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Active Teaching Strategies and Student Engagement: A Comparison of Traditional and Non-traditional Business Students

Amir Arjomandi

University of Wollongong, amira@uow.edu.au

Juergen Heinz Seufert

University of Wollongong, University of Nottingham Ningbo China, juergen@uow.edu.au

Martin J. O'Brien

University of Wollongong, martinob@uow.edu.au

Sajid Anwar

University of Sunshine Coast, sanwar@usc.edu.au

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Amir Arjomandi

School of Accounting, Economics and Finance,
University of Wollongong, Australia.

Juergen Seufert

Nottingham University Business School China,
University of Nottingham Ningbo, China

Martin O'Brien

School of Accounting, Economics and Finance,
University of Wollongong, Australia.

Sajid Anwar *

USC Business School,
University of the Sunshine Coast, Australia

*Corresponding author

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Using survey data, this paper presents a comprehensive analysis of student engagement for different groups of students, many of which may be classified as "non-traditional". The analysis presented in this paper is based on Kahu's framework for student engagement. Both the antecedents as well as consequences of engagement are incorporated in the framework used in this paper. The research highlights the role that active teaching strategies may play in this engagement framework. An important contribution of this research is to show that non-traditional students generally display greater engagement than traditional students. However, while there is a strong connection between active teaching strategies and engagement for traditional students, this link is weak for non-traditional students. The results presented in this paper highlight the need for greater inclusiveness in the design of active teaching strategies.

Keywords: Active teaching strategies; student engagement; traditional students; non-traditional students.

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Introduction

Advancement of digital teaching technologies and the increasing diversity of tertiary student enrolments from non-traditional backgrounds are some of the pressures pushing teachers to constantly review their methods for contemporary relevance and to cater for different learning styles (Jensen & Owen, 2003; Ahlfeldt et al., 2005; Tait, 2009). For a teacher to be effective across the continuum of learning styles, many studies suggest the adoption of active teaching methods (see, *inter alia*, Jensen & Owen, 2003; Kolb & Kolb, 2005; Velasco et al., 2012). Active teaching methods can broadly be defined as “instructional activities involving students doing things and thinking about what they are doing” (Bonwell & Eison, 1991, p. iii). It is believed that the utilisation of active teaching methods will immerse students more deeply within the learning experience, leading to greater student understanding and improved performance (Warren, 2003). Thus, its proponents state that teachers should encourage greater student participation and activities in class as well as private study (Salemi et al., 2001; Scott, 2005; Hawtrey, 2007). As such active teaching methods appear to fit neatly within the broad concept of student engagement, defined as “the students’ psychological investment in and effort directed toward learning, understanding or mastering the knowledge, skills or crafts that academic work is intended to promote” (Newmann 1992, p. 12).

To our knowledge no studies have offered a comprehensive analysis of traditional and non-traditional students explicitly incorporating the link between student engagement and both its influences and consequences. Furthermore, nor has there been an explicit incorporation of active teaching strategies within a formal conceptual framework of student engagement. Therefore, this study fills a crucial gap in the literature by analysing traditional and non-traditional students, as well as the role of active teaching strategies, using Kahu’s conceptual framework of student engagement.

The remainder of this paper is structured as follows: Section 2 provides a stylised depiction of Kahu’s student engagement framework, followed by a discussion of comparative research pertaining to traditional versus non-tradition student engagement and performance in Section 3. An overview of active teaching methods is then provided in Section 4. Section 5 discusses the measures used in this study, followed by empirical results in Sections 6 and 7, followed by concluding remarks in Section 8.

Literature Review

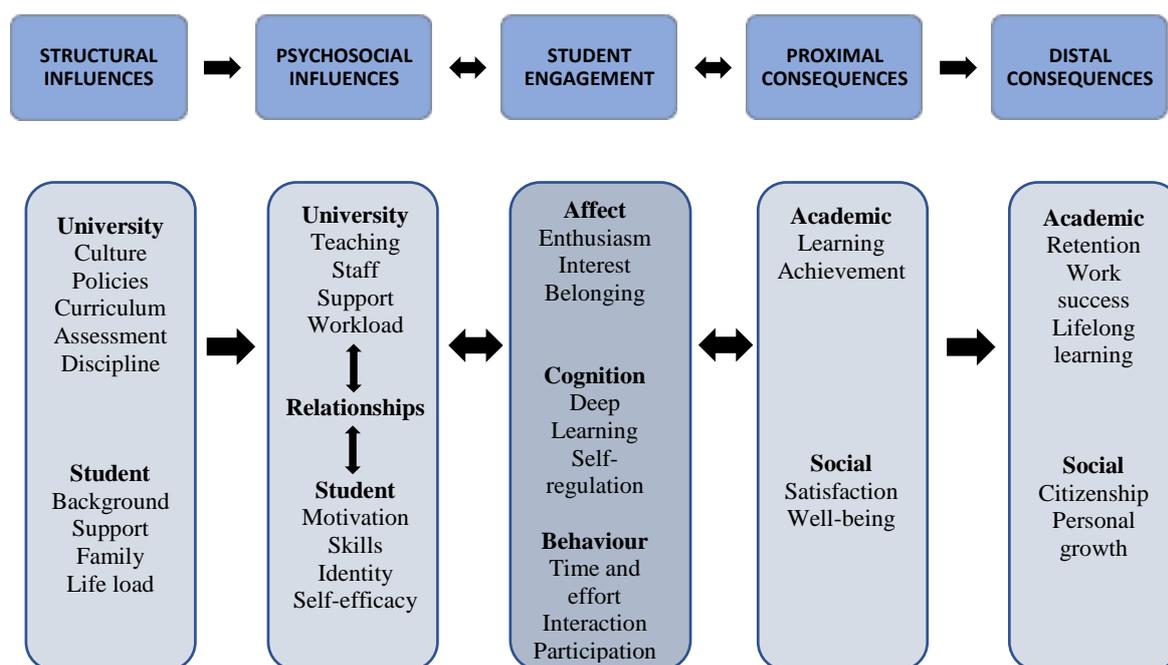
Kahu’s conceptual framework for student engagement

Fredricks et al. (2004) and Kahu (2013) emphasise the complexity and multifaceted nature of student engagement, uniting diverse threads of educational research to arrive at explanations for students’ success. In particular, Kahu proposed a comprehensive and coherent conceptualisation of student engagement that incorporates both its antecedents (structural and psychosocial) and consequences (proximate and distal) (see Figure 1.). This framework has been used widely for empirical analyses of various aspects of student engagement (Kahu, 2014; Nelson et al., 2014; Maskell & Collins, 2017).

A unidirectional relationship is posited from structural to psychosocial influences as antecedents to student engagement. Structural influences are comprised of student background, support, family and lifeload (the sum of all the pressures a student has in their life), as is the University’s culture, policies, curriculum, assessment and discipline. Similarly, psychosocial influences are categorised as University (teaching, support and workload), and student (motivation, skills, identity and efficacy).

In comparison, a bidirectional relationship exists between psychosocial influences and student engagement. In turn, student engagement is comprised of the three concepts of affect, cognition, and behaviour. Affect comprises attributes such as enthusiasm and interest of students for their studies and the sense of belonging they have within the university. Cognition contains the aspects of surface vs. deep-learning and self-regulation. Finally, student engagement can be captured by student behaviour in terms of time and effort to learn and engage with learning content, interaction with other students, and participation in learning activities.

Figure 1:
Kahu's Conceptual Framework of Student Engagement



Source: Kahu (2013, P. 766).

Student engagement can trigger proximal consequences which in turn can lead to an increase in students' engagement, indicating another reciprocal relationship. Proximal consequences are academic or social in nature. Academically, students will have higher achievements (including marks) and a higher level of learning, while socially they may feel satisfaction from their learning experience and improved well-being. Finally, those proximal consequences can then lead to distal consequences which are either academic or social. These distal consequences include immediate academic success as reflected by retention, work success and lifelong learning, as well as other long term social impacts such as citizenship and personal growth.

Active teaching strategies appear in Kahu's model as both psychosocial influences within the teaching category, as well within the student engagement participation category.

Traditional vs. non-traditional students

A wealth of research has emerged analysing engagement of different student types or groups, in particular, traditional versus non-traditional students. Whereby traditional students are generally assumed to follow in the footsteps of their university educated parents and enrol full-time in university immediately after completing domestic secondary school, non-traditional students may be defined on a variety of criteria such

as (older) age (Bye et al., 2007), first in family (O'Shea, 2007), ethnicity (Bowl, 2001), or more generally from minority groups. Students from non-traditional backgrounds would differ from traditional students with respect to structural influences which would in term be expected to affect their psychosocial influences.

Past research has established that many non-traditional student groups struggle with the belonging aspect of student engagement, with feelings of isolation and being overwhelmed at university, particularly international students (Anderson et al., 2009), students with disabilities (Nichols & Quaye, 2014), lesbian, gay, bisexual, transgender, and questioning (LGBTQ) students (Schueler et al., 2014), students from minority religious groups (Mahaffey & Smith, 2014), racial/ethnic minority students in different contexts (Harper, 2014; Hawkins & Larabee, 2014; Quaye et al., 2014; Sallee et al., 2014), gender minority students in different contexts (Harris & Lester, 2014; Rypisi et al., 2014), commuter/part-time/transfer/returning students (Silverman et al., 2014), and low-income, and first-generation students (Gupton et al., 2014).

With respect to the consequences of student engagement, Pascarella and Terenzini (2005) establish that student engagement can result in beneficial proximal consequences for both traditional and non-traditional students, with the latter gaining most in terms of grades and persistence (Pascarella & Terenzini, 2005; Carini et al., 2006; Cruce et al., 2006; Kuh et al., 2008; NSSE, 2007; Kuh, 2009). However, other studies show that the effects of student engagement vary in their magnitude of impact on achievement for low-ability students (Carini et al., 2006), students of colour (Kuh et al., 2008), first-generation students (Pascarella et al., 2004), and students' gender (Bai & Pan, 2009).

In this study, traditional and non-traditional students would first differ within Kahu's model in terms of structural influences (student background, family, lifeload). Then it is shown how this subsequently affects psychosocial influences and student engagement.

An overview of active teaching strategies

Practitioners have a vast range of various potential methods at their disposal in order to encourage active student participation. Active teaching strategies are intended to complement, rather than substitute for, traditional teaching modes (Jensen & Owen, 2003; Baird & Narayanan, 2010; Velasco et al., 2012). They can occur both within class as well as making use of students' time outside of class. The techniques used need not necessarily be time consuming or complex. For example, Hawtrey (2007) suggests that a simple call for a show of hands is an effective and easily managed way to rouse students from a state of passive listening and integrate them more fully in their learning process. There are many other ways to encourage such participation and discussion in both large and small classes.

Visual aids are also among the most used methods for active student engagement. This allows a shift in the pace of a lecture and provides connections to the real world and can be further utilised to form the basis of discussion points (Bond et al., 2012). Students can be probed for their opinion or answers to a specific question, which provokes independent thought and enables them to become part of the learning process (Ali et al., 2009). Visual aids include the use of videos, graphs, art, and cartoons (Velasco et al., 2012; Watts & Christopher, 2012). It is a common practice to use graphs in business classes but other tools such as graphics and cartoons can also encourage class participation (Ostrom, 2004), bring enjoyment (Velasco et al., 2012), and notably assist students from non-English speaking backgrounds (Akamca et al., 2009; Zhang, 2012). With respect to other visual aids, Szabo and Hastings (2000) established that PowerPoint presentations can contribute to active teaching strategies. However, they also have the potential to discourage classroom interaction and discussion (see also Hanft, 2003; McDonald, 2004). To avoid this, Burke and James (2008) encourage the

use of interactive tools such as annotating material while presenting, which can then be saved for subsequent online circulation. Similarly, Tight (2002) and Crosling et al. (2009) ask students to solve quiz questions presented in the PowerPoint to reinforce application of specific topics.

Interaction created within pair or group work is another means to drive students' enthusiasm (Tight, 2002; Ali et al., 2009; Afari et al., 2012). Groups can be formal or informal, and could involve problem-solving tasks, classroom debates or case studies (Velasco et al., 2012). Yazici (2004) argues that such collaborative learning experiences contribute to improve generic skills such as critical thinking and communication, and also aid student retention (see also Crosling et al., 2009).

Teacher–student feedback is also identified as an important method for actively engaging students, whether they are identified as at-risk but also high-performing (Hawtrey, 2007; Crosling et al., 2009; Tait, 2009; Bond et al., 2012). Crosling et al. (2009) argue that regardless of the method chosen, the feedback always needs to be constructive, timely, and integrated into the learning experience. Such feedback would encourage students to stay engaged with their studies as part of active teaching and learning strategies.

Many contemporary textbooks offer an array of online resources such as quizzes, case studies, feedback and study plan that students can utilise in their own time. Other potential strategies may include the use of contemporary new stories or newspaper articles. Similarly, asking the students to bring, or provide by email, an example from their own workplace or personal experience can create a sense of ownership and relevance, which in turn encourages, engages, and enhances students' learning experience (Hawtrey, 2007; Crosling et al., 2008; 2009). Others document the benefits of games in the active teaching environment (Gosen & Washbush, 2004; Zantow et al., 2005; Proserpio & Gioia, 2007; Annetta et al., 2010; Paraskeva et al., 2010; Byun, 2014; Kuhn, 2014; McPherson, 2014). Finally, simulation-based exercises can also incorporate aspects of problem solving, technology, team work, communication and critical thinking, which are vital, sought-after qualities of graduates to support workplace competency and contribution to society in general (Hawtrey, 2007; Velasco et al., 2012).

Using Kahu's framework for student engagement, this study incorporates both the antecedents and consequences of engagement. For this purpose, traditional and non-traditional students' engagement levels as well as their antecedents and outcomes attributed to active teaching strategies (as detailed in the next section) are compared. Such analysis helps us to gain a better understanding of the complex nature of engagement for students with different backgrounds. The hypotheses tested in this paper are as follows:

- Psychological influences interact with student engagement.
- Student engagement is linked with learning and achievement.
- Psychological influences interact with engagement, which is linked with student achievement.

Methodology

The measures employed in this study are consistent/congruent with Kahu's (2013) conceptual framework of student engagement. The utilised measures of psychosocial influences, engagement, and proximal consequences are the same as those previously established in NSSE publications and other academic surveys (Kuh, 2009; Zepke, 2011; Heng, 2014). The comprehensive list of survey items is disclosed in the Appendices,

with subsequent metrics used in this study constructed as a sum of individual survey responses. The survey was pilot tested by a group of students and colleagues to receive their feedback and suggestions in order to improve the clarity and quality of questions. It is also reviewed and approved by the University's Human Research Ethics Committee.

Psychological influences are categorised as support, teaching, workload and student motivation. These influences are hypothesised to interact with students' engagement, which are measured as affect, cognition, and behaviour. The main focus of this study is on behaviour in terms of observed time and effort, interaction and participation. Active teaching strategies are captured as both psychological influences (teaching) as well as with engagement itself (participation, and to a lesser extent, interaction). Finally, engagement is expected to interplay with proximal consequences, which are measured as learning and achievement. The descriptive statistics for influences, engagement and consequences are first reported in aggregate and then disaggregated by traditional versus non-traditional student categories. Correlation analyses are also utilised to establish the link between influences and engagement, and engagement with consequences.

A compulsory first year business statistics subject (COMM121) in the Bachelor of Commerce at the University of Wollongong, Australia, is used as the case study to analyse student engagement of different groups of students. The aim of the subject is to introduce students to quantitative techniques and their application to the business world with an emphasis on the decision-making process. The main focus of the subject is business statistics and topics will include descriptive statistics, probability, sampling, confidence intervals, hypothesis testing, elementary correlation, regression analysis and time series forecasting. Students are also introduced to the use of computer programs for estimation and analysis to improve business decision-making. On successful completion of COMM121, students are expected to be able to: 1) Explain and demonstrate the basic concepts of probability and statistics; 2) Demonstrate in substantial depth the statistical techniques that are commonly used in the business world; 3) Apply statistical techniques to improve analysis and planning of the business decision-making process; 4) Interpret and explain solutions in non-technical way for a range of situations including business and commerce; 5) Use and interpret appropriate output from statistical computer packages; 6) Evaluate the role played by statistics in empirical research and business practices in the workplace.

Within this subject several active teaching strategies including end of lecture summary questions within PowerPoint slides, videos and humorous cartoons, as well as group work were applied, with the aim of improving students' engagement and performance. To further immerse students within the learning process the textbook utilised was conceptualised as an application of the practice-into-theory model of teaching whereby a business scenario is introduced with each chapter and statistical tools are sequentially introduced throughout the chapter to address this core scenario. As a complement to each chapter, students had access to a range of additional online resources, allowing additional practice and application. In particular, MyMathLabGlobal (MMLG) software offered interactive tutorial exercises from chapter topics, a personalised study plan showing which topics students had mastered, as well as directing students to further tutorial exercises for topics in which they may need extra practice. Hence, they were able to practise at home and bring their results to the class for further discussions. MMLG is included in both *teaching* and *support* categories as it was used both within and outside of formal classes. It also enabled direct contact between students and instructors enabling students to ask questions from our teaching team while they were doing online practice quizzes. MMLG was used for online quizzes of this subject as well. Such quizzes enabled students to review their answers immediately after submission and hence improve their understanding of the topics by learning from their mistakes.

In addition, students were provided with an online student forum service, which helped us to stay connected with our students during the session (also used during the lectures to receive students' questions), and which also promoted interaction among students. Finally, students had also the opportunity to attend the Peer Assisted Study Sessions (PASS), which are a form of supplemental instruction classes led by past students of the subject.

To assess the level of engagement of our students with a focus on active teaching strategies, capturing engagement antecedents and consequences, a survey was conducted using an online survey tool (Qualtrics) during Week 10 computer laboratory classes. Although students' involvement was voluntary, just over 50% of enrolled students (220 out of 430) participated. Checks were conducted to minimise the problem of non-response bias.

Traditional students were defined as those who enrolled in university immediately after graduation from high school, pursuing their undergraduate studies on a full-time basis. Furthermore, these students are assumed to be financially dependent on others and consider their study to be a primary responsibility (that is, they don't have to work full time and do not have dependents). Finally, it is assumed they have not failed the subject previously and their enrolment represents their first attempt at the subject. Therefore, for the purposes of this study, non-traditional students are classified as those who are enrolled on a part-time basis or work full-time, older than 25, have dependents, disabled, have previously failed the subject, not born in Australia and their English is not their first language, and / or identified as being from a minority. Table 1 shows that in total, 113 students fall into at least one of these categories. The remaining 107 students are also considered as traditional students.

Table 1:
Categories of non-traditional students

Measure	Number	Percentage
Part-time students	12	5.45
Those with children living with them and depending on them for their care	3	1.36
Non-Australian resident and non-English speaking background	34	15.45
Those who identified themselves as having a disability	7	3.18
Those who have failed the subject before	29	13.18
26 years of age and older	14	6.36
Non-Christian background	38	17.27
Identified as being from a minority because of their ethnicity, race, etc.	35	15.91
Those who don't have a personal computer	4	1.82
Students working more than 30 hours a week	19	8.64

Note: 113 students fall into at least one of the above categories.

Results

Descriptive statistics results

Descriptive statistics for all measures are presented in Table 2, complemented by Mann-Whitney U hypothesis tests to compare the studied distributions. It is established that there are a number of differences in observed characteristics and behaviour between traditional and non-traditional students. Starting with student engagement, non-traditional students display higher engagement scores in terms of their time and effort, as well as interaction with classmates and instructors. However, these groups cannot be distinguished from each other in terms of lecture and tutorial participation, being an important aspect of active teaching strategies. When analysing engagement influences, it can be observed that non-traditional students on average displaying greater motivation for their studies. However, of particular interest to this study, both groups report the same increase in engagement derived specifically from active teaching techniques. Finally, non-traditional students report greater gains in personal and professional skills from their engagement, but not necessarily higher academic grades.

Engagement, its influences as well as consequences for the disaggregated non-traditional student groups can be analysed based on the findings reported in Tables 3, 4 and 5, respectively.

Starting with Table 3, non-Australian residents and those from a non-English-speaking background, students from a minority and those working greater than 30 hours per week all display greater student engagement than traditional students. Looking at the various components of engagement, the majority of the non-traditional student groups differ in at least one category compared to the traditional students. However, with regard to the frequency of lecture and tutorial participation, which would reflect active teaching strategies, no non-traditional group displays statistically significant differences from traditional students (see Participation in Table 3).

Table 4 shows that it is not possible to distinguish any non-traditional group in terms of total psychological influences, however, a number of distinguishing features for its various components can be observed. For example, older students and those working long hours reported a greater workload, while higher levels of motivation were reported for non-Australian and non-English speaking background students and other minorities. Table 4 also shows that no student group could be distinguished from traditional students in terms of self-reported engagement improvement caused by active teaching techniques.

Finally, Table 5 shows that non-Australian and non-English speaking background students actually experienced higher academic achievements compared to traditional students, while the opposite was the case for those who had previously failed the subject as well as older students. Perhaps of greater importance, those with children, non-Australian and non-English speaking background students and those working long hours reported greater gains in personal and professional skills.

Table 2:
Summary statistics of the three groups

Measure	Description	Metric	All students		Traditional students		Non-traditional students	
			Mean	SD	Mean	SD	Mean	SD
Psychosocial Influences								
• University support	• Degree satisfied with the teaching support services and materials	Sum of 9 items	29.78	9.71	29.45	9.03	30.09	10.34
• Teaching	• Self-reported engagement improvement level caused by active teaching techniques	Sum of 6 items	21.69	6.53	21.33	6.61	22.02	6.47
• University workload	• Number of hours spent for preparation of the subject-related assessment, tutorials, lectures, and studying other subjects	Sum of 5 items	11.53	2.90	11.19	2.42	11.85	3.28
• Student motivation	• Degree of student motivation in learning the subject better	Sum of 4 items	11.52	2.93	11.01	2.77	12.01**	3.02
• Total		Sum of 24 items	74.54	17.09	73.01	16.56	75.99	17.45
Engagement								
• Time and effort	• Degree of participation in peer-assisted study sessions, online practising and reviewing recorded lectures	Sum of 5 items	17.70	3.34	17.07	3.51	18.29**	3.08
• Interaction	• Degree of student interaction with classmates and instructors	Sum of 7 items	18.01	6.79	16.79	6.35	19.16**	7.02
• Participation	• Frequency of lectures and tutorials participation and contribution to tutorial and online forum discussions	Sum of 4 items	14.30	2.94	14.11	2.95	14.49	2.94
• Total		Sum of 16 items	50.02	10.61	47.98	10.67	51.95***	10.23
Proximal Consequences								
• Academic achievement	• Student academic test grade	Grade average	3.39	1.49	3.36	1.50	3.42	1.49
• Self-reported outcome	• Self-reported gains in personal and professional skills, including thinking critically and analytically	Sum of 5 items	17.47	4.52	16.77	4.54	18.13**	4.42
• Total		Sum of 6 items	20.86	5.02	20.14	5.04	21.55**	4.92

Note: *, ** and *** are indicative of statistical differences at the 1%, 5% and 10% levels of significance, respectively.

Table 3:*Average of engagement scores for traditional students and sub-groups of non-traditional students*

Measure	Number	Time and effort		Interaction		Participation		Total Engagement Score	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Traditional students	107	17.07	3.51	16.79	6.35	14.11	2.95	47.98	10.67
Non-traditional students									
• Part-time students	12	18.33	3.22	16.5	7.85	12.75	2.45	47.58	10.33
• Those with children living with them and depending on them for their care	3	18.33	1.52	23.33*	3.05	14.66	4.04	56.33	8.32
• Non-Australian resident and non-English speaking background	34	18.38	2.53	22.02***	6.30	15.20	2.87	55.61***	10.13
• Those who identified themselves as having a disability	7	18.85	1.57	22.42*	7.45	14.85	3.13	56.14	10.21
• Those who have failed the subject before	29	18.41	3.28	19.37	5.85	14.89	2.95	52.68	8.46
• 26 years of age and older	14	19.64**	2.89	16.07	7.17	14.57	3.45	50.28	10.50
• Non-Christian background	38	18.68*	2.95	19.16	7.02	14.49	2.94	51.95*	10.23
• Identified as being from a minority because of their ethnicity, race, etc.	35	18.25	3.14	21.40***	6.73	14.77	2.98	54.42**	10.44
• Those who don't have a personal computer	4	16.5	1.73	23.75**	0.50	13.00	3.74	53.25	5.43
• Students working more than 30 hours a week	19	19.30**	2.51	19.32	7.24	15.26	2.02	53.89*	8.15

Note: *, ** and *** are indicative of statistical differences at the 1%, 5% and 10% levels of significance, respectively.

Table 4:*Average of psychosocial influences for traditional students and sub-groups of non-traditional students*

Measure	Number	Support		Teaching		Workload		Student motivation		Psychosocial Influences	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Traditional students	107	29.45	9.03	21.33	6.61	11.19	2.42	11.01	2.77	73.01	16.56
Non-traditional students											
• Part-time students	12	29.5	9.60	20.08	5.59	11.66	2.26	11.5	3.72	72.75	16.38
• Those with children living with them and depending on them for their care	3	34	5.29	22	5.19	14.66	8.96	13.33	2.08	84	4.35
• Non-Australian resident and non-English speaking background	34	30.32	10.34	22.38	6.15	12.26	3.86	12.79**	3.04	77.76	16.31
• Those who identified themselves as having a disability	7	39.85	12.26	18.14	6.46	13.28	5.34	12.85	3.76	74.14	21.07
• Those who have failed the subject before	29	28.65	11.99	21.96	7.23	11.65	2.09	11.86	2.27	74.13	19.28
• 26 years of age and older	14	31.07	13.08	21.78	9.31	14.28***	4.51	11.78	3.49	78.92	25.76
• Non-Christian background	38	30.09	10.34	22.02	6.47	11.85	3.28	12.01*	3.02	75.99	17.45
• Identified as being from a minority because of their ethnicity, race, etc.	35	27.51*	11.15	21.54	6.83	12.57	4.57	12.45**	3.00	74.08	19.84
• Those who don't have a personal computer	4	23.25	15.56	15.75	4.34	14.75	6.89	13	2.44	66.75	22.91
• Students working more than 30 hours a week	19	29.42	9.46	23.31	6.28	13.84***	4.45	12.15	2.65	78.73	16.40

Note: *, ** and *** are indicative of statistical differences at the 1%, 5% and 10% levels of significance, respectively.

Table 5:*Average of proximal consequences for traditional students and sub-groups of non-traditional students*

Measure	Number	Academic achievement		Self-reported outcome		Total Proximal Consequences	
		Mean	SD	Mean	SD	Mean	SD
Traditional students	107	3.36	1.50	16.77	4.54	20.14	5.04
Non-traditional students							
• Part-time students	12	3.91	1.50	17.66	4.31	21.58	4.71
• Those with children living with them and depending on them for their care	3	3.33	2.08	22.33**	2.51	25.66**	1.52
• Non-Australian resident and non-English speaking background	34	3.97**	1.21	18.82*	4.25	22.79**	4.78
• Those who identified themselves as having a disability	7	4.00	0.81	19.28	7.11	23.28	7.01
• Those who have failed the subject before	29	2.93***	1.66	17.24***	4.85	20.17***	5.40
• 26 years of age and older	14	2.64**	1.39	17.42	5.66	20.07	6.01
• Non-Christian background	38	3.47	1.49	18.13	4.42	21.55	4.92
• Identified as being from a minority due to their ethnicity, race, etc.	35	3.48	1.44	17.68	5.43	21.17	5.83
• Those who don't have a personal computer	4	4.00	1.41	14.5	6.65	18.5	5.97
• Students working more than 30 hours a week	19	3.10	1.62	19.36**	3.84	22.47	4.93

Note: *, ** and *** are indicative of statistical differences at the 1%, 5% and 10% levels of significance, respectively.

Hypothesis testing using correlation analysis

The previous descriptive statistics analysis has established that non-traditional and traditional students display different characteristics for psychosocial influences, student engagement and proximal consequences. However, the link between influences and engagement, as well as engagement with consequences, are yet to be formally established, nor have been controlled for other observable student characteristics. In this section, a number of correlation analyses are presented to test the strength of relationship between influences and consequences with student engagement. In addition to rudimentary bivariate correlation analyses, partial correlation analyses are also presented for both traditional and non-traditional students after controlling for enrolment status, high school grades, gender, and attendance in a mathematics bridging course (before starting their major).

The links between student engagement levels and psychosocial influences of university support, active teaching strategies, students' workload and motivation are quantified in Table 6. The bivariate correlations show that, on the surface, there is a positive and significant link between engagement and different aspects of psychosocial influences. However, after controlling for other variables, the partial correlation results show a strong correlation between motivation and engagement of non-traditional students, but no connection between support or workload with engagement for these group. Of particular interest to this study, a very weak association between active teaching strategies and engagement for non-traditional students is found. In contrast, strong evidence of the effect of active teaching on engagement is maintained for traditional students.

Table 6:
Psychosocial influences and engagement correlation

<i>Psychosocial influences</i>	Traditional students		Non-traditional students	
	Engagement		Engagement	
	Bivariate correlation	Partial	Bivariate correlation	Partial
Support	0.5158***	0.0465	0.3847***	0.1323
Teaching	0.5737***	0.3171***	0.3524***	0.1770*
Workload	0.4676***	0.3102***	0.2152**	0.0211
Student motivation	0.5935***	0.4240***	0.5859***	0.5504***
Total score	0.6745***	---	0.5005***	---

The correlation analysis results provided in Tables 7 can now be used to exhibit whether traditional and non-traditional students show any different learning outcomes from their engagement. As presented in Table 7, there is a statistically significant and positive bivariate correlation between engagement and proximal consequences for both traditional and non-traditional students. However, this result is solely attributable to the correlation between engagement and self-reported gains in personal and professional skills, as no significant pair-wise correlation was found between engagement and academic achievement. It should be noted that a lack of significant correlation between engagement and academic achievement has also been found in other studies such as Carini et al. (2006).

Table 7:
Engagement and proximal consequences correlation

<i>Engagement scale</i>	Traditional students		Non-traditional students	
	Proximal consequences		Proximal consequences	
	Bivariate correlation	Partial correlation	Bivariate correlation	Partial correlation
Time and effort	0.3571***	0.2000**	0.3740*	0.1970**
Interaction	0.3102***	0.1281	0.3156*	0.1216
Participation	0.3357***	0.1694*	0.4359*	0.3101***
Total score	0.3952***	---	0.4549*	---
	Self-reported outcome		Self-reported outcome	
	Bivariate correlation	Partial correlation	Bivariate correlation	Partial correlation
Time and effort	0.4165***	0.2028**	0.3849***	0.1949**
Interaction	0.3775***	0.1835*	0.3312***	0.1379
Participation	0.3926***	0.1735*	0.4891***	0.3646***
Total score	0.4706***	---	0.4843***	---
	Academic achievement		Academic achievement	
	Bivariate correlation	Partial correlation	Bivariate correlation	Partial correlation
Time and effort	-0.0604	0.0849	0.0927	0.0818
Interaction	-0.1004	-0.1032	0.0593	0.0023
Participation	-0.0601	0.0665	-0.0117	-0.0487
Total score	-0.0963	---	0.0653	---

Conclusion

Using Kahu's (2013) framework, this paper examines the impact and interplay between various factors associated with student engagement for both traditional and non-traditional students.

Empirical results presented in this paper show that traditional and non-traditional students display quite different behaviour in some aspects of psychosocial influences, student engagement and proximal consequences. Non-Australian and non-English speaking background students, those identified as being from a minority or working greater than 30 hours per week display statistically significant higher engagement than traditional students. However, with respect to involvement in active teaching strategies, no non-traditional group differed from traditional students. In terms of psychological influences, older students and those working long hours reported a greater workload, while higher levels of motivation were reported for non-Australian and non-English speaking background students and other minorities. Again, there did not appear to be any difference for self-reported engagement improvement caused by active teaching techniques for non-traditional students. With regard to proximal consequences, non-Australian and non-English speaking background students showed higher academic achievements and also reported greater gains in personal and professional skills compared to traditional students. These results generally demonstrate that the potential benefits of student engagement for non-traditional students in terms of skill acquisition are very strong.

This study's correlation analysis also established that there was only a weak connection between active teaching strategies and student engagement for non-traditional students. However, there was a strong connection between engagement and gains in personal and professional skills for non-traditional students. The findings of this study further highlight that as traditional and non-traditional students have different learning needs and preferences, so too should active teaching strategies be designed for greater inclusiveness and appreciation of student heterogeneity.

The research presented in this paper has some limitations. Like other studies (NSSE and so on), this study relies on students' self-assessment. Also, for ethical reasons, the survey conducted for this research was not linked to the final results, which might be a better indicator of academic achievement. Finally, due to the use of cross-sectional data, this study does not provide the richness and depth of observation of that of a longitudinal study. However, it is expected that the insights found in this study provide an impetus for further research into active teaching strategies and heterogeneous student groups.

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Appendix A

Survey items contributing to student engagement

Behaviour (Student Engagement)

- I. Time and effort (degree of participation in peer assisted study sessions, online practising and reviewing recorded lectures)
 1. Use online practising (e.g. MyMathLabGlobal)
 2. Use ECHO (recorded lectures)
 3. How many hours a week did you spent on preparation for PASS
 4. Work harder than you thought you could to meet an instructor's standards or expectations
 5. Prepare a copy of lecture notes before attending the lectures
 - II. Interaction (degree of student interaction with classmates and instructors)
 1. Work with classmates outside of class on class projects, tutorial questions or assignments
 2. Use an electronic tool (email, class website, etc.) to communicate with another student about coursework
 3. Use an electronic tool (email, class website, etc.) to communicate with an instructor about coursework
 4. Discuss a tutorial question or grade with an instructor
 5. Discuss ideas from your readings or classes with instructors outside of class (during consultation)
 6. Discuss ideas from your readings or classes with others outside of class (students, family, co-workers, etc.)
 7. Have serious conversations about this subject with students of a different race or ethnicity than your own
 - III. Participation (frequency of lectures and tutorials participation and contribution to tutorial and online forum discussions)
 1. Attend lectures
 2. Attend weekly tutorials
 3. Use online forum (on Moodle)
 4. Ask questions in tutorials or contribute to tutorial discussions
-

Appendix B

Survey items contributing to Proximal Consequences

Academic

- I. Achievement (student academic test score)
 1. What mark did you get from COMM121 mid-term exam?

 - II. Self-reported outcome (self-reported gains in personal and professional skills including thinking critically and analytically)
 1. Overall, within a class:
 - a) I learned to improve my study skills (listening, note taking, highlighting readings, working with others, etc.)
 - b) I learned skills and strategies to improve my test-taking ability
 - c) I learned to think critically and analytically
 - d) I learned to learn effectively on your own
 - e) I learned to analyse quantitative problems
-

Appendix C

Survey items contributing to psychosocial influences

University

- I. Support (degree satisfied with the teaching support services and materials)
 1. How useful did you find the pass program
 2. This subject provides access to MyMathLabGlobal. Did you find this software useful to prepare for this subject?
 3. Did MyMathLabGlobal help you to understand the subject content better?
 4. Did you gain better understanding through participation at PASS?
 5. To what extend did this feature let you feel more understanding with this subject:
 - A. Slides being upload at least one week before lecture
 - B. Practical examples
 - C. Cartoons
 - D. Funny videos
 - E. Summary in the end of each lecture

(Questions for students at the end of each learning unit)
 - II. Workload (amount of hours spent for preparation of the subject-related assessment, tutorials, lectures, and studying other subjects)
 1. How many hours a week did you spend on each of the following:
 - preparation for the midterm exam
 - preparation for each Lecture
 - preparation for each tutorial
 - preparation for each of online quizzes for which you receive marks
 - Total time for studying during a typical 7-day-week
-

Student

- I. Motivation (degree of student motivation in learning the subject better)
 1. Feel enthusiastic when studying for this subject –engagement – interest
 2. Summarise major points and information in your readings or notes.
 3. Tutor or teach other students.
 4. Come to class with completing readings
- II. Teaching (self-reported interest improvement level caused by active teaching techniques)
 1. Did MyMathLabGlobal help you feel more engaged with the subject?
 2. To what extend did this feature let you feel more engaged with this subject:
 - A. Slides being upload at least one week before lecture
 - B. Practical examples
 - C. Cartoons
 - D. Funny videos
 - E. Summary in the end of each lecture