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School-leavers' Transition to Tertiary Study: A Literature Review

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“School-leavers’ Transition to Tertiary Study: A Literature Review”

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Abstract

The theoretical and empirical literature relating to factors and problems in the transition of students from secondary to tertiary level education is reviewed here. Studies on persistence and attrition, and on the analysis and prediction of academic performance of students, generally and in particular discipline areas, are included.

Keywords: transition to university; student performance.

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Introduction

The problem of the transition from secondary school to the first year at university is not new in Australia – see for example Powell (1979) on transition and Downes (1976) on predicting performance – but the issues change with time. The problem can be devastating for individuals and their families, and it represents an enormous social and economic waste (Pargetter 1995).

The theoretical and empirical literature relating to factors and problems in the transition of students from secondary to tertiary level education is reviewed here. Studies on persistence and attrition, and on the analysis and prediction of academic performance of students, generally and in particular discipline areas, are included. Results relating to first year university entry direct from school are of particular interest, though the literature also encompasses non-standard-entry students as well as other post-secondary institutions. The review includes most of the recent Australian literature, and key works from the plethora of overseas material, particularly from North America, in addition to studies of theoretical models from the education, psychology, sociology, economics, and statistics literature, and of their application in specific discipline areas. It is based on the excellent literature review of Clarke et al. (1994)*, which is augmented, particularly with post-1993 studies. (* denotes an Australian study.)

As noted by Clarke et al., a significant problem related to reviewing this type of literature results from different types of admission policies. Many overseas institutions, particularly in North America, have an open-door as opposed to competitive, and hence selective, admission policy, as was generally the case in Australia until 1998. Another relevant differentiation from Australian universities is the American two-year residential (liberal arts) colleges (where much of the Clarke research has been undertaken).

Theories and Models

Early theories on transition were based in psychology, focusing on individual personal characteristics. From the mid-seventies, the emphasis shifted to sociological factors, and more recently it has focussed on the institutional context and the students' integration.

Tinto's (1975) conceptual model, based on Durkheim's (1961) suicide theory and Spady's (1970) model of the student dropout process, is the most widely recognised and tested. Tinto (1987, 1993) synthesised much research on the theory of student departure, emphasising the role of the institution and social/academic integration of students, particularly the interaction between the students' attributes, skills and dispositions and the institution's academic and social systems. Students' departure was found to be primarily related to isolation and incongruence. Tinto's model has been confirmed by Allen and Nelson (1989), Grossett (1989), Boyle (1989), Halpin (1990), Christie and Dinham (1990) and others. However, Neumann and Neumann (1989) found it a poor predictor, though

possibly useful for freshmen. Pascarella et al. (1983) note that Tinto's model was based in a residential context, but that 'the concepts of person-environment fit, social integration, and institutional commitment operated differently in the commuter institution'. Pascarella (1982) also found the relationship among these concepts was more consistent with 'theoretical expectations in the residential and liberal arts samples than in the two- or four-year commuter samples.'

Bean's (1980,1982,1985) and Bean and Metzner's (1985) theories and models of student departure, which emphasise the influence of the external environment more than social integration factors, are particularly applicable to non-traditional students. Related studies include those of McCaffrey (1989) for distance education, Stahl and Pavel (1992), Eaton and Bean's (1993, 1995) model of attrition based on attrition/avoidance behaviour, Azjen and Fishbein's (1975) model (c.f. Koslowsky 1993, Carpenter and Fleishman 1987*), Brewer's (1992) life-task model, and Pascarella's general model for assessing change. Cabrera et al. (1992, 1993) examine empirically 'the convergent and discriminant validity' of the theoretical models of Tinto and Bean.

Learning models of academic performance are used in the economic literature. These educational 'production function' models relate output (in terms of value added or absolute achievement) to input (in terms of students' ability, background, interest and effort, and instructional input).

Analyses

Research has been extensive and varied, generally focusing on specific aspects of transition, persistence and academic performance in particular contexts. Some common themes and factors emerge from the literature, but variations in findings occur in different countries and cultures and by disciplines, institutions and student categories, as do conflicting results due to theoretical and methodological issues (Anderson 1987; etc).

Studies have been undertaken in a range of countries:

- USA – Tinto, Pascarella, Terenzini, Astin etc, Gutierrez-Marquez (1994) (10,000 students), Gillespie and Noble (1992);
- Canada – Sarkar (1993), Sweet (1986), Anderson et al. (1994);
- UK – Goldstein, Thomas, Rabash, Raudenbusch etc., Hadley and Winn (1992), Gramlich and Greenlee (1993);
- Israel – Koslowsky (1993), Ben-Shakar and Kiderman (1996);
- Asia – Kember et al. (1991) in Hong-Kong, Tay (1994) in Singapore, Pongboriboon (1993) in Thailand;
- Australasia – Anderson (1959, 1960, 1972)*, Keef (1992) in New Zealand;
- Australian studies, indicated by *, include: Dobson et al. (1996)*, Dobson and Sharma (1995)*, Shah and Burke (1996)*, Calderon (1997)* in Victoria, Long et al. (1995)*, Lewis (1994)*, Clarke et al. (1994)*, Everett and Robins (1991)*, Elsworth et al. (1982)*, Watkins (1979, 1981, 1982)*, Abbott-Chapman et al. (1992)* in Tasmania, McClelland and Kruger (1993)* in Queensland, Clark and Ramsay (1990)*, Power et al. (1986, 1987)* and Linke et al. (1985)* in South Australia, Watkins (1979-1986)*, Stevens and Walker (1996)*, Jackson (1997)*.

Large scale studies include:

- Gutierrez-Marquez (1994), Gillespie and Noble (1962) (6000), Anderson et al. (1994) (7000), Clark and Ramsay (1990)* (7000), Dobson et al. (1996)*, Shah and Burke (1996)*, Calderon (1997)*.

Some studies have focussed on specific discipline areas:

- Nursing – Care (1995), Burgum et al. (1993)*, Benda (1991);
- Medicine – Tutton and Wigg (1990)*;
- Law – Bradsen and Farrington (1986)*;
- Education – Hart (1992)*;
- Geography – Walmsley (1990)*;
- Physics – Brekke (1994), Young (1991)*, Bailey et al. (1989), Logan and Bailey (1983), O'Halloran and Russell (1980), Dale and Jennings (1986)*;
- Science – Young (1991)*, Kidd and Naylor (1991), Warwick-James (1994)*;
- Engineering – Stone (1988);
- Mathematics – Umoh et al. (1994), Pongboriboon (1993), Wood and Smith (1993)*, Watson (1988)*;
- Statistics – Smith et al. (1994)*, Thompson and Smith (1982)*, Magel (1996), Jackson (1997)*;
- Computing – Flitman (1997)*;
- Accounting – Ramsay and Baines (1994)*, Auyeung and Sands (1993)*, Bouillon and Doran (1990, 1992), Danko et al. (1992), Keef (1992), Dinius (1991), Farley and Ramsay (1988)*, Norton and Reding (1992), Nourayi and Reding (1992), Nourayi and Cherry (1993);
- Economics – Douglas and Sulock (1995), Milkman et al. (1995), Stratford and Sulock (1995), Anderson et al. (1994), Brasfield et al. (1993), Williams et al. (1992), Dancer and Doran (1990)*, Siegfried and Fels (1979), Siegfried and Walstead (1998), Tay (1994), Ferber et al. (1983), Heath (1989), Horvath et al. (1992), Lumsden and Scott (1983, 1987), Palmer et al. (1979);
- Management – Hadley and Inn (1992);
- Business/Commerce – Hand and Fry (1995)*, Tay (1994), Ashar and Skenes (1993), Pharr et al. (1993), Cheng (1991)*, Wright and Palmer (1994), Stanley and Oliver (1994)*.

Some studies have focused on study mode or student type:

- Distance Education – Care (1995), Long (1994)*, Kember (1989, 1990), Kember et al. (1991), Stone (1988), Sweet (1986), Eisenberg and Dowsett (1990), McMahan (1990)*;
- Adults – Duke (1987), Farabaugh-Dorkins (1991), Ashar and Skenes (1993), Munn et al. (1994), Dirk and Jha (1994);
- Disadvantaged – Fox (1994, 1986), O'Dowd (1996), West (1985)*;
- Minority groups – Pavel (1991), Levin and Levin (1991), Kiang (1992), Castle (1993), Dobson (1995), Kramer (1993), von Destinon (1985), Price et al. (1992)*, Lewis (1994)*, McJamerson (1992)*, Nora (1987), Norman and Norman (1995).

Types of comparative analysis:

- Progress rates – Dobson et al. (1996)*;

- Simple correlations – McClelland and Kruger (1993)*, Myers and Pyles (1992);
- Chi-squared analyses to more sophisticated regression analysis – West et al. (1986)*;
- Multiple linear regression – Auyeung and Sands (1993)*, Elsworth and Day (1983)*, Munro, (1981);
- Non-linear – Salemi and Tauchen (1982);
- Logistic – Benso (1991), Everett and Robbins (1991)*, Gillespie and Noble (1992), McClelland and Kruger (1993)*, Becker and Salemi (1977);
- Probit – Spector and Mazzeo (1980), Dey and Astin (1993) ;
- Logit – Dey and Astin (1993);
- Multinomial logit – Park and Kerr (1990);
- Discriminant analysis – Hamdi et al. (1991), West et al. (1986)*;
- Path analysis – Farabaugh-Dorkins (1991), Munro (1981), Murray-Harvey (1993)*, Pascarella and Terenzini (1983);
- Neural networks – Flitman (1997)*;
- Causal modelling – Elsworth and Day (1983)*, Mencke et al. (1988), Stage (1987);
- Structural equation analysis – Cabrera et al. (1993), Kuh and Vesper (1991), Minnaert and Janssen (1992);
- Educational production functions – Jackson (1997)*, Douglas and Suloch (1995), Becker and Salemi (1977), Salemi and Tauchen (1980), Becker (1977, 1982), Modk (1959), Anderson et al. (1994), Siegfried and Fels (1979), Hanushek (1979);
- Multilevel statistical modelling – in secondary schools’ effectiveness studies – Young (1991)*, Goldstein (1995), Goldstein and Spiegelhalter (1996), Goldstein and Thomas (1996), Goldstein et al. (1996), Deely and Smith (1998), Thomas and Mortimore (1996), Woodhouse et al. (1996), Hill (1995)*, Raudenbusch and Willms (1995), Thomas et al. (1995), Tymms (1995), Seltzer (1994), Rabash and Goldstein (1994), Paterson and Goldstein (1991), Raudenbush et al. (1991) – and ‘value-added’ measures at university level – Hadley and Winn (1992).

Criticisms of methodologies include Braxton et al. (1988), who suggest that data from *post hoc* studies should be treated cautiously. Similar issues have been raised in Pascarella (1988), Terenzini and Pascarella (1990), Johnes and Taylor (1990), McPherson and Paterson (1990), Levin and Levin (1993)*.

Factors Identified as Significant

Transition is complex, and varies according to several factors and their interaction. This is evidenced in the following review, as is the divergence of findings. Calderon’s (1997)* recent large-scale Monash comparison of student progress-rates identifies the stereotypical successful student in terms of personal characteristics such as gender, socioeconomic status and school background, and shows that these vary by faculty. Following Clarke et al. (1994)*, variables identified as relevant in the literature are grouped in categories.

(i) Student Demographic Characteristics

Age

A variable for age is included in most studies, but the results are mixed, partly due to analytic problems of definition and control. For example, sometimes analysis includes 'mature age' students, a variable which often but not necessarily includes students without 'normal entry' qualifications (see McClelland and Kruger 1993)*. With increasing alternative entry pathways to higher education, a variable based on entry type is more appropriate in such cases. Maturity is suggested as a factor in student success: hence the argument for deferring university studies for a year after secondary school. Linke et al. (1985)* found that 5000 deferring South Australian students generally perceived deferring as 'valuable personal experience with relevance also to their ability to cope with subsequent studies', but also that deferment acts as a filter, diverting female non-metropolitan students from entering higher education.

Age appears to have little predictive power in some studies for success (e.g. Kuh and Vesper 1991, McClelland and Kruger 1993)* or persistence (e.g. Gillespie and Noble 1992, West et al. 1986)*. Farabaugh-Dorkins (1991) in a study of adult (over 21 years) freshmen, found that dropping out most correlated with intent to leave, GPA and goal commitment. [See Clarke re age]. However Clark and Ramsay (1990)* found age correlated with performance in most institutions and courses. Siegfried and Walstead (1990) indicate that age has a positive effect on performance in economics. However, Anderson et al. (1994), controlling for vintage in a large Toronto study, found significant differences across sessions and campuses, and that after 25 years higher ages begin to have a positive effect. [Hong (1982, 1984) also considered the age factor in predicting success.]

Shah and Burke's (1996)* national Australian study using input-output analysis found a 20 year old commencing student has the highest chance of completing a course, and that the difference in probabilities varies with the commencement of age.

Linguistic and Cultural Background

Non-English Speaking Background (NESB) is used sometimes as an indicator of ethnicity (Winefield et al. 1990). North American research variously indicates that ethnicity either influences success (Myers and Pyles 1992) or has no effect (Benson 1991, Kuh and Vesper 1991), and also either affects persistence indirectly (Munro 1981, Pascarella and Terenzini 1983) or has no effect (Gillespie and Noble 1992, Kuh and Vesper 1991). Stage (1987) noted that majority students are likely to be more academically integrated. Australian research appears more clear cut. Aboriginal and Torres Strait Islander (ATSI) students have been consistently reported as being less successful (McClelland and Kruger 1993)* and less persistent (Abbott-Chapman et al. 1992)*. Price et al. (1992)* studied attrition in the Northern Territory.

Asian students tend to enter (Winefield et al. 1992) and to persist (Abbott-Chapman et al. 1992*, West et al. 1986)* in tertiary education disproportionately,

but to have more problems with their institutions, their courses and with not being academically prepared (West et al. 1986)*. Tay (1994) found performance in economics in Singapore different according to ethnic background. Birrell's (1994)* Monash study indicates Greek and Asian students have a high entry and low attrition rate, and discusses the issue of family support and motivation. Other studies of equity groups include Lewis (1994)*, Dobson and Sharma (1995)* and Levin and Levin (1993)*.

Gender

In some studies gender did not appear to predict performance (Benson 1991, Murray-Harvey 1993*, Tutton and Wigg 1990)* or persistence (Gutierrez-Marquez 1994, Gillespie and Noble 1992, West et al. 1986)*. However females dominated males in performance in the following studies: Everett and Robins (1991)*, Hamdi et al. (1992), Abdulrazzak and Nada (1992), Clark and Ramsay (1990)*, McClelland and Kruger (1993)*. Females also dominated males in persistence in the following studies: Hamdi et al. (1992), Munro (1981), Pascarella and Terenzini (1983), Clark and Ramsay (1990)*, Tinto (1993).

Clarke et al. (1994)* considered that these mixed results can be attributed to confounding factors and methods of analysis, and that any interpretation must avoid being simplistic. For example, Abbott-Chapman et al. (1992)* found attrition risks greatest for able females, while West et al. (1986)* found different motivations for dropping out by gender, but no quantitative differences. Pascarella and Terenzini (1983) found an overall indirect gender effect on persistence through initial institutional commitment, but separate analyses revealed that different male and female behaviour could be explained differently. Elsworth and Day (1983)* found females less likely to take courses offered to them from choices of secondary subjects in science, or based on their perceptions of career advantages.

Shah and Burke (1996)* found that, overall, females have a higher chance of completing a course, and take less time to complete it, than a male of the same commencing age. However, though generally true, the opposite holds in some cases in some discipline areas – e.g. males in Business, Law and Engineering. In general, females have a higher chance of completion in Architecture, Arts, Education, Health and Science. The pattern appears less uniform across other ages for other areas.

Significant differences have been found in some discipline areas. Much recent empirical work has been done in Economics, a subject where failures and attrition are high (e.g. 60% in Toronto). Males appear more persistent than females in Economics subjects (Anderson et al. 1994, Douglas and Sulock 1995). Males also have been found to perform better than females in economics by Heath (1989), Ferber et al. (1983), Lumsden and Scott (1981), Tay (1994) (in Singapore), and Anderson et al. (1994), but not by Douglas and Sulock (1995), who suggested that previous findings of a significant gender effect may be the result of sample selection bias. Interestingly, Anderson et al. could not duplicate their result in other commerce or mathematical subjects. Differences appear to depend on particular course components in disciplines such as Accounting (Bouillon and Doran 1992, Ramsay and Baines 1996*, Nourayi and Cheney 1993), Economics (Siegfried and Walstead 1990), and styles of assessment (Lumsden and

Scott 1987, Williams et al. 1992). Some other studies omitted gender, although it might have been relevant (Auyeung and Sands 1993*, Minnaert and Janssen 1992). Other studies include Clark and Ramsay (1990)*, Bean and Vesper (1994), Dobson and Sharma (1995)* and Goldstein (1996).

Student Entry Category/School Type

The North American literature is inconclusive on the relevance of type of school to persistence (e.g. Gillespie and Noble 1992). In Australia students from government schools generally appear less likely than those from non-government schools to enter tertiary education (Elsworth and Day 1983)*, but more likely to persist (Abbott-Chapman et al. 1992*, West 1985)* and also to perform (Abbott-Chapman et al. 1992*, West et al. 1986)*, except in the Tutton and Wigg (1990)* study of medical students.

Although the focus here is on school to university transition, special entry is an increasing category in many tertiary institutions. Hitherto this variable was rarely included in studies because of the small numbers involved. This will change in at least some institutions with the increasing emphasis on recognition of prior learning and credit transfer, the expansion of pathways to tertiary education, and lifelong learning. McClelland and Kruger (1993)* in their study of the 1990 Queensland tertiary admissions cohort, found tertiary performance slightly negatively correlated with tertiary entrance index and performance for a group of 119 'mature age' students (here indicating a lack of formal qualifications). They also found that compared with regular school entry students, students with previous post-secondary qualifications (particularly other tertiary rather than TAFE) were more successful, but students previously excluded from tertiary institutions less successful. Dobson and Sharma (1995)* and Lewis (1994)* also examined equity groups.

Socioeconomic and Socioeducational Status

Relationships between indices of socioeconomic status (SES) and tertiary entry, performance and persistence are discussed in a comprehensive literature review by O'Dowd (1997)*. Higher SES students have been found to have an increased probability of gaining entry (Winfield et al. 1992), achieving success (McClelland and Kruger 1993*) and persisting (Munro 1981, Scott et al. 1992, Astin 1993, Lewis 1994*). Most of those withdrawing for financial reasons were from low SES backgrounds (West et al. 1986)*. However Gutierrez-Marquez (1994) found that family income was not relevant to success, and a review of economics education, Siegfried and Fels (1979), found that socioeconomic background did not seem to matter much.

Some studies focused on parental education, but it was not found to be a significant factor by Gillespie and Noble (1992) or Pascarella and Terenzini (1983). It has been used as an indicator of socioeconomic status (e.g. Pascarella and Terenzini 1983, West et al. 1986)*. Young (1991)* found a composite measure of socioeducational level, parental occupation and education, and number of books in the home had a significant effect, using multilevel analysis.

Location – Home and Residential

Elsworth and Day (1983)* found that rural students were more likely to decline tertiary place offers. This could be related to a financial support factor. A location variable can be a concomitant of others, such as: socioeconomic status, where home postcode is often used as an indicator (McClelland and Kruger 1993)*, financial support (e.g. West et al. 1986* found a significant number of students attributing finance for deciding to withdraw or transfer to an institution nearer home), and social integration. Tinto (1987) found 'external community pivotal to off-campus students'. Terenzini and Pascarella (1982), after controlling for other characteristics, found the residence unit context appeared to relate to persistence among males but not females. Any analysis of overseas versus local students may be confounded by this factor.

(ii) Student Psychological Characteristics

Academic Preparedness, Learning Strategies and Locus of Control

Significant numbers of students who voluntarily withdrew from full-time study cited unsatisfactory study skills and a lack of important pre-requisite knowledge as reasons (West et al. 1986)*. Studying and learning approaches at tertiary level appear to be strongly influenced by practices at secondary school level (Ramsden 1991, Ramsden et al. 1989)* and a mis-match may create problems.

Achievement was found to be best explained by metacognitive ability by Murray-Harvey (1993)* using a cluster of ten variables including age, gender and psychological characteristics. Van Rossum and Schenk (1984) found that achievement was generally comparable for questions involving knowledge, but was higher for students using a deeper approach to learning when insight was required. An internal (sense of control of one's own behaviour), rather than an external (control by others or fate), locus of control, has been shown to increase the likelihood of entering tertiary education (Winefield et al. 1992) and indirectly affect performance (Murray-Harvey 1993)* and persistence (Munro 1981). However Wilhite (1990) found that student/academic performance is affected by the external locus of control, and West et al. (1986)* that students with dominantly an extrinsic motivation are more likely to persist than withdraw.

From the limited relevant literature available, students' performance is clearly related to their own concepts of their academic ability (Murray-Harvey 1993*, Wilhite 1990, Watson 1988* (in mathematics)). Watkins (1978-1986)* and colleagues focussed on the effects of students' personalities and attitudes, the nature of institutions and different faculties, disciplines and learning environments on student learning, study approaches and adjustment.

Goal Commitment

Students' goals for tertiary study are an important factor in persistence, as shown by Mutter (1992), Webb (1989), Preston (1993) and Sarkar (1993). Such

goals appear to have a direct effect (Gillespie and Noble 1992, Pascarella and Terenzini 1983, Allen and Amaury 1995 (one factor only)), or an indirect effect (Munro 1981, Bean 1985, Pascarella and Terenzini 1983). The influence appears to vary: greater during the earlier years (Bean 1985); more direct for females but essentially indirect for males (Pascarella and Terenzini 1983). Warwick-James (1994)*, using a national longitudinal data base, found that a clear career goal was correlated with retention, whereas Lewallen (1993) found no evidence that students who were undecided about a choice of career or major study area had a greater potential for non-persistence.

Munro (1981) found students' goals appear to be strongly influenced by their perceptions of their parents' attitudes and goals for their tertiary education. Munro (1981) also demonstrated that self-esteem indirectly influences performance through institutional commitment and satisfaction with academic activities, etc. Students' stated intention is consistently the strongest predictor, whether of persistence (Bean 1982, 1985, Cabrera et al. 1993) or dropping out (Farabaugh-Dorkins 1991).

Academic Motivation

The academic orientation and motivation of students has been found to be a significant predictor of performance and persistence by Abbott-Chapman et al. (1992)*, Hughes and Wyld (1986) and West et al. (1986)*.

Siegfried and Walstead's (1990) survey of economics students indicated study effort was positively related to student performance, whereas their earlier study (Siegfried and Fels 1979) did not. Tay (1994) found that preparation for class, and Romer (1993) attendance at class, were important for the final performance of students.

(iii) Student Prior Performance

Admission to Australian tertiary institutions on the basis of academic performance is determined according to one index or some combination of indices, such as secondary school results or ranking (overall or in specific subjects), the score of some form of scholastic aptitude test, school recommendations, and other relevant experience or submitted folio of work. Research, in Australian and overseas, consistently indicates that secondary school subject results invariably are strong direct predictors of tertiary performance.

Prior Academic Performance – Overall

A tertiary entrance index, using a sometimes complex combination of secondary school and scholastic results, appears a strong predictor of performance. This is demonstrated in Abbott-Chapman et al. (1992)*, Auyeung and Sands (1993)*, Bean (1985), Benson (1991), Hamdi et al. (1992), McClelland and Kruger (1993)*, Clark and Ramsay (1990)*, and Power et al. (1987)* for performance, and for persistence in Abbott-Chapman et al. (1992)* and Gillespie and Noble (1992). Its validity, however, may decrease over time (Clark and

Ramsay 1990*, Schofield 1989)*. See also Myers and Pyles (1992). In Singapore, Tay (1994), in contrast to all previous studies elsewhere, found overall ability or intelligence to be insignificant, but noted that this may be the result of examinations focusing only on material taught rather than on student ability, or of the homogenous high quality of the student cohort.

Prior Academic Performance – in Subjects

Many studies, including Abbott-Chapman et al. (1992)*, Auyeung and Sands (1993)*, Bean (1985), Benson (1991), Hamdi et al. (1992), McClelland and Kruger (1993)*, Minnaert and Janssen (1992), and Myers and Pyles (1992), found prior academic performance a strong predictor of persistence, both direct (Gillespie and Noble 1992, Minnaert and Janssen 1992) and indirect (Pascarella and Terenzini 1983).

Some studies distinguished between performance in, and undertaking, subjects at school. Minnaert and Janssen (1992) note that students' domain-specific knowledge relates to their intrinsic motivation to study a subject, which also relates to their course preference and their academic preparedness. Consistently, the predictive power was more obvious for the science disciplines (McClelland and Kruger 1993)* and decreased in later years (Abbott-Chapman et al. 1992*, Auyeung and Sands 1993*, Farabaugh-Dorkins 1991, McClelland and Kruger 1993*, Gutierrez-Marquez 1994).

Secondary economics is related to tertiary economics performance in Hyann and Waddell (1990) and Lumsden and Scott (1987), but not in the reviews of Siegfried and Fels (1979) and Siegfried and Walstead (1990) of mainly US studies, whereas Anderson et al. (1994) found the relationship complex, and a positive relationship only for relatively successful secondary students. An early study by Downes (1976) found secondary school performance in economics and mathematics significant in explaining first year performance in all subjects in the Economics faculty at Monash, using data from both the mid 60s and 1972, a result confirmed in this current study for the same cohort in 1996 and 1997.

Scholastic Aptitude

The most commonly used measures are the Scholastic Aptitude Test (SAT), All Australian Scholastic Aptitude Test (ASAT) and the American College Testing Program (ACT). Various measures of scholastic aptitude directly predicted tertiary performance (Bean 1985, Benson 1991, Everett and Robins 1991*, Horn et al. 1993, McClelland and Kruger 1993* (weakly), Myers and Pyles 1992). Such means appear to reflect persistence both directly (Gillespie and Noble 1992) and indirectly (Pascarella and Terenzini 1983). Everett and Robins (1991)* found the ASAT quantitative test comparable to the total tertiary admission index in the University of Western Australia for both humanities and science students. Jenkins (1992) concluded it should be used only as a supplement to secondary school Grade Point Average.

Tertiary Offer

The rank of final offer accepted has been shown to directly influence performance (McClelland and Kruger 1993)* and persistence (West et al. 1986)* in Australia, and to influence persistence indirectly (Pascarella and Terenzini 1983) in the US. Anecdotal evidence suggests that satisfaction with offer, which also relates to rank of offer accepted, may influence persistence. Stage and Ruskin (1993) linked the student college choice and persistence literature. Tertiary course choice has been explored by Kidd (1992) and Kidd and Naylor (1991).

(iv) Social Factors

Family and Peer Support

Family support influenced students' commitment to the institution and course satisfaction (Cabrera, Nora and Castaneda 1993) and was an important factor in persistence for a small sample of waverers (West et al. 1986)*, though West found that a few withdrew because of the difficulty of combining study with family commitments and needs. Terenzini (1992) noted that families can be either a supportive asset or a source of stress as relationships change. Parental encouragement related more to satisfaction for males (Bean and Vesper 1994).

Peer support and relationships have been found to enhance persistence of students both directly (West et al. 1986*, Pascarella and Terenzini 1983, Mutter 1992) and indirectly (Cabrera et al. 1993, Munro 1981, Pascarella and Terenzini 1983), although Gillespie and Noble (1992) and Kuh and Vesper (1991) found that it was not a significant predictor of persistence. Pascarella and Terenzini (1983) and Bean and Vesper (1994) found that the support of friends was more relevant for females, whereas academically-oriented factors were more influential in males' decisions. School friends were a facilitating or a complicating transition influence depending on whether they attended the same institution or not.

Study Mode

McClelland and Kruger (1993)* found no difference in the performance of part- and full-time enrolled students, but Kuh and Vesper (1991) found that the range and quality of academic activities available to each group were different. [Metzner and Bean (1987) discussed the dropout of commuter and part time students.]

Long's (1994)* results confirm previous findings that distance education students are more likely than on-campus students to withdraw, but that their academic achievement was comparable in later years although marginally lower in first year. [See also McCaffrey (1989) and Sweet (1986) on distance education, and also Care (1995).]

Financial

Financial matters generally appear to have a small but significant effect on persistence either directly (e.g. Webb 1989), or indirectly via goal commitment (Cabrera et al. 1990), or not at all (Gillespie and Noble 1992). Withdrawers gave financial problems as the most important reason in West et al. (1986)*, and third reason in Abbott-Chapman et al. (1992)*. West et al. (1986)* found that, compared to withdrawers, persisters relied on casual employment more than on family financial support. Anecdotal evidence suggests that increasing numbers of students are involved in casual jobs. Gutierrez-Marquez (1994) found weekly job hours negatively correlated with success. [See Green and Jacques 1987, Tierney 1992, Astin 1992.] Bean (1985) found a direct relationship between persistence and financial support, whereas Cabrera et al. (1993) found an indirect relationship through course satisfaction and institutional commitment. Tinto (1995) ‘found it more often cited as a reason by SES students’.

(v) Institutional Factors

Pascarella et al. (1986) found that persistence was affected by person/environment fit (which had the most salient influence), measures of academic and social integration (which had the most direct effect), and student pre-college characteristics (which had the most indirect effect).

Institutional Commitment

Overseas research has found that ‘institutional commitment’ is a factor which influences persistence (Cabrera et al. 1993, Munro 1981, Kuh and Vesper 1991). Some have distinguished between ‘initial’ and ‘subsequent’ institutional commitment: Bean (1982, 1985) found initial commitment strongly influential, particularly in the second year, whereas Pascarella and Terenzini (1983) found subsequent commitment most directly influential, and in turn directly influenced by initial commitment. Gender differences were observed: Stage (1987) found that institutional commitment appears to be more related to persistence for females, as did Allen and Nelson (1989) (and directly affected by social integration), whereas Pascarella and Tinto found it to be more of an influence on the subsequent commitment of males.

Clarke et al. (1994)* suggest that, although the perceived goals or vision of the institution and student/institution fit appear important in some of the literature, on reflection these factors appear to represent a disparate combination of goals, which are addressed in other variables such as institutional commitment, personal and social orientation of the institution, perceived value of the course and course characteristics and faculty contact.

Academic Integration

Academic integration, or out-of-class contact with faculty staff related to academic activities, has been found to be a significant predictor of persistence by Gillespie and Noble (1992). This has been confirmed by Mutter (1992), Stage

(1987), Pascarella and Terenzini (1983), particularly for males' persistence, and Towles et al. (1993) for distance students (especially freshman) with faculty-initiated contact. See also Pascarella et al. (1986). However, Bean and Vesper (1994) and Bean (1995) found that faculty contact did not appear significant at a large US research university. The quality of the interaction was observed to be more important than the frequency by Pascarella et al. (1983). West et al. (1986)* found 14% of withdrawers described teaching staff as uncaring or uninterested.

Social Integration

Bean's (1985) faculty contact variable included both social and academic contact. Stage (1987) found that social integration was likely to be higher the higher the academic integration. Students' perception that academic and administrative staff provide for their personal and social needs appears to positively influence persistence both directly and indirectly, particularly for females (Bean and Vesper 1994, Pascarella and Terenzini 1983, Pascarella et al. 1986, Cabrera et al. 1993, West et al. 1986)*. Munro (1981) and Allen and Nelson (1989) found these qualities influenced institutional commitment.

The literature on mentoring has been reviewed by Jacobi (1991), and Muckert et al. (1996)*. Life on campus and extra curricular activities appear to enhance student integration (Christie and Dinham 1990). This factor may be confounded with term residence. Other relevant studies include Astin (1993), Tinto (1995), Kuh (1993, 1995), Astin (1993) (for counselling, support services), Braxton et al. (1995), Eaton and Bean (1995) and Stevens and Walker (1996)*.

Course Expectations/Characteristics

A mismatch between prior expectations and actual experiences was found to be a significant reason for withdrawing by Abbott-Chapman et al (1992)*. West et al. (1986)*, Braxton et al. (1995), Power et al. (1986)* found that low commitment and withdrawal were often the result of inadequate counselling and decision making about university courses. King (1992) also stressed the central role of academic advising on retention. Glass and Garrett (1995) found that orientation courses improved retention, as did Sendman (1991) for the third but not the first semester, but did not result in significantly higher GPAs. Terenzini et al. (1993) found that faculty involvement was important in orientation. They also found a need for parents' involvement. Other studies include Frost et al. (1991), ERIC *Digest on Academic Advising*, Upcraft et al. (1995), Price et al. (1992)*, and Clark and Ramsay (1990)*.

A perceived lack of relevance was found to be a significant factor in dropping out in some Australian studies (Abbott-Chapman et al. 1992*, West et al. 1986)*. Overseas, Bean (1982, 1985) found course 'utility' a significant indirect predictor of persistence, and Kuh and Vesper (1991) found that student effort related to the practical values associated with courses.

Nature of Course

Findings sometimes vary according to the discipline area, which can also relate to prerequisite knowledge. Success in science subjects has been found to be better predicted than in the humanities by the total ASAT test (Everett and Robins 1991)* and by performance in relevant school subjects (McClelland and Kruger 1993)*. Shah and Burke's (1996)* input-output analysis found that students have the least chance of completing Engineering and most of Law once enrolled, noting that Medicine is probably similar to Law but they could not model it.

Teaching/Pedagogy

The level of student satisfaction with the teaching and learning activities provided by the institution has been found to predict persistence, both indirectly by Bean (1985) and directly by West et al. (1986)* (where withdrawers cited little encouragement or enthusiasm) and by Abbott-Chapman et al. (1992)*. The latter's sample of withdrawers ranked this factor as the fourth most important reason, also citing uncaring and uninterested teaching staff, an unsuccessful or inadequately supportive tutoring system, large and impersonal classes, and poor facilities. Important aspects of teacher behaviour were identified by Care (1995) in a qualitative Canadian study of distance education nurses. Elliott's (1992) interviews identify a link between behaviour of faculty and student persistence.

Persistence has been found to be slightly higher and performance better for first-year students in learning communities than in traditional classes. Collaborative learning has been discussed by Tinto (1993), Tinto and Love (1995), and 'freshman interest groups' by Tinto and Goodsell (1993, 1993, 1994), Tinto and Russo (1994), Tinto et al. (1994), and Tinto (1995).

Douglas and Suloch (1995) suggested their results provide some basis to evaluate the effectiveness of methods of teaching. Their results support the importance of homework, and indicate that homework and class attendance are similar in production of good grades. In surveys of economics education, Siegfried and Fels (1979) found that class size and textbooks are not significant for performance, and Siegfried and Walstead (1990) found that a good match between students' learning style and instructors' teaching style had positive effects, but both found that having a graduate student instructor was not relevant. Tay (1994), in a relatively controlled experimental environment, found that effects relating to the type of instructor (graduate assistant, tutor, lecturer, foreigners) were significant in performance for Economics in Singapore, and suggests contrary US findings of Watts and Lynch (1989) resulted from language ability, not cultural effects.

For distance education, see Biner et al. (1995) on the use of television classes, and Stone (1988) who cites research showing no significant difference in performance of on-campus and off-campus Engineering graduate students in video courses. Also see Long (1994)*, Lumsden and Scott (1983) on the efficacy of innovative teaching techniques in Economics in the UK, and Becker and Salemi (1977) on testing the effectiveness of audio-visual tutorials.

Administration

Bean (1982, 1985) found that the opportunity to transfer to another university directly influenced persistence, and West et al. (1986)* found that 15% of withdrawers indicated that the administrative arrangements of the institution were too inflexible.

(vi) Outcomes

Most of the literature uses outcomes related to academic performance in terms of grades, pass rates etc, and persistence/attrition. The latter two terms are generally (but not always) defined in terms of voluntary withdrawals, rather than failures or exclusions. A few outcome measures relate to students' intellectual development or personal and social development (Kuh and Vesper 1991, Volkween 1991, Terenzini and Wright 1987, Pascarella and Terenzini 1983).

Longitudinal research studies often employ some of these outcome variables as predictors for later years. Results in the earlier years often predict subsequent performance (Abbott-Chapman et al. 1992*, Auyeung and Sands 1993*, Farabaugh-Dorkins 1991, McClelland and Kruger 1993)* and persistence, both direct (Bean 1982, 1985, Cabrera et al. 1993, Gillespie and Noble 1992, Pascarella and Terenzini 1983) and indirect (Pascarella and Terenzini 1983). Intellectual development has been shown to have both a direct and indirect effect on persistence (Pascarella and Terenzini 1983).

Institutional Actions

Gillespie and Noble's (1992) study of 6000 students in five institutions supports Tinto's view that persistence models are specific to individual institutions and the time period examined. They discuss the need to identify high-risk students and develop intervention strategies targeting key factors related to student retention.

Relevant literature includes Tinto's (1993) major monograph, Cohen's (1994) *ERIC Digest on Indicators of Institutional Effectiveness*, Price (1993) on intervention strategies, Abbott-Chapman et al. (1992)*, Terenzini's et al. (1993) suggestions for transition, and Henry and Smith's (1994) system-wide effort in Colorado to develop a framework for student persistence and success. Davis and Murrell's (1994) work on the role of student responsibility in collegiate experience discusses institutions' role in encouraging this. See also Upcraft, Lee and Kramer's (1995) book on academic advising, and 'CollegeEdge eases the transition from H.S. to college' http://www.collegeedge.com/TBL_HOME.HTML.

Overview

Research on transition, attrition and performance in tertiary education is extensive, as can be seen from this bibliography.

Research studies and applications based on different theoretical models can be found in the education, psychology, sociology, statistics and economics literature. Transition and attrition research studies are mainly from the USA, but also from the UK, Canada, Israel, Hong Kong and Australia. Much research since 1975 has been based on particular theoretical models, such as those of Tinto, Spady, Bean, and on their empirical validation by Terenzini, Pascarella and others, both generally, and in particular contexts.

In general, these studies suggest that transition and persistence are related to background characteristics, disposition on entry, goal commitment, experiences after entry – including academic and social integration – and external and institutional factors. Methodological issues arise as to how these can be measured and tested. Research indicates significant differences in the sources and frequency of difficulties in different groups of students, depending on factors such as their academic and social background, and personal and personality characteristics. Other factors involve the nature of the institution – its residential character, size, and selection policies – as well as the type and nature of the course and discipline area. In the USA this research has resulted in a variety of institutional strategies for selection, orientation, mentoring, academic and social transition assistance, early contact and community building, academic involvement and support, monitoring and early warning counselling and advising, and integration of programs.

Research on the academic performance of students generally and in various discipline areas and educational institutions, has generally increased in quantity and methodological complexity in recent years. This is particularly the case in the UK with the increase in schools' effectiveness research, which includes publication of league tables for schools and the recognition of the need for appropriate value-added multilevel statistical modelling, and also generally with the development of learning models based on economic production functions. A variety of Australian studies have been undertaken on transition and academic performance generally and by discipline area or student category and institutional type.

However, as the findings are not always consistent, research on student transition, performance and attrition needs to be analysed carefully to ascertain its validity in the current Australian context and to identify key factors.

Bibliography

Abbott, C.J., Hughes, P. & Wyld, C. 1986, *Participation and Retention Rates and Social and Educational Factors which are Related to Them in Tasmania*, Australian Government Printing Service, Canberra Commonwealth Schools Commission.

Abbott, C. J., Hughes, P. & Wyld, C. 1992, *Monitoring Student Progress. A framework for improving student performance and reducing attrition in higher education*, Youth Education Studies Centre, University of Tasmania. A report funded by the Department of Employment Education and Training.

Adams, R. 1983, 'Sex Differences in ASAT and Retentivity', Australian Association for Research in Education Conference, Melbourne.

Aitkin, M. & Longford, N. 1986, 'Statistical Modelling Issues in School Effectiveness Studies', *Journal of the Royal Statistical Society A.*, Vol. 149, No. 1, pp. 1-43.

Allen, D. & Amaury, N. 1995, 'An Empirical Examination of the Construct Validity of Goal Commitment in the Persistence Process', *Research in Higher Education*, Vol. 36, No. 5, pp. 509-33.

- Allen, D.F. & Nelson, J.M. 1989, 'Tinto's Model of College Withdrawal Applied to Women in Two Institutions', *Journal of Research and Development in Education*, Vol. 22, No. 3, pp. 1-11.
- Anderson, G., Benjamin, B. & Fuss, M.A. 1994, 'The Determinants of Success in University Introductory Economics Courses', *Journal of Economic Education*, Vol. 25, No. 2, pp. 99-119.
- Anderson, J. (undated) *A.C.T. I: Assessment Counselling and Tutoring for First Year Students at University*, Preliminary Report prepared for DEET, Monash University.
- Anderson, K.L. 1986, *College Contexts, Student Integration, and Educational Attainment*. ASHE Annual Meeting Paper.
- Anderson, K.L. 1987, 'Persistence, Student Background, and Integration/Commitment: Variation by definition of persistence and institutional type', Association for the Study of Higher Education, Conference Paper, Baltimore.
- Ashurst, J.T, De La Rocha, O. & Tobis, J. 1992, 'Analysis of Collateral Data: A method for assessing and correcting the effects of attrition on internal validity', *Journal of Experimental Education*, Vol. 60, No. 3, pp. 215-234.
- Astin, A. 1975, *Preventing Students from Dropping Out and Knowledge*, Jossey-Bass, San Francisco.
- Astin, A. 1977, *Four Critical Years: Effects of college on beliefs, attitudes and knowledge*, San Francisco, Jossey-Bass.
- Astin, A. 1984, 'Student Involvement: A development theory of higher education', *Journal of College Student Personnel*, Vol. 25, pp. 297-308.
- Astin, A. 1993, *What matters in college?: Four critical years revisited*, Jossey-Bass, San Francisco.
- Auyeung, P K., & Sands, J.S. 1993, 'An Evaluation of Secondary School Studies as Predictors of Performance for Accounting Majors', *Australian Educational Researcher*, Vol. 20, No. 3, pp. 51-61.
- Bailey, D.E., Emeleus, T.G. & Logan, P.F. 1989, *Student Performance and Success Predictions in the First Year Physics Courses of Applied Science Degree Programs*, Higher Education Research and Development Society of Australasia, Melbourne.
- Baxton, J.M. et al. 1988, 'The Influence of Student Problems on Student Withdrawal Decisions: An autopsy on autopsy studies', *Research in Higher Education*, Vol. 28, No. 3, pp. 241-53.
- Bean, J.P. 1980, 'Dropouts and Turnover: The synthesis and test of a causal model of student attrition', *Research in Higher Education*, Vol. 12, pp. 155-187.
- Bean, J.P. 1982, 'Student Attrition, Intentions, and Confidence: Interaction effects in a path model', *Research in Higher Education*, Vol. 17, pp. 291-319.
- Bean, J.P. 1985, 'Interaction Effects Based on Class Level in an Exploratory Model of College Student Dropout Syndrome', *American Educational Research Journal*, Vol. 22, pp. 35-64.
- Bean, J.P. & Metzner, B.S. 1985, 'A Conceptual Model of Nontraditional Undergraduate Student Attrition', *Review of Educational Research*, Vol. 55, No. 4, pp. 485-540.
- Bean, J.P. & Vesper, N. 1994, 'Gender Differences in College Student Satisfaction', Association for the Study of Higher Education, Conference Paper, Tucson.
- Becker, W.E. 1983, 'Economic Education Research: Part III, statistical estimation methods', *Journal of Economic Education*, Vol. 14, pp. 4-15.
- Becker, W.E. & Salemi, M.K. 1977, 'The Learning and Cost Effective of AVT Supplemented Instruction: Specification of learning models', *Journal of Economic Education*, Vol. 8, pp. 77-92.
- Becker, W.E. & Walstad, W.B. 1990, 'Data Loss from Pretest to Post Test as a Sample Selection Problem', *Review of Economics and Statistics*, Vol. 72, pp. 184-188.
- Beltzer, S. 1985, *Persistence of GED and Traditional Students at a Public Community College: A test of a conceptual model*, American Council on Education, Washington.
- Benda, E.J. 1991, 'The Relationship among Variables in Tinto's Conceptual Model and Attrition of Bachelor's Degree Nursing Students', *Journal of Professional Nursing*, Vol. 7, No. 1, pp. 16-24.

- Ben-Shakhar, G. & Kiderman, I. 1996, 'Comparing the Utility of Two Procedures for Admitting Students to Liberal Art', *Educational and Psychological Measurement*, Vol. 56, No. 1, pp. 90-106.
- Benson, M.T. (ed.) 1991, *A Statistical Analysis of the Predictions of Graduation Rates for College Student Athletes*, NCAA Academic Performance Study.
- Bers, T. 1994, 'English Proficiency, Course Patterns and Academic Achievements of Limited-English-Proficient Community College Students', *Research in Higher Education*, Vol. 35, No. 2, pp. 209-234.
- Beswick, D., Schofield, H., Meek, L. & Masters 1984, *Selective Admissions Under Pressure: An evaluation and development study of student selection procedures at the University of Melbourne*, Centre for the Study of Higher Education, Melbourne.
- Biner, P.M., Bink, M., Martin, L., Huffman, M. & Dean, R. 1995, 'Personality Characteristics Differentiating and Predicting the Achievement of Televised-Course Students and Traditional-Course Students', *The American Journal of Distance Education*, Vol. 9, No. 2, pp. 46-60.
- Binkley, M. et al. 1995, *Methodological Issues in Comparative Educational Studies: The case of the IEA reading literacy study*, National Center for Education Statistics, Washington.
- Birrell, B. 1994, 'Competition for Tertiary Entrance: The Monash experience', *People and Place*, Vol. 2, No. 2, pp. 18-24.
- Blanc, R., DeBuhr, L. & Martin, D. 1983, 'Breaking the Attrition Cycle', *Journal of Higher Education*, Vol. 54, No. 1, pp. 80-90.
- Boddy, G. 1996, 'A Three Year Longitudinal Study of the University Experience: A progress report', Asia Pacific Student Services Association, Conference Proceedings, Sydney.
- Bollen, K.A. 1989, *Structural Equations with Latent Variables*, John Wiley and Sons, New York.
- Bouillon, M.L. & Doran, M. 1990, 'Factors That Predict Success in Principles of Accounting Classes', *Journal of Education for Business*, pp. 23-27.
- Bouillon, M. & Doran, M. 1992, 'The Relative Performance of Female and Male Students in Accounting Principles Classes', *Journal of Education for Business*, pp. 224-228.
- Boyle, P. 1987, *Secondary Students' Knowledge of Postsecondary Education Options, and its Relationship to Background Variables*, University of Western Australia, Perth.
- Boyle, T. 1989, 'An Examination of the Tinto Model of Retention in Higher Education', *NASPA Journal*, Vol. 26, No. 4, pp. 288-94.
- Bradsen, J.R. & Farrington, J.A. 1986, 'Student Selection and Performance in the Faculty of Law, the University of Adelaide', *Australian Universities Review*, Vol. 29, No. 1, pp. 25-31.
- Brasfield, D., Harrison, D., McCoy, J. & James, P. 1993, 'The Impact of High School Economics on the College Principles of Economics Course', *Journal of Economic Education*, pp. 99-111.
- Braxton, J. et al. 1995, 'Expectations for College and Student Persistence', *Research in Higher Education*, Vol. 36, No. 5, pp. 595-612.
- Brekke, S.E. 1994, *Some Factors Affecting Student Performance in Physics*, Illinois.
- Brewer, A. 1992, 'The 'Second Half' of Student Integration: The effects of life task predominance on student persistence', *Journal of Higher Education*, Vol. 63, No. 4, pp. 441-62.
- Burgum, M., Martins, A.C. & Northey, K. 1993, 'Predicting Student Persistence and Performance in the First Year of a Tertiary Nursing Programme: A pilot study', *Higher Education Research and Development*, Vol. 12, No. 2, pp. 157-169.
- Cabrera, A. et al. 1990, 'Exploring the Effects of Ability to Pay on Persistence in College', *Review of Higher Education*, Vol. 13, No. 3, pp. 303-36.
- Cabrera, A., Castaneda, M., Nora, A. & Hengsteen, D. 1992, 'The Convergence between Two Theories of College Persistence', *Journal of Higher Education*, Vol. 63, No. 2, pp. 143-64.
- Cabrera, A.F., Nora, A. & Castaneda, M.B. 1993, 'College Persistence: Structural equations modelling test of an integrated model of student retention', *Journal of Higher Education*, Vol. 64, No. 2, pp. 123-139.

- Caldas, S. 1992, 'Using Multiple Regression to Predict Achievement: A reply to Klingele and Warrick, Penny and Bond', *Journal of Educational Research*, Vol. 85, pp. 325-326.
- Calderon, A. 1997, 'Student Progress Units (SPU) and SPU Ratios', Memo, Budget and Statistical Services, Monash University, Melbourne.
- Campbell, J.D. 1990, 'Self-Esteem and Clarity of the Self-Concept', *Journal of Personality and Social Psychology*, Vol. 59, pp. 538-549.
- Carbone, A., Mitchell, I., & Macdonald, I.D.H. 1996, 'Improving Teaching and Learning in First Year Computer Science Tutorials', ASCILITE Conference paper.
- Care, W. 1995, *Helping Students To Persist in a Distance Education Program: The role of the teacher*, University of Manitoba, Canada.
- Carpenter, P. 1982, *Origins, Aspirations and Attainments*, University of Queensland.
- Carpenter, P. & Fleishman, J. 1987, 'Linking Intentions and Behaviour: Australian students' college plans and college attendance', *American Educational Research Journal*, Vol. 24, No. 1, pp. 79-105.
- Carpenter, P. & Hayden, M. 1992, 'Academic Achievement among Australian Youth', *Australian Journal of Education*, Vol. 29, No. 3, pp. 199-220.
- Carpenter, P. & Western, J. 1984, 'Transition to Higher Education', *Australian Journal of Education*, Vol. 28, No. 3, pp. 249-273.
- Cash, R. & Bissel, H. 1985, 'Testing Tinto's Model of Attrition on the Church-Related Campus', Association for Institutional Research, Conference Paper, Portland.
- Castle, E.McC. 1993, 'Minority Student Attrition Research, Higher Education's Challenge for Resource Development', *Educational Research*, Vol. 22, No. 7, pp. 21-30.
- Caudill, S. & Gropper, D. 1991, 'Test Structure Human Capital, and Student Performance on Economics Exams', *Journal of Economic Education*, Vol. 22, No. 4, pp. 303-06.
- Cheng, K.C., Keeves, J., Sellin, N. & Tsoi, S.C. 1990, 'The Analysis of Multilevel Data in Educational Research: Studies of problems and their solutions', *International Journal of Educational Research (UK)*, Vol. 14, p. 3.
- Cheng 1991, *The Impact of Class Format on Business Student Performance: A model and test*, School of Commerce, Charles Sturt University - Riverina.
- Chickering, A. & Reisser, L. 1993, *Education and Identity*, (2nd ed.) Jossey-Bass, San Francisco.
- Christie, N. & Dinham, S. 1990, 'Elaboration of Tinto's Model of College Student Departure: A qualitative study of freshman experiences', American Educational Research Association, Conference Paper, Boston.
- Christie, N. & Dinham, S. 1991, 'Institutional and External Influences on Social Integration in the Freshman Year', *Journal of Higher Education*, Vol. 62, No. 4, pp. 412-36.
- Clark, E. 1989, 'The Importance of a Comprehensive Advising System in Improving Student Retention and Graduation Rates', *Australian Universities' Review*, Vol. 1, pp. 27-29.
- Clark, E. & Ramsay, W. 1990, 'Problems of Retention in Tertiary Education', *Education Research and Perspectives*, Vol. 17, No. 2, pp. 47-59.
- Clarke, J. 1995, 'Tertiary Students' Perceptions of their Learning Environments: A new procedure and some outcomes', *Higher Education Research and Development*, Vol. 14, No. 1, pp. 1-12.
- Clarke, J., Burnett, P. & Dart, B. 1994, *A Research Project Investigation: Predictors of Performance in Higher Education. Phase 1: Literature review and model development*, Tertiary Entrance Procedures Authority.
- Clarke, J. & Davis, W. 1992, 'Does High School Economics Turn Off Too Many Students?', *Journal of Education for Business*, pp. 152-155.
- Cobbin, D.M. & Barlow, A.R. (eds.) 1993, *Tertiary Access and Equity Initiatives: A handbook for evaluative research*. Evaluative Studies Research Group, Higher Education Division, EIP, Australian Government Publishing Service, Canberra.
- Cohen, A.M. 1994, 'Indicators of Institutional Effectiveness', *ERIC Digest*, Office of Educational Research and Improvement, Washington.
- Cope, R. & Hannah, W. 1975, *Revolving College Doors: The causes and consequences of dropping out, stopping out, and transferring*, John Wiley & Sons, New York.

- Corman, J., Barr, L. & Caputo, T. 1992, 'Unpacking Attrition: A change of emphasis', *Canadian Journal of Higher Education*, Vol. 22, No. 3, pp. 14-27.
- Cornell, I., Cornell, R., Dickie, L., Elizov, H., Farrell, J., Kubanek, A., Montpetit, D. & Waller, M. 1990, *Easing the Transition from Secondary School to College*, Ste. Anne de Bellevue, Quebec (ERIC Document Reproduction Service).
- Dale, M.G. & Jennings, P.J. 1986, 'Factors Affecting the Performance of Students in Undergraduate Physics', *Australian Physicist*, Vol. 23, No. 1, pp. 9-12.
- Dancer, D.M. & Doran, H. 1990, *Prediction of the Probability of Successful First Year University Studies in Terms of High School Background: With application to the Faculty of Economic Studies*, University of New England.
- Danko, K., Duke, J.D. & Franz, D.P. 1992, 'Predicting Student Performance in Accounting Classes', *Journal of Education for Business*, Vol. 67, No. 5, pp. 270-274.
- Dart, B.C. 1993, 'Personal and Environmental Influences on Tertiary Students' Learning Strategy Use', European Association for Research in Learning and Instruction, Conference Paper, France.
- Dart, B.C. 1994, 'A Goal-Mediational Model of Personal and Environmental Influences on Tertiary Students' Learning Strategy Use', *Higher Education*, Vol. 27-28, p. 16.
- Dart, B.C. & Clarke, J.A. 1992, 'Learning and Learning Environments', *Research and Development in Higher Education*, Vol. 15, pp. 167-174.
- Davis, T.M. & Murrell, P.H. 1994, 'Turning Teaching into Learning. The role of student responsibility in the collegiate experience', *ERIC Digest*.
- Deely, J.J. & Smith, A.F.M. 1998, 'Quantitative Refinements for Comparisons of Institutional Performance', *Journal of the Royal Statistical Society, A*, Vol. 161, No. 1, pp. 5-12.
- De Rome, E. & Lewin, T. 1984, 'Predicting Persistence at University from Information Obtained at Intake', *Higher Education (NETH)*, Vol. 13, No. 1, pp. 49-60.
- Dey, E.L. & Astin, A.W. 1993, 'Statistical Alternatives for Studying College Student Retention: A comparative analysis of logit, probit, and linear regression', *Research in Higher Education*, Vol. 34, No. 5, pp. 569-81.
- Diasma, K. et al. 1994, 'Look What You Get When the System is a Bit More Flexible and Generous', *JANSSA News*, No. 4.
- Dietsche, P.H.J. 1995, 'Attrition Research: Implications for quality in community college education', *Community College Journal of Research and Practice*, Vol. 19, No. 5, pp. 423-426.
- Dinius, S.H. 1991, 'Accounting Students: Secondary-level study and academic performance and characteristics', *Journal of Education for Business*, pp. 244-250.
- Dirkx, J.M. & Jha, L.R. 1994, 'Completion and Attrition in Adult Basic Education: A test of two pragmatic prediction models', *Adult Education Quarterly*, Vol. 45, No. 1, pp. 269-85.
- Dobson, I. 1995, 'A Fair Chance for Whom?', National Conference on Equity and Access in Tertiary Education, paper.
- Dobson I. R. & Sharma, R. 1993, *Student Progress: A study of the experience in Victorian tertiary institutions*, DEETYA.
- Dobson, I. & Sharma, R. 1995, *Student Performance and the Diversification of Modes of University Study and Bases of Admission*, DEETYA.
- Dobson, I., Sharma, R. & Haydon, A. 1996, 'Evaluation of the Relative Performance of Commencing Undergraduate Students in Australian Universities', *Australian Credit Transfer Agency*, Adelaide.
- Douglas, S. & Sulock, J. 1995, 'Estimating Educational Production Functions with Correction for Drops', *Journal of Economic Education*, Vol. 26, No. 2, pp. 101-12.
- Downes, B. 1976, 'A Model for Prediction of Academic Performance and Selection of Students for University Entrance', *The Australian University*, Vol. 14, No. 2, pp. 202-212.
- Duke, F. 1987, 'Degrees of Experience: Are the needs of mature age adults and school leavers compatible?', *Journal of Access Studies*, Vol. 2, No. 1, pp. 54-63.
- Durkheim, E. 1961, *Suicide*, (Spaulding, J. and Simpson, G. trans.), The Free Press, Glencoe.
- Eaton, S.B. & Bean, J. 1995, 'An Approach/Avoidance Behavioral Model of College Student Attrition', *Research in Higher Education*, Vol. 36, No. 6, pp. 617-45.

- Eckel, P. 1994, 'Building Community in the Freshman and Senior Year Experiences: Completing the cycle of student-institution involvement', International Conference on the First Year Experience, Dublin.
- Ecob, R. & Goldstein, H. 1983, 'Instrumental Variable Methods for the Estimation of Test Score Reliability', *Journal of Educational Statistics*, Vol. 8, No. 3, pp. 223-41.
- Edwards, R. 1993, *Mature Women Students: Separating or connecting family and education*, Taylor and Francis Ltd., London.
- Eisenberg, E. & Dowsett, T. 1990, 'Student Drop-Out from a Distance Education Project Course: A new method of analysis', *Distance Education*, Vol. 11, No. 2, pp. 231-253.
- Elkin, G. 1990, 'The Admission of Mature Adult Students to Executive MBA Programs', *Australian Journal of Adult and Community Education*, Vol. 30, No. 3, pp. 166-173.
- Elliott, D.B. 1992, *Community College Faculty Behaviors, Impacting Transfer Student Success: A qualitative study*, Ed D dissertation, Arizona State University.
- Elsworth, G., Day, N., Hurworth, R. & Andrews, J. 1982, *From School to Tertiary Study: Transition to college and university in Victoria*, Australian Council for Education Research, Melbourne.
- Elsworth, G.R. & Day, N.A. 1983, 'Eligibility and Self Selection: Discontinuities in transition to tertiary education in Victoria', *Australian Journal of Education*, Vol. 27, No. 1, pp. 62-77.
- Eskilson, A., Wiley, M.G., Muehlbauer, G. & Dodder, I. 1986, 'Parental Pressure, Self-Esteem and Adolscnt Reported Deviance: Bending the twig too far', *Adolescence*, Vol. 21, pp. 501-515.
- Everett, J.E. & Robins, J. 1991, 'Tertiary Entrance Predictors of First-Year University Performance', *Australian Journal of Education*, Vol. 35, No. 1, pp. 24-40.
- Farabaugh-Dorkins, C. 1991, 'Beginning To Understand Why Older Students Drop Out of College: A path analytic test of the Bean/Metzner model of nontraditional student attrition', *The Association of Institutional Research*, Vol. 39, pp. 1-10.
- Farley, A.A. & Ramsay, A.L. 1988, 'Student Performance in First Year Tertiary Accounting Courses and Its Relationship to Secondary Accounting Education', *Accounting and Finance*, pp. 29-41.
- Farley, B.L. 1995, *A Is for Average: The grading crisis in today's colleges*, Princeton University.
- Fels, R. & Siegfried, J.J. (eds.) 1982, *Research on Teaching College Economics: Selected readings*, Joint Council on Economic Education, New York.
- Ferber, M.A., Birnbaum, B.G. & Green, C.A. 1983, 'Gender Differences in Economic Knowledge: A re-evaluation of the evidence', *Journal of Economic Education*, Vol. 14, No. 2, pp. 24-37.
- Fetler, M.E. 1989, 'School Dropout Rates, Academic Performance, Size, and Poverty: Correlates of educational reform', *Educational Evaluation and Policy Analysis*, Vol. 11, No. 2, pp. 109-16.
- Fetler, M.E. 1990, 'A Method for the Construction of Differentiated School Norms', *Applied Measurement in Education*, Vol. 4, No. 1, pp. 53-66.
- Fetler, M.E. 1991, 'Pitfalls of Using SAT Results to Compare Schools', *American Educational Research Journal*, Vol. 28, No. 2, pp. 481-91.
- Finch, P.D. 1977, 'Some Statistical Comments on Educational Issues in Tertiary Selection', *Vestes*, Vol. 20, pp. 33-39.
- Flitman, A.M. 1997, 'Towards Analysing Student Failures: Neural networks compared with regression analysis and multiple discriminant analysis', *Computers Ops. Res.*, Vol. 24, No. 4, pp. 367-377.
- Fox, R.N. 1984, 'Reliability and Discriminant Validity of Institutional Integration Scales for Disadvantaged College Students', *Educational and Psychological Measurement*, Vol. 44, No. 4, pp. 1051-57.
- Fox, R.N. 1986, 'Application of a Conceptual Model of College Withdrawal to Disadvantaged Students', *American Educational Research Journal*, Vol. 23, No. 3, pp. 415-24
- Francis, K.C. et al. 1993, 'Success in School: A research agenda on student attrition and retention in the SEEK program', *Educational Evaluation and Policy Analysis*, Vol. 15, No. 4, pp. 437-41.

- Frazer, L. 1992, 'Students at Risk of Dropping Out: Developing accurate criteria to identify them', *ERS Spectrum*, Vol. 10, No. 4, pp. 3-9.
- Fries-Britt, S. 1995, 'Voices of Gifted Black Students', Association for the Study of Higher Education, Conference paper, Orlando.
- Frost, S.H. 1991, *Academic Advising for Student Success: A system of shared responsibility*, ERIC Digest, ASHE-ERIC Higher Education Report, Washington.
- Fulmer, A. & Jenkins, H.I. 1992, 'Evaluating a Tertiary Access Program for Mature Age Women', *Higher Education Research and Development*, Vol. 11, No. 1, pp. 45-60
- Garner, C. L. & Raudenbush, S.W. 1991, 'Neighborhood Effects on Educational Attainment: A multilevel analysis', *Sociology of Education*, Vol. 64, No. 4, pp. 251-62.
- Geiger, M.A. & Cooper, E.A. 1995, 'Predicting Academic Performance: The impact of expectancy and needs theory', *Journal of Experimental Education*, Vol. 63, No. 3, pp. 251-62.
- Getzlaf, S.B. et al. 1984, 'Two Types of Voluntary Undergraduate Attrition: Application of Tinto's model', *Research in Higher Education*, Vol. 20, No. 3, pp. 257-68.
- Gillespie, M. & Noble, J. 1992, *Factors Affecting Student Persistence: A longitudinal study*, American College Testing Program, Iowa City.
- Glass, J.C.Jr. & Garrett, M.S. 1995, 'Student Participation in a College Orientation Course, Retention, and GradePoint Average', *Journal of Research and Practice*, Vol. 19, No. 2, pp. 117-32.
- Goldstein, H. 1983, 'Measuring Changes in Educational Attainment over Time: Problems and possibilities', *Journal of Educational Measurement*, Vol. 20, No. 4, pp. 369-77.
- Goldstein, H. 1984, 'The Methodology of School Comparisons', *Oxford Review of Education*, Vol. 10, No. 1, pp. 69-74.
- Goldstein, H. 1986, 'Multilevel Mixed Linear Model Analysis Using Iterative Generalised Least Squares', *Biometrika*, Vol. 73, pp. 43-56.
- Goldstein, H. 1987, 'Multilevel covariance component models', *Biometrika*, Vol. 74, pp. 430-431.
- Goldstein, H. 1989, 'Estimating the Regional Economic Impact of Universities: An application of input-output analysis', *Planning for Higher Education*, Vol. 18, No. 1, pp. 51-64.
- Goldstein, H. 1991, 'Better Ways to Compare Schools?' *Journal of Educational Statistics*, Vol. 16, No. 2, pp. 89-91.
- Goldstein, H. 1993, 'Assessing Group Differences', *Oxford Review of Education*, Vol. 19, No. 2, pp. 141-50.
- Goldstein, H. 1995, *Multilevel Statistical Models*, Kendalls Library of Statistics, No. 3, 2nd ed., John Wiley and Sons.
- Goldstein, H. & McDonald, R.P. 1988, 'A General Model for the Analysis of Multilevel Data', *Psychometrika*, Vol. 53, No. 4, pp. 455-67.
- Goldstein, H. & Spiegelhalter, D. 1996, 'League Tables and their Limitations: Statistical issues in comparisons of institutional performance', *Journal of the Royal Statistical Society, A*, Vol. 159, No. 3, pp. 385-443.
- Goldstein, J. & Thomas, S. 1996, 'Using Examination Results as Indicators of School and College Performance', *Journal of the Royal Statistical Society, A*, Vol. 159, No. 1, pp 149-163.
- Goldstein, Z. & Marcoulides, G.A. 1991, 'Maximizing the Coefficient of Generalizability in Decision Studies', *Educational and Psychological Measurement*, Vol. 51, No. 1, pp. 79-88.
- Gramlich, E.M. & Greenlee, G.E. 1993, 'Measuring Teaching Performance', *Journal of Economic Education*, Vol. 24, pp. 3-12.
- Green, G. & Jaquess, S. 1987, 'The Effect of Part-Time Employment on Academic Achievement', *Journal of Educational Research*, Vol. 89, No. 6, pp.?.
- Grimes, P.W. 1994, 'Public Versus Private Secondary Schools and the Production of Economic Education', *Journal of Economic Education*, Vol. 25, No. 1, pp. 17-30.
- Grosset, J.A. 1989, *Conceptual Framework for Describing the Causes of Student Attrition*, Philadelphia Community College, Philadelphia.
- Grosset, J. & Hawk, T.R. 1988, *Institutional Effectiveness: A three-year (1985-1988) status report*, Philadelphia Community College, Philadelphia.

- Gunn, F.M. & Macdonald, I.D.H. 1997, 'Developing a Culture of Teaching and Learning at Tertiary Level: A training course for post graduate student tutors that made a difference', ASERA, Conference paper.
- Gunstone, R., Macdonald, I.D.H., McKittrick, B., Mills, D., Mulhall, P. & White, R. T. 1996, 'Changing Students' Approaches to Laboratory Work in Undergraduate Physics', ASERA, Conference paper.
- Gutierrez, M. & Marquez, A. 1994, 'Longitudinal Model for Assessing Student Outcomes at a Community College', Association for Institutional Research, Conference Paper, Illinois.
- Hadley, T. & Winn, S. 1992, 'Measuring Value Added at Course Level: An exploratory study', *Higher Education Review*, Vol. 25, No. 1, pp. 7-30.
- Hagan, D.L., Sheard, J.I. & Macdonald, I.D.H. 1997, 'Monitoring and Evaluating a Redesigned First Year Programming Course', ACM SIGCSE/SIGCUE Conference on Integrating Technology into Computer Science Education, paper, Sweden.
- Halabi, A. & Smyrnios, K. 1996, 'Orientation Programs: What Monash Gippsland Business students think...finally!', *Journal of Australian and New Zealand Student Services Association*, Vol. 8, pp. 73-89.
- Halpin, R.L. 1990, 'An Application of the Tinto Model to the Analysis of Freshman Persistence in a Community College', *Community College Review*, Vol. 17, No. 4, pp. 22-32
- Hamdi, F.A., Abdulrazzak, C. & Nada, K.H. 1992, 'A Discriminant Function Model for Admission at Undergraduate University Level', *International Review of Education*, Vol. 38, No. 5, pp. 505-518.
- Hand, M. & Fry, T.R.L. 1995, *Honours Streaming of Undergraduate Students: The predictive ability of the binary logit model*, Department of Econometrics, Monash University, Melbourne.
- Hansen, W.L. 1993, 'Bringing Total Quality Improvement into the College Classroom', *Higher Education*, Vol. 25, pp. 259-279.
- Hansford, B.C. & Hattie, J.A. 1982, 'The Relationship Between Self and Achievement/Performance Measures', *Review of Educational Research*, Vol. 52, pp. 325-340.
- Hart, G. 1992, *Selected Correlates of Academic Performance*, Institute of Education, University of Melbourne, Melbourne.
- Hau, I. 1991, 'Teaching Quality Improvement by Quality Improvement in Teaching', *University of Wisconsin Report Series in Quality and Productivity*, Vol. 59, pp. 1-15.
- Hawker, L. et al. 1991, 'The Relationship of Interpersonal Communication Variables to Academic Process and Persistence in College', *Communication Quarterly*, Vol. 39, No. 4, pp. 297-308.
- Hayes, S. 1977, 'Pressure Contributing to the Decision to Dropout – Comparison between dropouts and persisters', *Australian Journal of Education*, Vol. 18, No. 2, pp. 138-148.
- Heath, J.A. 1989, 'An Econometric Model of the Role of Gender in Economic Education', *American Economic Review*, Vol. 79, pp. 226-30.
- Heckman, J.J. 1979, 'Sample Selection Bias as a Specification Error', *Econometrica*, Vol. 47, pp. 153-161.
- Hemmings, B., Boylan, C., Hill, D. & Kay, R. 1996, 'Coping with and Adjusting to University Life: A qualitative study', *Journal of the Australian and New Zealand Student Service Assoc.*, Vol. 8, pp. 4-29.
- Henry, T.C. & Smith, G.P. 1994, 'Planning Student Success and Persistence: Implementing a state system strategy', *Community College Review*, Vol. 22, No. 2, pp. 26-36.
- Hill, P.W. 1995, 'Value Added Measures of Achievement', Seminar Paper, IARTV, Australia.
- Hill, P.W. et al. 1993, *School and Teacher Effectiveness in Victoria. Key findings from Phase 1 of the Victorian Quality Schools Project*, Centre for Applied Educational Research, University of Melbourne.
- Hisada, P. 1988, *Studying Student Retention: The requirements and process of retention research*, Hawaii University, Honolulu.
- Holdaway, E. & Kelloway, K. 1987, 'First Year at University: Perceptions and experiences of students', *The Canadian Journal of Higher Education*, Vol. 17, pp. 47-63.

- Hong, S.M. 1982, 'Age and Achievement: The age factor in predicting academic success', *Australian Journal of Adult Education*, Vol. 22, No. 3, pp. 21-28.
- Hong, S.M. 1984, 'The Age Factor in the Prediction of Tertiary Academic Success', *Higher Education Research and Development*, Vol. 3, No. 1, pp. 61-70.
- Horn, C., Bruning, R., Schraw, G., Curry, E. & Kathkanant, C. 1993, 'Paths to Success in the College Classroom', *Contemporary Educational Psychology*, Vol. 18, pp. 464-478.
- Horvath, J., Beaudin, B.Q. & Wright, S.P. 1992, 'Persisting in the Introductory Economics Course: An exploration of gender differences', *Journal of Economic Education*, Vol. 23, pp. 101-108.
- Huang, G. 1995, 'National Data for Studying Rural Education: Elementary and Secondary Education Applications', *ERIC Digest*.
- Jackson, J. 1997, *TQM in Higher Education: Continuously improving the teaching and learning of introductory statistics*, Unpublished Ph.D thesis, Department of Econometrics and Business Statistics, Monash University, Melbourne.
- Jacobi, M. 1991, 'Mentoring and Undergraduate Academic Success: A literature review', *Review of Educational Research*, Vol. 61, No. 4, pp. 505-532.
- James, R. & Johnston 1996, 'Transition to Active Learning Conference', Conference Proceedings, Melbourne University, Melbourne.
- Jenkins, N.J. 1992, 'The Scholastic Aptitude Test as a Predictor of Academic Success: A literature review', ERIC ED354243.
- Johnes, J. & Taylor, J. 1990, 'Undergraduate Non-Completion Rates: A reply', *Higher Education*, Vol. 19, No. 3, pp. 385-90.
- Jones, J. 1990, 'Outcomes of Girls' Schooling: Unravelling some social differences', *Australian Journal of Education*, Vol. 34, No. 2, pp. 153-167.
- Kalsbeek, D.H. 1989, *Linking Learning Style Theory with Retention Research: The TRAILS project*, Association for Institutional Research, Florida State University.
- Kalsner, L. 1991, 'Issues in College Student Retention', *Higher Education Extension Service Review*, Vol. 3, No. 1.
- Keef, S.P. 1992, 'The Comparative Advantage of Cognate Studies in the New Zealand University Bursaries Accounting Examination', *Australian Journal of Education*, Vol. 36, No. 1, pp. 14-29.
- Keeves, J.P. (ed.) 1986, 'Aspiration, Motivation and Achievement: Different methods of analysis and different results', *International Journal of Educational Research*, Vol. 10, No. 2.
- Keeves, J.P. (ed.) 1988, *Educational Research, Methodology, and Measurement: An international handbook*, Pergamon, Potts Point, New South Wales.
- Keeves, J.P. 1995, 'The Contribution of IEA Research to Australian Education', in *Reflections on Educational Achievement*, ed. Bos, W. & Lehman, R.H. pp. 137-158.
- Kember, D. 1989, 'A Longitudinal-Process Model of Drop-Out from Distance Education', *Journal of Higher Education*, Vol. 60, No. 3, pp. 278-301.
- Kember, D. 1990, 'The Use of a Model to Derive Interventions which might Reduce Drop-Out from Distance Education Course', *Higher Education*, Vol. 20, pp. 11-24.
- Kember, D., Murphy, D., Siaw, I., & Yuen, K.S. (1991) 'Towards a Causal Model of Student Progress in Distance Education: Research in Hong Kong', *The American Journal of Distance Education*, Vol. 5, No. 2, pp. 3-15.
- Kiang, P. 1992, 'Issues of Curriculum and Comments for First-Generation Asian Americans in College', *New Directions for Community College*, Vol. 20, No. 4, pp. 97-117.
- Kidd, G. 1992, *Tertiary Course Choice: Interests as predictors*, University of Melbourne
- Kidd, G. & Naylor, F. 1991, 'The Predictive Power of Measured Interests in Tertiary Course Choice: The case of science', *Australian Journal of Education*, Vol. 35.
- Koslowsky, M. 1993, 'A Comparison of Two Attitude-Behaviour Models for Predicting Attrition in Higher Education', *Journal of Applied Behavioural Science*, Vol. 29, No. 3, pp. 359-365.
- Kraemer, B.A. 1993, 'The Dimensionality of Academic and Social Integration in Persistence Studies of Hispanic Students', Association for the Study of Higher Education, Conference Paper, Pittsburgh.

- Kreft, I.G.G. 1992, 'The Analysis of Small Group Data: A reanalysis of Webb 1982 with a random coefficient model', American Educational Research Association, Conference Paper, San Francisco.
- Kuh, G. 1993, 'In Their Own Words: What students learn outside the classroom', *American Educational Research Journal*, Vol. 36, No. 2, pp. 277-304.
- Kuh, G. 1995, 'The Other Curriculum: Out of class experiences associated with student learning and personal development', *Journal of Higher Education*, Vol. 66, No. 2, pp. 123-153.
- Lam, Y.L.J. 1984, 'Predicting Dropouts of University Freshmen: A logit regression analysis', *Journal of Educational Administration*, Vol. 22, No. 1, pp. 74-82.
- Langston, P.D. & Boyles, C. 1987, 'The Search for a Mission and New Admission Standards: A case study', *College and University*, Spring, pp. 183-193.
- Le Claire, K.A. 1988, 'Higher Education Access and Participation: Political dependency and student choice', *International Journal of Education Research*, Vol. 12, No. 4, pp. 375-393.
- Leppel, K. 1984, 'The Academic Performance of Returning and Continuing College Students', *Journal of Economic Education*, Vol. 15, pp. 46-54.
- Levin, J.R. & Levin, M.E. 1993, 'Methodological Problems in Research on Academic Retention Programs for At-Risk Minority College Students', *Journal of College Student Development*, Vol. 34, No. 2, pp. 118-24.
- Levin, M.E. & Levin, J.R. 1991, 'A Critical Examination of Academic Retention Programs for At-Risk Minority College Students', *Journal of College Student Development*, Vol. 32, No. 4, pp. 323-34.
- Lewallen, W. 1993, 'The Impact of Being 'Undecided' on College-Student Persistence', *Journal of College Student Development*, Vol. 34, No. 2, pp. 103-12.
- Lewis, D.E. 1991, *Credit Transfers Between TAFE and Higher Education*, University of Wollongong, DEET, Evaluations and Investigations Program, Australian Government Publishing Service, Canberra.
- Lewis, D.E. 1994, *The Performance at University of Equity Groups and Students Admitted Via Alternative Modes of Entry*, Higher Education Division, Evaluations and Investigations Program, Australian Government Publishing Service, Canberra.
- Linke, R.D. 1992, 'Some Principles for Application of Performance Indicators in Higher Education', *Higher Education Management*, Vol. 4, No. 2, pp. 194-203.
- Linke, R.D., Barton, A.R. & Cannon, A.R. 1985, *Deferment of Entry into Higher Education*, Tertiary Education Authority of South Australia.
- Linke, R.D. et al. 1991, *Performance Indicators in Higher Education*, DEET, Canberra AGPS.
- Logan, P.F. & Bailey, D.E. 1983, 'Diagnostic testing for success in tertiary physics', *Australian Physicist*, Vol. 20, No. 3, pp. 62-65.
- Long, M. 1994, *A Study of the Academic Results of On-Campus and Off-Campus Students: Comparative performance within four Australian tertiary institutions*, Australian Government Publishing Service, Canberra.
- Long, Carpenter & Hayden 1995, *Graduating from Higher Education*, DEET, Australian Government Publishing Service, Canberra.
- Lowe, I. 1987, 'Alternatives in Tertiary Selection', *Australian Mathematics Teacher*, Vol. 43, No. 3, pp. 19-20.
- Lublin, J. 1982, 'Some Alternative Entry Characteristics as Factors in Tertiary Success', *Higher Education Research and Development*, Vol. 1, No. 1, pp. 69-71.
- Lumsden, K. & Scott, A. 1983, 'The Efficacy of Innovative Teaching Techniques in Economics: The UK experience', *American Economic Review*, Vol. 73, pp. 13-17.
- Lumsden, K.G. & Scott, A. 1987, 'The Economics Student Re-examined: Male-female differences in comprehension', *Journal of Economic Education*, Vol. 18, pp. 365-375.
- Lyons, L. 1991, 'The Integration of Qualitative and Quantitative Research in a Longitudinal Retention Study', Association for Institutional Research Forum Paper, San Francisco.
- Macdonald, I.D.H., Mitchell, I., & Carbone, A. 1996, 'Helpless, Isolated and Underpaid: Turning computer science demonstrators into teachers', ASERA Conference paper.
- Macdonald, I.D.H. & Hagan, D. 1996, 'How Education Research became Part of Teaching First Year Programming', AARE/ERA Joint Conference paper, Singapore.

- Macdonald, I.D.H. & Gunn, F.M. 1997, 'A Model for Change in Tertiary Teaching: Combining education research, tutor training, and reflective practice to create Teaching Communities', ASERA Conference paper.
- Magel, R.C. 1996, 'Increasing Student Participation in Large Introductory Statistics Courses', *The American Statistician*, Vol. 50, No. 1, pp. 51-56.
- Magolda, M. & Baxter, B. 1990, 'The Impact of the Freshman Year on Epistemological Development: Gender differences', *Review of Higher Education*, Vol. 13, No. 3, pp. 259-84.
- Marcoulides, G.A. & Goldstein, Z. 1992, 'The Optimization of Multivariate Generalizability Studies with Budget Constraints', *Educational and Psychological Measurement*, Vol. 52, No. 2, pp. 301-08.
- Marsh, H.W. 1990, *Self-Description Questionnaire – 1: Manual*, University of Western Sydney, Campbelltown.
- Marsh, H. & Craven, R. 1994, 'Who Benefits from Selective Schools? The role of academic self concept and a call for further research', *Forum of Education*, Vol. 49, No. 1, pp. 3-13.
- Mason, P.M. et al. 1995, 'Student Evaluations of Faculty: A new procedure for using aggregate measures of performance', *Economics of Education Review*, Vol. 14, No. 4, pp. 403-16.
- McCaffrey, S. 1989, 'A Key to Survival: The retention of adult students in an external degree program', ASHE Annual Meeting Paper.
- McClelland, A.A. & Kruger, P.W. 1993, *An Investigation of the Subsequent Performance in Tertiary Studies of Students Admitted Through the Queensland Tertiary Admissions Centre in 1989-90*, Australian Government Publishing Service, Canberra.
- McInnes, C. & James, R. 1995, *First Year On-Campus*, Australian Government Publishing Service.
- McJamerson, E.McC. 1992, 'Undergraduate Academic Major and Minority Student Persistence: Individual choices, national consequences', *Equity and Excellence*, Vol. 25, No. 2-4, pp. 35-48.
- McKeown, B., Macdonnell, A. & Bowen, C. 1993, 'The Point of View of the Student in Attrition Research', *Canadian Journal of Higher Education*, Vol. 23, No. 2, pp. 65-85.
- McMahon, M.F. 1990, *Distance-Education Relationship of Motivational Variables to Academic Performance*, University of Sydney.
- McNamara, E. & Kelly, B. 1996, 'Where Does Peer Assisted Learning Belong? A comparative analysis of schemes for first year students offered by academic departments and student services', *Journal of Australian and New Zealand Student Services Association*, Vol. 7, pp. 56-71.
- McPherson, A. & Paterson, L. 1990, 'Undergraduate Non-Completion Rates: A comment', *Higher-Education*, Vol. 19, No. 3, pp. 377-83.
- Mencke, R. et al. 1988, 'Assessing Institutional Effects on Retention', Association for Institutional Research, Conference paper, Phoenix.
- Metzner, B.S. & Bean, J.P. 1987, 'The Estimation of a Conceptual Model of Nontraditional Undergraduate Student Attrition', *Research in Higher Education*, Vol. 27, No. 1, pp. 15-38.
- Meyler, M.J. 1989, 'A Multivariate Approach to the Study of Student Success at University', Higher Education Research and Development Society of Australia Conference, Perth.
- Milkman, M. et al. 1995, 'Some Additional Evidence on the Effect of University Math on Student Performance in Principles of Economics', *Journal of Research and Development in Education*, Vol. 28, No. 4, pp. 220-29.
- Miller, M.T. & Dirkx, J.M. 1995, 'Mentoring in Graduate Education: The role of graduate student organizations', *Journal of Adult Education*, Vol. 23, No. 1, pp. 20-30.
- Minnaert, A. & Janssen, P.J. 1992, 'Success and Progress in Higher Education: A structural model of studying', *British Journal of Educational Psychology*, Vol. 62, pp. 184-192.
- Modk, D.H. 1989, 'The Education Production Function: Its evaluating role in policy analysis', *Educational Evaluation and Policy Analysis*, Vol. 11, No. 1, pp. 31-45.
- Mortimore, P. 1993, 'School Effectiveness and the Management of Effective Learning and Teaching', *School Effectiveness and School Improvement*, Vol. 4, No. 4, pp. 290-310.

- Moss, P. 1992, 'Shifting Conceptions of Validity in Education of Management: Implications for performance indicators', *Review of Educational Research*, Vol. 62, No. 3, pp. 229-288.
- Muckert, T., Wilson, K. & Lizzio, A. 1996, 'Can Peer Mentoring Assist the Adjustment of First Year Psychology Students in Making the Transition to University? A preliminary report of work in progress', *First Year Experience*, Conference proceedings, University of Melbourne.
- Munn, P. et al. 1994, *The Effectiveness of Access Courses: Views of access students and their teachers*, Research Report Series, Scottish Council for Research into Education, Edinburgh.
- Munro, B. 1981, 'Dropouts from Higher Education: Path analysis of a national sample', *American Educational Research Journal*, Vol. 20, pp. 133-141.
- Muraski, E.J. *Core Indicators of Effectiveness and Student Success*, Porterville College, California.
- Murray-Harvey, R. 1993, 'Identifying Characteristics of Successful Tertiary Students Using Path Analysis', *Australian Educational Researcher*, Vol. 20, No. 3, pp. 63-81.
- Mutter, P. 1992, 'Tinto's Theory of Departure and Community College Student Persistence', *Journal of College Student Development*, Vol. 33, No. 4, pp. 310-18.
- Myers, R.S. & Pyles, M.R. 1992, 'Relationships among High School Grades, ACT Test Scores and College Grades', Mid-South Educational Research Association, Conference paper.
- Neumann, Y. & Finaly-Neumann, E. 1989, 'Predicting Juniors' and Seniors' Persistence and Attrition: A quality of learning experience approach', *Journal of Experimental Education*, Vol. 59, pp. 129-140.
- Neumann, Y., Finaly-Neumann, E. & Reichel, A. 1990, 'Determinants and Consequences of Students' Burnout in Universities', *Journal of Higher Education*, Vol. 61, No. 1, pp. 21-31.
- Nightingale, P., Te Wiata, I., Toohey, S., Ryan, G., Hughes, C. & Magin, D. 1996, *Assessing Learning in Universities*, UNSW Press, Sydney.
- Nora, A. 1987, 'Determinants of Retention Among Chicano College Students: A Structural Model', *Research in Higher Education*, Vol. 26, No. 1, pp. 31-59.
- Nora, A. et al. 1990, 'Testing Qualitative Indicators of Precollege Factors in Tinto's Attrition Model: A community college student population', *Review of Higher Education*, Vol. 13, No. 3, pp. 337-55.
- Nora, A. & Rendon, L.I. 1990, 'Determinants of Predisposition to Transfer among Community College Students: A structural model', *Research in Higher Education*, Vol. 31, No. 3, pp. 235-55.
- Norman, K.F. & Norman, J.E. 1995, 'The Synergy of Minority Student Persistence and Faculty Renewal', *Innovative Higher Education*, Vol. 20, No. 2, pp. 129-40.
- Norton, C. & Reding, K. 1992, 'Predicting Success in Collegiate Accounting Courses', *Journal of Education for Business*, pp. 314-316.
- Nourayi, M. & Cherry, A. 1993, 'Accounting Students' Performance and Personality Types', *Journal of Education for Business*, pp. 111-115.
- O'Dowd, M. 1996, *Young People At-Risk: Empowerment and perspective*, Unpublished PhD Thesis, Monash University.
- O'Dowd, M. 1997, *The Transition Needs of Mature Age Students: An evaluation of a pilot transition program*, Report to Monash University Vice Chancellor (in process).
- O'Halloran, P.M. & Russell, G.J. 1980, 'Assessment and Prediction of Success in First Year Physics at an Australian University', *Higher Education (Neth)* Vol. 9, No. 5, pp. 529-547.
- Pacheco, A. 1994, 'Bridging the Gaps in Retention: Metropolitan universities, *An International Forum*, Vol. 5, No. 2, pp. 54-60.
- Palmer, J., Carliner, G. & Romer, T. 1979, 'Does High School Economics Help?' *Journal of Economic Education*, Vol. 10, pp. 58-61.
- Pargetter, R. 1995, 'Transition Research, Analysis and Strategy', Keynote address at the Monash University Conference on the Transition from Secondary School to University, Monash University, Melbourne.
- Park, K.H. & Kerr, P.M. 1990, 'Determinants of Academic Performance: A multinomial logit approach', *Journal of Economic Education*, Vol. 21, pp. 101-111.

- Pascarella, E.T. 1980, 'Student-Faculty Informal Contact and College Outcomes', *Review of Educational Research*, Vol. 50, pp. 545-95.
- Pascarella, E.T. 1982a, 'Perspectives on Quantitative Analysis for Research in Postsecondary Education', *Review of Higher Education*, Vol. 5, No. 4, pp. 197-211.
- Pascarella, E.T. 1982b, *Validation of a Theoretical Model of College Dropouts*, National Inst. of Education (ED), Washington, DC.
- Pascarella, E.T. 1986, 'A Program for Research and Policy Development on Student Persistence at the Institutional Level', *Journal of College Student Personnel*, Vol. 27, No. 2, pp. 100-107.
- Pascarella, E.T. & Chapman, D.W. 1983, 'A Multi-Institutional, Path Analytic Validation of Tinto's Model of College Withdrawal', *American Educational Research Journal*, Vol. 20, No. 1, pp. 87-102.
- Pascarella, E.T. & Terenzini, P.T. 1974, *Ratings of the Academic Program by Freshman Students in Systematically Designed and Conventional Courses: A discriminant analysis*, Syracuse University, N.Y.
- Pascarella, E.T. & Terenzini, P.T. 1977a, 'Informal Interaction with Faculty and Freshman Ratings of Academic and Non-Academic Experience of College', *Journal of Educational Research*, Vol. 70, No. 1, pp. 35-41.
- Pascarella, E.T. & Terenzini, P.T. 1977b, 'Patterns of Student-Faculty Informal Interaction Beyond the Classroom and Voluntary Freshman Attrition', *Journal of Higher Education*, Vol. 48, No. 5, pp. 540-52.
- Pascarella, E.T. & Terenzini, P.T. 1978, 'Student-Faculty Informal Relationships and Freshman Year Educational Outcomes', *Journal of Educational Research*, Vol. 71, No. 4, pp. 183-9.
- Pascarella, E.T. & Terenzini, P.T. 1979a, 'Interactive Influences in Spady and Tinto's Conceptual Models of College Attrition', *Sociology of Education*, Vol. 52, No. 4, pp. 197-210.
- Pascarella, E.T. & Terenzini, P.T. 1979b, 'Student-Faculty Informal Contact and College Persistence: A further investigation', *Journal of Educational Research*, Vol. 72, No. 4, pp. 214-18.
- Pascarella, E.T. & Terenzini, P.T. 1980, 'Predicting Freshman Persistence and Voluntary Dropout Decisions from a Theoretical Model', *Journal of Higher Education*, Vol. 51, No. 1, pp. 60-75.
- Pascarella, E.T. & Terenzini, P.T. 1981, 'Residence Arrangement, Student/Faculty Relationships, and Freshman Year Educational Outcomes', *Journal of College Student Personnel*, Vol. 22, No. 2, pp. 147-56.
- Pascarella, E.T. & Terenzini, P.T. 1983, 'Predicting Voluntary Freshman Year Persistence/Withdrawal Behavior in a Residential University: A path analytic validation of Tinto's model', *Journal of Educational Psychology*, Vol. 75, No. 2, pp. 215-226.
- Pascarella, E.T. & Terenzini, P.T. 1991, *How College Affects Students: findings and insights from twenty years of research*, Josey-Bass, San Francisco.
- Pascarella, E.T. et al. 1981, 'Pre Enrollment Variables and Academic Performance as Predictors of Freshman Year Persistence, Early Withdrawal, and Stopout Behavior in an Urban, Nonresidential University', *Research in Higher Education*, Vol. 15, No. 4, pp. 329-49.
- Pascarella, E.T. et al. 1983a, 'A Test and Reconceptualization of a Theoretical Model of College Withdrawal in a Commuter Institution Setting', *Sociology of Education*, Vol. 56, No. 2, pp. 88-100.
- Pascarella, E.T. et al. 1983b, 'Student-Faculty Relationships and Freshman Year Intellectual and Personal Growth in a Nonresidential Setting', *Journal of College Student Personnel*, Vol. 24, No. 5, pp. 395-402.
- Pascarella, E.T. et al. 1986, 'Long-Term Persistence of Two-Year College Students', *Research in Higher Education*, Vol. 24, No. 1, pp. 47-71.
- Pascarella, E.T. et al. 1994, 'Impacts of 2-Year and 4-Year Colleges on Learning Orientations: A preliminary study, 1994', *Community College Journal of Research and Practice*, Vol. 18, No. 6, pp. 577-89.
- Paterson, L. & Goldstein, H. 1991, 'New Statistical Methods for Analysing Social Structures: An introduction to multilevel models', *British Educational Research Journal*, Vol. 17, No. 4, pp. 387-93.

- Peng, S.S. 1977, *Transfer Students in Institutions of Higher Education*, National Center for Education Statistics, Research Triangle Institute, Durham.
- Pharr, S., Bailey, J. & Dangerfield, B. 1993, 'Admission/Continuance Standards as Predictors of Academic Performance of Business Students', *Journal of Education for Business*, pp. 69-74.
- Pongboriboon 1993, *Variables Influencing the Mathematics Performance of First-Year Tertiary Students: A case study*, Deakin University, Geelong.
- Pope, B., Cameron, B. & McClelland, A.A. 1991, *Unmet Demand for Higher Education Places in Victoria and Queensland*, Australian Government Printing Service, Canberra.
- Powell, J. 1979, 'From School to University', *The Australian Journal of Education*, Vol. 23, No. 2, pp. 113-120.
- Power, C. 1984, 'Factors Influencing Retentivity and Satisfaction with Secondary Schooling', *The Australian Journal of Education*, Vol. 28, No. 2, pp. 115-125.
- Power, C. & Robertson, F. 1987, *Factors Influencing Participation in Higher Education in Australia*, National Institute of Labour Studies, Flinders University, South Australia.
- Power, C., Robertson, F. & Baker 1987, *Success in Higher Education*, National Institute of Labour Studies, Flinders University, South Australia.
- Power, C., Robertson, F. & Beswick 1986, *Student Withdrawal and Attrition from Higher Education*, National Institute of Labour Studies, Flinders University, South Australia.
- Preston, D.L. 1993, 'Using the CCSEQ in Institutional Effectiveness: The role of goal commitment and students' perception of gains', Association for Institutional Research, Conference Paper, Chicago.
- Price, D., Harte, J. & Cole, M. 1992 *Student Progression in Higher Education: A study of attrition at Northern Territory University*, DEET, Evaluation and Investigations Program, Australian Government Publishing Service, Canberra.
- Price, L.A. 1993, *Characteristics of Early Student Dropouts at Allegany Community College and Recommendations for Early Intervention*, Allegany Community College, Cumberland.
- Ramirez, H. 1994, 'Programs and Drop-out in Universidad Estatal a Distancia (UNED) of Costa Rica', *The American Journal of Distance Education*, Vol. 8, No. 3, pp. 64-73.
- Ramsay, A.L. & Baines, A.R. 1994, 'The Impact of Gender on Student Performance in Introductory Accounting Courses', *Accounting Research Journal*, Vol. 7, No. 2, pp. 20-32.
- Ramsden, P. 1991, 'Study Processes in Grade 12 Environments', in Fraser, B.J. & Walberg, H.J. (eds.) *Educational Environments. Evaluation, antecedents and consequences*, Pergamon Press, New York.
- Ramsden, P., Martin E. & Bowden, J. 1989, 'School Environment and Sixth Form Pupils' Approaches to Learning', *Journal of Educational Psychology*, Vol. 59, pp. 129-142.
- Rasbash, J. & Goldstein, H. 1994, 'Efficient Analysis of Mixed Hierarchical and Cross-Classified Random Structures Using a Multilevel Model', *Journal of Educational and Behavioral Statistics*, Vol. 19, No. 4, pp. 337-50.
- Rasell, E. & Rothstein, R. 1993, 'School Choice: Examining the evidence', Economic Policy Institute, Washington, DC.
- Raudenbush, S.W. 1993, 'A Crossed Random Effects Model for Unbalanced Data with Applications in Cross-Sectional and Longitudinal Research', *Journal of Educational Statistics*, Vol. 18, No. 4, pp. 321-49.
- Raudenbush, S.W. & Chan, W.S. 1993, 'Application of a Hierarchical Linear Model to the Study of Adolescent Deviance in an Overlapping Cohort Design', *Journal of Consulting and Clinical Psychology*, Vol. 61, No. 6, pp. 941-51.
- Raudenbush, S.W. & Willms, J.D. 1995, 'The Estimation of School Effects', *Journal of Educational and Behavioural Statistics*, Vol. 20, No. 4, pp. 307-35.
- Raudenbush, S.W. et al. 1991, 'A Multilevel, Multivariate Model for Studying School Climate with Estimation via the EM Algorithm and Application to U.S. High-School Data', *Journal of Educational Statistics*, Vol. 16, No. 4, pp. 295-330.
- Raudenbush, S.W. et al. 1993, 'Higher Order Instructional Goals in Secondary Schools: Class, teacher, and school influences', *American Educational Research Journal*, Vol. 30, No. 3, pp. 523-53.

- Riley, K.A. & Nuttall, D.L. (eds.) 1994, *Measuring Quality: Education indicators – United Kingdom and international perspectives*, Falmer Press, Bristol.
- Rogosa, D. & Saner, H. 1995, 'Longitudinal Data Analysis Examples with Random Coefficient Models', *Journal of Educational and Behavioural Statistics*, Vol. 20, No. 2, pp. 149-70.
- Romer, D. 1993, 'Do Students Go to Class? Should they?', *Journal of Economic Perspectives*, Vol. 7, No. 3, pp. 167-174.
- Romm, T., Patterson, P. & Hill, P.W. 1991, *Overseas Students in Australia: A qualitative exploration of pre-purchase expectations and post-purchase satisfaction*, University of Wollongong, Wollongong.
- Romm, T. & Portugal, V. 1992, *Selection and Placement of Management Graduate Students: A mathematical classification model*, University of Wollongong, Wollongong.
- Rowe, K.J., Hill, P.W. & Holmes-Smith, P. 1995, 'Methodological Issues in Education Performance and School Effectiveness Research: A discussion with worked examples', *Australian Journal of Education*, Vol. 39, No. 3, pp. 217-248.
- Rump, E. & Greeb, N. 1975, 'The Characteristics and Motivations of Students who Withdraw without Failing', *Vestes*, Vol. 18, pp. 150-160.
- Sadler, R. 1986, 'The Prediction of Tertiary Success: A cautionary note', *Journal of Tertiary Educational Administration*, Vol. 8, No. 2, pp. 151-158.
- Salemi, M.K. & Tauchen, G.E. 1980, 'Guessing and the Error Structure of Learning Models', *American Economic Review*, Vol. 70, No. 2, pp. 41-49.
- Salemi, M.K. & Tauchen, G.E. 1982, 'Estimation of Non-Linear Learning Models', *Journal of the American Statistical Association*, Vol. 77, pp. 725-31.
- Salganik, L.H. 1994, 'Apples and Apples: Comparing performance indicators for places with similar demographic characteristics', *Educational Evaluation and Policy Analysis*, Vol. 16, No. 2, pp. 125-41.
- Sawchuk, M.T. 1991, *Access and Persistence: An educational program model. Celebrating cultural diversity in higher education*, Mount St. Mary's College, Los Angeles.
- Schedvin, M. 1985, "'Why We Discontinued": An exploration of voluntary discontinuation of studies among first year students at a college of health science', *Higher Education Research Development*, Vol. 4, No. 2, pp. 159-173.
- Schofield, H. 1989, 'The Predictive Value of School Based Assessment in Tertiary Selection', Australian Association for Research in Education, Conference paper, Adelaide.
- Schultz, R.A. et al. 1992, 'Assessing a Short-Term Intervention to Senior Secondary School Persistence and Attrition: The development and testing of a theoretical model. Facilitate academic success', *NASPA Journal*, Vol. 30, No. 1, pp. 43-50.
- Selby, P. & Hore, T. 1996, *Cohort '94: A longitudinal study of student characteristics and expectations*, Professional Development Centre, Monash University, Melbourne.
- Seltzer, M.H. 1993, 'Sensitivity Analysis for Fixed Effects in the Hierarchical Model: A Gibbs sampling approach', *Journal of Educational Statistics*, Vol. 18, No. 3, pp. 207-35.
- Seltzer, M.H. 1994, 'Studying Variation in Program Success: A multilevel modeling approach', *Evaluation Review*, Vol. 18, No. 3, pp. 342-61.
- Seltzer, M.H. et al. 1994, 'The Metric Matters: The sensitivity of conclusions about growth in student achievement to choice of metric', *Educational Evaluation and Policy Analysis*, Vol. 16, No. 1, pp. 41-49.
- Shah, C. & Burke, G. 1996, *Student Flows in Australian Higher Education*, Monash, ACER, Centre for the Economics of Education and Training, Australian Government Publishing Service, Canberra.
- Sharma, R. & Dobson, I. 1995, *Student Performance and the Diversification of Modes of University Study and Bases of Admission*, Australian Government Publishing Service, Canberra.
- Sheldrake, P. 1976, 'Failure and Withdrawal: Student dropout at Flinders University', *Vestes*, Vol. 19, pp. 25-29.
- Sherman, R.H. & Tinto, V. 1975, 'The Effectiveness of Secondary and Higher Education Intervention Programs: A critical review of research', American Educational Research Association, Conference paper, Washington.

- Siegfried, J. & Fels, R. 1979, 'Research on Teaching Economics: A survey', *Journal of Economic Literature*, Vol. 17, pp. 923-69.
- Siegfried, J. & Walstead, W. 1990, *Research on Teaching College Economics. In the principles of Economics comes: A handbook, for instructors*, ed. Saunders, P. & Walstead, W., McGraw Hill, N.Y..
- Singer and Willett 1992, 'From Whether to When: New methods for studying student dropout and teacher', *Review of Educational Research*, Vol. 61, No. 4, pp. 407-50.
- Singer, J.D. & Willett, J.B. 1993a, 'It's about Time: Using discrete time survival analysis to study duration and the timing of events', *Journal of Educational Statistics*, Vol. 18, No. 2, pp. 155-95.
- Singer, J.D. & Willett, J.B. 1993b, 'New Methods for Studying Event Occurrence: Using survival analysis in early intervention research', *Journal of Early Intervention*, Vol. 17, No. 3, pp. 322-39.
- Sladden, J.D. 1979, 'Secondary/Tertiary Transition', *Pivot*, Vol. 6, No. 1, pp. 39-43.
- Slark, J. & Nguyen, T. 1994, *Pathways of Student Persistence and Performance at RSC*, Office of Research, Planning and Resource Development, Pancho Santiago Community College, Santa Ana.
- Smart, J.C. (ed.) 1985, *Higher Education: Handbook of theory and research. Volume I*, American Educational Research Association, Washington, D.C. *Volume II*, Agathar Press Inc., New York.
- Smith, N.F., Wood, L.N., Gillies, R.K. & Perrett, G. 1994, 'Analysis of Student Performance in Statistics', Mathematics Education Research Group of Australasia Conference, Lismore.
- Smith, P. 1990, 'The Use of Performance Indicators in the Public Sector', *Journal of the Royal Statistical Society, A*, Vol. 153, No. 1, pp. 53-72.
- Smyth, G.K., Knuiman, M.W., Thornett, M.L. & Kiiveri, H. 1990, 'Using the EM Algorithm to Predict First Year University Performance', *Australian Journal of Education*, Vol. 34, No. 3, pp. 204-224.
- Spady, W.D. 1970, 'Dropouts for Higher Education: Towards an empirical model', *Interchange*, Vol. 2, No. 3, pp. 38-62.
- Spann, N.G. 1990, 'Student Retention: An interview with Vincent Tinto', *Journal of Developmental Education*, Vol. 14, No. 1, pp. 18-20,22,24.
- Spector, L.C. & Mazzeo, M. 1980, 'Probit Analysis and Economic Education', *Journal of Economic Education*, Vol. 11, pp. 37-44.
- Staats, S. et al. 1991, *Intent To Get a Degree, Expectations, and Attitude Change*, Wright State University, Dayton.
- Stage, F.K. 1987, 'University Attrition: LISREL with logistic regression for the persistence criterion', American Educational Research Association, Conference paper, Washington.
- Stage, F.K. 1989, 'Motivation, Academic and Social Integration, and the Early Dropout, 1989', *American Educational Research Journal*, Vol. 26, No. 3, pp. 385-402
- Stage, F.K. & Richardson, R.C.Jr. 1985, 'Motivational Orientation within the Tinto Model of College Withdrawal', Association for the Study of the Higher Education, Conference paper, Chicago.
- Stage, F.K. & Rushin, P.W. 1993, 'A Combined Model of Student Predisposition to College and Persistence in College', *Journal of College Student Development*, Vol. 34, No. 4, pp. 276-82.
- Stahl, V.V., Pavel, D. & D. M. 1992, *Assessing the Bean and Metzner Model with Community College Student Data*.
- Stanley, G. & Oliver, J. 1994, 'Variation in Student Selection within the Australian Unified National System: A case study in undergraduate business studies from Western Australia', *Higher Education*, Vol. 28, No. 3, pp. 113, 291-299
- Steele, G.E. et al. 1993, 'The Retention of Major-Changers: A longitudinal study', *Journal of College Student Development*, Vol. 34, No. 1, pp. 58-62.
- Stevens, C.D. & Walker, B.M. 1996, 'How Residential College Students Adjust Socially and Emotionally to First Year University', *Higher Education Research and Development*, Vol. 15, No. 2, pp. 201-221.

- Stone, H.R. 1988, 'Capabilities of Traditional Quantitative Admissions Criteria in Predicting Performance of Off Campus Engineering Graduate Students Enrolled in Videotaped Courses', *Distance Education*, Vol. 9, No. 2, pp. 250-272.
- Sweet, R. 1986, 'Student Dropout in Distance Education: An application of Tinto's model', *Distance Education*, Vol. 7, No. 2, pp. 201-213.
- Swift, J.S.Jr. 1987, 'Retention of Adult College Students', *NACADA Journal*, Vol. 7, No. 2, pp. 7-19.
- Tay, R.S. 1994, 'Students' Performance in Economics: Does the norm hold across cultural and institutional settings?', *Journal of Economic Education*, Vol. 25, No. 4, pp. 291-301.
- Terenzini, P.T. 1987, 'A Review of Selected Theoretical Models of Student Development and Collegiate Impact', Association for the Study of Higher Education, Conference paper.
- Terenzini, P.T. 1993, 'On the Nature of Institutional Research and the Knowledge and Skills It Requires', *Research in Higher Education*, Vol. 34, No. 1, pp. 1-10.
- Terenzini, P.T. & Pascarella, E.T. 1977, 'Voluntary Freshman Attrition and Patterns of Social and Academic Integration in a University: A test of a conceptual model', *Research in Higher Education*, Vol. 6, No. 1, pp. 25-43.
- Terenzini, P.T. & Pascarella, E.T. 1978, *The Role of Students' Backgrounds and Levels of Academic and Social Integration in College Attrition: A test of a model*, Syracuse University, New York.
- Terenzini, P.T. & Pascarella, E.T. 1980a, 'Toward the Validation of Tinto's Model of College Student Attrition: A review of recent studies', *Research in Higher Education*, Vol. 12, No. 3, pp. 271-82.
- Terenzini, P.T. & Pascarella, E.T. 1980b, 'Student/Faculty Relationships and Freshman Year Educational Outcomes: A further investigation', *Journal of College Student Personnel*, Vol. 21, No. 6, pp. 521-28.
- Terenzini, P.T. & Pascarella, E.T. 1984, 'Freshman Attrition and the Residential Context', *The Review of Higher Education*, Vol. 7, No. 2, pp. 111-24.
- Terenzini, P.T. & Pascarella, E.T. 1990, 'Twenty Years of Research on College Students: Lessons for future research', Association for Institutional Research, Forum paper.
- Terenzini, P.T. & Wright, T.M. 1987a, 'Differences in Academic Skill Development among Men and Women during the First Two Years of College', American Education Research Association, Conference paper, Washington.
- Terenzini, P.T. & Wright, T.M. 1987b, 'Influences on Students' Academic Growth During Four Years of College', *Research in Higher Education*, Vol. 26, No. 2, pp. 161-79.
- Terenzini, P.T. et al. 1981, 'Predicting Freshman Persistence and Voluntary Dropout Decisions: A replication', *Research in Higher Education*, Vol. 15, No. 2, pp. 109-27.
- Terenzini, P.T. et al. 1985, 'A Replication of a Path Analytic Validation of Tinto's Theory of College Student Attrition', *Review of Higher Education*, Vol. 8, No. 4, pp. 319-40.
- Terenzini, P.T. et al. 1994, 'The Transition to College: Diverse students, diverse stories', *Research in Higher Education*, Vol. 35, No. 1, pp. 57-73.
- Thomas, R.O. & Bean, J.P. 1988, 'Student Retention at Liberal Arts Colleges: The development and test of a model', Association for the Study of Higher Education, Conference paper, St. Louis.
- Thomas, S. & Mortimore, P. 1996, 'Comparison of Value-Added Models for Secondary-School Effectiveness', *Research Papers in Education*, Vol. 11, No. 1, pp. 5-33.
- Thomas, S., Sammons, P. & Mortimore, P. 1995, 'Determining What "Adds Value" to Student Achievement', *Educational Leadership International*, pp. 19-22.
- Thompson, A.P & Smith, L.M. 1982, 'Conceptual, Computational Correlates of Student Performance in Introductory Statistics', *Australian Psychologist*, Vol. 17, No. 2, pp. 191-197.
- Thompson, G. 1984, 'The Cognitive Style of Field-Dependence as an Explanatory Construct in Distance Education Drop-Out', *Distance Education*, Vol. 5, No. 2, pp. 286-93.
- Tierney, W. 1992, 'An Anthropological Analysis of Student Participation in College', *Journal of Higher Education*, Vol. 63, No. 6, pp. 603-18.

- Tiggemann, M. & Winefield, A.H. 1989, 'Prediction of Employment, Unemployment and Further Study among School-Leavers', *Journal of Occupational Psychology*, Vol. 62, No. 3, pp. 213-221.
- Tinto, V. 1972, *The Effect of College Proximity on Rates of College Attendance*, Columbia University Teachers' College, New York.
- Tinto, V. 1975, 'Dropout From Higher Education: A theoretical synthesis of recent research', *Review of Educational Research*, Vol. 45, No. 1, pp. 89-125.
- Tinto, V. 1982, 'Limits of Theory and Practice in Student Attrition', *Journal of Higher Education*, Vol. 53, No. 6, pp. 687-700.
- Tinto, V. 1987, *Leaving College: Rethinking the causes and cures of student attrition*, The University of Chicago Press.
- Tinto, V. 1988, 'Stages of Student Departure: Reflections on the longitudinal character of student leaving', *Journal of Higher Education*, Vol. 59, No. 4, pp. 438-55.
- Tinto, V. 1990, 'Principles of Effective Retention', *Journal of the Freshman Year Experience*, Vol. 2, No. 1, pp. 35-48.
- Tinto, V. 1993, *Leaving College: Rethinking the causes and cures of student attrition*. (Second Edition) The University of Chicago Press.
- Tinto, V. 1995, 'Educational Communities and Student Success in the First Year of University', Transition from Secondary School to University Conference Paper, Monash University.
- Tinto, V. & Wallace, D.L. 1986, 'Retention: An admission concern', *College and University*, Vol. 61, No. 4, pp. 290-93.
- Towles, D.E. et al. 1993, 'Student Persistence in a Distance Education Program: The effect of faculty-initiated contact', Association for Institutional Research, Conference paper, Chicago.
- Trigwell, K., Prosser, M. & Taylor, P. 1994, 'Qualitative Differences in Approaches to Teaching First Year University Science', *Higher Education*, Vol. 27, pp. 75-84.
- Tutton, P.J.M. & Wigg, S.J. 1990, 'The Influence of Last Secondary School Attended, Subjects Taken in Last Year of Secondary Education and Gender on Preclinical Performance of Medical Students', *Australian Journal of Education*, Vol. 34, No. 2, pp. 168-173.
- Tymms, P. 1995, 'A Comment on Gray, Jesson, Goldstein, Hedger, and Rasbash', *School Effectiveness and School Improvement*, Vol. 6, No. 2, pp. 115-17.
- Umoh, U.J. et al. 1994, 'Factors Related to Student Retention in Community College Developmental Education Mathematics', *Community College Review*, Vol. 22, No. 2, pp. 37-47.
- Van Rossum, E.J. & Schenk, S.M. 1984, 'The Relationship between Learning Conception, Study Strategy and Learning Outcome', *British Journal of Educational Psychology*, Vol. 54, pp. 73-83.
- Volkwein, J.F. 1991, 'Improved Measures of Academic and Social Integration and Their Association with Measures of Student Growth', Association for Institutional Research, Conference paper.
- von Destinon, M. 1988, *Chicano Students: Applying Tinto's and Astin's Theories*, Center for Research on Undergraduate Education, Arizona University, Tuscon.
- Walleri, R.D. & Peglow-Hock, M. 1988, 'Case Studies of Non-Traditional High Risk Students: Does social and academic integration apply?', Association for Institutional Research, Conference paper, Phoenix.
- Walmsley, D.J. 1990, 'How Well do HSC Scaled Aggregate Scores Predict University Performance in Geography?', *Geography Bulletin*, Vol. 22, No. 3, pp. 241-245.
- Warwick-James, J.J. 1994, *Pilot Study: Retention and withdrawal among first year students in science*, Student Services, University of New South Wales.
- Watkins, D. 1978, 'A Note on Student Satisfaction with University: A case study', *Education Research and Perspectives*, Vol. 5, No. 2, pp. 45-53.
- Watkins, D. 1979a, 'Prediction of University Success: A follow up study of the 1977 internal intake to the University of New England', *Australian Journal of Education*, Vol. 23, No. 3, pp. 301-3.
- Watkins, D. 1979b, 'The Adjustment of Mature Age Un-Matriculated Entrants to Life as Internal Students at the University of New England: A pilot study', *Vestes*, Vol. 22, No. 1, pp. 48-51.

- Watkins, D. 1981, 'The Relationship between Student and Lecturer: Educational orientations and voluntary withdrawal at an Australian university', *Education Research and Perspectives*, Vol. 8, No. 2, pp. 79-82.
- Watkins, D. 1982a, 'Factors Influencing the Study Methods of Australian Tertiary Students', *Higher Education*, Vol. 11, No. 4, pp. 369-380.
- Watkins, D. 1982b, 'Identifying the Study Process Dimensions of Australian University Students', *Australian Journal of Education*, Vol. 26, No. 1, pp. 76-85.
- Watkins, D. 1982c, 'Students' Personality and Satisfaction with an Australian University: A study of interdisciplinary differences', *Higher Education Research and Development*, Vol. 1, No. 2, pp. 155-165.
- Watkins, D. 1982d, 'Academic Achievement and the Congruence of Study Motivation and Strategy', *British Journal of Educational Psychology* (UK), Vol. 52, No. 2.
- Watkins, D. 1983, 'Assessing Tertiary Study Processes', *Human Learning* (UK), Vol. 2, No. 1, pp. 29-37.
- Watkins, D. 1984, 'Student Perceptions of Factors Influencing Tertiary Learning', *Higher Education Research and Development*, Vol. 3, No. 1, pp. 33-50.
- Watkins, D. 1985, 'How Students Explain their Academic Performance', *Higher Education Research Development*, Vol. 4, No. 1, pp. 89-93.
- Watkins, D. 1986a, 'The Approaches to Learning of Australian Tertiary Students: A replication', *Higher Education Research and Development*, Vol. 5, No. 2, pp. 185-190.
- Watkins, D. 1986b, 'Assessing Causal Dimensions', *Australian Psychologist*, Vol. 21, No. 3, pp. 467-472.
- Watkins, D. & Hattie, J. 1985, 'A Longitudinal Study of the Approaches to Learning of Australian Tertiary Students', *Human Learning* (UK), Vol. 4, No. 2, pp. 127-141.
- Watkins, D. & Hattie, J. 1990, 'Individual and Contextual Differences in the Approaches to Learning of Australian Secondary School Students', *Educational Psychology* (UK), Vol. 10, No. 4, pp. 33-342.
- Watkins, D. & Hattie, J. 1992, 'The Motive-Strategy Congruence Model Revisited', *Contemporary Educational Psychology* (US), Vol. 17, No. 2, pp. 194-198.
- Watkins, D., Marsh, H.W. & Young, D. 1987, 'Evaluating Tertiary Teaching: A New Zealand perspective', *Teaching and Teacher Education* (US), Vol. 3, No. 1, pp. 41-53.
- Watson, J.M. 1988, 'Student Characteristics and Prediction of Success in a Conventional University Mathematics Course', *Journal of Experimental Education* (US), Vol. 56, No. 4, pp. 203-212.
- Webb, M.A. 1989, 'Theoretical Model of Community College Student Degree Persistence', *Community College Review*, Vol. 16, No. 4, pp. 42-49.
- Webster, W.J. et al. 1995, 'Alternative Methodologies for Identifying Effective Schools', American Education Research Association, Conference paper, Texas.
- Weidman, J.S. 1985, 'Retention of Nontraditional Students in Post-secondary Education', American Education Research Association, Conference paper, Chicago.
- Weidman, J.C. & White, R.N. 1985, 'Post-secondary "High-Tech" Training for Women on Welfare: Correlates of program completion', *Journal of Higher Education*, Vol. 56, No. 5, pp. 555.
- West, L.H.T. 1985, 'Differential Prediction of First Year University Performance for Students from Different Social Backgrounds', *Australian Journal of Education*, Vol. 29, No. 2, pp. 175-187.
- West, L.H.T. & Hore, T. 1989, *Students' Reasons for Withdrawing from Full Time Higher Education: A national picture*, HEARU, Monash University, Melbourne.
- West, L.H.T., Hore, T., Bennie, C.N., Browne, P.A. & Kermond, B. 1986, *Students Withdrawing from Full Time Higher Education*, HEARU, Monash University, Melbourne.
- White, R.T., Gunstone, R., Elterman, E., Macdonald, I.D.H., McKittrick, B., Mills, D., & Mullhall, P. 1995, 'Students' Perceptions of Teaching and Learning in First-Year University Physics', *Research in Science Education*, Vol. 25, No. 4, pp. 465-478.
- Wilhite, S.C. 1990, 'Self-Efficacy, Locus of Control, Self-Assessment of Memory Ability, and Study Activities as Predictors of College Course Achievement', *Journal of Educational Psychology*, Vol. 82, No. 4, pp. 696-700.

- Willett, J.B. & Singer, J.D. 1991, 'From Whether to When: New methods for studying student dropout and teacher attrition', *Journal of Educational and Behavioral Statistics*, Vol. 20, No. 1, pp. 41-67.
- Willett, J.B. & Singer, J.D. 1995, 'It's Deja Vu All over Again: Using multiple-spell discrete-time survival analysis', *Journal of Educational and Behavioral Statistics*, Vol. 20, No. 1, pp. 41-67.
- Williams, M.L., Waldauer, C. & Duggal, V.G. 1992, 'Gender Differences in Economic Knowledge: An extension of the analysis', *Journal of Economic Education*, pp. 219-231.
- Willms, J.D. & Kerckhoff, A.C. 1995, 'The Challenge of Developing New Educational Indicators', *Educational Evaluation and Policy Analysis*, Vol. 17, No. 1, pp. 113-31.
- Winefield, H.R., Tiggeman, M., Goldney, R.D. & Winefield, A.H. 1992, 'Predictors and Consequences of Tertiary Education: A nine-year follow-up of academically capable school leavers', *British Journal of Educational Psychology*, Vol. 62, No. 1, pp. 148-153.
- Wood, L.N. & Smith, N.F. 1993, *Students' Ideas about Mathematics*, Mathematics Education Research Group of Australia, Brisbane.
- Wood, R. 1986, 'The Agenda for Educational Measurement', in *Assessing Educational Achievement*, ed. Nuttall, D.L., Falmer Press, London.
- Wood, R. & Power, C. 1987, 'Aspects of Competence Performance Distinction: Educational, psychological and measurement issues', *Journal of Curriculum Studies*, Vol. 19.
- Woodhouse, G. & Goldstein, H. 1988, 'Educational Performance Indicators and LEA League Tables', *Oxford Review of Education*, Vol. 14, No. 3, pp. 301-20.
- Woodhouse, G., Yang, M., Goldstein, H. & Rasbash, J. 1996, 'Adjusting for Measurement Error in Multilevel Analysis', *Journal of the Royal Statistical Society A*, Vol. 159, No. 2, pp. 202-212.
- Wright, R.E. & Palmer, J. 1994, 'GMAT Scores and Undergraduate GPAs as Predictors of Performance in Graduate Business Programs', *Journal of Education for Business*, Vol. 69-70, pp. 344-348.
- Young, D.J. 1991, 'Gender Differences in Science Achievement: A hierarchical linear model', Australian Association for Research in Education, Conference paper, Gold Coast, Queensland.
- Youngs, G.A.Jr., Rathge, R., Mullis, R. & Mullis, A. 1990, 'Adolescent Stress and Self-Esteem', *Adolescence*, Vol. 25, pp. 333-341.
- Zahrly, J. 1990, 'The Use of Discriminant Analyses to Determine Subject Attrition Bias in Field Research', *Educational and Psychological Measurement*, Vol. 50, pp. 505-514.

Reports

Australian Vice-Chancellors' Committee 1960, A Conference on University Education, University of Melbourne, Melbourne.

Australian Vice-Chancellors' Committee 1985, *Annual Report – Survey of Student Progress – 1981*.

Department of Employment Education and Training 1994, *Diversity and Performance in Australian Universities*, Report No. 22, Higher Education Series, AGPS.

IARTV 1994, 'Simple Models for Estimating Value Added: General principles', Ch. 3 in *Value Added Performance Indicators for Schools*, London School Curriculum and Assessment Authority.

National Research Centre for the Freshman Year Experience 1994, 'The Freshman Year Experience Special Focus: Conference on urban campuses', South Carolina University, Columbia.

Office of Education Research and Improvement 1995, *Teaching Student Achievement in Science and Math: The promise of state assessment programs*, Policy Brief, Consortium for Policy Research in Education, Washington.

Teaching and Curriculum Working Party, Division of Science, Engineering and Design, Swinburne University 1997, *Progression and Retention Rates in First Year Engineering and Science: Strategies for improvement*, Swinburne University, Melbourne.

Texas Higher Education Co-Ordinating Board 1995, 'Students in Transition: Critical mileposts in the collegiate journey', Inaugural National Conference Proceedings, Texas.