time than will persisting (Tinto, 1975).

The goal and institutional commitments are predictors of, and reflections of, the persons experiences, disappointments and satisfactions, and form part of the input, as well as process, variables which provide a dynamic component of an individual's progression through the educational system (Tinto, 1975). Tinto (1975) argues that it is the individuals integration in the academic and social systems of the university that most directly relates to continuance with a greater likelihood of completion after a

higher degree of integration into university systems. The final determination of the dropout decision is based on the interplay between the individual's commitment to the goal of university completion and commitment to the institution itself, where other forms of "dropout behaviour" can occur, such as transferring to another programme or university.

Either low goal commitment or low institutional commitment can lead to dropout. Assuming prior commitment to the goal of completing, institutional commitment is likely to have an influence on the drop out decision. This also depends on the level of commitment, as, a high commitment to the goal of university completion, even with minimal levels of academic and social integration may not lead to drop out. Likewise, given levels of institutional commitment, dropout is more likely with lower goal commitments, with decisions to withdraw despite integration, if educational expectations have been re-evaluated (Tinto, 1975). This interplay of varying levels of goal and institutional commitment and the characteristics of the institution may also be utilised to explain the occurrence of differing patterns of transfer between institutions of higher education in a diminished transfer (e.g 4 to 2 year institutions) or upward transfer (Tinto, 1975), which is not particularly relevant in the South African context where such transfer possibilities are few. Berger & Braxton (1998) later found little influence of initial institutional commitment on student departure, but this was attributed to the lack of variability for the population chosen (students from a highly selective, private, research university), where the access to higher levels of social and occupation status enabled by such an institution would result in uniformly high levels of institutional commitment.

Pascarella & Terenzini (1979) investigated accentuating (experiences and involvement that accrue to those with high educational goals to begin with) and compensatory (institutions academic and social systems that compensate for initially low goal commitments) interactions with the conceptual framework of the models proposed by Tinto (1975) and Spady (1970) and (1971). They highlighted the need to understand the model as a process, as the influence of different dimensions of social and academic integrations increased the variance accounted for than that explained purely

by measures of student entering characteristics. They also suggest that programs and policies that can positively influence the quality of relationships (with faculty for men, and with both faculty and peers for women) may result in persistence, although the extent of social and academic integration was influenced by student background characteristics. Due to the interaction effects observed, student-lecturer relationships were thought to be compensate for low initial commitment, and high levels of academic integration in some areas appeared to compensate for low levels of social and academic integration in other areas (Pascarella & Terenzini, 1979).

Pascarella (1980) then developed a longitudinal conceptual model to explain persistence based on the educational impact of the student-lecturer relationship (Figure 2.4). The model proposes that student background characteristics, experiences of university and institutional factors influence the informal contact between students and lecturers. Institutional factors may also result in applications from students with certain pre-enrolment dispositions and traits that may be accentuated by the institution. Pre-enrolment traits may also impact on how peer culture, classroom and extracurricular activities are experienced. A reciprocal influence between university experiences and informal contact with lecturers is also shown, as friendship groups can positively or negatively influence interactions with lecturers. Institutional factors such as the kinds of students enrolled, faculty culture, institutional size, organisational substructure, administrative decisions and policies bearing on curriculum, faculty reward structure, advising and counselling programmes, student orientation and residence arrangements can influence informal contact with lecturers as well as other college experiences (Pascarella, 1980).
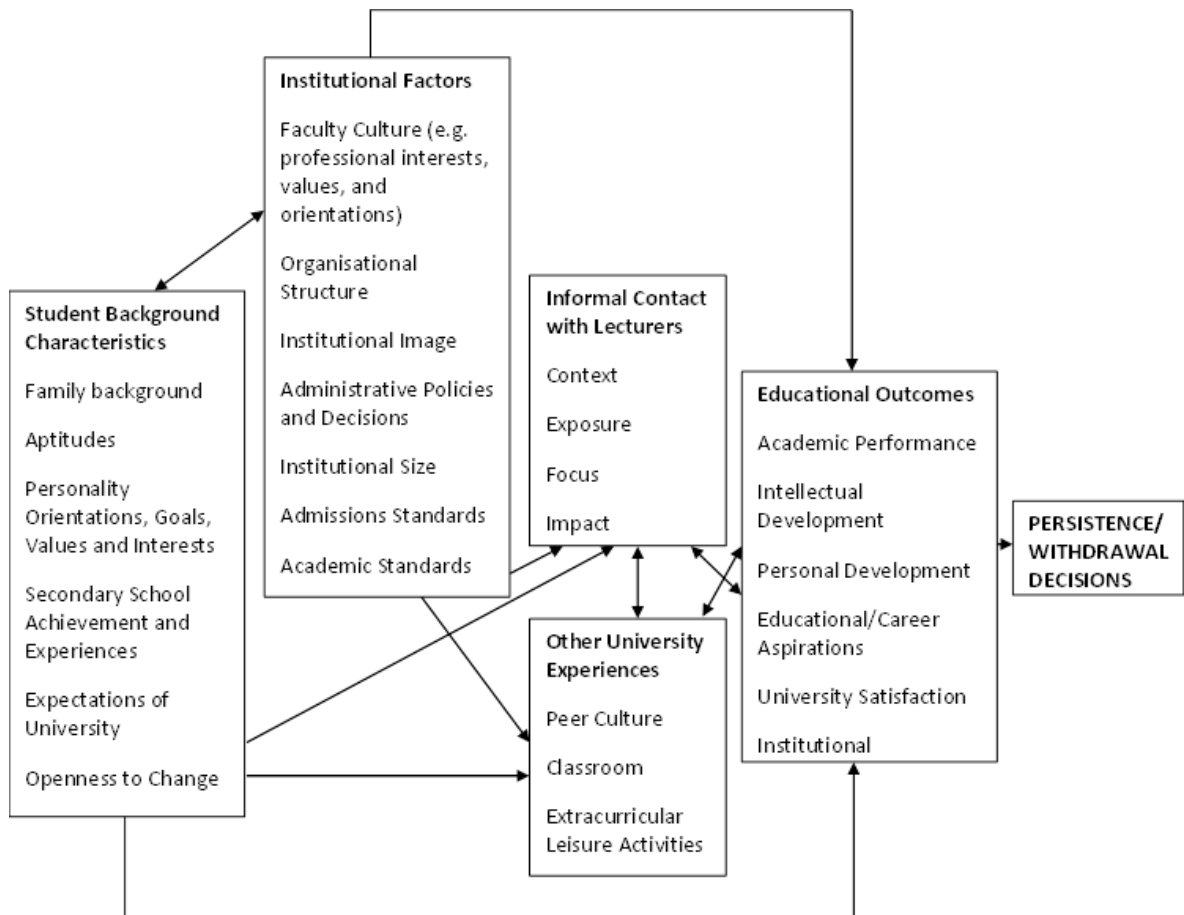
Figure 2.4. Conceptual model developed by (Pascarella, 1980) for research the student-lecturer relationship on persistence.

However, Bean & Metzner (1985) found that the attrition process of "non-traditional" (older, part-time and commuter) students was more affected by the external environment than by the social integration variables used in the models developed by Spady (1970), (1971), Tinto (1975) and Pascarella (1980), and they developed a conceptual model, similar in structure, but different in content (Figure 2.5). The model was intended to provide a framework for understanding reviewed work, and a guide for future work. In this model, the social integration variables do not have such an influence on retention, and social variables from the outside environment have a greater influence, since non-traditional students are more concerned with the academic offerings of an institution than the social environment. When academic and environmental variables are both good, students persist, and when both are poor,

they leave. When only academic variables are good, but environmental variables are poor, students leave (i.e. the positive effects of the academic variables are negated), but the reciprocal (good environmental support but low academic support) is expected to result in retention, as the environmental support can compensate for poor academic support (Bean & Metzner, 1985). It was thought that students that score highly in the academic (grade point average) and psychological outcomes would remain, while students who scored low in both would be expected to drop out. Those who scored highly in only academic outcome could still drop out if the psychological outcomes are not met, although the reciprocal (scoring highly in psychological outcomes but not grade point average) are expected to remain. Thus, the non-academic factors can compensate for low levels of academic success, but not the reciprocal.
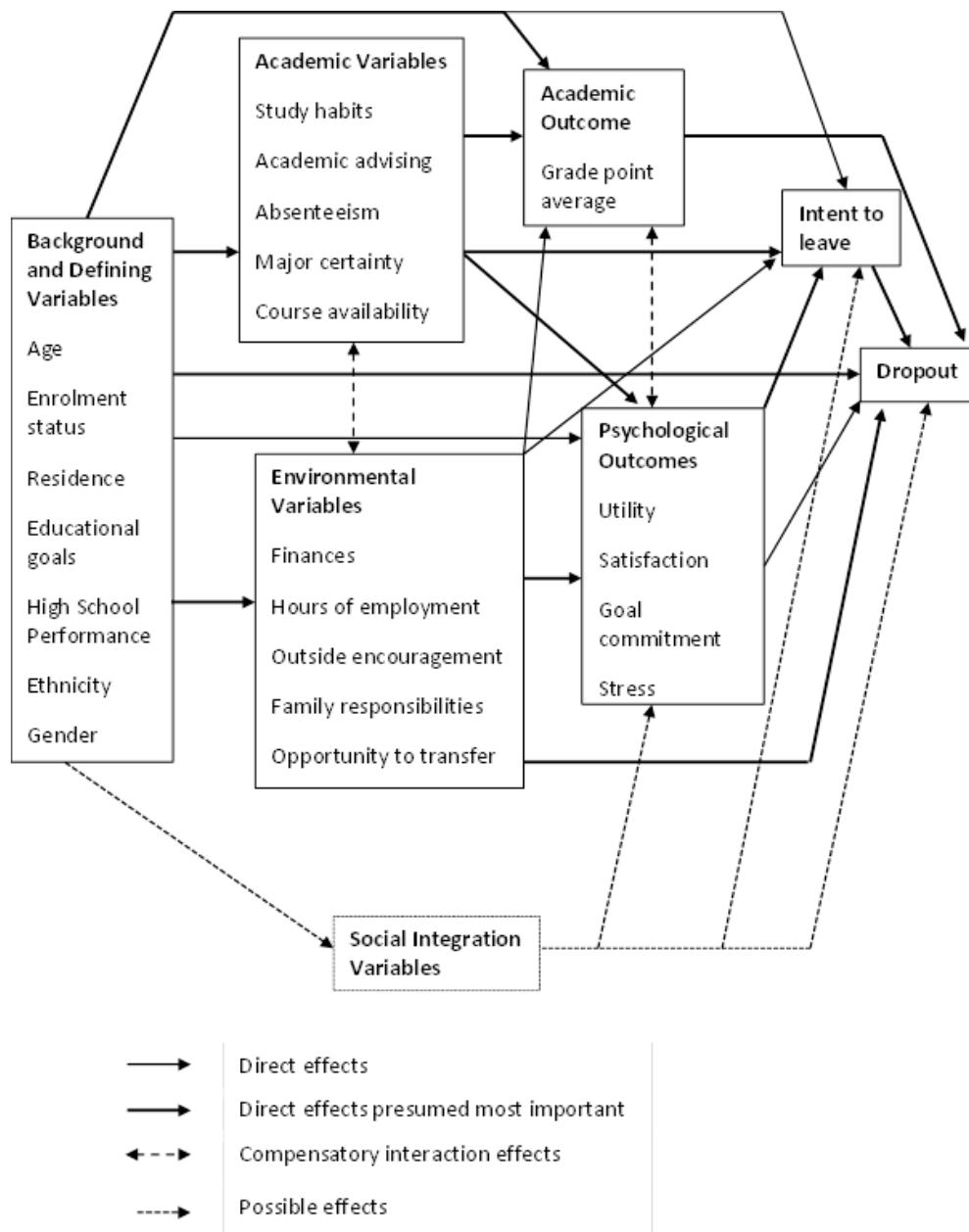
Figure 2.5. Conceptual model of non-traditional student attrition developed by Bean & Metzner (1985).

This model was tested empirically and partly validated by Metzner & Bean (1987) who showed that social integration variables (memberships, faculty contact and university friends) had no significant effects on dropout, grade point average or the psychological outcomes, in contrast to models that consider traditional university students. Dropout for these students is more likely to be associated with poor academic integration, and more likely in students who are academically ill-prepared and do not perform well and are not committed to the university (enrol for fewer credits, absent from class and show less commitment to the academic process

(Metzner & Bean, 1987). However, the environmental variables failed to directly predict dropout, the background variables showed mostly indirect effects on dropout, and not all the psychological variables were directly related to intent to leave or dropout (Metzner & Bean, 1987).

Tinto (1982) acknowledges that theoretical models may be limited in that they can only explain a portion of the wide range of behaviours in the realm of social interaction, and that a choice needs to be made between maximising the ability of the model to statistically account for variation in behaviours or explaining clearly the origins of particular types of disengagement behaviours. He acknowledges that the model from Tinto (1975) does not give sufficient emphasis to the role of finances, does not adequately distinguish between those behaviours that lead to either institutional transfer or permanent withdrawal, fails to highlight important differences in education careers that mark the experiences of students of different genders, race and social status backgrounds, and is not very sensitive to forms of disengagement that occur within the two-year college sector (Tinto, 1982).

Revision of Tinto's theory has since occurred through theory elaboration in an attempt to explain social integration. Berger & Braxton (1998) sought to elaborate on Tinto's theory by investigating the role of organisation attributes on student withdrawals a possible source of social integration. They had previously revised Tinto's theory which led to discounting the role of academic integration on student departure, and they focussed rather on social integration, and its effect on withdrawal through organisational attributes. They used a conceptual model (Figure 2.6) to consider the effect of student entry characteristics on initial institutional commitment and the effects of organisational attributes and social integration on subsequent institutional commitment and ultimately reenrolment decisions. All three organisational attributes considered directly affected social integration, with positive effects seen from institutional communication on peer relations, fairness is enforcing policies and rules on both peer and faculty relations and participation in decision making on faculty relations. Social integration in terms of both peer and faculty relations then positively predicted subsequent institutional commitment, which then positively predicts the

intent to return (Berger & Braxton, 1998). Two of the three organisational attributes also positively indirectly affected student's intent to persist, indicating the importance of organisational attributes. Although race was the only entry characteristic shown to influence social integration, there was a lack of variability in the other entry characteristics, which may have limited the statistical potential to demonstrate any effect (Berger & Braxton, 1998).

| Entry Characteristics | Initial Commit. | Organisational Attributes | Social Integration | Subsequent Commit. | Departure Decision |
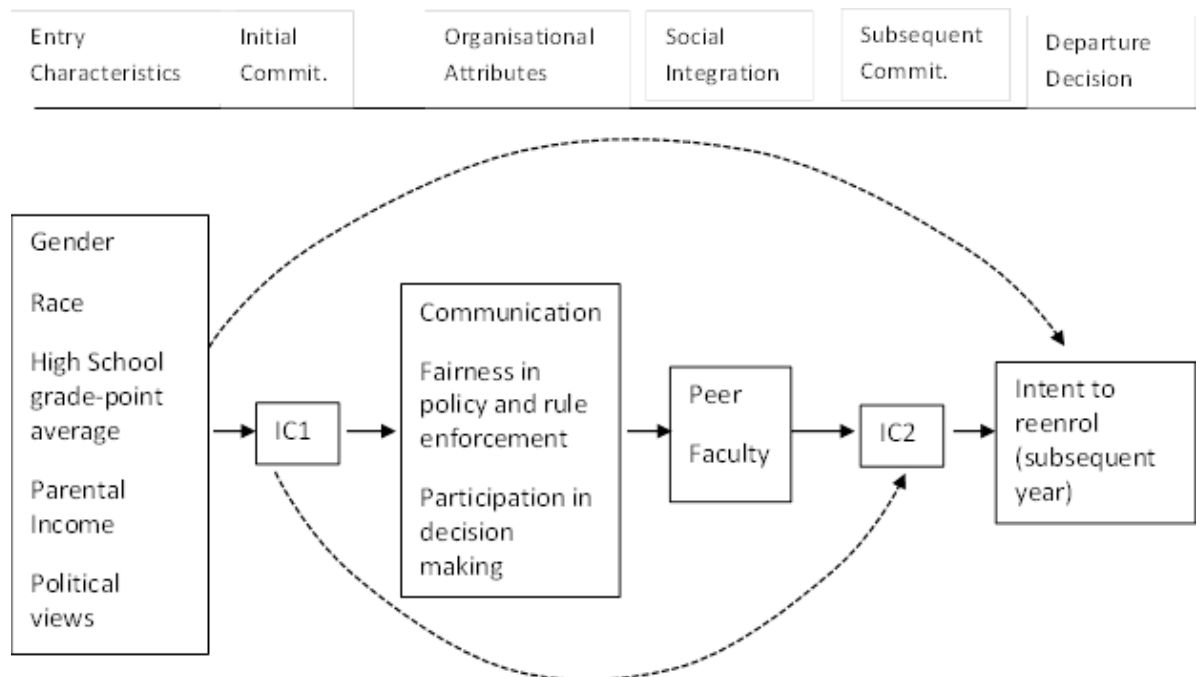
Figure 2.6. Path diagram of the conceptual model tested by Berger & Braxton (1998).

Chapman & Pascarella (1983) sought to understand social (and academic) integration by investigating institutional type (4-year public or private, primarily residential universities; 2-year primarily commuter community colleges; 4-year primarily commuter institutions and liberal arts colleges with a mix of residential and commuter students). Supporting Spady (1970) and (1971) as well as Tinto (1975), high levels of social integration were linked to greater institutional commitment, and this was influenced by institution type with greater levels of social integration observed more with institutions that were bigger, residential and had 4-year programmes.
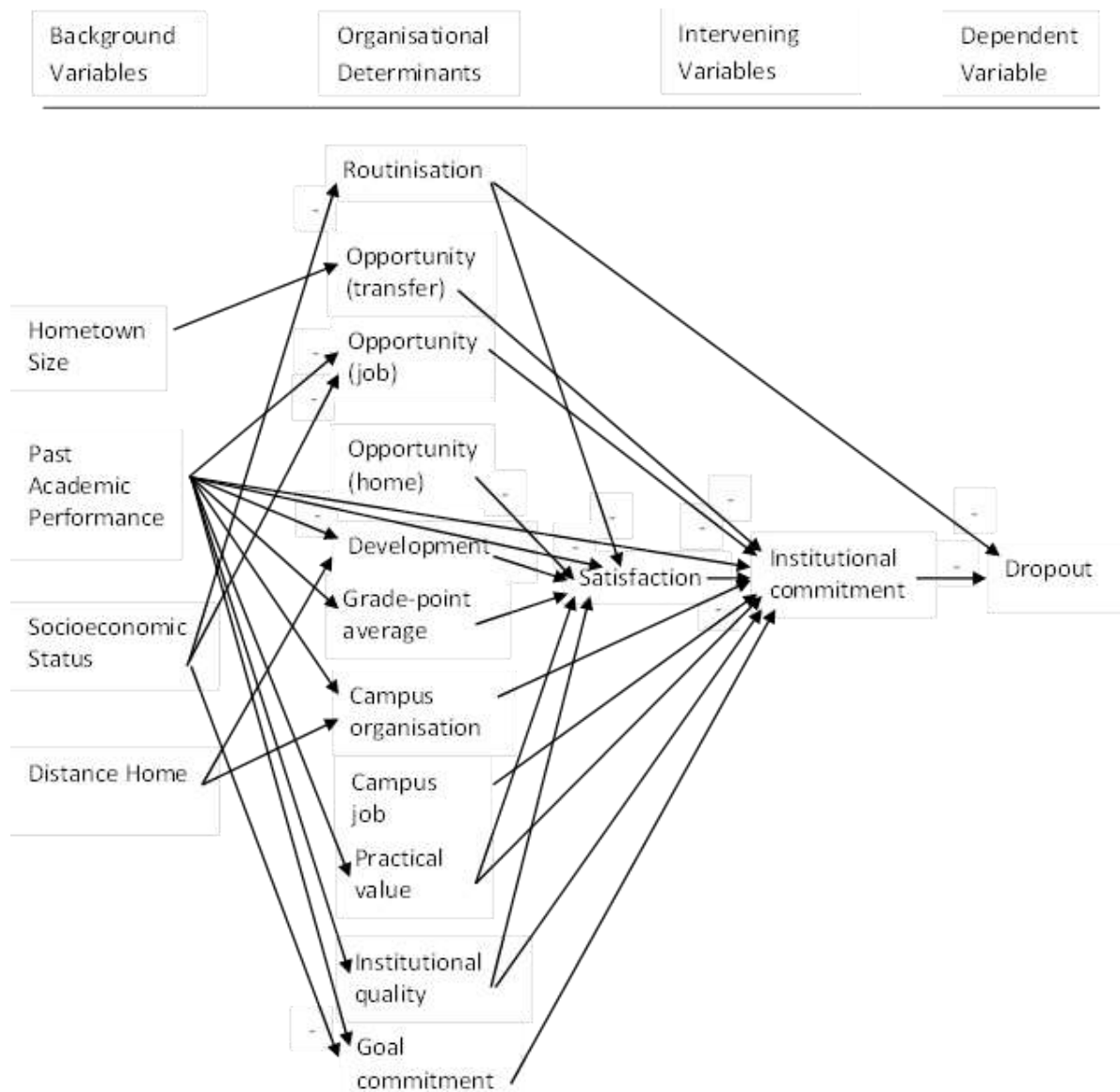
Braxton *et al.* (2000) looked at the influence of active learning on student departure and social integration in particular. Active learning is conceptually distinct from

academic integration, and relates to activities that involve students doing things and thinking about what they are doing. The four composite measures used were class discussions, knowledge level exam questions (as a negative indicator), group work and higher order thinking activities (such as posing questions to students in class that require higher order thinking about the course material). Class discussions and higher order thinking activities had a direct positive influence on social integration (a composite of peer group relations and out-of-class interactions with faculty), and class discussions were found to positively influence subsequent institutional commitment and persistence. Knowledge-level exam questions, as an indicator of passive rather than active learning, negatively affected subsequent institutional commitment and negatively influenced student persistence. In support of the models developed by Spady and Tinto, social integration and subsequent institutional commitment exerted positive effects on persistence.

Bean (1980) criticises the models developed by Spady (1970), (1971) and Tinto (1975) by arguing that there is insufficient evidence to base student attrition on Durkheim's theory of suicide and that the variables used rendered the models unsuitable for path analysis, due to grouping, and therefore no conclusions can be reached about which elements of a grouped measure are significant. Thus, Bean (1980) developed a causal model, based on the premise that student attrition is similar to employee turnover in work organisations, and which was tested and variables ranked. Because there was an interaction between gender and satisfaction, the resultant final models are different for men and women. Like Spady (1970; 1971) and Tinto (1975), Bean (1980) also demonstrated that institutional commitment influences dropout. For women, routinisation (the degree to which the role of being a student is viewed as repetitive), three measures of opportunity (for transfer, employment and at home) which reflect the degree to which alternative roles exist in the external environment and the surrogate measures for "pay" (the degree to which a student believes they are developing as a result of attending the institution, university grade-point average, the degree to which the student perceives that their education will lead to employment and the degree to which the institution is perceived as providing a good education) which were taken from a model of employee turnover, dominated the causal model.

The only other variables included in addition to these were the number of memberships of campus organisations, the necessity to have a campus job to persist and goal commitment. Of the background variables included, previous academic performance was the most important in influencing organisational determinants (Figure 2.7). For men, routinisation, the degree to which a student believes they are developing as a result of attending the institution and university grade-point average were influential. Satisfaction (the degree to which being a student is viewed positively) was positively related to dropout, but not institutional commitment, and thus its status in the model was considered questionable. Unlike with women, all the determinants considered to be related to turnover (the pay surrogates, degree to which a student believes they are developing, university grade-point average, the degree to which the institution is perceived as providing a good education, the degree to which the student believes they are being treated fairly by the institution, opportunity to transfer, routinisation, and the degree to which information (pertaining to requirements and rules) about being a student is viewed as being received, appear in the final model for men (Figure 2.8).

Background
Variables

Organisational
Determinants

Intervening
Variables

Dependent
Variable

Routinisation

Opportunity
(transfer)

Opportunity
(job)

Opportunity
(home)

Hometown
Size

Past
Academic
Performance

Development

Grade-point
average

Satisfaction

Institutional
commitment

Dropout

Socioeconomic
Status

Campus
organisation

Distance Home

Campus
job

Practical
value

Institutional
quality

Goal
commitment

Figure 2.7. Path model of student attrition for women from Bean (1980). Causal relationships are indicated by arrows, and the negative relationships are shown (remaining paths are positive relationships). "Routinisation" is the degree to which the role of being a student is viewed as repetitive, "Opportunity" is the degree to which alternative roles, as a student (transfer), employee (job) or dependent (home) exist in the external environment, "Development" is the degree to which a student believes that he/she is developing as a result of attending the institute of higher education, "Grade-point average" is the degree to which a student has demonstrated a capability to perform at the institute of higher education, "Campus organisation" is the number of memberships in campus organisations, "Campus job" is the necessity of having a campus job to stay in school, "Practical value" is the degree to which the student perceives that his/her education will lead to employment, "Institutional quality" is the degree to which the institution is perceived as providing a good education and "Goal commitment" is the degree to which obtaining the bachelor's degree is perceived as being important.
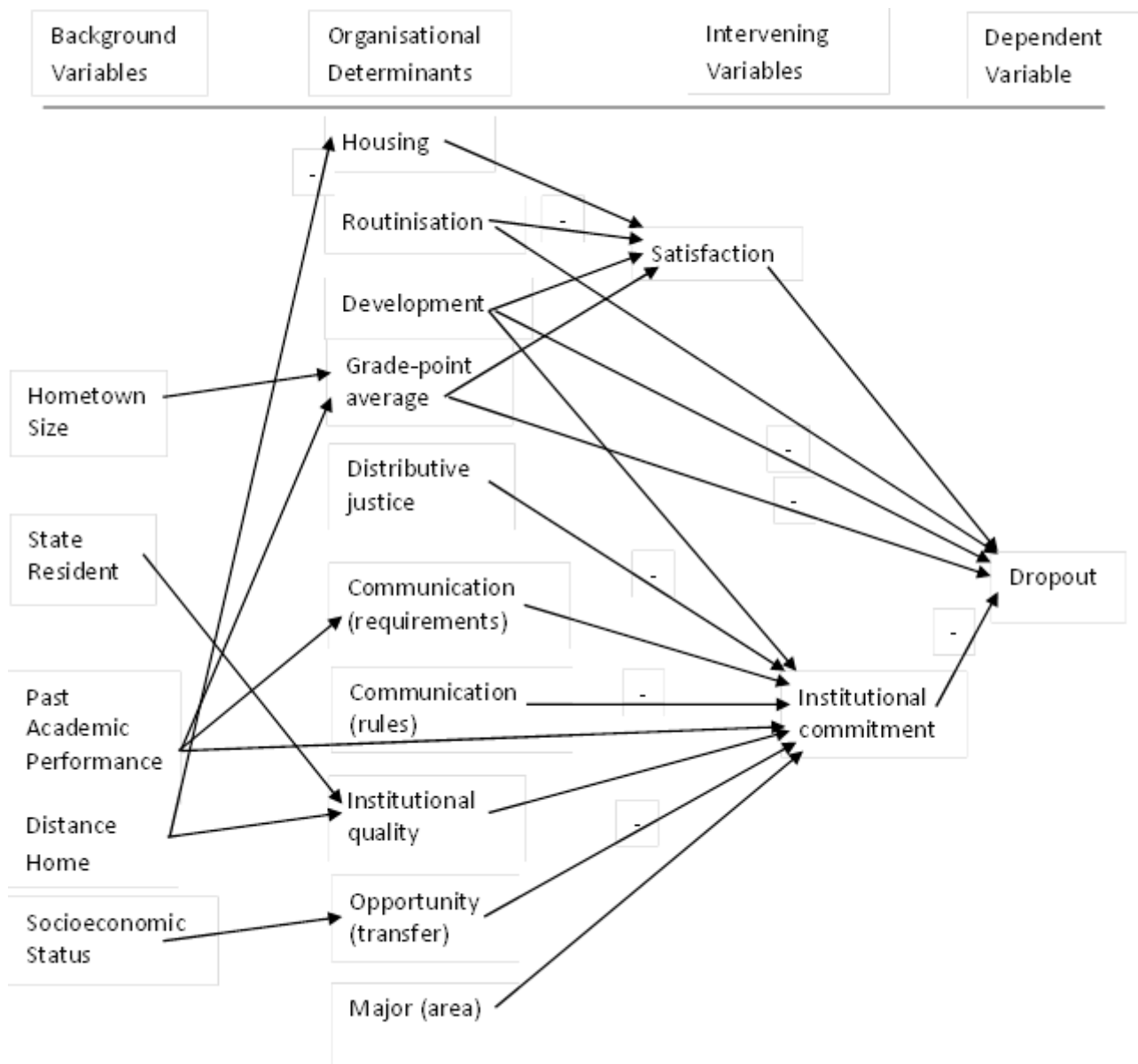
Figure 2.8. Path model of student attrition for men from Bean (1980). Causal relationships are indicated by arrows, and the negative relationships are shown (remaining paths are positive relationships). "Housing" is where a person lives while attending the institution, "Routinisation" is the degree to which the role of being a student is viewed as repetitive, "Development" is the degree to which a student believes that he/she is developing as a result of attending the institute of higher education, "Grade-point average" is the degree to which a student has demonstrated a capability to perform at the institute of higher education, "Distributive justice" is the degree to which a student believes that he/she is being treated fairly by the institution (receives rewards and punishments proportional to the effort expended in the student role), "Communication (requirements) and (rules)" is the degree to which information

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about being a student is viewed as being received, "Institutional quality" is the degree to which the institution is perceived as providing a good education, "Opportunity" is the degree to which alternative roles, as a student (transfer), employee (job) or dependent (home) exist in the external environment and "Major (area)" is the area of one's field of study.

Bean (1982) then developed a path model of first year attrition, that is a revision of a previous model that had originally contained 23 independent variables, to contain 10 independent variables, with no background variables. The causal model is shown in Figure 2.9, and because there were interaction effects based on gender and level of confidence, different path models, with different regression and correlation coefficients were presented for men and women with high or low confidence levels. These 10 variables accounted for 50.3%, 45.8%, 42.8% and 41.8% of the variance in dropout for high-confidence women, low-confidence women, high-confidence men and low-confidence men respectively. The mean total effects for these four groups ranked the variables according to their effect on dropout as; intent to leave, grades, opportunity to transfer, practical value, certainty of choice, loyalty, family approval, courses, student goals and major and occupational certainty. Although there were differences with gender and confidence levels on the effects of some of the variables, intent to leave, which was estimated by asking "Do you expect to return to this university next fall?" and "Do you expect to be enrolled at this university one year from today?" was the best predictor of annual attrition (Bean, 1982). However, intent to leave cannot be influenced directly, and Bean (1982) highlights the need to develop motivation and learning skills to improve grades (as low grades have an influence on dropout), demonstrate the practical value (employment opportunities) of the degree, foster loyalty through a desirable image and a supporting environment, making the curriculum relevant and developing the students educational goals by clarifying degree options in various fields and the expected outcomes or value of having the degree.
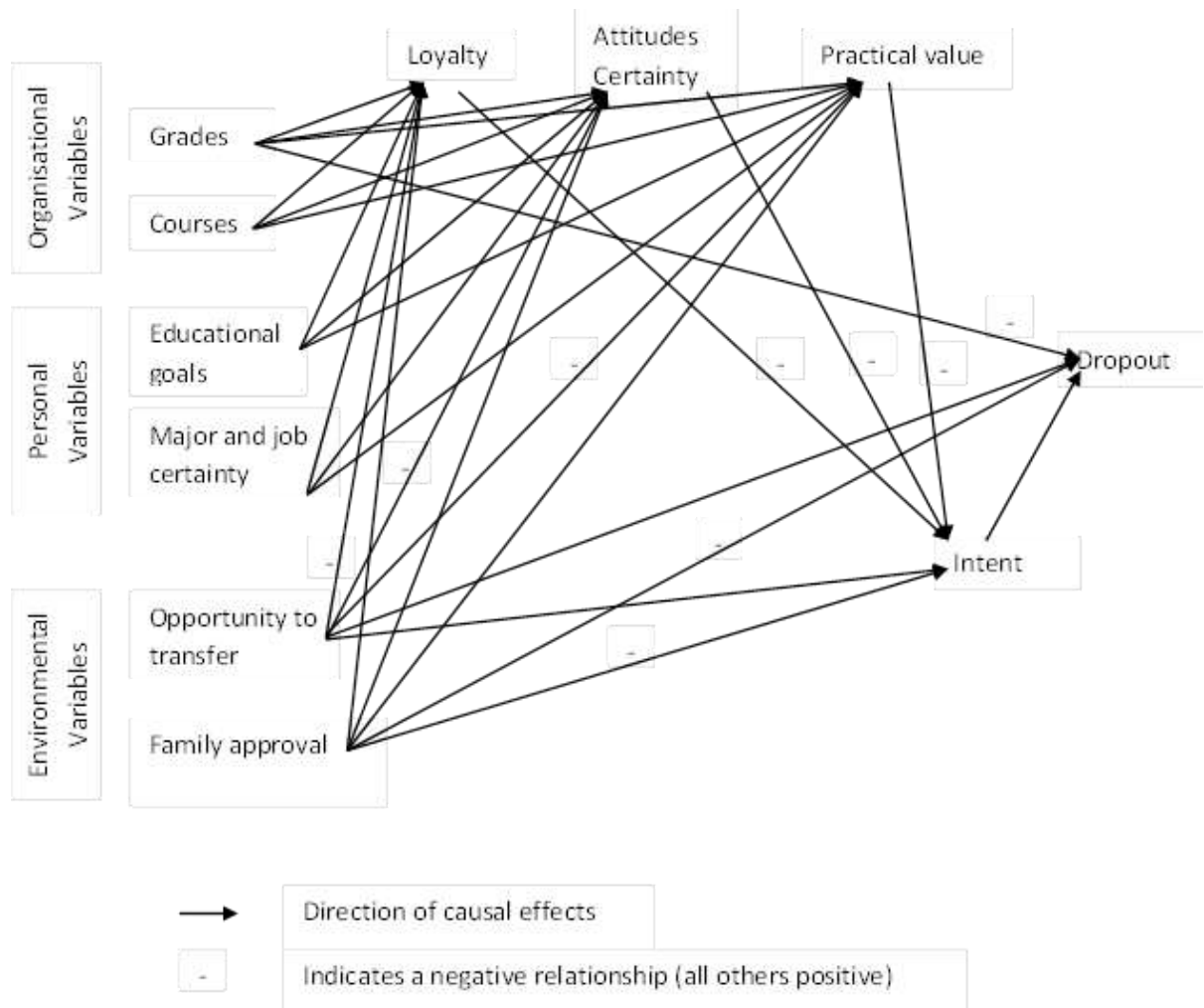
Figure 2.9. A 10-variable causal model of the attrition process developed by Bean (1982)

Cabrera *et al.* (1992) investigated the extent to which the two theories, used in the work of Tinto (1975) in the development of the Student Integration Model and Bean (1980), (1982) in the development of the Student Attrition Model, converge and diverge in explaining decisions to leave university. They found that both models add relevant knowledge to the understanding of attrition, but that a model integrating the leading factors in each theory may contribute to explain this process better (Cabrera *et al.*, 1992). Variables from each model were tested empirically and then convergence was assessed through a polyserial correlation analysis between indicators of the two models. More rigorous tests of convergence were also performed between the constructs "Courses" and "Academic Integration" and between "Institutional Fit and Quality" and "Institutional Commitment" and models

tested the hypotheses that: the constructs across the two theories were independent of each other, that they were correlated and that they represented a single construct. Results showed that the construct Courses, a factor in the Student Attrition Model could be regarded as a measure of Academic Integration, a construct in the Student Integration Model. There was also significant overlap between the construct Institutional Commitment from the Student Integration Model and Institutional Fit and Quality, a construct in the Student Attrition Model. While almost 70% of the hypotheses from the Student Integration Model were confirmed, only 40% of those underlying the Student Attrition Model were supported, however the Student Attrition Model in this case accounted for more variation in "Intent to Persist" and "Persistence", and indicates the complex role of factors external to the university on persistence (Cabrera *et al.*, 1992).

For a number of reasons, including that some attrition is involuntary due to reasons such as health or family crisis, Bean (1985) produced a model (Figure 2.10) similar to those of Spady (1970) and Tinto (1975) but looked at *dropout syndrome* (a conscious openly discussed intention to leave an institution coupled with actual attrition), rather than *dropout*. The theoretical foundation was that of "socialisation/selection", where socialisation was seen as a process of acquiring appropriate behaviours that lead to acceptance, and that selection of students who matriculate with abilities and attitudes towards the institution may result in anticipatory socialisation. Therefore the conceptual model that was tested to produce the path model aimed to emphasize student selection for or socialisation to certain behaviours or attitudes that were expected to have a direct effect on attrition has a large influence on dropout decisions. Bean (1985) also tested whether there were class level (year of study) differences, to determine whether institutional commitment might increase with longer time in the system (if low grades take their toll early in the degree), however, the relationships within the model remained mostly stable across class levels. The model shows how academic, social-psychological and environmental factors are expected to influence three factors assumed to result from the socialisation/selection process – one academic (university grades), one social (Institutional fit) and one personal (Institutional commitment). Only variables that were significant were

included in the model. Three environmental variables (finances, opportunity to transfer and outside friends) as well as the three socialisation/selection outcomes (university grades, Institutional fit and Institutional commitment) were significantly related to dropout syndrome. The academic (prematriculation academic performance and academic integration) or social-psychological (goals, usefulness of education to find employment, the extent to which rules frustrate student life, the degree of faculty contact outside the classroom and social life) factors were not directly related to dropout syndrome, but influenced dropout syndrome through the socialisation/selection variables (Bean, 1985)
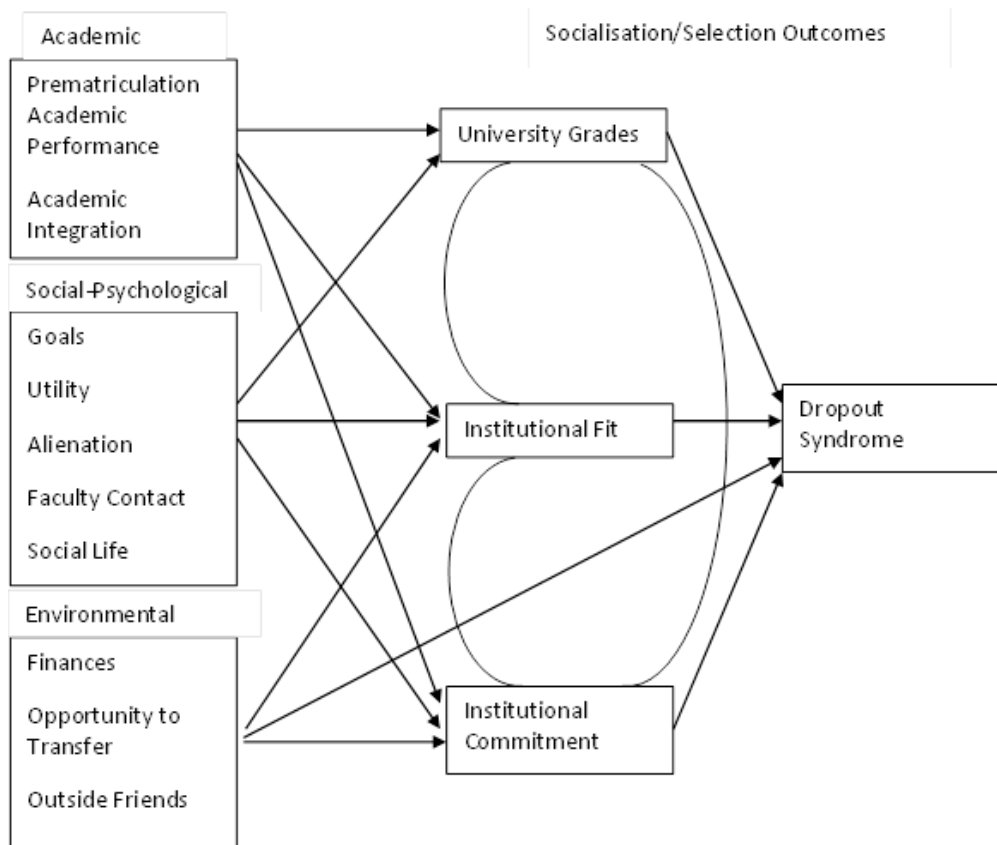
Figure 2.10. Path model of dropout syndrome developed by Bean (1985). Straight lines represent significant causal paths from the regression analysis, and curved lines significant correlations.

Robbins *et al.* (2004) suggests there is a lack of integration of educational and psychological theory, and recommend the need to include the role of psychosocial and other factors in understanding college outcomes. In a meta-analysis of 109 studies, they found that psychosocial and study skill factors, which included academic goals,

institutional commitment (the extent to which the student feels committed to the institution), social support, social involvement, academic self-efficacy, academic-related skills, financial support and institutional selectivity were positively correlated with retention, and that academic goals, academic self-efficacy and academic-related skills were the strongest predictors of retention. Thus, educational persistence models may be underestimating the importance of academic engagement (Robbins *et al.*, 2004).

Terenzini & Reason (2005) suggests that previous models do not adequately capture the consideration of organisational influences on student outcomes. They developed a "college impact model" drawing from theoretical constructs in psychology and social psychology, particularly learning and cognitive development theory to understand the complex array of forces shaping the first year of university (Figure 2.11). They believe that the first year is critical in shaping both learning and persistence, and the model takes into account the influences of other students, faculty and the institution that may influence this. The model was thought to potentially aid in enhancing institutional effectiveness. Terenzini & Reason (2005) suggest that the framework could aid in informing program review, revision and development, as well as more effective resource allocation. The framework is also intended to stress the significance of the first year in shaping student success.

Tinto & Pusser (2006) further focussed on the institution and developed a model of Institutional action (Figure 2.12), that focuses on the conditions within institutions that shape student success that are within the capacity of institutions to change. Although attributes of the student will contribute to their success, and some of these are beyond the control of the institution, there are aspects of the institutional environment that research has shown are within the scope of the institution to promote student success. As reviewed by Tinto & Pusser, (2006), these include institutional commitment (the willingness of the institution to invest resources and provide incentives and rewards needed to enhance student success), high expectations of the student, academic, social and financial support, settings that

provide faculty, staff and students frequent feedback about their performance, and finally the more academic and social integration.

Reason (2009) concludes that student persistence must be an institution-specific enterprise and that interventions to reduce attrition need to consider the local organisational context and the local student peer environment.
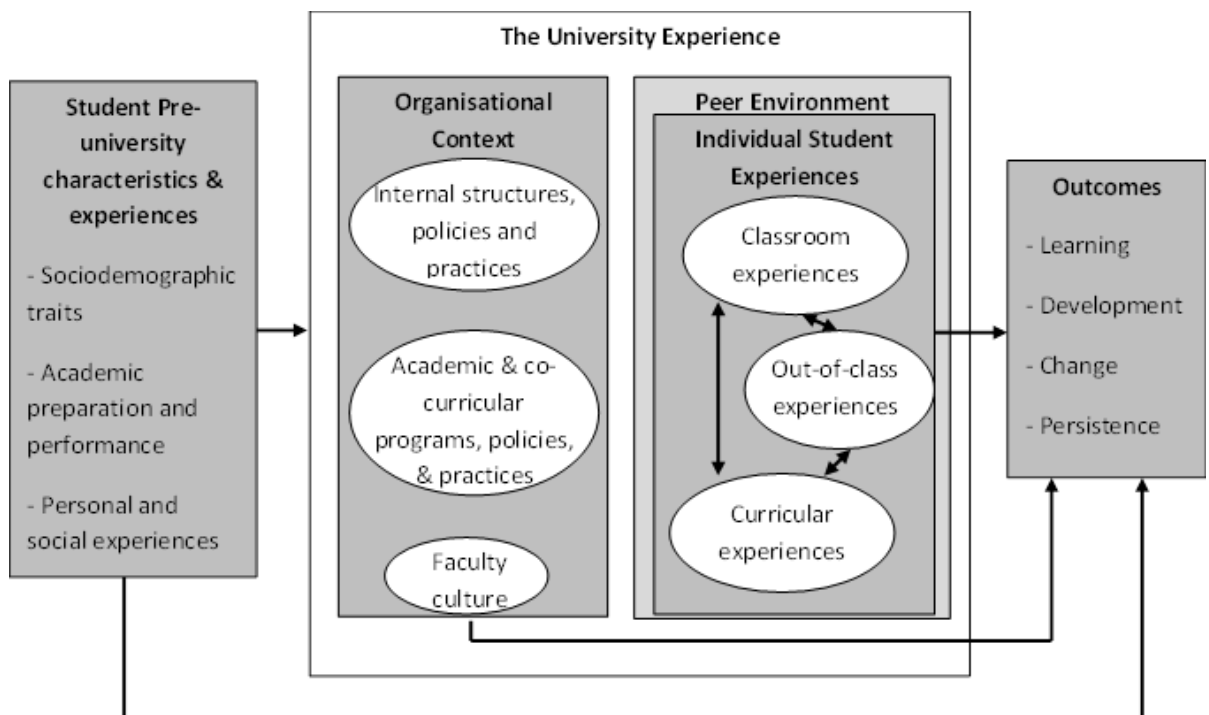
Figure 2.11. Conceptual model of influences on student learning and persistence, which incorporate institutional factors (Terenzini & Reason, 2005).

Institutional Leadership

Institutional Commitment

Expectational Climate

Academic, Social,
Financial Support

Learning

Abilities, Skills,
Preparation

Support

Involvement

Quality
of Effort

Success

Attributes

Feedback

Attitudes, Values,
Knowledge

Extracurricular
Activities

Pedagogy
Curriculum

Staff Development

External
Commitments

Monitoring, Assessment,
Early Warning

Figure 2.12. A preliminary model of Institutional Action developed by Tinto & Pusser (2006), with types of institutional action that shape each condition and promote student success

Thus it can be seen that there is a vast amount of literature that aims to understand the complexity of student persistence behaviour, which has shed light on such an inexorable problem (Reason, 2009). This has allowed researchers to try to fully explain the relationships and interactions between students and their environment as they relate to the decision to persist, and as Reason (2009) states, the importance of the local environment can be recognised and research findings adapted to the local context to maximise institutional efforts.

Constructs such as "Institutional Commitment" and "Institutional Fit and Quality" may be more pertinent to the American Higher Education system, from where most of these models have been derived. As Pascarella & Terenzini (1991) state, the

relationship that Americans have with their colleges results in an emotional, sometimes lifelong, bond, which often leads to financial support of millions or even billions of dollars in endowments. This may heighten the chances of transferring to a more highly thought-of institution should the chance arise, which may not be related to the situation in South Africa.

2.6. Conclusions

This review has demonstrated the vast amount of literature that has investigated the complexity of student persistence behaviour, some of which considers time-to-completion. Various conceptual and empirical models have been developed to try and account for some of these factors.

In the light of the scope of this work, this has been utilised to determine that there will be country and institution-specific contexts and that the nature of persistence and student success is indeed a complex integration of student attributes, psychologies, and institutional considerations.

The complex nature of dropout and throughput (mostly referring to undergraduate students) is recognised in this review, and the development of models to attempt to explain this has been discussed. All of these models include academic preparedness in some way, usually in terms of academic performance or academic potential as well as various measures of student demographics. There is usually some form of relationship with other input variables, but the aim of this study was to focus on inputs available from student records from graduations from 2000 to 2012 and whether any of these inputs would have any impact of the time-to-completion of an MScAgric. In most of these models there is also a linkage to support, in terms of both peer and lecturer interactions, which, if positive, reduce dropout. This study sought to determine whether the perceptions of supervisors in terms of their role in the supervisory process could be linked to time-to-completion, as consensus in the pool of MScAgric supervisors as to their role in the supervision process could be argued to improve student understanding of the requirements of the masters programme and could thus

be linked to time-to-completion. Thus, although there was no alignment to a single theoretical model, the input variables were included in all the models and the narrow focus on some of the variables that influence dropout was thought to be useful within the context of a broader range of influences and their interactions.

CHAPTER 3 – RESEARCH PARADIGM, METHODOLOGY & METHODS

This chapter will explore the research paradigm, methodology and methods used in attempting to answer the research questions posed at the beginning of the thesis:

- What factors identified from UKZN student records promoted or impeded time-to-completion of MScAgric students graduating from 2000 to 2012

- What was the mean time to graduate of MScAgric students during this time period?

- How do supervisors of MScAgric students view their role in the supervisory process in relation to time-to-completion?

Before 2004, the MScAgric degree was offered at the University of Natal, within the Faculty of Science and Agriculture. The University of KwaZulu-Natal was formed in 2004 from the merging of the former University of Natal and University of Durban-Westville. At this time, the Faculty of Science and Agriculture was divided into "Schools" and the majority of MScAgric students were registered in the School of Agricultural Sciences and Agribusiness, which included specialisation in Agribusiness, Agricultural Economics, Agronomy, Animal Science, Crop Science, Horticultural Science, Plant Breeding and Poultry Science. Specialisations within the MScAgric degree from other schools included Agrometeorology, Environmental Science, Forestry, Genetics, Microbiology, Plant Pathology, Rural Resource Management, Soil Science and Wildlife Science. In 2012 a restructuring took place which saw the development of the College of Agriculture, Engineering and Science, within which the School structures changed, and most MScAgric students were registered in the School of Agricultural, Earth and Environmental Sciences. Some specialisations over this time have been lost to MScAgric students, including Forestry, Genetics and Wildlife Science.

I currently work in Animal and Poultry Science, in the School of Agricultural, Earth and Environmental Sciences, and have been interested in what affects students' time-to-completion. While questions of reliability may arise when a researcher is not clearly an outsider (Cohen *et al.*, 2010), the nature of quantitative research, and the fact that there was no sampling (all student records available were used and the survey was

sent to all supervisors of MScAgric students) serves to make this study more objective. This was also an investigative and exploratory study, and therefore bias was limited.

Philosophical ideas need to be identified as they influence the practise of research and form the basis of the selected strategies of enquiry and research methods (Creswell, 2009). These philosophical ideas are sometimes referred to as "paradigms" (Husén, 1997) or "philosophical worldviews" (Creswell, 2009), and point to the ontology, epistemology and methodology (Punch, 2009). They determine the criteria according to which problems are selected and defined and how they are approached theoretically and methodologically (Husén, 1997). These paradigms are often shaped by discipline of study, and coming into this study as an Animal Scientist, with experience of the more traditional form of scientific method of enquiry, and with the objective of the study, this work was positioned within the postpositive paradigm, with its deterministic philosophy. According to Creswell (2009) the problems studied by postpositivists "reflect the need to identify and assess the causes that influence outcomes" (p 7). Postpositivist research is most commonly aligned with quantitative methods of data collection and analysis (Mackenzie & Knipe, 2006).

Within the paradigms of research are located methodologies, or styles of educational research (Cohen *et al.*, 2010). The style of educational research in this study was *ex post facto* research, where data were examined retrospectively in an attempt to establish causes, relationships or associations of data with a dependent variable (Cohen *et al.*, 2010). *Ex post facto* research is appropriate where cause-and-effect relationships are being explored and can give a sense of direction that can subsequently be tested by more rigorous experimental method (Cohen *et al.*, 2010). In the case of this research, historical student demographic data was obtainable, and provided the basis for exploration of causes of time-to-completion. It is acknowledged that there are limitations to this type of research, as Cohen *et al.* (2010) describes. These include, among others, that one cannot know if the causative factor has been included or even identified; it may be that no single factor is the cause, a particular outcome may result from different causes on different occasions; there is a problem in determining the cause and effect (may be the reverse causation); the relationship of

two factors does not establish cause and effect and classifying into dichotomous groups can be problematic. While these weaknesses are acknowledged, this method was seen as a starting point to determine whether any of the available information was able to point to possible factors that could be explored further, and aid in understanding of how to improve time-to-completion. The bottleneck effect of students not graduating timeously also causes an increased burden on supervisors, and it was reported that in 2005, the "average" supervisor in South Africa would have to supervise 7 Master's and Doctoral students, which is high by international standards (CHE, 2009). Current supervisors perceptions of their role in the supervisory process were also thought to contribute information useful to the understanding of the time-to-completion of past students, although it is acknowledged that staff complement will have changed over the years. This was therefore another avenue to explore in possible factors affecting time-to-completion of MScAgric students, while also describing the nature of existing conditions.

Part 1 – Analysis of student records

Gatekeepers permission to obtain anonymised records of all students who had graduated with a MScAgric since 2000 was granted (Appendix I), and ethics approval was also granted (Appendix II). Demographic information and academic records of these students was received from the UKZN Division of Management Information, which included:

- Year of graduation
- Full or part-time registration
- Number of years student had been registered
- Major subject
- Degree complete or degree complete *cum laude*
- Race
- Gender
- Institute where undergraduate degree was obtained
- Matric points (mainly if undergraduate degree was from UKZN)

- Weighted average for undergraduate qualification (if undergraduate degree was from UKZN)
- Weighted average for final year of undergraduate (if undergraduate degree was from UKZN)

Once the student data were received, it was "cleaned" by checking that there were no anomalies. For example, one student had a 0 for the weighted average for final year of undergraduate which was deleted. Only data for full research MScAgric students was included and there were a total of 186 student records which included graduations from 2000 to 2012.

There is no "accepted" time stipulated for a MScAgric degree, but according to rule MR3 (p51 in the College handbook), the minimum period of registration for a Master's degree by Research is two semesters (1 year) for a full-time student and 4 semesters (2 years) for a part time student. The College provides remission of fee's for one year of Masters registration, which also implies that the "accepted' time to complete is 1 year. Therefore the number of years a student had been registered was divided by 2 for part time students to convert to a full-time-equivalent of time to graduate for each student to be able to include both full- and part-time registered students in the analysis. Interrupted registration years were excluded from the analysis.

Statistical Analysis

A Shapiro-Wilk test for normality was run on the distribution of both full-time and part-time registered students for the FTE time to graduate using GenStat 14th Edition (Genstat, 2011). The distribution of FTE time to graduate was not normally distributed, but rather resulted in a skew distribution, which was expected since most graduations are expected to happen within the accepted time

The use of decision trees can "classify cases into groups or predict values of a dependent (target) variable based on values of independent (predictor) variables" (p 76) (SPSS, 2010). They are useful for segmentation (identifies persons likely to be members of a particular group), stratification (assigning cases into several categories),

prediction (creates rules to allow for the prediction future events), data reduction and variable screening (selects a useful subset of predictors from within a large set of variables for use in building a formal parametric model), and interaction identification (identifies relationships that pertain only to specific subgroups) (SPSS, 2010). A decision tree was run, using both the classification and regression trees (CRT) or Chi-squared automatic interaction detection (CHAID) growing method to determine whether there was segmentation or stratification of any of the variables with respect to whether degree was *passed cum laude* or not, or FTE time to graduate with SPSS 21 (SPSS, 2012). Variables included were type of registration, race, gender, Institution where undergraduate degree was obtained, major subject of MScAgric, and year MScAgric was obtained, matric score, weighted average for undergraduate degree and weighted average for final year of undergraduate degree. Matric score, weighted average for undergraduate and weighted average for final year were made ordinal by ranking results.

Analysis of variance (ANOVA) is useful to analyse the differences between group means. Since the assumption of ANOVA, that the response variable is normally distributed, was not met in this study, and because there was no transformation possible to change the skewed distribution into a normal distribution, a Permutation test within the ANOVA in Genstat 14th Edition was used which asks the program to make 4999 random permutations of the values of the response variate, and repeat the analysis with each one (Payne, 2011). This determines the probability from the variables distribution over the randomly permuted data sets, which negates the need for residuals to follow normal distributions (Payne, 2011).

A general ANOVA, using the Permutation test, was used to determine the effects of all nominal variables (gender, race, type of registration, Institution where undergraduate degree was obtained (also whether this was foreign or domestic), major subject of MScAgric, and year MScAgric was obtained) on the measures of "success" – time to graduate and whether degree was awarded *cum laude* or not using GenStat 14th Edition (Genstat, 2011). An ANOVA with the Permutation test was also performed to

determine whether FTE time to graduate was influenced by whether students passed *cum laude* or not.

Single and multiple regression analyses using GenStat 14th Edition (Genstat, 2011) were run with the continuous data for matric score, weighted average for undergraduate degree and weighted average for final year of undergraduate degree to determine whether these explained any response in FTE time to graduate.

Part 2 – Role Perception Rating Scale on Supervision

A questionnaire was distributed to all members of current staff (n=19) in the School of Agricultural, Earth and Environmental Sciences who supervise MScAgric students. This was a Role Perception Rating Scale developed by Aspland *et al.* (1999) and modified by Lessing (2011) (Appendix III). A five-point Likert scale was used as opposed to the four-point scale used by Lessing (2011) in order for supervisors to state if their perception of a particular role was a shared one.

This was distributed with an invitation to participate (Appendix IV) and a letter of informed consent (Appendix V). Seven staff members (37%) returned the survey. One staff member who was newly employed declined to participate and one staff member resigned during the process, from whom a return was not received. A follow-up was done, where possible, with staff who had not returned the survey, and a further 9 were returned, resulting in an 84% return rate.

The survey sought to gain information about the perception of the supervisor and student roles in three main areas: the topic and course of study, contact and involvement and the thesis itself.

The results from the survey were recorded in Excel and descriptive and inferential statistics were used to analyse the views of supervisors regarding their roles in the supervision of research MScAgric students. A Chi-square test (SPSS) was used to determine if actual counts differed significantly from expected counts of supervisors

role perceptions in each question based on rank/position (P, AP, SL, L), whether they were less (<10 MScAgric graduations) or more (≥10 MScAgric graduations) experienced in supervision of MScAgric students, whether they were less (<6 PhD graduations) or more (≥6 PhD graduations) experienced in supervision of PhD students, or whether supervisors had attended seminars or workshops related to supervision. "Experience" was looked at from both the point of MScAgric graduations and PhD graduations since some supervisors were experienced in MScAgric graduations but not PhD graduations, some in PhD graduations but not MScAgric graduations, some experienced in both and some experienced in neither.

Responses 1 and 2, indicating the particular topic to be a supervisor role were combined and responses 4 and 5, indicating a student role, were combined, since there was an option to state a shared responsibility. Because of the low sample number in this study, Chi-square results may be invalid and should be interpreted with caution.

On return of the questionnaires, it was noticed that question 5, which asked about purely professional versus close personal supervisor-student relationships, was not in line with the other questions which asked whether certain roles were perceived as the supervisor or students responsibility, but rather whether respondents thought that relationships should be professional or personal. However, this question was retained as it relates to social integration, a factor important in most of the conceptual models discussed.

CHAPTER 4 – THE EFFECT OF VARIABLES INCLUDED IN STUDENT RECORDS ON TIME TO GRADUATE OF MSCAGRIC DEGREES

This chapter will present the results and discussion from the analysis of student records on time to graduate, with the aim of answering the first two research questions:

- What factors identified from UKZN student records promoted or impeded time-to-completion of MScAgric students graduating from 2000 to 2012

- What was the mean time to graduate of MScAgric students during this time period?

Overall, the mean FTE time to complete an MScAgric degree was 2.9 years. The number of students graduating per annum is fairly consistent, with higher than expected numbers in 2003 and 2005, but on average 14 students graduate with a MScAgric per year (Figure 4.1). This is fairly low and could expected to increase with the enrolment plan of the UKZN strategic plan (University of KwaZulu-Natal, 2012). Staff in the School of Agricultural, Earth and Environmental Sciences are expected to supervise 6 postgraduates per professor/senior professor, 4 postgraduates per senior lecturer and 1 postgraduate per lecturer (UKZN Performance Management System). With the current staff complement that supervises MScAgric students, this would translate to about 70 postgraduates per year, although some of these will be PhD students. If the Masters students finish within 2 years this would equate to nearly double the current numbers graduating. However, there are various limitations to this ideal, such as the pool of available good quality students and funding for research projects.
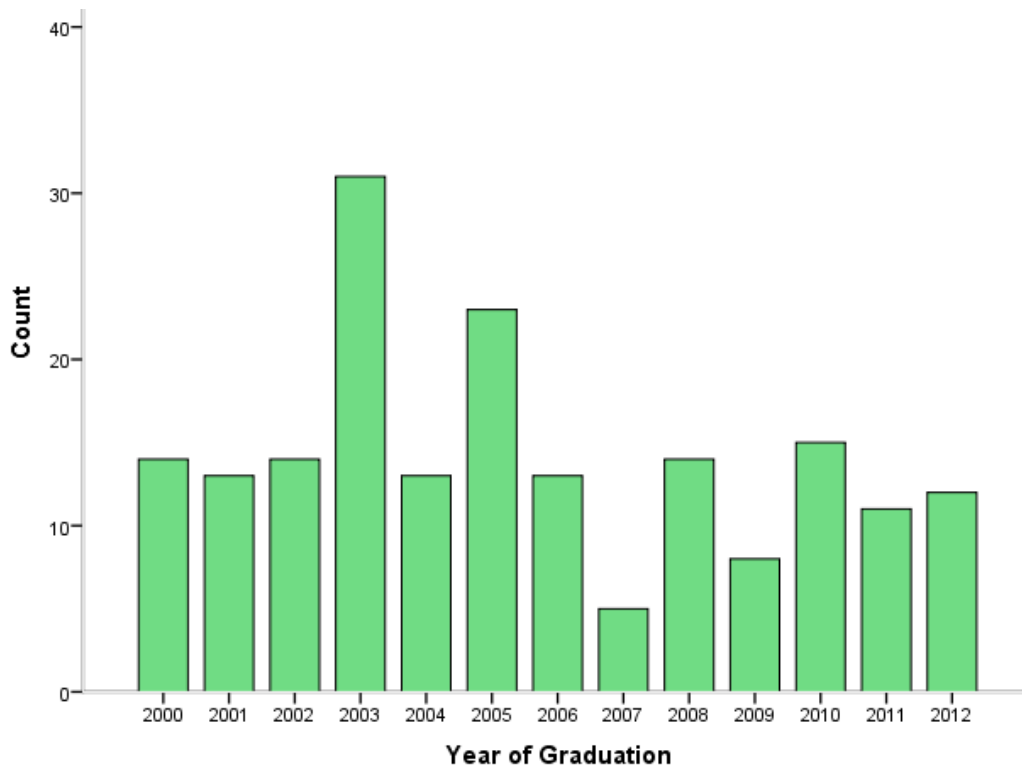
Figure 4.1. – The numbers of students graduating with a MScAgric per year

In 2003 there may have been a drive to complete degree's before the uncertainty of what the merger would bring, which could explain the increased graduations in 2003, and likewise, there could have been an increase in enrolments in 2004 as the first intake of the new institution causing an increase in graduations in 2005. This may also reflect the overall increase in enrolments of Masters by thesis students in the Faculty of Science and Agriculture in 2003 and 2004 (Barnes & Pillay, 2008). There was no difference each year in the FTE time to graduate (P = 0.062) or whether degree was completed *cum laude* or not (P = 0.335) in any of the years from 2000 to 2012.

The distribution of the time to graduate for students graduating during 2000 to 2012 is not normal (P < 0.001) for full-time registered students, but is for part-time students (Figure 4.2). A number of full-time students took considerably longer than "normal". An acceptable time frame for graduates was considered to be "the approved formal time of the qualification plus one year" (p 2) (Barnes & Pillay, 2008), so in this case,

the minimum of 1 year plus 1 year (2 FTE years). 67% of full-time students (n = 99) and 56% of part-time students (n = 22) took longer than this "acceptable" time.
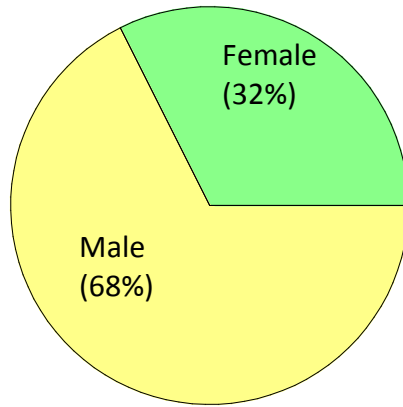
The proportions of male and female MScAgric graduates, African, Indian and White graduates, and full-time or part-time registered students are presented in Figure 4.3, 4.4 and 4.5 respectively.

Gender had no influence on the time to graduate (P = 0.794) or whether degree was completed *cum laude* or not (P = 1.000). This concurs with general statistics for Masters students across South Africa (CHE, 2009).

The effect of race on time to graduate was approaching significance (P = 0.063), with African, Indian and White students taking on average 2.7 ± 0.1, 3.4 ± 0.5 and 3.1 ± 0.2 years respectively. However, there were only 6 Indian students in the entire dataset and there were 4 white students that were skewing the data, two that had taken 7yrs to complete, one that had taken 8 years to complete and one that had taken 11 years to complete. When these were removed and ANOVA performed, the effect of race was not significant (P = 0.185). Race was the only independent variable to be included in the regression tree of FTE time to graduate (Figure 4.6), but again, once the four students who took 7, 7, 8 and 11 years to graduate were removed, race was removed and there were no other independent variables included in the regression tree, so this result needs to be observed with caution. CHE (2009) reports a lack of race effects on completion times of masters degree's across all fields in South Africa.
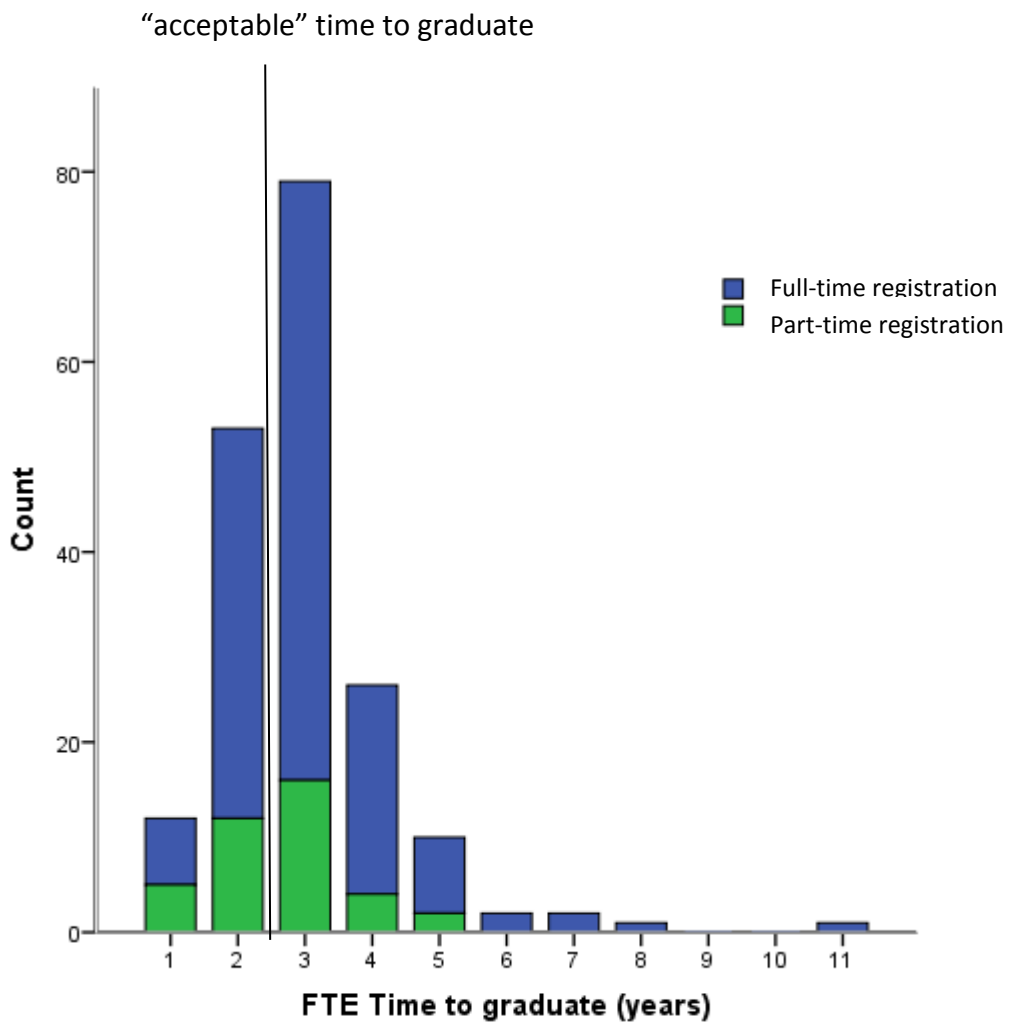
Figure 4.2. The full time equivalent time to graduate of MScAgric students between 2000 and 2012.

Figure 4.3. The proportion of female and male MScAgric graduations between 2000 and 2012
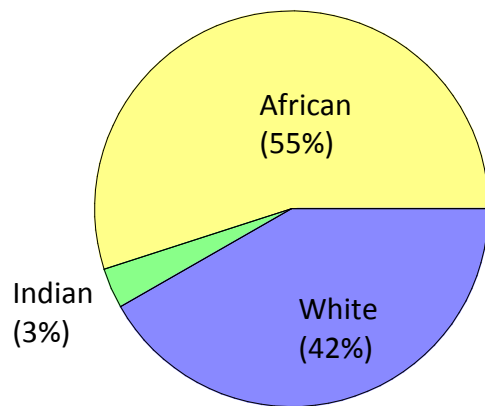
Figure 4.4. The proportion of race groups graduating with a MScAgric between 2000 and 2012
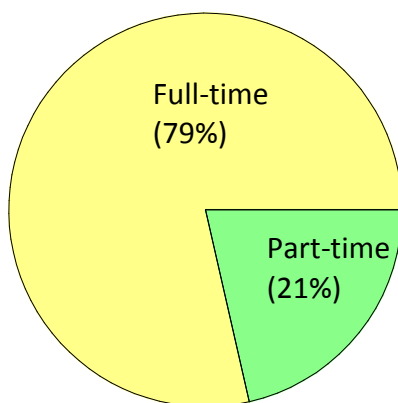
Figure 4.5. The proportion of Full and Part-time students graduating with a MSCAgric between 2000 and 2012
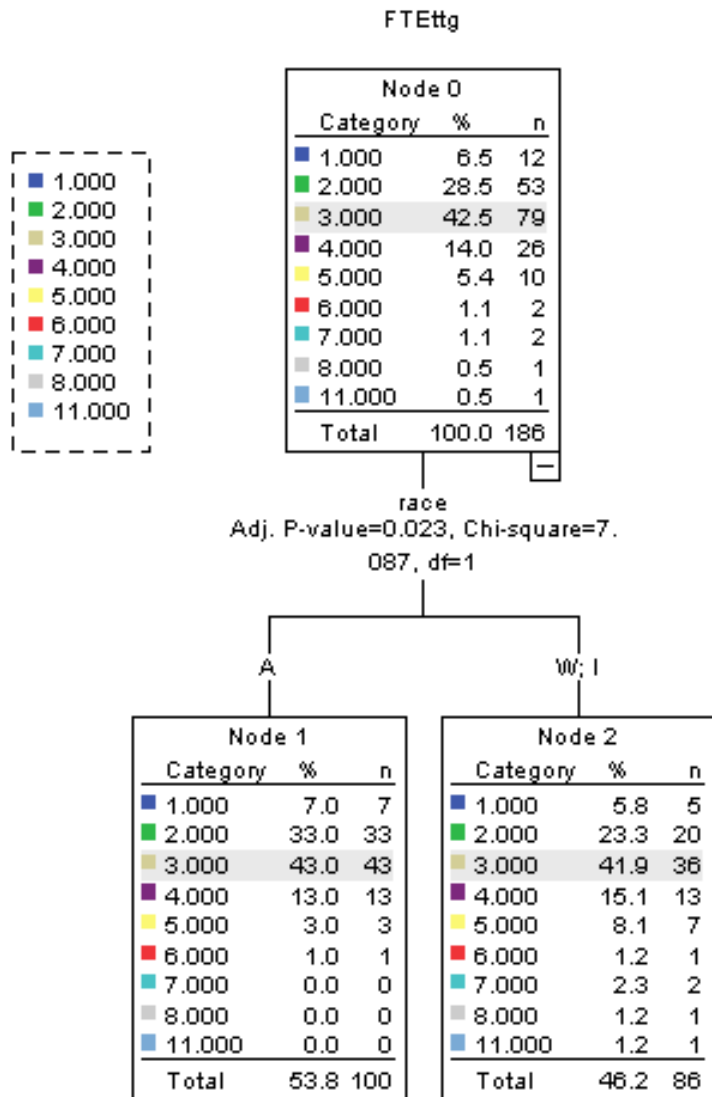
Figure 4.6. Decision tree, using the CHAID growing method to segregate variables based on FTE time to graduate (FTEttg)

The results of the classification tree on whether students passed *cum laude* or not, separated White students from African or Indian students (Figure 4.7), and showed that significantly more White students passed *cum laude* than did African or Indian students ($P < 0.05$), even with outliers removed. It was thought that perhaps because White students took longer to complete their degree's this may have been the reason that more *cum laude* passes were achieved in this group, however there was no

overall influence of FTE time to graduate on whether degree was passed *cum laude* or not (P = 0.699). Rule MR13 (p55 AES College handbook) now states the MScAgric degree may only be awarded cum laude if the degree is completed in the prescribed minimum time plus two semesters for a full-time student (2 years) and minimum time plus four semesters for a part-time student (3 years), which was not in place until 2011. No other variables included in this study contributed to type of degree pass.
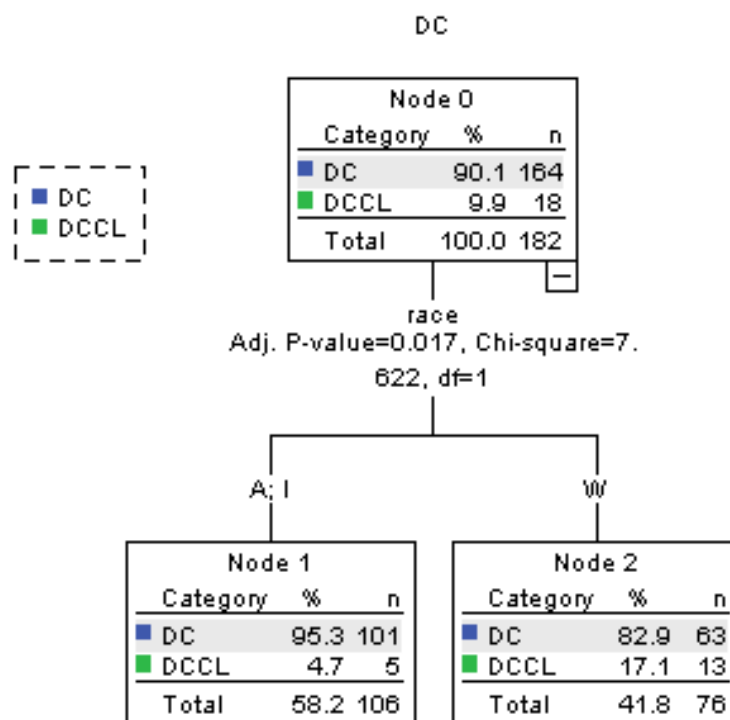
Figure 4.7. Decision tree, using the CHAID growing method, to segregate variables based on whether degree was passed cum laude or not (DC = Degree complete, DCCL = Degree complete cum laude)

Type of registration had no effect on whether degree was passed *cum laude* or not (P = 0.767), but full-time registered students took significantly longer (full time equivalents) to graduate than part-time registered students (P < 0.05), with full-time students taking an average of 3.1 years to graduate and part-time students taking a FTE equivalent of 2.4 years (i.e. actually 4.8 years). Even with outliers removed this is still a significant variable (P<0.05) but the average time to graduate drops to 2.9 years for full-time students.

Rule MR7 (p52 in the College Handbook) states that if a Masters student has not completed the requirements for the degree after six semesters as a full-time student, or ten semesters as a part-time student, they shall be required to apply for re-registration, which will only be permitted on receipt of a satisfactory motivation. The average time to graduate for a full-time student is close to this limit, so it is clear that some students have motivated for, and been granted, an extension of the time allowed. However, the average of 2.9 years to graduate could also be inflated due to the fact that the number of years a student was registered was reported by DMI as a whole number, and therefore may have been rounded up if a student was registered for only one semester in a year (e.g. they could have been registered for 2.5 years and this was reported as 3 years). A student's registration is also broken into half years (semesterised), and even if they complete in the first month of that semester, they are required to be registered for the entire semester which could also falsely inflate this number.

While the reverse result may have been expected, other studies have also found part-time students likely to finish more timeously (Wright & Cochrane, 2000; Rodwell & Neumann, 2008) due to a higher emotional and financial investment. It is also possible that students that have part-time employment and that should register part-time are actually registering as full-time students because only full-time students are eligible for the waiving of the tuition fee for the minimum prescribed study period of 1 year (UKZN Applications and Information Office, 2012). It is also expected that full-time students have no other form of income and could be drawn to part-time employment out of necessity, which takes time away from their studies and may cause a loss of focus.

Institution of undergraduate degree had no bearing on the time to graduate (P = 0.714) or whether degree was passed *cum laude* or not (P = 0.482). There were 38 missing data points for this variable, but 57% of MScAgric students graduated had obtained their undergraduate degree at UKZN. The remaining 43% of students had obtained undergraduate qualifications from at least 24 other HEI's (18 students were

listed as having obtained their undergraduate degree from Foreign Institutions that weren't named).

78% of students attending a domestic HEI registered as full-time students and 80% of students attending a foreign HEI registered as full-time students. However, it is not known whether the students themselves were foreigners or not and foreign students may have also attended a South African HEI to obtain their undergraduate degree. Whether the Institute where undergraduate degree was obtained was foreign or domestic HEI had no influence on time to graduate (P = 0.406) or whether the MScAgric degree was passed *cum laude* or not (P = 0.074).

Five students had no record for degree major, but this had no impact on FTE time to graduate (P = 0.094) or whether degree was completed *cum laude* or not (P = 0.589).

There was no response in FTE time to graduate with matric score (P = 0.502, n = 75), weighted average for undergraduate (P = 0.059, n = 86) or weighted average for final year of undergraduate (P = 0.106, n = 85), although this data was not available for all students. Weighted average for undergrad was approaching significance (P = 0.059), with a trend for a slight increase in FTE time to graduate as weighted average for undergraduate increased (FTE time to graduate = 0.45 + 0.04(wavUG), although only accounted for 3% of the variation in the model.

Those that achieved their masters *cum laude* had significantly (P < 0.05) higher mean matric points (41.2 vs 35.7), weighted average for undergrad (71.1% vs 64.2%) and) weighted average for final year of undergrad (74.6% vs 67%) than those that did not graduate *cum laude* (Figure 4.8), but these were not considered significant variables in a simple or multiple regression and were not the basis to distinction in a decision tree.
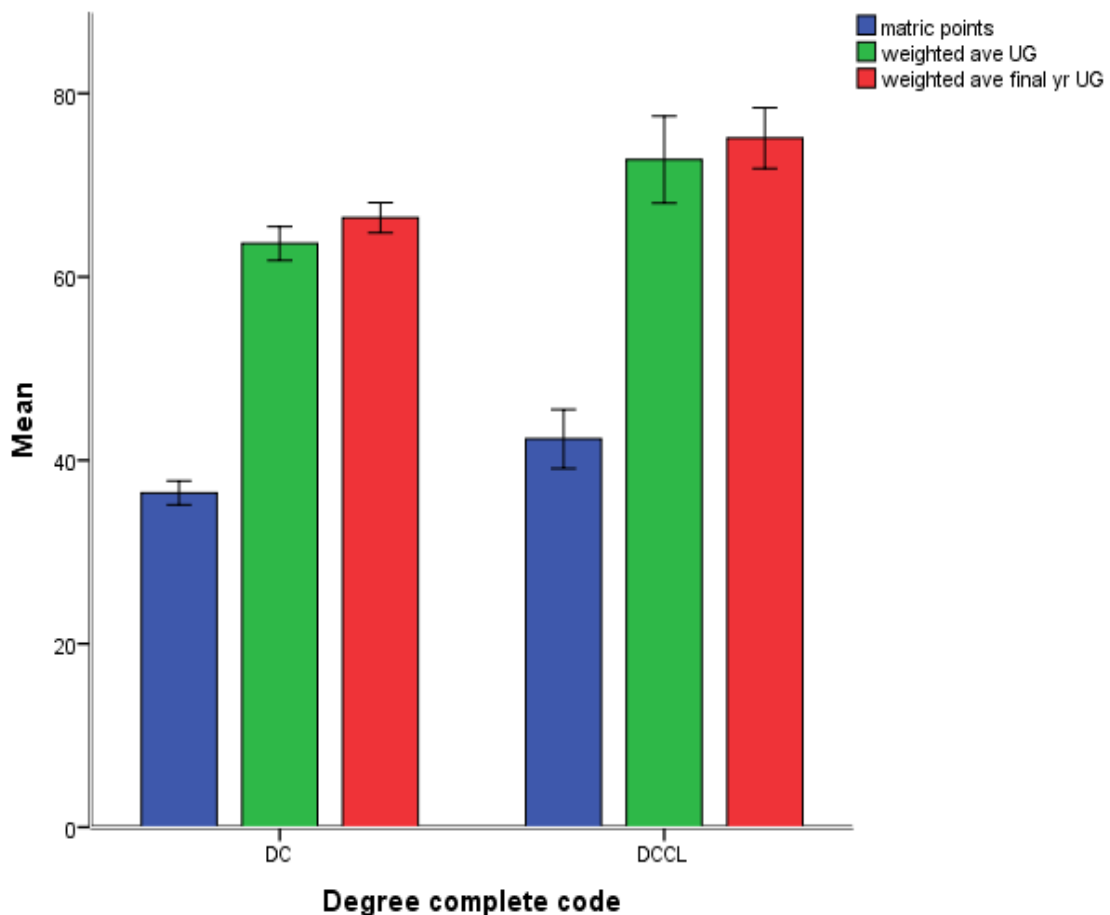
Figure 4.8. Differences in matric score, weighted average of undergraduate and weighted average of final year undergrad of those who graduated with a MScAgric degree complete (DC) or degree complete cum laude (DCCL).

A multiple regression of matric score, weighted average for undergraduate or weighted average for final year of undergraduate had no effect on the FTE time to graduate, and did not account for any of the variation observed.

Limitations

The data was only obtained for graduated students, so does not allow a glimpse into attrition rates or throughput of students still in the system (e.g registered in 2008 and still not finished), and therefore "throughput rates" could not be calculated, only time to graduate. Exclusions formed a very small part of postgraduate numbers in the Faculty of Science and Agriculture from 2000 to 2006 (Barnes and Pillay, 2008). While

this study did not measure dropout ratios, this has been reported as an average of 25.7% from 2000 to 2006 by Barnes & Pillay (2008) for Masters by thesis in the Faculty of Science and Agriculture as those students that had been excluded or failed to re-register in the years following the intake year, until June 2007 (i.e. there could have been more dropouts as the dropout ratio for 2006 was already 9.8% in 2007 for Research Masters students). The graduation rate in the study by Barnes & Pillay (2008) (proportion of cohort graduating in the same approved qualification, as originally registered, within the accepted time frame) was on average 22.0% for Masters by thesis students.

Another limitation is that access to data on quality or actual mark awarded was not permitted, and there could be a tension between allowing a student time to develop certain skills in order to result in a good quality thesis and handing in a thesis of a lower quality in order to improve throughput.

CHAPTER 5 – ROLE PERCEPTIONS OF SUPERVISORS OF MSC AGRIC STUDENTS

This chapter presents the results of the Role Perception questionnaire in an attempt to answer the third research question:

- How do supervisors of MScAgric students view their role in the supervisory process?

The frequencies and percentages for the biographical data are summarised in Table 5.1. The School is in a good position currently, with all respondents in possession of a PhD, and it was reported at UKZN that postgraduates tend to have more positive experiences when there is a critical mass of staff with doctoral degrees (Lalendle & Ijumba, 2013).

The views of the respondents indicating their role in the different aspects of supervision are presented in Table 5.2. Responses were recorded on a five-point scale where "1" and "2" indicated the particular aspect of supervision as the responsibility of the supervisor, a "3" to indicate shared responsibility and "4" or "5" to indicate the responsibility as that of the student. This was then presented as the counts and percentages of perceptions of MScAgric supervisors depending on rank (Table 5.3), experience in terms of successful MScAgric supervision (Table 5.4) and PhD supervision (Table 5.5) and whether supervisors have attended seminars or workshops relating to supervision (Table 5.6). Since it was later realised that the question pertaining to the supervisor-student relationship did not fit the Likert scale on the basis of whether it was a supervisor or student role, but rather asked whether the relationship between the supervisor and student should be purely professional or a close personal one, the responses to this question were summarised in a separate table (Table 5.7).

Table 5.1. Biographical data from the role perception survey from supervisors of MScAgric students

Position	n	%
Senior Professor & Professor	4	25
Associate Professor	3	19
Senior Lecturer	4	25
Lecturer	5	31
Highest Qualification		
Doctoral degree	16	100
Master's degree	0	0
Master's students graduated		
Less than ten students	8	50
Ten or more students	8	50
Master's students supervised on average per year		
None	1	6
One to two students	11	69
Three or more students	4	25
Doctoral students graduated		
None	5	31
One to five students	4	25
Six or more students	7	44
Doctoral students supervised on average per year		
None	0	0
One to two students	10	63
Three or more students	6	38
Attended seminar/workshop on supervision		
Yes	12	75
No	4	25
Supervision based on:		
Past experience	16	100
Research	12	75
Seminars/workshops attended	10	63
Other options stated:		
Program to manage throughput	2	13
Based on style of own supervisor	1	6

Table 5.2. Supervisor's views of their roles in various aspects of the supervision of MScAgric students.

	Supervisor's role		Shared role		Student's role	
	n	%	n	%	n	%
Selecting the research topic	6	37.5	6	37.5	4	25.0
Selecting theoretical frame of reference	9	56.3	6	37.5	1	6.3
Development of research program	10	62.5	3	18.8	3	18.8
Ensuring access to facilities	14	87.5	1	6.3	1	6.3
Initiation of frequent meetings	5	31.3	8	50.0	3	18.8
Monitoring student's progress	7	43.8	6	37.5	3	18.8
Terminating the candidature if convinced student will not succeed	8	50.0	4	25.0	4	25.0
Ensuring completion within the minimum time	8	50.0	7	43.8	1	6.3
Responsibility for methodology & content	8	50.0	7	43.8	1	6.3
Responsibility for the presentation of the thesis	3	18.8	4	25.0	9	56.3
Responsibility to review drafts of each section in timely fashion	14	87.5	1	6.3	1	6.3

Table 5.3. Lecturers' rating of their role in the supervision process according to post level [Senior Professor and Professor (P); Associate Professor (AP); Senior Lecturer (SL); Lecturer (L)].

	Supervisor's role				Shared role				Student's role				χ^2	P
	P N=4 %	AP N=3 %	SL N=4 %	L N=5 %	P N=4 %	AP N=3 %	SL N=4 %	L N=5 %	P N=4 %	AP N=3 %	SL N=4 %	L N=5 %		
Selecting the research topic	0 / 0	1 / 33.3	2 / 50	3 / 60	3 / 75	1 / 33.3	1 / 25	1 / 20	1 / 25	1 / 33.3	1 / 25	1 / 20	4.58	0.60
Selecting theoretical frame of reference	3 / 75	2 / 66.6	1 / 25	3 / 60	1 / 25	0 / 0	3 / 75	2 / 40	0 / 0	1 / 33.3	0 / 0	0 / 0	8.15	0.23
Development of research program	2 / 50	2 / 66.6	2 / 50	4 / 80	2 / 50	1 / 33.3	0 / 0	0 / 0	0 / 0	0 / 0	2 / 50	1 / 20	7.96	0.24
Ensuring access to facilities	4 / 100	2 / 66.6	3 / 75	5 / 100	0 / 0	1 / 33.3	0 / 0	0 / 0	0 / 0	0 / 0	1 / 25	0 / 0	7.71	0.26
Initiation of frequent meetings	1 / 25	0 / 0	0 / 0	4 / 80	3 / 75	2 / 66.6	3 / 75	0 / 0	0 / 0	1 / 33.3	1 / 25	1 / 20	10.89	0.09
Monitoring student's progress	1 / 25	1 / 33.3	1 / 25	4 / 80	3 / 75	0 / 0	2 / 50	1 / 20	0 / 0	2 / 66.6	1 / 25	0 / 0	10.86	0.93
Terminating the candidature if convinced student will not succeed	3 / 75	1 / 33.3	3 / 75	1 / 20	0 / 0	0 / 0	1 / 25	3 / 60	1 / 25	2 / 66.6	0 / 0	1 / 20	9.40	0.15
Ensuring completion within the minimum time	4 / 100	1 / 33.3	0 / 0	3 / 60	0 / 0	2 / 66.6	4 / 100	1 / 20	0 / 0	0 / 0	0 / 0	1 / 20	12.11	0.06
Responsibility for methodology & content	2 / 50	1 / 33.3	2 / 50	3 / 60	2 / 50	1 / 33.3	2 / 50	2 / 40	0 / 0	1 / 33.3	0 / 0	0 / 0	4.76	0.58
Responsibility for the presentation of the thesis	1 / 25	1 / 33.3	0 / 0	1 / 20	2 / 50	1 / 33.3	0 / 0	1 / 20	1 / 25	1 / 33.3	4 / 100	3 / 60	5.66	0.46
Responsibility to review drafts of each section in timely fashion	4 / 100	3 / 100	2 / 50	5 / 100	0 / 0	0 / 0	1 / 25	0 / 0	0 / 0	0 / 0	1 / 25	0 / 0	6.86	0.33

Table 5.4. The views of more experienced (≥10 graduated MScAgric students) and less experienced (<10 graduated MScAgric students) on their roles in MScAgric supervision.

	Supervisor's role		Shared role		Student's role		χ^2	P
	<10 N=7 %	≥10 N=9 %	<10 N=7 %	≥10 N=9 %	<10 N=7 %	≥10 N=9 %		
Selecting the research topic	3 42.9	3 33.3	1 14.3	5 55.6	3 42.9	1 11.1	4.33	0.12
Selecting theoretical frame of reference	5 71.4	4 44.4	2 28.6	4 44.4	0 0	1 11.1	1.11	0.57
Development of research program	4 57.1	6 66.6	1 14.3	2 22.2	2 28.6	1 11.1	0.67	0.71
Ensuring access to facilities	6 85.7	8 88.9	0 0	1 11.1	1 14.3	0 0	2.00	0.37
Initiation of frequent meetings	3 42.9	2 22.2	1 14.3	7 77.8	3 42.9	0 0	5.20	0.07
Monitoring student's progress	4 57.1	3 33.3	1 14.3	5 55.6	2 28.6	1 11.1	4.29	0.12
Terminating the candidature if convinced student will not succeed	1 14.3	7 77.8	4 57.1	0 0	2 28.6	2 22.2	6.00	0.05*
Ensuring completion within the minimum time	4 57.1	4 44.4	3 42.9	4 44.4	0 0	1 11.1	1.14	0.57
Responsibility for methodology & content	4 57.1	4 44.4	3 42.9	4 44.4	0 0	1 11.1	1.14	0.57
Responsibility for the presentation of the thesis	2 28.6	1 11.1	2 28.6	2 22.2	3 42.9	6 66.6	0.44	0.80
Responsibility to review drafts of each section in timely fashion	6 85.7	8 88.9	0 0	1 11.1	1 14.3	0 0	2.00	0.37

Table 5.5. The views of more experienced (≥6 graduated PhD students) and less experienced (<6 graduated PhD students) on their roles in MScAgric supervision.

	Supervisor's role		Shared role		Student's role		χ^2	P
	<6 N=9 %	≥6 N=7 %	<6 N=9 %	≥6 N=7 %	<6 N=9 %	≥6 N=7 %		
Selecting the research topic	5 55.6	1 14.3	1 11.1	5 71.4	3 33.3	1 14.3	6.18	0.05*
Selecting theoretical frame of reference	5 55.6	4 57.1	4 44.4	2 28.6	0 0	1 14.3	1.55	0.46
Development of research program	6 66.7	4 57.1	1 11.1	2 28.6	2 22.2	1 14.3	0.83	0.66
Ensuring access to facilities	8 88.9	6 85.7	0 0	1 14.3	1 11.1	0 0	2.07	0.36
Initiation of frequent meetings	4 44.4	1 14.3	2 22.2	6 85.7	3 33.3	0 0	6.65	0.04*
Monitoring student's progress	5 55.6	2 28.6	2 22.2	4 57.1	2 22.2	1 14.3	2.07	0.36
Terminating the candidature if convinced student will not succeed	3 33.3	5 71.4	4 44.4	0 0	2 22.2	2 28.6	4.32	0.12
Ensuring completion within the minimum time	3 33.3	5 71.4	5 55.6	2 28.6	1 11.1	0 0	2.58	0.28
Responsibility for methodology & content	5 55.6	3 42.9	4 44.4	3 42.9	0 0	1 14.3	1.42	0.49
Responsibility for the presentation of the thesis	1 11.1	2 28.6	2 22.2	2 28.6	6 66.7	3 42.9	1.10	0.58
Responsibility to review drafts of each section in timely fashion	7 77.8	7 100	1 11.1	0 0	1 11.1	0 0	1.78	0.41

Table 5.6. The views of those that have attended seminars and workshops on supervision (✓) or not (x) on their roles as supervisors of MScAgric students.

	Supervisor's role		Shared role		Student's role		χ^2	P
	X N=4 %	✓ N=12 %	X N=4 %	✓ N=12 %	X N=4 %	✓ N=12 %		
Selecting the research topic	2 50.0	4 33.3	1 25.0	5 41.7	1 25.0	3 25.0	0.45	0.80
Selecting theoretical frame of reference	2 50.0	7 58.3	2 50.0	4 33.3	0 0	1 8.3	0.60	0.74
Development of research program	3 75.0	7 58.3	1 25.0	2 16.7	0 0	3 25.0	1.24	0.54
Ensuring access to facilities	4 100.0	10 83.3	0 0	1 8.3	0 0	1 8.3	0.76	0.68
Initiation of frequent meetings	1 25.0	4 33.3	3 75.0	5 41.7	0 0	3 25.0	1.73	0.42
Monitoring student's progress	1 25.0	6 50.0	3 75.0	3 25.0	0 0	3 25.0	3.43	0.18
Terminating the candidature if convinced student will not succeed	3 75.0	5 41.7	0 0	4 33.3	1 25.0	3 25.0	2.00	0.37
Ensuring completion within the minimum time	2 50.0	6 50.0	1 25.0	6 50.0	1 25.0	0 0	3.43	0.18
Responsibility for methodology & content	3 75.0	5 41.7	1 25.0	6 50.0	0 0	1 8.3	1.43	0.49
Responsibility for the presentation of the thesis	0 0	3 25.0	1 25.0	3 25.0	3 75.0	6 50.0	1.33	0.51
Responsibility to review drafts of each section in timely fashion	3 75.0	11 91.7	1 25.0	0 0	0 0	1 8.3	3.43	0.18

Table 5.7. The views of supervisors on the nature of the supervisory relationship

	Purely professional n (%)				In between n (%)				Close personal n (%)				χ^2	P
Supervisors view of the relationship	5 (31.3)				8 (50.0)				3 (18.8)					
	P	AP	SL	L	P	AP	SL	L	P	AP	SL	L		
Supervisors view of the relationship based on post level	1 (25.6)	1 (33.3)	2 (50)	1 (20)	2 (50)	1 (33.3)	2 (50)	3 (60)	1 (25)	1 (33.3)	0 (0)	1 (20)	2.151	0.91
	<10		≥10		<10		≥10		<10		≥10			
Supervisors view based on number of MScAgric graduations	2 (28.6)		3 (33.3)		3 (42.9)		5 (55.6)		2 (28.6)		1 (11.1)		0.53	0.77
	<6		≥6		<6		≥6		<6		≥6			
Supervisors view based on number of PhD graduations	2 (22.2)		3 (42.9)		5 (55.6)		3 (42.9)		2 (22.2)		1 (14.3)		0.80	0.67
	X		✓		X		✓		X		✓			
Supervisors view based on attendance of seminars & workshops	1 (25.0)		4 (33.3)		2 (50.0)		6 (50.0)		1 (25.0)		2 (16.7)		0.18	0.92

The results will be discussed in four sections, three that formed part of the questionnaire, namely the topic/course of study, contact/involvement and the thesis, and lastly the question on the nature of the supervisory relationship.

5.1. The role perceptions of MScAgric supervisors with regard to the topic/course of study

The majority of respondents (75%) viewed the selection of the research topic to be a supervisor or shared role. These views were not affected by post level, experience in MScAgric supervision or whether respondents had attended seminars or workshops on supervision. However, there was a significant difference in the perception of this role based on experience in PhD supervision. More experienced PhD supervisors perceived selecting a research topic as a shared role, while less experienced PhD supervisors perceived this either as a supervisor role or a student role (Table 5.5).

UKZN has published guidelines on the supervision of postgraduate degrees, which identify the suggested roles and responsibilities of the university and college, the faculty (2010 document), the school, the supervisor and the student (University of KwaZulu-Natal, 2010a).The document lists the responsibilities of the supervisor and the student at the outset of the degree, during the course of the research and toward the close of the research. Some of these refer directly to the questions asked in this study. In terms of arising at a research topic, the role of the supervisor is to "assist the student to arrive at a research topic which may be identified by either or both of the prospective student and supervisor" (p 10) (University of KwaZulu-Natal, 2010a). There was a lack of consensus in this study sample, of those differing in PhD supervision experience, of whose role this was, but this is probably explained because it can be the role of either or both the supervisor and student, although the supervisor is expected to assist the student to arrive at the topic which may be informed by factors such as stated in the guidelines; interest, academic merit and funding. The difference may also be explained in that some students, who have a clear idea of what they would like to research, arrive at the research topic on their own, and then the feasibility is assessed by the supervisor.

Whether supervisors see this mainly as a supervisor responsibility (in the case of less experienced PhD supervisors) or a shared responsibility (in the case of more experienced PhD supervisors), most agreed that this was not a student role, and therefore is unlikely to impede on completion times by delaying the start of the project because a student is stuck right at the beginning of the degree trying to find a topic. It could be expected that if choosing a research topic is a shared responsibility that the student may have greater motivation, through a greater sense of ownership, during the course of the degree. This is in contrast to Lessing (2011), where 88% of the respondents saw the selection of the research topic as the role of the student. This difference may reflect different disciplinary cultures between the humanities and sciences, where in the sciences, students often work on supervisors projects or key areas, which may be limited by available funding, whereas the lecturers approached in the study of Lessing (2011) were from the humanities.

Selecting the theoretical frame of interest was viewed mainly as the supervisor's role or a shared role, with only 1 respondent suggesting that this is a student role. Similarly 81.3% of respondents viewed development of the research program as either a supervisor or shared role (Table 5.2). These views were not significantly affected by post level, MScAgric supervision experience, PhD supervision experience or whether supervisors had attended seminars/workshops on supervision. This is again in contrast to Lessing (2011) who found that 76% of respondents viewed this as a student role and could again reflect disciplinary differences. While the UKZN guidelines are not specific about the theoretical framework, the supervisor is expected to "assist the student to prepare a Research Proposal…" (p 10) (University of KwaZulu-Natal, 2010a) where the theoretical framework would need to have been considered. These guidelines do suggest that the supervisor should develop a Research Agreement and assist the student to develop a Research Plan (University of KwaZulu-Natal, 2010a).

Most respondents viewed ensuring access to facilities as the supervisor role (only 1 respondent saw this as a shared role and 1 as a student role), and these views were not significantly affected by post level, MScAgric supervision experience, PhD supervision experience or whether supervisors had attended seminars/workshops on

supervision. The UKZN guidelines state that both the College and School should ensure that there are adequate resources and support for supervisors and students, within their extent to provide. The School is expected to arrange for the students to become familiar with the facilities, activities and services of UKZN, its student bodies and the School (University of KwaZulu-Natal, 2010a), but the fact that 88% of supervisors view the responsibility as theirs should be conducive to a good supervisor-student relationship and enhance throughput.

5.2. The role perceptions of MScAgric supervisors with regard to the contact and involvement with the student

The UKZN guidelines on supervisory roles outlines the responsibility to set up a regular schedule of meetings as that of the supervisor (University of KwaZulu-Natal, 2010a). However, the respondents in this study showed a varied response, with 50% viewing this as a shared role and 19% as the student's role. A significant effect of PhD supervision experience was observed where, interestingly, some less experienced PhD supervisors identified this as a supervisor role, while others saw it as a student role. Most experienced PhD supervisors viewed this as a shared role. Similarly, this trend was observed for less and more experienced MScAgric supervisors (P=0.07). There was also a trend (P=0.09) for post level to affect the views, with more lecturers viewing this as a supervisor role, while other post levels tended to stipulate this as a shared role. There was no significant effect of whether supervisors had attended seminars/workshops on supervision or not on the role perception to initiate frequent meetings.

81% of respondents viewed monitoring student progress as either a supervisor or shared role, and these views were not significantly affected by post level, MScAgric supervision experience, PhD supervision experience or whether supervisors had attended seminars/workshops on supervision. Monitoring student progress would imply the willingness of the supervisor to "mentor and train", "be accessible", "encourage the student to engage in complementary activities" and "review progress" (p 11), as suggested (University of KwaZulu-Natal, 2010a), but which also calls for a

willingness on the part of the student to comply – which is perhaps why this role was seen as supervisory or shared.

The responsibility to terminate candidature, if considered necessary, was perceived by 50% of respondents to be a supervisor role, by 25% as a shared role and by the remaining 25% as a student role. These views were significantly affected by MScAgric supervision experience, but not by post level, PhD supervision experience or whether supervisors had attended seminars/workshops on supervision. More experienced MScAgric supervisors saw this as a supervisor role, while less experienced MScAgric supervisors saw this as a shared role (57%) or student role (29%). The UKZN guidelines don't specifically address termination, but do suggest that the supervisor reviews student progress, and report on this including significant issues and remedial action. It is also a supervisor responsibility to "assess the candidate as to his/her ability to undertake the proposed project" (p 10) at the outset of the research. However, this may be difficult when students are accepted from other institutions. 86% of less experienced MScAgric supervisors viewed this role as shared or as that of the student, perhaps because they have not been placed in a situation to have to deal with this, but it is unlikely that students will recognize their own incompetence (Dunning *et al.*, 2003), and is therefore probably necessary that the supervisor accepts responsibility for this role. The lack of consensus in this role could negatively affect dropout rather than time-to-completion, but if a supervisor is unwilling to accept responsibility for terminating candidature, it is possible that students would continue in the system and perhaps eventually complete the degree, and contribute negatively to time-to-completion.

5.3. The role perceptions of MScAgric supervisors with regard to the thesis

Ensuring completion within the minimum time was viewed by all but 1 as a supervisor or shared role. The was a tendency (P = 0.06) for a difference in counts of the perceived role of ensuring timeous completion according to post level, with Senior Professors/Professors and Lecturers regarding this more as the supervisors role while Associate Professors and Senior Lecturers regarded this as more of a shared responsibility. The UKZN guidelines recommend that the supervisor should facilitate

timely completion, adjusting the scope of the project if necessary without compromising on the quality, although the student is recommended to discuss and confirm with the supervisor the processes and timelines for submission (University of KwaZulu-Natal, 2010a).

Responsibility for methodology and content was seen mainly as a supervisor or shared role, while responsibility for the presentation of the thesis was seen largely as a student or shared role. Responsibility to review drafts in a timely manner was seen mainly as the supervisor role. There was generally consensus between supervisors on their view of roles pertaining to the thesis and these were not significantly affected by post level, MScAgric supervision experience, PhD supervision experience or whether supervisors had attended seminars/workshops on supervision. The views of respondents generally adhered to the UKZN guidelines, and concurred with the recommendations that supervisors provide constructive criticism within a reasonable and agreed timeframe and to assist in style, content, form, structure and the development of a research argument, but that the supervisor is not expected to correct grammar, spelling mistakes, language, tense or referencing, nor to rewrite any parts of the dissertation or thesis (University of KwaZulu-Natal, 2010a).

Lessing (2011) found that despite clear views of the role of the supervisor in the literature, few lecturers at an institution of open and distance learning (UNISA) identified these roles as part of their responsibility, suggesting that a mind shift with regard to their role in the supervisory process is required. However, in the case of this study, a different level of commitment was observed, with supervisors appearing to accept responsibility for many aspects of supervision. A lack of consensus in role perception that could impede completion times was only observed in the responsibility to initiate frequent meetings. This is suggested by UKZN to be a supervisor responsibility, but was not perceived as such by some respondents and without regular meetings it is possible that students could lose motivation.

Due to time constraints and increased pressure on supervisors to take on more postgraduates, a "blended learning" approach has been suggested by de Beer &

Mason (2009), where the use of an on-line program which keeps track of reviewed work and comments as well as a route of enquiry. Students felt a stronger supervisor presence and the ability to communicate better which could prevent setbacks in the thesis writing due to an inability to meet. However, face-to-face contact was emphasised as being important in the early stages in order to build rapport, trust and understanding in the supervisory relationship.

The views of MScAgric supervisors on their role in the supervisory process did not differ according to whether they had attended seminars/workshops on supervision. The majority of respondents had attended a seminar/workshop on supervision and supervisory style was generally based on past experience, research and information obtained from seminars/workshops. A few respondents added that they had a specific program to manage throughput and one stated that they followed the style of their own supervisor.

5.4. The nature of the supervisory-student relationship

50% of respondents thought that the supervisor-student relationship needed to somewhere between being purely professional one and a close personal one, however there were no significantly different views based on post level, experience in MScAgric or PhD supervision or whether respondents had attended seminars or workshops on supervision. Students are expected to "establish a professional working relationship with the supervisor" (p 15), and supervisors are expected to play a supportive role, which may entail becoming familiar with the individual background, needs, expectations and constraints of a research student in order to be in a position to do so (University of KwaZulu-Natal, 2010a), but it is the responsibility of the supervisor, as the one in the position of authority, to maintain professional relationships (Sullivan & Ogloff, 1998). In order to maintain a professional relationship it may be necessary to know the students personal circumstances, but the obligation of a supervisor to remain objective with respect to their students professional development can be jeopardised by taking on roles that blur the boundaries (Sullivan & Ogloff, 1998). Sullivan & Ogloff (1998) caution against a supervisor-student relationship that could be considered a dual or multiple relationship, such as becoming involved in the

extracurricular activities of students, enquiring about significant others, renting space in their homes or loaning money, as the roles become impossible to clarify and may affect the supervisors judgement of the student. It may not be feasible for supervisors to avoid social or nonprofessional contact with students altogether, and the process of professional socialisation may be important and beneficial to the student, but Sullivan & Ogloff (1998) suggest that supervisors must be sensitive to the potential harmful effects of other nonprofessional contact and should refrain from entering into or promising another personal, scientific, professional, financial or other relationship with students if it appears likely that it would impair objectivity or otherwise harm or exploit the student. Hockey (1995), however, suggests that, at least in PhD supervision, pastoral support is necessary, and because academic and pastoral support can become conflated, resulting in supervisors' decisions being influenced by emotional involvement, it is important that supervisors receive training on how to offer pastoral support, so that they can empathise with their students' intellectual and emotional problems, whilst simultaneously achieving enough social and emotional distance so as to be able to effect the intellectual tasks of guide and critic.

The supervisor-student relationship has been likened to therapy relationships, where, due to a position of power or influence, the psychologist may exploit the person whom they are expected to help. If engaged in nonprofessional relationships, the consent cannot be considered valid due to the client's faith in the psychologists therapeutic abilities and greater knowledge, or alternatively may fear the negative consequences of noncompliance, which leads to a power differential (Sullivan & Ogloff, 1998). Sullivan & Ogloff (1998) list three reasons why it is inappropriate to become too emotionally involved in a student's life; it becomes difficult to sort out the extent to which supervisor evaluations of the student are based solely on the supervisor's professional, objective knowledge of the student's performance, it is inappropriate to judge a student's private life and the reputation of the supervisor, student and the programme may be tarnished if the relationship is called into question. Although Hockey (1995) advocates pastoral support in PhD supervision, the examples from this study showed that problems can emerge when supervisors become over-involved with students, with academic judgement being influenced, the

supervisor feeling that they were being "sucked in", as well as problems with the autonomy of the thesis, and he advises that supervisors are trained in how to provide pastoral care.

Experienced supervisors in a study by Manathunga (2005) appeared to be more alert to potential warning signs that their students were experiencing difficulties, and they attributed this to having worked to establish and build supportive relationships to the point where students had developed trust and confidence in them, and felt willing to raise issues or problems directly. These supervisors also appeared to have found a balance where they could for example have a heated discussion about the project and then talk about the weekend over a cup of coffee. Manathunga (2005) suggests that completion times of PhD's can be minimised if supervisors can adopt a pedagogical focus to supervision, providing personal guidance and regular and individualised supervision, as it would place them in a position to detect early warning signs that students are experiencing difficulties. Thus it appears as if there is a balance required in the supervisor-student relationship that is both personal and professional.

CHAPTER 6 –CONCLUSIONS

While it was acknowledged in the literature review that throughput and dropout are complex issues involving many factors, the aim of this thesis was to determine from available student records and supervisor perceptions, whether there were any predictors of the time-to-completion of MScAgric students that could be used to assess how time-to-completion could be improved. While socio-demographic predictors of persistence, and in this case of time-to-completion, may not provide actionable results in practice, they can be useful in an understanding of persistence and the effects of interventions aimed at improving persistence (Reason, 2009). As Manathunga (2002) suggests, developing a set of student characteristics to predict attrition or slow throughput needs to be done cautiously as this could lead to generalisations that may disadvantage equity groups, with the institution viewing risk status of applicants as if they were business propositions, however, the interpretation of the results can aid in the development of customised support systems (Rodwell & Neumann, 2008). This was the premise that Tinto (1982) took, in recognizing that there are limits to what we can do to reduce dropout and the question is not whether we should eliminate dropout (which is not possible) but for which types of students in which types of settings we should act to reduce it. This investigation was a starting point for a specific set of students (MScAgric students) to determine whether there are any differences that could point towards achieving this

The following research questions were asked:

- What factors identified from UKZN student records promoted or impeded time-to-completion of MScAgric students graduating from 2000 to 2012
- What was the mean time to graduate of MScAgric students during this time period?
- How do supervisors of MScAgric students view their role in the supervisory process in relation to time-to-completion?

Time-to-completion did appear to be slow with 67% of full-time students (n = 99) and 56% of part-time students (n = 22) taking longer than the minimum duration + 1 year to complete. However, the national average in South Africa in 2000 and 2005, in the Natural and Agricultural Science fields, was reported to be about 2.9 years to completion (CHE, 2009), and it was stated in this report that these rates were comparable to similar findings in Europe, Australia and North America, and do not signify whole scale inefficiencies. This was considering that some students do not study full-time though, and time-to-completion was not estimated on a full-time basis.

Full-time students took significantly longer to complete a MScAgric than the part-time students (calculated as a full-time equivalent). Overall, it took a mean time of 2.9 years to complete. Significantly more White students passed *cum laude*, however they tended to take longer to complete and this may be a result of spending more time on the thesis before rule MR13 came into effect. Those students that obtained their MScAgric *cum laude* had significantly higher matric score, undergraduate weighted average and final year of undergraduate weighted average; however, these did not appear as significant variables in the regression analyses.

In general there was consensus in the way supervisors viewed their roles in the supervision process irrespective of post level, experience in supervising MScAgric or PhD students, or whether they had attended seminars or workshops relating to supervision. These views also related well to the guidelines suggested by the University and supervisors appeared to acknowledge responsibility for roles allocated to them, unlike a similar report in the literature (Lessing, 2011). The major areas where consensus was not achieved were in the role of terminating the candidature if necessary relating to MScAgric supervision experience, and in selecting the research topic and initiation of frequent meetings relating to PhD supervision experience. The effects of this lack of consensus on time-to-completion could have a role in that less experienced supervisors may cost students time in finding a research topic and getting the project off the ground and the student losing momentum through infrequently meeting. If a supervisor is not prepared to accept responsibility for terminating

candidature should this be required, it may also result in long times to completion with students dragging through the process to eventually complete or dropout.

While it is clear that there are many variables, many of which are interlinked, that influence throughput, probably relevant to time-to-completion, this thesis has focused on student attributes and supervisors role perceptions as two indicators of time- to-completion of MScAgric students. While it was clear that many students do not complete timeously, these results didn't reveal many points of action to be considered to improve time-to-completion, and probably point to the greater degree of complexity needed to understand this issue. Perhaps there could be greater monitoring that full-time students are really full-time and not just registering as such to obtain the benefits in terms of funding, or perhaps benefits should be extended to part-time students. Current supervisor role perceptions also didn't highlight many areas of concern, and although perhaps not linked to the student records from 2000 to 2012, but rather providing current views, these do provide some insight into the perceived supervision roles. One issue that could perhaps influence time-to-completion are that some supervisors do not accept responsibility for terminating MScAgric candidature if necessary. While there may not have been significant differences in the perception of the roles of a supervisor in most areas, there are still some supervisors that don't feel responsible at all for ensuring completion within the minimum time, the methodology or content, or reviewing drafts in a timely manner, which could possibly delay completion times in some students. While students need to also accept responsibility, the supervisor, who is in the position of authority needs to be aware of early warning signs.

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APPENDICES

APPENDIX I – Gatekeepers permission

UNIVERSITY OF ™
KWAZULU-NATAL
INYUVESI
YAKWAZULU-NATALI

10 April 2013

Dr Nicola Tyler
Animal & Poultry Science
School of Agriculture, Earth
and Environmental Sciences
UKZN

Email: Tyler@ukzn.ac.za

Dear Dr Tyler,

RE: PERMISSION TO CONDUCT RESEARCH

Gatekeeper's permission is hereby granted for you to conduct research at the University of KwaZulu-Natal towards your postgraduate studies, provided Ethical clearance has been obtained. We note the title of your research project is:

"Factors associated with throughput of MScAgric students in the former School of Agricultural Sciences and Agribusiness"

It is noted that you will be constituting your sample with a request for anonymised data from the ITS system. A copy of this letter (Gatekeeper's approval) together with the ethical clearance must be attached when requesting the services from ICS.

Data collected must be treated with due confidentiality and anonymity.

Yours sincerely

Professor J J Meyerowitz
REGISTRAR

APPENDIX II – Ethics approval

UNIVERSITY OF
KWAZULU-NATAL ™
INYUVESI
YAKWAZULU-NATALI

15 February 2012

Dr Nicola Tyler (952046637)
School of Education
Edgewood Campus

Protocol Reference Number: HSS/0060/013M
Project Title: Factors associated with throughput of MScAgric students in the former School of Agricultural Sciences
and Agribusiness.

Dear Dr Tyler

Expedited Approval

I wish to inform you that your application has been granted Full Approval through an expedited review process:

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form,
Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through
the amendment/modification prior to its implementation. In case you have further queries, please quote the above
reference number. PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5
years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

....
Professor Steven Collings (Chair)
/px

cc Supervisors Dr Edith Dempser and Ruth Searle
cc Academic Leader: Dr MN Davids
cc School Administrator Ms Bongekile Bhengu

INSPIRING GREATNESS

APPENDIX III – Questionnaire to Supervisors

Position:
How long have you been lecturing at UKZN:
Do you have a PhD:
How many MScAgric students do you supervise on average per year:
How many PhD students do you supervise on average per year:
How many MScAgric students have graduated under your supervison/co-supervision:
How many PhD students have graduated under your supervison/co-supervision:
Have you been to any seminars/workshops etc on supervision:
Is your style of supervision based on past experience/research/any seminars or workshops you attended on supervision? (cross out irrelevant options)

Tracking postgraduate supervision: Role Perception Rating Scale (RPRS)

Read each pair of statements listed on this sheet. Each expresses a standpoint supervisors and students may take. However, you may not agree fully with either of the statements. Please estimate your position and mark it on the scale. For example, if you believe very strongly that supervisors should select the research topic you would circle '1' on scale 1; if you believe that is a student prerogative, you would circle '5'. If you think it is a shared negotiated responsibility, circle '3'. You should be particularly looking for patterns (e.g. tendency to s or s) which indicate strong disagreement between student and supervisor. This would form the basis for negotiation. However, it is important to remember that there is no 'right' answer - these are expectations!

	Topic/course of study		
1.	It is a supervisor's responsibility to select a promising topic	1 2 3 4 5	It is a student's responsibility to select a promising topic
2.	In the end, it is up to the supervisor to decide which theoretical frame of reference is most appropriate	1 2 3 4 5	A student has a right to choose a theoretical standpoint even if it conflicts with that of the supervisor
3.	A supervisor should direct a student in the development of an appropriate program of research and study	1 2 3 4 5	A student should be able to work out a schedule and research program appropriate to his/her needs
4.	A supervisor should ensure that a student has access to all necessary facilities	1 2 3 4 5	Ultimately, the student must find the necessary facilities to complete his/her research

	Contact/involvement		
5.	Supervisor-student relationships are purely professional and personal relationships should not develop	1 2 3 4 5	Close personal relationships are essential for successful supervision
6.	A supervisor should initiate frequent meetings with a student	1 2 3 4 5	A student should initiate meetings
7.	A supervisor should check constantly that a student is on track and working consistently	1 2 3 4 5	Students should work independently and not have to account for how they spend their time
8.	A supervisor should terminate the candidature if she/he thinks a student will not succeed	1 2 3 4 5	A supervisor should support the student regardless of his/her opinion of the student's capability
	The thesis		
9.	A supervisor should ensure that the thesis is finished not much later than the minimum period	1 2 3 4 5	As long as a student works steadily she/he can take as long as she/he needs to finish the work
10.	A supervisor has direct responsibility for the methodology and content of the thesis	1 2 3 4 5	A student has total responsibility for ensuring that the methodology and content are appropriate to the discipline
11.	A ;supervisor should assist in the actual writing of the thesis if the student has difficulties and should ensure that the presentation is flawless	1 2 3 4 5	A student must take full responsibility for presentation of the thesis, including grammar and spelling
12.	A supervisor should insist on seeing drafts of every section of the thesis in order to review them in a timely fashion	1 2 3 4 5	It is up to a student to ask for constructive criticism from a supervisor

APPENDIX IV – Invitation to participate in study

UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF EDUCATION
MASTERS IN EDUCATION (MEd)

Dear Participant,

MEd Research

Researcher: Dr NC Tyler (Tel. No: 033 260 5475)

Supervisor: Dr E.R. Dempster (Tel. No: 033 260 5723)

I, Nicola Tyler, am a staff member in the School of Agricultural, Earth and Environmental Sciences and am registered for a MEd in the School of Education, in the College of Humanities at the University of KwaZulu-Natal. You are invited to participate in a research project entitled:

Factors associated with throughput of MScAgric students in the former School of Agricultural Sciences and Agribusiness.

The overall aim of this study is to determine factors that influence the throughput of MScAgric students, which if slow, cause a bottleneck in the system as well as delayed subsidies. Factors associated with the student, the supervisor and the Institution will be investigated in an attempt to identify how throughput can be improved. These students form the pool of doctoral candidates, an important resource in the country's drive to become a knowledge-based economy.

This section of the study seeks to identify the perceptions of supervisors as to their role in the process

Your participation in this study is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no monetary gain from participating in this research project. Confidentiality and anonymity of records identifying you as a participant will be maintained by the School of Education and Development at UKZN. All names will be removed in the data analysis and reporting.

If you have any questions or concerns about participating in this study, please contact me, or my supervisor at the numbers listed above.

Sincerely

N. Tyler

Investigator's signature   20 November 2012

APPENDIX V – Informed consent

**UNIVERSITY OF KWAZULU-NATAL
SCHOOL OF EDUCATION
MASTERS IN EDUCATION (MEd)**

MEd Research Project

Researcher: Dr N.C. Tyler (Tel No: 033 260 5475)

Supervisor: Dr E.R. Dempster (Tel No: 033 260 5723)

CONSENT FORM

I_____(full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project. I understand that I am at liberty to withdraw from the project at any time, should I so desire.

_____   _____

Signature of Participant   Date