Identifying tertiary bridging students at risk of failure in the first semester of undergraduate study

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This study presents the findings of the second phase of a project examining the attrition and progression of two cohorts of students in a tertiary bridging program at a regional university in Australia. The first phase of the study (Whannell, 2013) based on data collected up to week 5 of the bridging program identified age, academic achievement on the initial assessment tasks, the level of peer support and the number of absences from scheduled classes as being the factors which predicted attrition from the bridging program. This phase of the study examined a sample of 92 students who subsequently completed a custom questionnaire in week 12 of the tertiary bridging program and then continued into the first semester of undergraduate study. Participants at risk of failure in the first semester of undergraduate study were characterised by being younger in age, demonstrating a high incidence of absence from scheduled classes and low levels of academic achievement in the final assessment tasks in the bridging program and reporting lower quality relationships with academic

staff. The need to initiate interventions to target at-risk students prior to commencement of their undergraduate study is discussed.

Keywords: *tertiary bridging program, attrition, educational transition.*

Introduction

A longitudinal research project was conducted at a regional university in Australia examining the attrition and progression of two cohorts of tertiary bridging students for the period from their initial enrolment in the bridging program to the end of the first semester of undergraduate study. The findings of the first stage of the study relating to the factors associated with attrition from the bridging program have been previously reported (Whannell, 2013). The principal finding of that report, based on data collected in the first five weeks of the bridging program, were that the primary predictors of attrition were age, academic achievement in the initial assessment tasks, the quality of peer support and the number of absences from scheduled classes. The quality of academic staff support was found to be strongly positively associated with the emotional commitment and academic identity of the participant and negatively associated with scheduled class absence for those participants who dropped out.

The research question that guided the component of the research project targeting the transition from the bridging program into undergraduate study was: *What factors, measureable at the end of a tertiary bridging program, identify tertiary bridging students at risk of failure in the first semester of undergraduate study*. A focus for the study was to investigate whether the factors relevant to attrition in the tertiary bridging phase are also applicable to the quality of academic achievement during the transition into undergraduate study. A profile of a tertiary bridging student who may be at risk of poor academic performance will be developed.

The tertiary bridging program

The tertiary bridging program in which the participants involved in this

study were enrolled is conducted at a regional Australian university. It is available for on-campus study only and is completed by the majority of students in one full-time semester. It requires the completion of four courses, including one compulsory course targeting academic skills appropriate for study at the tertiary level. The only restriction on access to the program is that students must not be enrolled in secondary school and be at least 17 years of age at the time of enrolment. No academic restrictions are applied to enrolment with enrolment statistics indicating that about 45% of students have not completed secondary school. Successful completion of the program guarantees direct enrolment into most undergraduate programs at the institution.

Theoretical background informing the study

A study conducted over a number of years at the Whyalla campus of the University of South Australia (Cooper, Ellis, & Sawyer, 2000) identified an attrition rate of 50% in an on-campus one year bridging program. The program did not include any academic restrictions on enrolment. It was concluded that the academic performance of the tertiary bridging students in undergraduate study was comparable to that of students who gained entry through traditional means, a finding confirmed by Cantwell, Archer and Bourke (2001). The Cantwell, Archer and Bourke (2001) study examined the academic outcomes of students who had gained entry to undergraduate study at the University of Newcastle through bridging programs offered at the institution. It was identified that age was a "significant predictor of academic achievement with older students outperforming younger students" (2001, p. 232). Older students have also been demonstrated to have "more confidence to solve problems that arise in their lives, more confidence to plan a desired course of action, and more confidence to appraise accurately their strengths and weaknesses" (Archer, Cantwell, & Bourke, 1999, p. 50).

McKenzie and Schweitzer (2001), in a study involving students in the first semester of undergraduate study at the Queensland University of Technology, identified previous academic performance as the primary indicator of university performance. The study also identified integration into university, self-efficacy and employment responsibilities as being associated with the quality of academic achievement. The view that prior academic performance is a significant

indicator of achievement in the first year of undergraduate study has also been expressed by other Australian researchers (Burton & Dowling, 2005; Evans, 2000). The level of undergraduate achievement has also been identified as a direct predictor of persistence in continued tertiary study (Grebennikov & Skaines, 2008; Wintre & Bowers, 2007).

A longitudinal study (Krause, Hartley, James, & McInnis, 2005) of the first year undergraduate student experience was conducted by the University of Melbourne over the period from 1994 to 2004, with three different data collections being completed at five year intervals. The study targeted a number of Australian universities, with nine institutions participating in the 2004 data collection. The study defined three types of students, school-leavers who were aged 19 years and younger, non-traditional students who were between the ages of 20 to 24 and mature age students who were those over 25 years of age. A number of conclusions were made in the most recent study in relation to non-traditional and mature age students. It was established that mature age students "emerge as a highly satisfied group on the whole. They typically receive higher marks than their younger peers, and are slightly more positive about the way university has met their expectations" (p. v). It was also identified that mature age students "tend to have strong clarity of purpose and are more likely to seek assistance from staff" (p. v). Non-traditional students were also identified as receiving:

> Marks higher than they expected during the first semester of study. This may reflect the general lack of confidence experienced by older students who often feel daunted at the thought of sharing classes with younger students after returning to study after years of being involved in home or work settings. (p. 26)

Tinto's (1975, 1993) Student Integration Model identifies academic and social integration as primary influences on the decision to abandon tertiary study. The related constructs of commitment to tertiary study and intention to persist or leave were identified on a number of occasions in the Krause et. al. (2005) study. It was identified that "females are more likely than males to say that emotional health and physical health are important decisions for considering deferring, and males are more likely to cite disliking study and thinking they might fail" (p. 19). An overall gender difference in the level of commitment

was also identified where female students demonstrate "more academic commitment and more satisfaction with their study than the males. The females are more likely to indicate that their intrinsic interest in the subject area is an important motivating factor for them" (p. 70). A difference was also identified between full-time and part-time students where "part-time students show a clearer sense of purpose than the full-time students" (p. 73). Of particular interest to the current study is the identification of a better clarity of purpose which was identified in mature age students. It was expected that this will be reflected in higher levels of commitment to the goal of completing tertiary study and improved academic performance for mature age students in the bridging program.

Cao and Gabb (2006) completed a study at the University of Victoria which examined student attrition during the first year of undergraduate study at a new generation university over the three years from 2002 to 2004. The study established that females had a higher attrition rate than males with a difference between 0.8% and 4.6% being recorded. Differences in attrition rates were also identified based upon age and socio-economic status (SES). Students between 20 and 24 years of age and those from a low SES background were demonstrated to have a lower attrition rate. Part-time students were found to have a much higher attrition rate when compared to their full-time colleagues with part-time attrition rates varying between 39% and 47% and full-time rates varying between 13% and 17%.

McMillan (2005), in a study of data from the Longitudinal Surveys of Australian Youth, compared young people who had dropped out of tertiary study with those who persisted and identified that:

> Groups that displayed relatively *low* levels of attrition included students from language backgrounds other than English, students from small provincial cities, students whose parents have a university degree or diploma, students with high ENTER scores, and students in fields such as health and law. (p. v)

These studies identify previous academic performance as being relevant to both attrition and academic achievement in undergraduate study, which may have particular relevance to bridging program students who have generally demonstrated poor levels of academic outcomes

in secondary education. It also identifies other areas which may be relevant to the current research, including the amount of tertiary education exposure through the previous tertiary study of other family members and the differing attrition rates which may result in different tertiary programs. The McMillan (2005) study also concluded that the number of hours of paid work completed each week had an influence on attrition. No differences were identified in attrition for students who worked up to 10 hours per week, however "long hours of paid work while studying were associated with higher levels of attrition" (McMillan, 2005, p. v). A significant finding of the McMillan study was that student interests played a major role in the situation where tertiary students change course or dropout of university. It was identified that "students less commonly cited academic difficulties, difficulties juggling work and study, or financial difficulties as their main reason for changing courses or leaving the higher education sector" (p. v).

Intervention on the part of academic staff has also been demonstrated to have a positive influence on student engagement in the first year of undergraduate study. Nelson, Duncan and Clarke (2009), in a study at the Queensland University of Technology with first year undergraduate students, demonstrated that contacting students who were considered at risk of poor academic performance due to non-submission of assessment tasks had a positive influence on student retention and achievement. The contact took the form of a telephone call, the purpose of which was to identify any possible issues that the student may have and to identify additional support options which were available within the institution, such as counselling and academic services. In particular, "the at risk group who were contacted achieved significantly higher end-of-semester final grades than, and persisted...at more than twice the rate of, the at risk group who were not contacted" (p. 1). The times of the semester which were considered of particular importance, and which may also be relevant to the current study, were "the start of semester, the first four weeks, the first assignment and prior to the final assessment" (p. 1).

The Nelson, Duncan and Clarke (2009) study provides support for the view that tertiary students require additional academic and social support during the early transition period of accessing tertiary education. This view is further supported by research that examined

the university experience of mature age students at the University of Tasmania which concluded that "what happens at enrolment and university entry is less important than the orientation, academic and social support which students receive throughout the course of their studies, and their own aspirations and expectations of themselves" (Abbott-Chapman, Braithwaite, & Godfrey, 2004). The role of academic and social support was also identified in a study done at the Queensland University of Technology (Tindle & Lincoln, 2002) relating to mature age students in their first year of tertiary study. The study participants identified the following factors, in order of frequency, as important to their academic success: social support from fellow students, preparation before arrival at university, family support, access to on-line resources, accessibility to academic staff, and personal attitudes with students referring to their own determination and perseverance in the face of obstacles. It would be expected that academic and social support would be particularly important for students such as those in a tertiary bridging program, many of whom have a poor academic background.

Lawrence (2005) based on a review of the literature, proposed a re-conceptualisation of the tertiary student attrition/retention phenomenon. She proposed that the phenomenon comprised two different components which should be looked at separately, namely the time of the transition into tertiary study and the period after transition. It is also noted that the majority of the more recent studies which have been done in relation to the tertiary attrition phenomenon have taken a sociocultural approach. The early models, which appear heavily influenced by Tinto's (1975, 1993) approach, present the role of the student as one in which he/she must integrate into the existing university culture. The more recent studies, collectively, appear to be proposing that the university culture should be sufficiently flexible to adapt itself to allow students to be accepted as they are upon their initial arrival. If this were the case, many of the issues associated with the transition process into undergraduate study may be eliminated, or at least reduced due to a lessening of cultural shock.

The previously reported first stage of this research project (Whannell, 2013) examined the student experience from enrolment to the end of the tertiary bridging program. A logistic regression analysis, based on data (*N = 295)* obtained from a questionnaire administered in week

3 and the first assessment tasks completed in week 5, identified the following factors as being significantly associated with attrition from the bridging program:

- Age, with older participants demonstrating a lower attrition rate;
- Absence from scheduled classes, with lower attrition associated with lower levels of absence;
- Academic performance at the first assessment task, with better performance being associated with a lower attrition rate;
- The quality of peer support, with higher levels of support being associated with a lower attrition rate. (Whannell, 2013: 294)

The literature reviewed and the findings from the first stage of the current study (Whannell, 2013) identify a number of factors that may influence the quality of the outcomes for tertiary bridging program students as they transition into undergraduate study. Age and the quality of previous academic achievement were identified as being associated with attrition in tertiary study and would be expected to be relevant to the quality of academic achievement in the first semester of undergraduate study for tertiary bridging students. The quality of social support was also expected to play an important role in the transition process and be reflected in the quality of academic results achieved. Other factors, such as gender and the number of hours of outside work completed, may also be relevant.

Method

The aim of this study was to identify factors measureable in the final weeks of the tertiary bridging program that could be used to identify students at risk of poor academic performance in the first semester of undergraduate study. For this reason, a quantitative approach was employed involving the completion of a questionnaire that facilitated measurement of a number of variables that the literature indicated may potentially be predictive of the level of academic performance in the first semester of undergraduate study.

This study utilised the same custom questionnaire as that used in the first stage of the research project (Whannell, 2013). The data analysed for this report was collected by a questionnaire completion in week 12

of the tertiary bridging program in a lecture of a course compulsory for all students. The week 12 data collection involved 92 participants who subsequently enrolled in undergraduate study at the same institution in the following semester.

The questionnaire was composed of an introductory demographics and study behaviours section, followed by a series of Likert-style items using a five point scale ranging from Strongly Disagree to Strongly Agree. Five Likert scales, comprising a total of 30 items, were provided by the questionnaire and are summarised in Table 1.

***Table 1:** Questionnaire Scales*

Scale	Number of Items	Cronbach's Alpha
Peer Support	8	0.872
Emotional Commitment and Identity	7	0.882
Family Support	6	0.893
Staff Support	5	0.809
Academic Self-Efficacy	4	0.773

The Cronbach's alpha values reported (Whannell, 2013) demonstrate a high level of internal reliability for each scale.

The family, staff and peer support scales included items such as "My family are supportive of my desire to attend university", "I have developed good relationships with other students at university" and "Academic staff are supportive of my attempt to complete university study". The emotional commitment and identity scale included items such as "I feel proud of being a university student", "I am strongly committed to pursuing my educational goals" and "I like going to university". The academic self-efficacy scale included items such as "I consider myself to be a good student" and "I am a good note-taker in lectures". The academic self-efficacy scale was intended to address skills applicable to successful tertiary study.
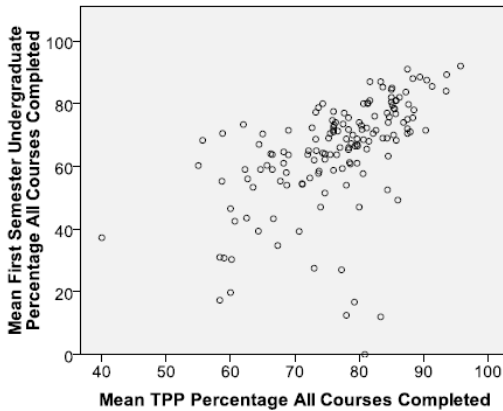
Findings and Discussion

Undergraduate achievement
Figure 1 shows a scatterplot comparing the final mean achievement

for all courses completed in the bridging program with that in the first semester of undergraduate study for the participants who completed the week 12 questionnaire in the bridging program who continued on to undergraduate study.
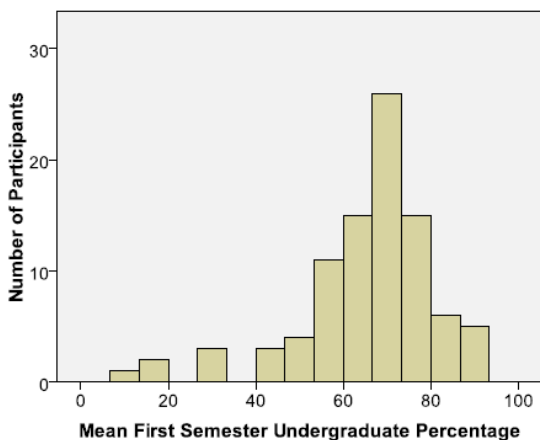
Figure 1 *– Scatterplot comparing final mean bridging program achievement and first semester mean undergraduate achievement (N = 92)*

The final mean achievement in the bridging program correlated well with the overall mean result for courses in the first semester of undergraduate study ($\rho = .607, p < .001, N = 92$). The level of correlation provides support for the view that achievement in the bridging program is acting as a good guide to the students' capacity to cope with the academic requirements of undergraduate study and to achieve at that level of education.

Figure 2 shows the data distribution for the mean achievement for all courses completed in the first semester of undergraduate study for these participants.

Figure 2 – *Histogram of first semester undergraduate results for participants who completed week 12 bridging program data collection (N = 92)*

While the data distribution includes a number of low outliers, the distribution is close to normal for results above 40. Results below 40 were considered outliers and were removed from the dataset to allow for a correlational analysis using Pearson's *r* and multiple linear regression to be conducted.

Previous research examining the first year undergraduate experience have indicated different qualities of outcomes based upon gender (Cao & Gabb, 2006; Krause, 2005), the number of hours of work completed outside university and whether the student was the first-in-family to attend university (McMillan, 2005). In this study, there was no significant difference in academic achievement based on gender, with males ($\bar{X} = 68.8, s = 9.6, N = 32$) demonstrating very similar results compared to females ($\bar{X} = 69.6, s = 10.1, N = 54$): $t(84) = 0.358, p = .721$. A Spearman's correlation between the number of hours of work outside university and the level of mean undergraduate achievement for the participants was very low and not statistically significant ($\rho = .020, p = .880, N = 57$) indicating no association between these

factors. Note that, of the participants who reported their outside work hours, 55% indicated they did not engage in this activity at all. Those who were the first in their family to attend university demonstrated a somewhat lower level of academic achievement $(\bar{X} = 62.5, s = 18.1, N = 53)$ when compared to other students $(\bar{X} = 67.1, s = 14.8, N = 39)$. However, the difference in achievement was not statistically significant $(t(90) = 1.3, p = .198)$. While the literature review suggested that gender, the number of hours of outside work and first-in-family status may be associated with differences in the outcomes for the participants, this study has not provided any substantive evidence to support this view. These findings support those of the previously reported first stage of this study (Whannell, 2013). Table 2 shows the Pearson's *r* correlations for the variables from the week 12 bridging program data collection with the mean achievement for the first semester of undergraduate study.

Table 2: *Pearson's r correlation coefficients – week 12 scales versus undergraduate achievement*

Measure	Emotional Commitment and Identity	Family Support	Peer Support	Staff Support	Self Efficacy	Hours Study	Scheduled Classes Missed	Age
Undergraduate Result	.009	.013	.137	.113	.026	.195	**-.375**[**]	**.251**[**]

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Sample size range = 82 to 85

Similar to the analyses previously reported of the data collected during the initial weeks of the bridging program (Whannell, 2013), the number of scheduled classes missed and age appear as predictors of the quality of academic achievement for participants in the first semester of undergraduate study. The correlations indicate that as age increases achievement is higher, supporting previous research (Cantwell, Archer & Bourke, 2001; Krause, Hartley, James & McInnis, 2005). Achievement was reduced for those students who demonstrated higher absenteeism.

A standard multiple linear regression was performed using the mean result obtained in the first semester of undergraduate study as the dependent variable and the final mean bridging program result, number of scheduled classes missed and age as the independent variables.

The purpose of the regression analysis was to determine the relative strength of influence of these factors on the level of undergraduate achievement for the participants. The multiple correlation coefficient ($R = .670$) was significantly different from zero, ($F(3,80) = 21.733, p < .001$) while 42.8% of the variation in the mean undergraduate result was explained. The final bridging program result ($t = 6.337, p < .001$) and the number of scheduled classes missed ($t = –2.193, p = .031$) made a statistically significant contribution to the model. Age ($t = 1.577, p = .119$) was found to not provide any significant unique contribution to prediction. The coefficients table is shown in Table 3.

Table 3: *Coefficients table – Regression with undergraduate result as independent variable*

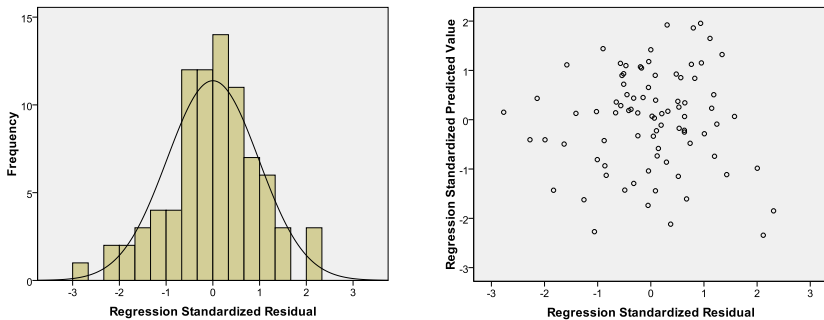| Model	Unstandardised Coefficients		Standardised Coefficients	*t*	Sig.
	B	**Std. Error**	**Beta**		
(Constant)	9.770	9.274		1.054	.295
Mean Bridging Program Result	.717	.113	.547	6.337	.000
Scheduled Classes Missed	-.737	.336	-.195	-2.193	.031
Age	.141	.089	.137	1.577	.119

The relative influence of each of the predictor variables on the mean undergraduate result is given by the Beta values. The higher the Beta value, the greater the relative influence of that variable, with negative values indicating that as the predictor value increases, the value of the undergraduate achievement will reduce. The standardised Beta weights indicate that the dominant contribution to improved academic achievement is the mean bridging program result, while the number of scheduled classes missed has a negative effect on achievement. The equation of prediction for the analysis is given by:

$$Mean\ Undergraduate\ Achievement \\ = .717 \times Mean\ TPP\ Achievement - .737 \times Classes\ Missed + .141 \times Age$$

This result supports the findings of previous studies (Burton & Dowling, 2005; McKenzie & Schweitzer, 2001), where the primary predictor of achievement in the first semester of undergraduate study was the quality of previous achievement. In this case, the mean result in the assessment tasks completed at the end of the tertiary bridging program.

The assumptions of the regression model were tested by examining the distribution of standardised residuals and the scatter plot of standardised predicted values versus standardised residuals, which are shown in Figure 3.

Figure 3 - *Undergraduate result regression plots*

The distribution of the standardised residuals is close to normal, while the standardised predicted values versus standardised residuals distribution is close to random, indicating homogeneity of variance. This indicates that the assumptions required for a valid regression analysis are met and the dataset was suitable for linear regression.

First semester undergraduate failure

This section will examine the data available at week 12 of the bridging program with a view to identifying the factors that may be predictive of students who are at risk of academic failure in the first semester of undergraduate study. To facilitate the analysis, the mean result for each participant for all courses studied in the first semester of undergraduate study were coded to distinguish between those students who had achieved a mean result of 50% or better and those who failed to achieve at this level. The coding identified 12 participants who did not achieve at the required level and 79 who did. This coding was then used as the grouping variable for the conducting of an independent samples t-test for each of the summated Likert scales from the week 12 data collections and the overall mean result in the bridging program. The results of the analysis are shown in Table 4.

Table 4: *Independent samples t-test – Week 12 bridging program summated scales by undergraduate passing result*

Measure	Levene's Test		t-test		
	F	Sig.	t	df	Sig. (2-tailed)
Family Support	.647	.423	1.604	89	.112
Peer Support	1.279	.261	.417	89	.678
Staff Support	**2.435**	**.122**	**3.171**	**89**	**.002**
Emotional Commitment and Identity	.485	.488	1.690	89	.095
Academic Self-Efficacy	1.277	.261	.777	88	.439
Final Bridging Program Result	**2.184**	**.143**	**2.951**	**89**	**.004**

The scales which demonstrated violation of Levene's Test were analysed using the non-parametric Mann-Whitney U-test, with the results shown in Table 5.

Table 5: *Mann-Whitney U-test – Week 12 bridging program data by undergraduate passing result*

Measure	Age	Hours Study	Hours Paid Work	Classes Missed
Mann-Whitney U	**310.5**	448.0	382.0	**255.0**
Z	**-1.922**	-.098	-1.077	**-2.579**
Asymp. Sig. (2-tailed)	**.055**	.922	.281	**.010**

These results indicate that significant differences exist for the levels of staff support ($\bar{X}_{<50\%} = 22.9, s_{<50\%} = 2.1, \bar{X}_{\geq50\%} = 25.7, s_{\geq50\%} = 3.1, d = 1.06$), age (Mean Rank$_{<50\%}$ = 61.3, Mean Rank$_{>=50\%}$=85.9), the number of classes missed (Mean Rank$_{<50\%}$=61.9, Mean Rank$_{>=50\%}$=43.4) and the final bridging program result ($\bar{X}_{<50\%} = 68.2, s_{<50\%} = 11.1, \bar{X}_{\geq50\%} = 78.1, s_{\geq50\%} = 8.2, d = 1.01$) based upon the participants' achieving an average of 50% in the first semester of undergraduate study. The emotional commitment and identity variable was just outside the cut-off for significance at the 95% confidence level. It will be remembered that, with one exception, these risk factors are identical to those identified as risk factors of attrition from the bridging program (Whannell, 2013). In the week 3 data collection the level of staff support was not significantly different between those who dropped out of the program and those who completed. However, a difference close to that for statistical significance

at the 95% confidence level was identified in the level of peer support. In the week 12 data collection, this situation has reversed and there was a significant difference in the quality of perceived staff support.

While a logistic regression analysis would have been beneficial to provide a more in-depth analysis to quantify the influences of predictor variables on academic failure in the first semester of undergraduate study, the size of the dataset does not allow for this to be done with confidence. The dataset includes only 12 cases of participants failing to achieve the required 50% mean result on their undergraduate courses. This small number of cases would not allow for a statistically reliable logistic regression analysis to be completed (Babyak, 2004). A much larger study using participants from a number of universities or over a much longer time period would be necessary to achieve the required sample size for this to be done successfully.

Conclusions

This analysis identifies the profile of a bridging program student at the finish of their tertiary bridging program who may be at risk of achieving poorly in their first semester of undergraduate study. Those participants at risk were characterised by:

- Being younger in age;
- Demonstrating a high incidence of absence from scheduled classes;
- Reporting lower quality relationships with academic staff; and
- Lower levels of academic achievement in the final assessment tasks in the bridging program.

When the findings of the initial component of the research project targeting attrition from the bridging program (Whannell, 2013) are considered in association with the results reported here, it is apparent that the consistent factors which predict the quality of outcomes for tertiary bridging students are the quality of academic achievement, the age of the student and the number of scheduled classes missed. Similarly to previous studies (Cantwell, et al., 2001; Krause, et al., 2005), older students have been identified as having improved outcomes in undergraduate study. The quality of supportive social relationships has been identified as being important. However, the source of support which maximises the likelihood of academic success appears to change

over the course of study. While support from peers is associated with reduced attrition during the transition into the bridging program, it is the support of academic staff which is associated with better academic performance during the transition into the first semester of undergraduate study.

Of particular interest is that the factors identified do not require sophisticated approaches to measurement. Age, high levels of absence from class and academic achievement are able to be measured within the ongoing activities of the bridging program. The measurement of the quality of relationships with staff could also be accomplished with a small questionnaire incorporated as a part of the final assessment task in the compulsory academic skills course. In this study, the quality of staff relationships were measured utilising a five item Likert scale.

The implication that these findings have for practice within the tertiary bridging program is that identifying students at risk of poor academic performance in the first semester of undergraduate study appears to be a relatively simple task and one which should be attempted. This process would be best undertaken immediately the final assessment results are available. At-risk students would then be passed onto the support staff responsible for first year students who would then initiate the institutional processes, similar to those described by Nelson, Duncan and Clarke (2009), to support these students during their first semester of undergraduate study.

The study has identified age, class absence, the quality of staff relationships and bridging program academic achievement as the variables that predict poor academic achievement in the first semester of undergraduate study at the institution where the study was conducted. However, there are limitations on the generalisability of these findings. The opportunity exists to repeat this study using a much larger sample size that incorporates a variety of delivery methods across different institutions to determine if the findings reported here are applicable more widely. It is also the case that, while this study may provide a profile of the tertiary bridging student who is at risk of poor academic performance during the transition into undergraduate study, it does not provide insight into the form that invention to address the issue should take. Further research would also be appropriate in this

area.

It must also be said that, of the 92 students who commenced undergraduate study, only 12 (13%) achieved a mean result on all undergraduate courses of less than 50%. The overall attrition rate for the university where this study was conducted for all students has been recorded as high as 25%, with a higher figure being demonstrated for first year students. While attrition rate and failure rate are not synonymous, a 13% failure rate for these students, considering their academic background, is a remarkable achievement.

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