

# Using psychometrics to identify traditionally-aged and mature students at risk of non-completion

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## **Abstract**

Returning to higher education can be a life-enhancing step, but returning then not completing can have a deleterious effect on self-esteem. Early identification of those at risk of non-completion would enable focussed deployment of supportive interventions. The work reported was designed to evaluate the use of two psychometric scales to predict successful completion of the first year of study in Higher Education. The aim of this paper is to explore the efficacy of these tests for both traditionally aged and older students returning to study.

In both studies participants were asked to complete the Performance Expectation Ladder and the Academic Behavioural Confidence (ABC) Scale at the start of the academic year. These data were then analysed by the subsequent outcome data from the examining boards at the end of that year. The first study comprised 160 Foundation Year students from four courses across two universities in different countries in the UK. For the sample as a whole, one subscale on the ABC Scale, Attendance, was significantly associated with successful end of year outcome. Broken down by age group, this applied to traditionally aged students and returning students under 40, but not to the small number of older returning students (N=5). The second study comprised 503 first year degree students from 19 courses across two universities. Again the Attendance subscale was the most effective predictor of end of year outcome for students under 40, with the 21 older students showing a different pattern. In both studies the older students had high scores on the Attendance subscale, but lower end of year success rates than their younger contemporaries.

It is acknowledged that the examining board outcome data provided a relatively crude distinction between those who were able to progress at this juncture from those who were not; this lack of subtlety in grouping however is likely to underestimate any real differences between successful and unsuccessful students. The findings suggest that the ABC may be used to identify those at risk of non-progression for traditional aged and younger returners. It appears ineffective as a diagnostic tool for more mature students. The latter's high level of confidence in attending yet relatively poor outcome is worthy of further consideration in the context of thwarted commitment for the mature returner to education. It would be informative to extending this research to compare graduation outcomes although it is noteworthy that national statistics evidence that student withdrawal peaks during the first year of study.

## Introduction

It is generally acknowledged that the transition for students leaving school and coming to university is challenging. The move requires many adjustments, both academic and personal meaning that the transition to university can be emotionally (Christie, 2009) and cognitively demanding (Rhodes and Nevill, 2004). There is an expectation that students will learn independently which involves less support than they have previously experienced (Hockings, Cooke and Bowl, 2007; Leese, 2010). Indeed the whole process can be bewildering as the following authors have noted:

*The transition from high school to college presents challenges as well as opportunities* (Smith and Wertlieb, 2005: 154).

*Coming to know a new community of practice is an emotional process ... feelings of alienation and exclusion, as well as of excitement and exhilaration* (Christie et al., 2008: 567).

*Students' initial transition into HE can be experienced as entering an 'alien environment'* (Leese, 2010; 242).

*Transition to uni is one of the most significant challenges students face, and has been under-rated and affects all students.* (Hume and de Wilde, 2015: 10).

It may be coincidental, but the language used in these quotes shows a rising level of severity over the last ten years. This could be because over that period of time in the UK, as elsewhere, there has been a rise in the number of students entering higher education, and new entrants are also coming from increasingly diverse backgrounds. Many of those entering university now are what are termed First Generation students (Thomas and Quinn, 2007) generally defined as those individuals where neither parent has had access to a university education and completed a degree. This increase in First Generation students has meant first year cohorts are increasingly diverse and for many of today's students the transition to university may seem more challenging than ever before.

This change in the university population is a direct result of the Widening Participation (WP) agenda in the UK, a governmental initiative that has recently set a target of doubling the proportion of students from disadvantaged backgrounds over ten years leading up to 2019. WP strategies are not restricted to the UK; there are similar initiatives in, for example, Australia and the Netherlands (van Stolk et al., 2007). In the United States a sustained policy over the last 50 years has succeeded in 'making college education a national goal for all US citizens' (Cahalan, 2013: 74). These initiatives acknowledge that, traditionally, participation in HE has not been evenly distributed across the population. The problem of unequal participation is not easily amenable to change. For example, in the UK in 2013/14 only 10.9% of university students came from neighbourhoods identified as traditionally having low rates of participation in HE, according to the Higher Education Statistics Agency (HESA, 2013/4). Indeed, the

Office of Fair Access (OFFA) argues that young people from our most disadvantaged areas in the UK are 6.8 times less likely to attend university than those coming from the most advantaged (OFFA, 2015). These targets acknowledge the established benefits of undertaking HE for both the individual and society.

Widening participation initiatives are designed to encourage non-traditional students to enter higher education. However, the term 'non-traditional', itself, does not have a universal definition. For some authors, it means those over the conventionally accepted age for undergraduates, for example, those over 24 years (Xuereb, 2014) or over 25 years (Markle, 2015). Non-traditional can also refer to communities where there is no history of attending university; these low participation neighbourhoods are usually associated with disadvantaged backgrounds (Archer, Hutchings and Ross, 2003).

Thus widening participation strategies are now an integral part of the higher education sector, in fact, one of its main drivers. The sector is equally concerned with the issue of student retention, progression and completion as reported, for example, 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, Winn and Fyvie-Gauld, 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).

The problems of transition to higher education are most evident amongst new students and the first year is the most critical for non-completion. 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). 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.

Whilst it seems that most students who withdraw begin by having doubts about their choice of course or institution, it is also evident that not all doubters withdraw. In the UK it has been estimated that somewhere between 30% and 40% of students experience doubts at some point (Thomas, 2013), but

less than 10% withdraw. Catching the doubters before the decision is made may be one way to improve retention. One of the first indicators of disengagement can be late arrival at taught sessions (Reisberg, 2000). When a student begins to disengage from a programme of study this tend to impact directly on their attendance (McCluckie , 2012); and attendance is critical to success, a better predictor than either personality or cognitive ability (Woodfield, Jessop and McMillan, 2006). This can then rapidly become a downward spiral as failing to attend, and missing classes fuels disengagement. By this time it is too late to effect a change in the student's approach to their studies, in fact it is likely to be quite difficult to contact them.

Importantly there is now a growing body of research that links factors directly related to the WP agenda as being associated with withdrawal. No family history of university education is one such factor (Cook, 2004; Rose-Adams, 2012). Older students are also more likely to withdraw (Rose-Adams, 2012) as are those from a lower socio-economic background – two groups targeted by WP interventions. An examination of a data set comprising close to 1,400,000 students enrolled in HE in the UK 2006-12 (just short of 70% of the total student population) concluded that non-traditional students are more likely to leave university early, and proportionately more likely to leave from more selective institutions (Rose-Adams, 2012). Thus a number of factors have been identified as affecting student retention, many of which are directly relevant to the WP agenda illustrating the tension between these two sector-wide issues.

Acknowledging that tension is crucial. Bamber and Tett 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” (1999: 15) and Tinto maintains that ‘access without support is not opportunity’ (2008: p1). However, despite accumulating evidence demonstrating 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).

Those of us teaching in the sector strive to provide all students with the opportunity to flourish. However we do this in a context of rising student numbers and reduced resources. Whilst we welcome all students from diverse backgrounds and differing stages of life, with varying levels of readiness to study, providing adequate resources to support each of them intensively is a luxury most of us cannot afford. Moreover we know that different students need differing levels and types of support and therefore extensive support for all students is not only impractical, it is also not necessary.

Distinguishing the doubters at an early stage in the process would be enable focussed support for this important section of the each cohort. The question then becomes how can we identify those students

who may need that extra support in time to make a difference? This was the question underlying the work described here. The aim was to investigate whether it was possible to use psychometrics to identify at the start of the course those students who may have difficulty later. If such a method of identification can be found, then it might be possible to target resources at those students before it is too late to prevent withdrawal.

The work presented here is a programme of research evaluating the value of two psychometric tools to predict successful course completion. The first study involved Foundation Year students; in the second, the design was repeated with First Year undergraduate students.

## **Study 1 – Foundation Year Students**

The first phase of the project focused on students undertaking a Foundation Year (FY) programme, a group who could be considered more vulnerable to doubt and insecurity than those on degree programmes given that, by definition, they have been identified and categorised as ineligible for direct undergraduate enrolment. Student confidence is known to be highly malleable (Zorkina and Nalbone, 2003); tapping into their confidence may be a key to identifying those at risk of later problems. The study was designed to determine whether it is possible to use measures of student confidence and their expectations of their own performance at the start of the year to predict end-of-year academic outcome. If prediction were possible, early intervention could then be targeted appropriately. Fowler and Norrie (2009) produced a Risk Tool based on the views of large sample of staff and students about key factors that may indicate a student is at risk of withdrawing. They argued that if this worked for early identification of those likely to withdraw, resources could be targeted appropriately. This study is based on the same premise by a different mechanism, namely using psychometric measures to enable early identification of this group.

### **Method**

#### **Sample**

Full-time students were recruited from four FY courses across universities: Science FY and Health Professions FY from one university; Health Science FY and Social Science FY from another. The study was approved by the Ethics Committees in each institution. Data collection, collation and storage were in line with the institutions' ethical frameworks.

#### **Materials**

This quantitative survey comprised two questionnaires designed to measure students' expectations of academic performance and outcome (Sander and Sanders, 2009). The first was the Academic

Behavioural Confidence Scale (ABC) in its shortened form which comprises 17 statements and yields four subscales measuring confidence about Grades, Verbalising, Attendance and Studying. The second was the Performance Expectation Ladder (PEL), where participants estimate their own expected marks on a graphic ladder representing the range of possible marks, with a putative 'national average' highlighted at 57%. In this version the task was to estimate the overall course mark likely to be achieved by the respondent and by their peers ('Year group') as a whole at two time points: the end of their foundation year and the point of degree graduation. The task thus requires a visual comparison about the position of the self in relation to their perception of their peers. A third section of the survey was a brief background questionnaire seeking information about some of the demographic factors that Fowler and Norrie suggested were associated with increased risk of dropping out.

### **Procedure**

Participants were invited to complete the paper survey in lecture theatres at the start of the academic year in the autumn term. The following summer progression data were collected from the from the end of year examining boards.

### **Method of Analysis**

The participants were categorised by the outcome from the end of programme summer examining boards into two groups: those who were able to progress on to their chosen undergraduate degree programme and those who were not yet able to do so. The first group included those who had been given compensation by the Examining Board for failed assessment(s). This latter group included those that had withdrawn, as well as those with mitigating circumstances that prevented them passing, or possibly from taking the examinations, and those who failed. Some of these will have subsequently passed at a later attempt. It is acknowledged that both groups are heterogeneous, the second covering a wider variety of circumstances than the first. However, the commonality in the first group meant no retrieval work was required to continue their academic career, whilst in the second the common feature was their inability to progress after the first attempt at assessments. As such it is a very crude distinction and one that is likely to underestimate the differences between students who will eventually progress and those who will not. However, examining board data available for analysis did not allow a more nuanced approach. In the interests of clarity, hereinafter, these two groups are referred to by the labels: Progressing and Non-Progressing whilst acknowledging that these names mask the heterogeneity. All analyses of the measures taken during the year were retrospective, as these two groups could only be identified at the end of the year.

Statistical analyses using SPSS v20 focussed on differences between these two outcome groups both across and within differing age groups of students. PEL data were considered suitable for parametric

analysis (Repeated Measures GLM) whereas ABC data, which could not be considered interval, were subjected to nonparametric analysis (Mann Whitney).

## Findings

Of the 232 students enrolled across the four courses, 160 (69%) took part in the survey. Of these, the Progressing group comprised 84 students and the Non-Progressing, 76. These data were then analysed by age group. Traditionally aged students (18-20) were nearly evenly split between the two groups: 52 Progressing; 56 Not-Progressing). The Mature Returners (aged over 40) were a very small group of 5, only one of whom was Progressing. However the results for the Young Returners (21-40) showed the best success rate at this stage with 31 Progressing and only 16 Non-Progressing. Given the difference in outcome data between these two sets of non-traditionally aged students it was appropriate to keep them separate even though the small numbers aged over 40 precluded statistical analysis.

## Psychometric data

The PEL data showed no difference between the two outcome groups with both expecting similar marks for themselves and their peers; these anticipated marks were in the low 60s for their expectations for Foundation Year and rising to the mid-60s for their expectations at Graduation. Analysis showed no significant difference between outcome groups, nor between ratings for self compared to year group, and no significant interactions ( $p > .05$ ). The only significant effect was the rise in both sets of expected marks for both groups at Graduation compared to end of First Year ( $F_{1, 135} = 26.63, p < .001$ ). Traditionally-aged and Young Returners gave very similar scores throughout whilst the two of the five Mature Returners gave markedly higher scores than other participants (in the 80s and 90s) thereby distorting this group's measures; age group data were not subjected to statistical analysis.

For the ABC data, there were no real differences between the two outcome groups for three of the subscales: Studying, Grades and Verbalising. However there was a significant difference in the Attendance subscale with the Non-Progressing being less confident about their ability to attend even at this early point in their course (Table 1). This subscale was analysed for each age group; only the Young Returners showed a significant difference between outcome groups.

**Table 1 Foundation Year students**

### Academic Behavioural Confidence Attendance subscale scores by age group –medians

	Non-Progressing	Progressing	Mann Whitney
Traditional (N=108)	4.26	4.44	$z = 1.50, p > .05$

Young Returners (N=47)	4.13	4.66	$z=3.00, p=.003$
Mature Returners (N=5)	4.42	5.00	-
All	4.23	4.49	$z=3.144, p=.002$

These data suggest that for the group as whole this psychometric tool was indeed useful in predicting, from a very early point in the course, those who may later have difficulty progressing through the first examination board. This is most striking amongst the Young Returners. It is noteworthy that the subscale in question is that related to confidence in ability to attend, given the established role that attendance has in relation to successful outcome (Woodfield, Jessop and McMillan, 2006). That these findings were significant for Foundation Year students led to the next study which was to repeat the paradigm with First Year Undergraduates.

## Study 2 – First year undergraduate students

### Method

#### Sample

New full-time undergraduates were recruited in two contrasting universities: 19 BSc programmes from one institution (a traditional multidisciplinary university) and 11 BA programmes from the other (a single discipline Arts university). The study was approved by the Ethics Committees in each institution. Data collection, collation and storage were in line with the institutions' ethical frameworks.

#### Materials

As in Study 1, the Academic Behavioural Confidence (ABC) Scale and the Performance Expectation Ladder (PEL) were used.

#### Procedure

As in Study 1, participants were invited to complete the survey at the start of the academic year in the autumn term, and progression data was collected from the end of year examining boards.

#### Method of Analysis

The participants were categorised by the outcome from the end of programme summer examining boards as in Study 1: Progressing and Non-Progressing. Again all analyses of the measures taken during the year were retrospective, as these two groups could only be identified at the end of the year. Statistical analyses were as Study 1.

## Findings

Complete data were obtained for 503 participants, 66% of whom were classified as Progressing. Twice as many of the traditionally-aged students were Progressing: 189 compared to 94 Non-Progressing. There was a similar picture for the Young Returners: 134 Progressing, 65 Non-Progressing. For the Mature Returners however, the split was nearly equal: 11 Progressing and 10 Non-Progressing. Given the difference in outcome data, and in line with the previous study, these two groups are considered separately.

## Psychometric data

The PEL data showed the anticipated marks rise from the mid-60s for their First Year to around 70 for their expectations at Graduation. Analysis showed this effect to be significant ( $F_{1,424}=295.11$   $p<.001$ ). Although there was no significant difference between Progressing and Non-Progressing groups ( $p>.05$ ) there was an interaction between these groups and whose marks they were expecting, their own or their year group's ( $F_{1,424}=6.61$ ,  $p=.01$ ). As Table 2 shows, the relative position of Self in relation to year group is consistently reversed between the groups. There was also a significant interaction over time, (First Year to Graduation) and the relative position of themselves to their year group ( $F_{1,424}=14.52$ ,  $p<.001$ ).

**Table 2 First Year undergraduates**

**Performance Expectation Ladder scores by outcome group - means (SD)**

	<b>Non-Progressing</b>	<b>Progressing</b>
First Year: <b>Self:</b>	64.6 (9.16)	65.4 (8.18)
First Year: <b>Year Group</b>	65.5 (8.50)	64.6 (7.34)
Graduation: <b>Self</b>	68.9 (11.14)	71.8 (10.24)
Graduation: <b>Year Group</b>	70.0 (11.01)	69.6 (9.14)

There was no evidence that age group affected any of the PEL scores; all three groups giving scores that were very similar.

With the ABC data there was no difference between the outcome groups for Verbalising and Grades subscales but there was for both Studying and Attendance. In both cases the Progressing group scored higher than the Non-Progressing (Table 3). Both these subscales were analysed for each age group separately. For both subscales, the Progressing score was higher than the Non-Progressing for all three

age groups. However, the Progressing score was significant only for the Traditional and the Young Returners and not for the Mature Returners.

**Table 3 First Year Undergraduate Students**

**Academic Behavioural Confidence Subscale Scores –Medians**

	<b>Non-Progressing</b>	<b>Progressing</b>	<b>Mann Whitney</b>
<b>Studying</b>	3.75	4.00	z=3.05, p=.002
Traditional (N=283)	3.75	4.00	z=2.18, p=.029
Young Returners (N=199)	3.5	4.00	z=2.12, p=.035
Mature Returners (N=21)	4.13	4.50	z=0.76, p>.05
<b>Attendance</b>	4.33	4.67	z=5.57, p<.001
Traditional (N=283)	4.33	4.67	z=3.87, p<.001
Young Returners (N=199)	4.00	4.67	z=4.69, p<.001
Mature Returners (N=21)	5.00	5.00	z=0.26, p>.05

## Discussion

The aim of these two studies was to test the use of psychometrics for predicting end of year outcome for students and to see whether there are differences in the patterns for those returning to education in comparison to traditionally aged students. Identifying the ‘doubters’ (Xuereb, 2014) at the start of their academic career could enable a programme of focussed support to reduce attrition.

The Performance Expectation Ladder (PEL) did not appear to be predictive for the Foundation Year students; for First Year undergraduates it did not distinguish between progressing students and the others, nor between age groups. However there was an interaction between end of year outcome and the relative position of their own expected marks in relation to their peers. This negative social comparison effect with this tool was noted elsewhere linking it to lower confidence (Sanders and Sander, 2003).

The Academic Behavioural Confidence (ABC) scale appeared to be partially predictive in both studies. In Study 1 with Foundation Year students, results showed that the subscale Attendance was predictive of non-progression. That is, those who would subsequently not progress at the end of year examining board were less confident from the start of the year about their own ability to attend. This apparent

self-doubt maps well onto the evidence about the role of punctuality (Reisberg, 2000) and attendance (Woodfield, Jessop and McMillan, 2006) in successful outcome. However, this factor appeared to be predictive for younger returners, and not traditionally aged students. With Study 2, two subscales appeared to be predictive: Studying and Attendance. When Studying was broken down by age group the effect was just significant for both traditionally aged and for younger returners, but not for the more mature students. Moreover even for the younger groups, the level of probability is such that any correction factor (e.g. Bonferroni) for multiple statistical tests used in the two studies would render it non-significant.

It would appear then that students who are uncertain about their ability to attend are less likely to progress at the first attempt. Moreover with the First Year students, there was also a relative lack of confidence in their own ability to study amongst those who did not subsequently progress and also lower expectations of their own academic performance relative to their peers at the point of graduation. These two subscales of the ABC, Attendance and Studying, could be considered to be tapping in to motivation, whilst Verbalising may be an aspect of social confidence and Grades of perceived academic ability. This resonates with the finding that personality and cognitive ability are less effective predictors of success than attendance (Woodfield, Jessop and McMillan, 2006). If this scale is measuring motivation this would concur with Markle's 'will to persist' that enables non-traditional students to succeed (2015: 12). Indeed the crucial role of motivation in academic success was evident even in the work reviewed by Tinto (1975); perhaps the Attendance and Studying subscales are tapping into this underlying construct.

However, although the Attendance subscale appears to be a significant predictor for both the traditionally aged and the younger returners, it is not significant for the more mature returners. In both studies there appeared to be clear differences between the younger and more mature returners, even though the latter comprised a relatively small proportion of the sample. Indeed the notably poorer progression rate for the older group (42%) meant they had to be considered separately from the other two groups whose overall rate was 64%. In fact it was the younger returners who had the highest rate at 67%. It is noteworthy that despite their poor progression rate these mature returners did not appear to lack confidence nor to expect poorer marks than their class-mates. It would seem therefore that they return to study with positive expectations of what they will achieve and yet experience difficulties that affect their overall performance. As a minority on these programmes, these students may have a qualitatively different experience of being at university full-time and could potentially feel separate to, and, perhaps, even isolated from their peers. This in itself would contribute to a lack of social integration which has been established as contributing to higher withdrawal rates (Wilcox, Winn and Fyvie-Gauld, 2005). However, interventions designed to promote

integration for this group can be effective (e.g. Thomas and Hanson, 2014). This group are worthy of further study, including a qualitative focus on the impediments they encounter in comparison to the younger returners.

That this group was under-represented in both these studies could be considered a limitation. HESA statistics (2013/14) report that the 6% of all full-time undergraduate students are over 30, therefore this sample is representative of the UK undergraduates as a whole. The over 30s represent 58% of part-time undergraduates in the two studies, although the sample was restricted to full-time students. Future research with part-time students might identify different trends. This is an area worthy of further exploration given the rising number of students who elect to study part-time.

As acknowledged, one major limitation of these studies is the heterogeneous nature of the two outcome groups; many of those identified as progressing may have had failed assignments for which they were given compensation whilst many of those named as not progressing may have had good reason and may have retrieved the situation subsequently. Thus the groups are not as different as their names appear and may be considered two ends of a continuum of student performance with a delineation point that is open to debate. Nonetheless some significant differences were found in their psychometric scores, findings that may perhaps underestimate the difference between those who succeed at study and those who do not. Moreover both these studies were relatively short term and followed students only for one academic year. The first year of study is often seen as diagnostic and has a higher withdrawal rate than later years, (Yorke and Longden, 2007) nonetheless a larger scale study tracking students through to the point of graduation would be informative and useful.

This study identified non-traditional students only by age and sought no information about family background. A similar study design could be used to examine the effect of being a First Generation student (Thomas and Quinn, 2007); also take into account the neighbourhood of origin (OFFA, 2015); and assess the impact of race (Stevenson, 2012) and other personal responsibilities external to studying at university on these measures as predictors of outcome. Each of these demographic factors is critical to measuring the impact of WP initiatives.

## **Conclusions**

It would seem that the predictive usefulness of the Performance Expectation Ladder is somewhat limited; however the Academic Behavioural Confidence scale appears to be more promising in this respect, at least with the Attendance sub-scale. This small three-item scale appeared to distinguish those who will progress at the first attempt from those who will not for both traditionally aged and the younger returners. It may be that this scale is identifying a tendency to doubt their decision to come to university, and doubting can be predictive of, and usually precedes withdrawal (Xuereb, 2014). It

did not appear to be effective for the older students, those over 40, who were an under-represented group on these courses; an area that needs further exploration.

The two studies involved students from differing starting points (Level 3 or Level 4) in three different institutions in two different nations, which suggests that these are robust findings. For these reasons it seems we can conclude that the Academic Behavioural Confidence psychometric tool can help identify at the start of the academic year those who will subsequently have problems later in the year. The question remains whether having identified an 'at risk' group, what resources are required to implement a suitable intervention selectively to alter these students' projected trajectory and improve retention for the sector.

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