ABSTRACT

Purpose

This study evaluated the use of two psychometric measures as predictors of end of year outcome for first year university students.

Design

New undergraduates (N=537) were recruited in two contrasting universities: one arts based, and one science, in different cities in the UK. At the start of the academic year, new undergraduates across 30 programmes in the two institutions were invited to complete a survey comprising two psychometric measures: Academic Behavioural Confidence Scale and the Performance Expectation Ladder. Outcome data were collected from the Examining Boards the following summer distinguishing those who were able to progress to the following year of study without further assessment from those were not.

Findings

Two of the four Confidence subscales, Attendance and Studying, had significantly lower scores amongst students who were not able to progress the following June compared to those who did (p<.003). The Ladder data showed the less successful group to anticipate a poorer performance at graduation relative to their year group than did the other group (p<.05).

Value

The results suggest that these two psychometric measures could be instrumental in predicting those at risk of non-completion; such identification could enable the

targeted use of limited resources to improve retention. Given the background of limited resources in which institutions are exhorted to improve retention rates, this approach, facilitating the early identification of those at risk of non-completion, could enable focussed use of additional support to reduce attrition.

Keywords

Transition to Higher Education, First Year Students, Academic Confidence, Retention, Progression, Non-completion

Classification

Research Paper

DETECTING UNCERTAINTY, PREDICTING OUTCOME

INTRODUCTION

Transition to Higher Education (HE) is acknowledged to be challenging (Christie *et al.*, 2008; Hockings *et al.*, 2007; Hulme and De Wilde, 2015; Leese, 2010).   Student retention, progression and completion remain a concern in higher education (HE) as reported in The *What Works*? Report (Thomas, 2013) in the UK as in other countries (van Stolk *et al.,* 2007). The negative consequences of not completing undergraduate studies, either through academic failure or voluntary withdrawal, are many. These impact the students, their families, institutions and society (Rhodes and Nevill, 2004; Wilcox *et al.,* 2005). The economic and ethical consequences for institutions and society are non-trivial and not easily remedied. The financial and psychological consequences for the students and their families can last a lifetime in terms of increased debt, reduced earnings and "contributions to human capital" (Thomas, 2012, p.7).

For years, researchers have been making a case for increased support for undergraduate students, especially in regards to non-traditional students in their first year of study. This is in part a result of Widening Participation initiatives which have resulted in rising numbers of 'first generation university students'. (Thomas and Quinn, 2006). These students have no family history of HE and may be least prepared for the experience. For example, Leese (2010) reported that many students were concerned about the emphasis on 'independent learning' at university and felt ill-prepared. Bamber and Tett (1999) argued that: "Higher education must accept that the implications of offering access to non-traditional students do not end, but rather begin, at the point of entry" (p. 15), and Tinto (2008) maintains that access without support is not opportunity. However, despite accumulating evidence demonstrating

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the need for better support to address the multiple problems of student non-completion (Lowe and Cook, 2003), and the calls for Higher Education Institutions (HEIs) to put in place a strategy to support students to be successful, dropout and failure continues to be a very real issue for HE in many countries (van Stolk *et al.,* 2007).

Non-completion, particularly in the first year of study, is not a recent phenomenon (Tinto, 1975). Because the first year remains the most critical for non-completion, Yorke and Longden (2007) surveyed 20,000 first-year full-time students in a number of contrasting UK HEIs and a range of disciplines, to identify potential reasons. Over 7,000 responses were returned and analysed. Findings showed that in general, students found their learning experiences stimulating and the teaching supportive. Although most understood the academic demands, a minority reported that they were not coping particularly well with them and many indicated a likelihood of considering withdrawal. Longden (2006) challenged HEIs to consider their responsibility to adapt to changing student demands and expectations by reviewing the course content, curricula and culture.

According to data from the Higher Education Statistics Agency in the UK (HESA 2012-13), overall non-continuation following year of entry for full-time first degree entrants in UK HEIs was 7%. For young entrants, non-completion is 6% (ranging from 1.4% - 15.2%); for mature entrants, non-completion is 10.9% (ranging from 2.7% - 21.85%) (HESA 2012-13). Although attrition rates have tended to remain fairly constant, as student numbers increase, non-completions increase proportionately. The outcomes for non-completers are non-trivial and can result in economic, ethical and legal implications for funders of HE, as well as psychological

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and financial deficits for the students themselves. For example, researchers have consistently found that non-completing students spend longer finding work and then earn less than graduates (Johnes and Taylor, 1991; Torenbeek *et al.*, 2010). Psychologically, students who drop out can feel guilty and ashamed with negative impact on their self-esteem and self-efficacy (Pervin *et al.*, 1966). Indeed Bandura (1986) argued that they key component of self-efficacy is mastery of experience; thus failure to achieve such mastery, in this context withdrawing from university, will adversely affect self-efficacy. Hence the Higher Education Funding Council for England developed a project, 'back on course' (sic) from 2009 to 2012 in response to increasing concern about the number of students leaving university early (Rose-Adams 2012). Thus, in the current context of rising student fees, retention and success are key concerns in the sector.

The *What Works?* Report (Thomas, 2013) comprises summaries of findings from 7 Projects. It argues that effective interventions are situated within the academic and the social experience. This is in line with Astin's theory of student involvement (1984) which predicts that student persistence is often related to levels of student activity and contact with the institution and peers and Tinto's student integration model (1993), which identifies academic and social integration and institutional and goal commitment as key variables contributing to students' decision-making about withdrawing. Indeed, some authors have argued that social integration into the new environment is equally central to success (York, 2000, Christie *et al.,* 2008). Consequently, effective interventions need to start pre-entry and emphasise engagement and an overt academic purpose (Trowler 2010). Establishing effective links between HE providers and feeder schools and colleges through outreach work

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can smooth the transition and improve preparedness (Yorke and Thomas, 2003). Furthermore, effective institutions are those that develop peer networks and friendships, create links with academic members of staff, provide key information, shape realistic expectations, improve academic skills, develop students' confidence, demonstrate future relevance and nurture belonging.

Thomas (2013) highlights findings describing the relationship between thinking about leaving within the first year and increased likelihood to do so. Worryingly, 42% (Project 1, n=237), 37% (Project 5, n=873) and between 33% and 39% (Project 7, N=142) of students had considered withdrawing from HE. She argues that efforts such as improved academic and social integration and institutional and goal commitment should be made to deter students from considering leaving in the first place. Thinking about leaving or 'doubting' can also be linked to academic workload or course-related problems. However, support from friends and families may influence such doubters to stay the course (Xuereb, 2014). This may be one reason why many who began by doubting their ability to complete the course do not subsequently withdraw, although it has been established that those who doubt are more likely to leave their course than those who do not (Foster, 2012). .

Over the past decades, many reasons have been proposed for student non-completion. Indeed, Yorke has published prolifically on student retention in HE (Yorke, 1998a, 1998b, 1998c, 1999, 2000) deriving findings from a sample of 1616 students who had dropped out (a response rate of 31.9%). Yorke identified 36 possible 'influences' on the decision to withdraw. Using factor analysis, these were reduced to 8: unsatisfactory experience of the programme; unhappiness with the locality of the institution; inability to cope with the demands of the programme; wrong

choice of field of study; dissatisfaction with institutional provision of facilities; problems associated with finance; health-related problems; and problems associated with relationships (Yorke, 1998a). These were later reduced to 6 factors (Yorke, 2000). In addition, both Benn (1995) and Cook (2004) argue that the failure of the course to live up to expectations, inadequate pre-course information and inadequate staff-student relationships are instrumental in student non-completion of their first year. In addition, Cook found significant correlations with dropping out between coming from a family with little parental experience of HE, poor entrance qualifications, intention to live at home, and student confidence in choosing the right course. He also found that male students were more likely than females to leave. Woodfield *et al.* (2006) found gender differences in attendance rates which in turn were identified as critical to final degree outcome. The same author later identified six key characteristics associated with lower continuation or attainment: being male, specific BME backgrounds, lower socio-economic class, being mature, studying part-time and studying locally (Woodfield 2014).

In line with Benn (1995) and Cook (2004) who found that inadequate pre-course information can have detrimental effects on student retention, Smith and Wertlieb (2005) reported that first-year college students' expectations about "what college is like" did not always align with their actual experiences. While self-confidence is encouraged in learning environments, overconfidence in predicting the outcomes of one's abilities is typical. Mair (2012) and others have found that like the general population, first year students in HE, may have unrealistically high confidence in their ability to predict their academic or social abilities. Consistent with the large literature on cognitive bias (e.g., Kahneman and Tversky, 1979; Dunning and Kruger, 1999),

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those who are overconfident in their predictions, have been found to achieve lower grades than students with average or below average expectations. Expectations that are misaligned with reality can result in missed opportunities to seek clarification or support when needed. This highlights the need to provide information and support before students start their programme of study (e.g., Benn, 1995; Cook, 2004). It also demonstrates the need for staff to be aware of and sympathetic to students' inaccurate expectations to enable adjustments to be implemented early on through targeted support. However, Bean and Eaton (2001) found that as students' confidence in their academic abilities grows so do their positive social relationships. Findings from focus groups with students conducted by Thomas (2002) also reported the importance of enhanced student-staff relationships. Explicitly, Thomas found that if students felt staff believed in them and cared about their outcomes they would gain self-confidence and motivation.

Thomas (2013) and many others argue that improving student belonging should be a priority for all programmes, departments and institutions. Yorke and Thomas (2003) and Yorke and Longden (2008) both emphasise the value of commitment to access and to retention arguing that success in retaining students requires a strong policy commitment and the need for these to be supported by practical action within the HEI. Cook (2004) suggests that as a result of identifying demographic and other indicators, both the identification of problems and potential solutions should be applied locally at course level as problems identified institutionally will not necessarily enable support to be directed where it is needed. When resources are limited, the action needs to be targeted at those most in need of additional support in the early days of their studying.

Psychometrics have been evaluated to predict programme outcome with varying degrees of success. Woodfield *et al.* (2006) argue that the focus of attention has been on cognitive ability and personality variables, where the five-factor model has dominated. More recently a belief in free will has been identified as correlating with better academic performance (Feldman *et al.*, 2016). A more specific measure relating to higher education is the Student Adaptation to College Questionnaire (Baker and Siryk, 1989) which has been shown to be an effective measure of adjustment to college (Credé and Niehorster, 2012) although its factor structure appears to vary with populations (Feldt *et al.* 2011). An alternative approach to understanding the process of adjustment, also with a focus on higher education, based on the principles of self-efficacy (Bandura, 2006), is to explore academic confidence. Self-efficacy can be defined as the conviction that one can successfully execute the behaviour required to produce outcomes (Bandura 1977).

Thus the study reported here applies two psychometric measures, the Performance Expectation Ladder (PEL) and the Academic Behavioural Confidence Scale (ABC) The PEL is based on social comparison theory, in particular, the principles of an external frame of reference as described by Skaalvik and Skaalvik (2002). They proposed that this is

> *a process by which a student compares his or her performance with*
> *the perceived performance of another which may be a comparison*
> *group or a comparison person. (Skaalvik and Skaalvik, 2002, p 234)*

The items that make up the ABC relate to specific behaviours associated with being enrolled on an undergraduate programme which reflects Bandura's (2006) argument

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that any attempt to measure self-efficacy should be situation specific. The ABC's emphasis on future anticipated behaviours makes it particularly suitable for use right at the start of a college career, before any decision about successful adjustment can be made. Moreover with its 17 items it is a more concise scale than others and, combined with the 4 question PEL, has the potential to be deployed across cohorts in a timely fashion.

Previous research with the ABC has shown that confidence varies between disciplines groups (e.g. Sanders and Sander, 2007; Matoti and Jonquiera, 2009; Matoti, 2011) and that it can predict end of semester outcomes (e.g. Nicholson *et al.* 2013). These two measures, ABC and PEL, were found to be good predictors of successful completion of studies with Foundation Year students in a previous study (Sanders *et al.*, 2012). (Foundation Year programmes are one means by which students lacking the necessary qualifications or skills to enter higher education can acquire those skills and improve their preparedness for degree level study.) The present study replicates the Foundation Year study with direct entry undergraduate students. The samples were recruited from undergraduates studying Health Sciences at a traditional multidisciplinary university and undergraduates studying Fashion at an Arts university.

The aim of the study was to evaluate the use of these two psychometric measures at the start of the academic year for identifying students at risk of non-completion. Previously, three of the four subscales of the ABC (Studying, Grades and Attendance) have been shown to be predictive for all three years of an undergraduate psychology programme (Nicholson *et al.* 2013) and the Attendance subscale has been shown to predictive with Foundation Year Students (Sanders *et*

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al. 2012). If these concise measures can be shown to be effective detectors of uncertainty and doubting at the start of the academic year, they could be used as routine screening for all new students enabling institutions to target interventions to improve retention.

METHOD

Sample

New undergraduates were recruited in two contrasting universities: 19 BSc programmes from one institution in Wales and 11 BA programmes from the other in England were invited to take part.

Measures

The paper-based survey comprised some background questions and two psychometric measures: the Academic Behavioural Confidence scale (ABC) and the Performance Expectation Ladder (PEL). The ABC comprises 17 statements relating to behaviours university students may undertake as part of their studies and participants are asked to rate, using a 5 point scale, how confident they feel that they will be able to undertake each of the behaviours listed (1, 'Not at all' to 5 'Very Confident'). This has four subscales: Attendance, Grades, Studying and Verbalising. (Sander and Sanders, 2009). The PEL is a vertical ladder as a visual analogue of potential marks with a clearly indicated mark of 57 labelled as the putative 'national average'. Beside the ladder are two columns, one titled 'End of First Year' the second 'Graduation'. Participants are asked to specify the mark they expect to be the average for their year group and for themselves at each time point, by writing first 'YG' and then 'Me' in each of the two columns.

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Procedure

Ethical approval was gained from each university's Ethics Panel prior to beginning data collection.

The researcher (RS) approached each of the individual programmes in a classroom towards the start of the Autumn Term, and explained that the research was intended to understand how students feel about their studies. As many of the Arts programmes were taught in small groups, it was not practical for the researcher to visit all class rooms, therefore not all the cohort were directly invited. Once in the classroom, she handed out participant information sheets and copies of the survey to be completed on the spot. Most present at the time of data collection responded to this request; no pressure was applied to those who did not wish to do so.

Data were also collected from the Examining Boards the following summer. Ethical considerations meant that the only outcome measure provided for the research was whether or not the student could progress on the basis of the summer board. No data were collected from Retrieval Boards at the end of the summer. Those who were identified as not yet being able to progress included: those with academic failure; those with mitigating circumstances and those who had withdrawn.

Analysis

The data were entered into IBM SPSS Statistics 20. Data were also collated on participants' age group, gender and any previous experience of university study. With the ABC, a mean mark for each participant was calculated such that a score near 1 suggested low levels of confidence whilst near 5 represented high levels. These data were analysed with a Mann Whitney nonparametric analysis, reporting a

z-score, as ABC data are rarely normally distributed and prone to outliers, making parametric testing ill-advised. For the PEL, the key measure was not the absolute expected mark but rather the placement of the participant's own expected mark relative to that they expected for their year. As these data are also prone to outliers, again the Mann Whitney test was chosen as the safer option. Two tailed testing was used throughout.

RESULTS

In England there were 193 participants, (20% of the cohort) and in Wales, 344 BSc participants (54% of the cohort), making an overall total of 537. As the focus of this study was undergraduate degree programmes, as a precautionary measure, those not identifying themselves as studying at Bachelor's level in each university were compared with those who were. This preliminary analysis showed similar ABC scores for the BA and Foundation Programme students the HNC or HND had significantly different ABC scores from the BSc students and therefore these 19 were dropped from subsequent analysis.

There were 21 participants who could not be identified in the Examining Board data, hence the final sample was 516. Of these 347 were classed as Progressing and 169 were not progressing.

Figure 1 ABC Sub-scale Scores by Examining Board Outcome ABOUT HERE

The ABC sub-scale scores are presented in Figure 1. The scores for Grades and Verbalising are quite similar between the two groups (z=0.441 and z=1.469,

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respectively, p>.05). Therefore at the start of the year both groups were reporting similar levels of confidence about their anticipated academic achievements and about their ability to discuss academic issues. However at the start of the year, those who did not subsequently progress at the first examining board were significantly less confident about their ability to study (z=3.076, p=.002) and their ability to attend (z=5.513, p<.001). This partially concurs with the study of Foundation students where only the Attendance subscale appeared predictive.

For the PEL the differential between participants' own expected mark ('Me') and that they expect for their year group ('YG') was calculated such that a minus score indicated ME poorer than YG; this was done for both end of first year and at Graduation, see Figure 2.

Figure 2 PEL Differentials by Examining Board Outcome ABOUT HERE

As shown in Figure 2, the median was 0 for all four differentials, and those for the first year were similar between the two groups (z=1.588, p>.05). Those who subsequently progressed at the Examining Board had expected slightly better marks relative to their year group than did those who were not going to progress (z=2.315, p=.021). It appears that for the Progressing group, those who expected to achieve higher than their peers showed a wide spread of marks, and those who expected a poorer outcome were within a smaller range. The converse is the case for the Not Progressing group. Thus at the start of the academic year for those who subsequently would not progress at the first Examining Board, there was tendency to expect to achieve poor performance at graduation relative to their peers.

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There was no indication that age-group, mode of study (part-time or full-time) or having studied at the university before were associated with progression status. Those who had completed a Foundation Programme previously had a significantly higher progression rate (76%) than those who had not (61%) (χ^2=6.228, df 1, p=.013). This is not surprising as it could be expected that a Foundation programme should act as a screen for the related degree.

DISCUSSION

This prospective study compared psychometric data collected at the start of the academic year for two groups of students who were distinguished only at the end of that year by their examining board outcome: those who could progress and those who could not progress without further assessment. Both groups were equally confident in their ability to discuss academic issues as demonstrated on the Academic Behavioural Confidence subscale, Verbalising, and in their ability to achieve good marks as shown by the subscale, Grades. However these data show that participants who were not able to progress had achieved lower scores on the ABC subscales, Attendance and Studying. It would seem that the Attendance subscale is the most generally effective for detecting doubting in line with previous work with psychology degree students (Nicholson *et al.* 2013) and Foundation Year (Sanders *et al.*, 2012.) The Studying scale was not effective in the Foundation Year study but was in the work of Nicholson *et al.* (2013), which was the only study also to find the Grades subscale to be predictive.

That the Attendance subscale appears to be the best predictor in all three studies is worthy of further consideration.   The climate for students in the UK has changed

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markedly over the last five years with fees rising from £3,000 to £9,000 in 2012. The pressing need for many learners to manage paid employment alongside full-time study was evident even before the fees increase, and the consequent detrimental effects on academic performance were established (Callender, 2008). It is not unreasonable to propose that conflicting demands of the programme and employment would have an adverse effect on attendance, of which some students may have been aware even at that early juncture of their studies.

It is noteworthy that the two subscales where the groups did not differ, Verbalising and Grades, can be considered to be linked to ability. In contrast Studying and Attendance refer more to notions of sustained motivation, and this is where the difference between the groups was evident. This should be considered in the context of the work of Gavin (2012) who found that erosion of personal confidence in their own ability was linked to students' withdrawal. One hypothesis could be that whilst confidence in ability at the start of the academic year is not predictive, with the passage of time, erosion of confidence could lead to doubting. This is in line with the findings of the study of Foundation Year students (Sanders *et al.*, 2012).

Participants were asked to complete the Performance Expectation Ladder by indicating the average mark they expected for their year group and for themselves for both the End of First Year and at the point of Graduation. In this study the expected marks overall were high, in many cases, unrealistically so. This mismatch between expectations and likely performance may in itself cause problems; Nicholson *et al.* (2013) have shown the importance of realistic expectations. Furthermore, Mellanby *et al.* (2000) showed that high self-esteem and academic efficacy are not predictors of success. Furthermore, when the outcomes differ from

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expectations, individuals can experience cognitive dissonance (James, 2002; Weiss, 1994) with all its associated negativity. A lack of appropriate expectations is likely to impede successful engagement and integration at all levels in the education system and future research could explore the impact at lower levels too.

Progressing students had expected to achieve higher marks than non-progressing students relative to their year group only at Graduation, there was no difference for their expectations for the end of their first year. This suggests a form of academic optimism or, possibly, superiority amongst the successful students. This finding takes into account differences in age-group, study mode and previous HE experience, although unsurprisingly, those who had completed a Foundation Programme had a significantly higher progression rate than those who had not.

One obvious limitation of this study is the crude distinction between the two groups. Whilst those who were progressing could be considered a relatively homogeneous group, the Non Progressing group included several different categories. Some of this group may have been prevented from progressing through illness, or other personal circumstances at the time of assessment. Others would have been carrying failed assignments or modules. Both of these categories of student may have subsequently been able to progress after the Retrieval Examination Board. A third set may have been required to retrieve the year as a result of extensive incomplete or failed modules. A fourth and final category may have, in fact, already left their course without formally withdrawing. Ethical and administrative considerations prevented our being able to distinguish the representation of these four typologies amongst the Non- Progressing group. However, the heterogeneity of this group does not undermine the findings above. Instead it suggests the difference between

the ABC scores of a successful and unsuccessful student may be more extreme than identified herein, as some of the Non-Progressing group may have subsequently succeeded at the Retrieval Board. This latter category of student may have raised the overall ABC scores of the Non-Progressing group. Further work following students into the next academic year would be able to disentangle these categories.

This study did not request demographic details from participants and therefore it was not possible to ascertain any possible interaction between diversity and confidence. Exploring how the predictive power of this scale is affected by the impact of race (OFFA, 2015), domicile of origin, (Rose-Adams, 2013) family history (Thomas and Quinn, 2007), previous education (Hemsley-Brown, 2015) and other demographic factors known to affect university application and success would be a useful development.

The data presented here can only be considered correlational; we may only conclude that those who lack confidence about their ability to attend are less likely than their peers to complete the year at the first attempt. As with the studies using other psychometric measures (e.g. Feldman *et al.*, 2016) we cannot assume causation. Unpicking the relationship between this lack of confidence and relatively poor academic performance would be a useful qualitative study that might help us tailor interventions.

The findings from the present study fit within a framework of self-efficacy and social comparison. This can be considered in the light of the work of Thomas (2013) who highlighted the relationship between thinking about leaving and the likelihood of

doing so, and that of Xuereb (2014) who described students consider terminating their studies and what convinced them to stay. Students who are not confident in the conviction that they can successfully execute the behaviours (Bandura 1977) required by their course are likely to harbour doubts, which in turn can lead to non-completion. Likewise students who compare their academic performance unfavourably with their peers are also likely to be at risk of further negative thinking potentially leading to disengagement and maybe withdrawal.   Interventions should be designed to ensure realistic expectations combined with an emphasis on strategies for enhancing academic success

The study reported here suggests that the two psychometric measures, ABC and PEL, showed early differences between the two outcome groups on these three of the six measures. The findings show some commonality with two previous studies using these measures with psychology students from all three years (Nicholson *et al.,* 2013) and Foundation year students; (Sanders *et al.* 2012). The sample in the present study comprised only first year undergraduate students in two contrasting Higher Education Institutions (HEI). That the cohorts in the three studies were from varying stages of their academic career, and that the sampling frame for each comprised a range of different disciplines indicates that the robust finding that non-progression is associated with early doubting as identified by these measures.

Taken together there appears evidence that these measures could be instrumental in predicting those at risk of non-completion early into the first year of study at HE. Their routine application with new students would identifier early doubters which, in turn, could enable additional targeted support to be provided in a timely manner before the disengagement cycle begins. Given the limited resources available in HE,

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targeting those most in need of additional support in the early days of their studying

makes obvious sense. Additionally, HEIs should improve pre-course information

(Benn, 1995; Cook, 2004; Smith and Wertlieb, 2005) to reduce cognitive dissonance

(James, 2002; Weiss, 1994). Helping students' to form expectations which are more

realistic (Nicholson *et al*, 2013) and providing opportunities for enhanced student-

staff relationships would potentially lead to a cycle of successful outcomes such as

improved self-confidence and motivation (Thomas, 2002; 2013), better social

relationships (Bean and Eaton, 2001) and ultimately improved retention.

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