

# Student Preferences and Attitudes to the Use of Early Alerts

*Full Paper*

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## Abstract

Learning analytics is receiving increased attention because it offers to assist higher education institutions in improving and increasing student success by automating the identification of at-risk students, thereby enabling interventions. While learning analytics research has focused on detection and appropriate interventions, such as early alerts, there has been little investigation of student attitudes and preferences towards receiving early alerts. In this paper, we report the results of a study involving three first year units that sought to determine the opinions and preferences of students on their attitudes towards the interventions; how to best contact students; their academic issues; type(s) and quality of communication with the teaching staff; and types of university services required and received. We found that the majority of students did want to be alerted, preferred to receive alerts as soon as performance was unsatisfactory, and strongly preferred to be alerted via email, then face-to-face then phone.

## Keywords

Early alerts, higher education, retention, student success, learning analytics.

## Introduction

Higher education institutions are using analytics to recruit students, retain students and to improve learning and teaching. The new but fast developing field of learning analytics is established on the ability of administrators, instructors, and students to use technology to mine data in order to improve student learning and performance. Data can be drawn from sources such as learning/course management systems (LMS/CMS), library systems and student information systems. Formally, learning analytics has been defined in a recent EDUCAUSE research report (van Barneveld, Arnold, and Campbell 2012) as, “the use of analytic techniques to help target instructional, curricular, and support resources to support the achievement of specific learning goals” (p.8). This definition states the challenge of learning analytics, which is not merely to collect data but rather to uncover hidden patterns in educational data and use those patterns to attain a better understanding of the educational process, assess student learning, retention, and degree completion. Therefore, the essential task is to extract information and translate that information to influence meaningful change in institutional processes, policies, and programs to improve student outcomes.

Improving student retention and success has become a priority for Australian universities as the Commonwealth Government has included retention (along with progression rates and student experience data) on its list of indicators for funding of higher education (DEEWR 2009). While institutions and students may use a range of student related databases for administrative and course management purposes, from the unit (sometimes called a course or subject) perspective of learning, the most common learning technologies in use in Australia are LMS (such as Blackboard or Moodle). E-learning environments automatically capture system-based records of users’ activities, recording who accessed what and when. Use of this data is termed usage logs, audit trails, or learning analytics (Phillips et al.

2011). With the current push to open up university education to more under-represented students (such as low socioeconomic students), early prediction of students at academic risk of attrition is an objective of many academic institutions. Estimates of university degree completion in Australia vary between 72 and 85 per cent (ACER 2011). It is challenging to obtain accurate figures as students often change degrees, institutions, their enrolment mode (from full-time to part time and vice versa), upgrade to honours, suspend their enrolment to resume study at a later stage or withdraw altogether. According to Gilling (2010), in some universities only half of first year students end up graduating. This has an emotional cost for those leaving their studies but also comes with a financial cost for individuals, educational institutions, and governments (Lobo and Matas 2011).

Since the 1970s, a number of student retention/attrition models were developed to explain why students were leaving their studies. Analysis of the existing models shows the lack of literature referring to students' in-course (within a single unit/subject) academic success. From the limited literature that deals with the withdrawal of students from a course, the majority refers to the issue of student withdrawal from language classes (Lobo and Matas 2011). There is lack of retention and attrition models that challenge the issue of student withdrawal from the beginning of the course before the student withdraws all together. These models were not developed to empower students in their learning experience or help teachers to understand when students in their classes could be at academic risk. Therefore, these models are not necessarily actively contributing to retaining any students in their courses. Moreover, it is likely that withdrawal from a course will act as a predictor of withdrawal from a full program of study, such as a degree or diploma. The earlier a student is identified as possibly being in need of support the better the prediction for their success. Literature shows that students are often highly apprehensive about seeking help. Reasons include uncertainty about what assistance is available, whom to approach and issues around confidentiality (Kinnear et al. 2008). It was found however that once students are aware of the help available and know whom to approach, they develop a network of people who could assist them to become more confident to seek help in the future. Evidence suggests that this network is pivotal to persisting with study and overcoming future critical incidents. Paradoxically, it is often the students who require support that do not seek it (Fusch 2011; Kinnear et al. 2008).

Given the importance of the proactive and early identification of students who may require support, higher education institutions in Australia have begun to put into place systems that monitor student progress. As part of that monitoring some institutions have implemented early alert systems. These systems are designed to provide the institution with an early indication of difficulties possibly arising. In principle they are structured to ensure that warnings or alerts come early enough to be useful, usually within the first four to eight weeks of the first semester (Fusch 2011) and at any other time that there may be a change of circumstances for an individual student.

Our research by aiming to develop an in-course student retention and success model by utilizing data from the LMS, differs from available tools and fills the current gap. If we can identify variables that enable us to predict success or failure of students within a unit, early intervention and types of assistance can be designed and implemented on a timely manner to achieve success instead of failure. Towards this goal, our current focus is to understand which early alerts students are willing to use and which ones they value.

Therefore, this paper reports on our work that seeks to answer "*What are the opinions and preferences of students with respect to the use of early alerts?*" The next section presents research background followed by methodology, results, discussion, and conclusions.

## **Background: Student Early Alert Systems**

The student early alert system is a formal, proactive, early intervention tool that allows faculty and designated university personnel to identify students who are presenting patterns that may lead to academic difficulty in their courses. It also allows submitting information regarding academic issues that usually present obstacles to student success (Miller 2014). The literature on learning analytics is replete with studies on the use of such systems and data in US, UK and Europe (Cochran et al. 2014; Hurn and Dietz-Uhler 2013) but a review of the Australian tertiary student experience found very little evidence of the use of such systems/technology which enable and support the implementation of automated early alert systems (Jackson and Read 2012). Formal, proactive and prompt feedback to early manifestations of poor academic performance or academic disengagement to students and to those who can assist students are an essential element in the effectiveness of these systems (Tinto 2012).

Qualitative studies (such as Tinto 2012; Singell and Waddell 2010) have shown that early intervention with students on the part of faculty, advisors, and other campus personnel can improve students' likelihood to succeed, persist, and graduate. The types of alerts (academic triggers) are based on LMS data such as, missed workshops/tutorials, low scores in assessments or assignments, missing work, not logged in to the LMS (e.g. for more than a week), discussion postings (how many?), and lecture content or lecture resources not viewed (course view, resource view, URL view, assignment view). There are examples of such tools at various Australian universities, such as the University of Wollongong's Social Networks Adapting Pedagogical Practice (SNAPP) (Bakharia and Dawson 2011), Edith Cowan University's Connect for Success (C4S) (Jackson and Read 2012), University of New England's Automated Wellness Engine (AWE) (Leece and Hale 2009), and the Open University Australia's Personalized Adaptive Study Success (PASS). A comparison of these tools can be found in (Atif et al. 2013). However, the current examples do not include retention of students within a single course/unit/subject.

There has also been little attention on whether students want such tools and are willing to have their LMS or other academic record data used for these purposes. Recently, Willis and his colleagues suggested a thorough list that exemplifies the types of questions institutions must address when using student data. According to Willis, Campbell, and Pistilli (2013), issues for learning analytics fall into the following broad, often overlapping categories: (1) the location and interpretation of data; (2) informed consent, privacy, and the de-identification of data; and (3) the management, classification, and storage of data. To address some of these issues, Slade and Prinsloo (2013) propose an ethical framework for higher education institutions to address the ethical issues and challenges in learning analytics which in turn can help to increase the quality and effectiveness of learning and teaching.

## Methodology

To gather the opinions and preferences of students, a survey was determined to be the most appropriate method (Neuman 1991). An online questionnaire developed in English, which had questions on (1) demographic information; (2) early alerts; (3) institutional factors; and (4) unit specific information, and administered in Qualtrics (Qualtrics Labs 2009). The questionnaire consisted of items that required answers for binary (yes/no), open ended, multiple choice, and likert scale questions. Topics covered in the survey include areas of academic struggle, type and quality of communication with the teaching staff, attitudes towards the interventions, types of university services required and received, and helpfulness of interventions. The preliminary questionnaire was pre-tested and pilot tested in order to assess the reliability of the questions. The questions for each section are provided in Appendix I.

We surveyed the students in Semester 1, 2014 and data was collected from May 31-July 31 2014. An initial personalized invitation to complete the survey was sent via university email (using Qualtrics) to 810 students who were enrolled in first year units from the departments of computing (COMPXXX), physics (PHYSXXX) and mathematics (MATHXXX) within the faculty of science and engineering. A reminder email was sent after 2 weeks. Students completed the questionnaire on an entirely voluntary basis. The units in this study were chosen because according to the faculty of science and engineering academic standards and quality committee they are considered as *units at risk*. Each contacted student received a copy of the following documents:

- A recruitment e-mail containing the link to the survey.
- An information and consent form following the survey questions. This explained the nature of the research and emphasized the confidentiality of their responses.

## Results

Ninety-five (95) students agreed to participate by checking the information and consent statement radio button; 39/95 did not finish the survey; 39 include both incomplete attempts to all sections and blank responses (blank responses=10 and incomplete attempts to all sections=29). After screening for usability and reliability, 85 responses were found to be complete and usable; 10 were dropped because they were blank. Of these responses, 85 completed the demographics (Section 1), 70 completed the alerts section (Section 2), 69 completed the institutional factors section (Section 3), and 78 completed the unit specific information section (Section 4). The number of respondents who completed every section of the survey was 56. If we define the completion rate as the ratio of the number of surveys completed to the number of

surveys started (that is, agreed to participate by checking the information and consent statement radio button), we found a survey completion rate of 59% (56/95=59%).

**Section 1-Student Demographics**

Section 1 collected student demographic information including an identifier (Student ID) so that we can match their achievement in the unit from another database. Table 1 presents the selected basic demographic attributes (Q1.1-Q1.7) of our respondents.

	<b>Respondents</b>	
	<b>Number</b>	<b>%</b>
<b>Basic Demographics</b>		
Number of respondents	<u>85</u>	
Gender		
Male	55	65
Female	28	33
I don't identify as male or female	2	2
Age (years)		
18 or younger	27	32
19-24	48	56
25-34	6	7
35-49	1	1
50 or older	3	4
First Language		
English	67	79
Other than English	18	21
Ethnicity		
International Student	4	5
Aboriginal/Torres Strait Islander Student	2	2
Neither	79	93
Student Status		
First year, first semester student in S1-2014	50	59
I came from another university in S1-2014	7	8
First year student, 2nd semester student in S1-2014	4	5
2nd year student	14	16
3rd year student	4	5
Other	6	7
Faculty		
Arts	10	12
Business and Economics	2	2
Human Sciences	0	0
Science and Engineering	72	85
Missing	1	1

**Table 1: Basic Student Demographics (Q1.1-1.7)**

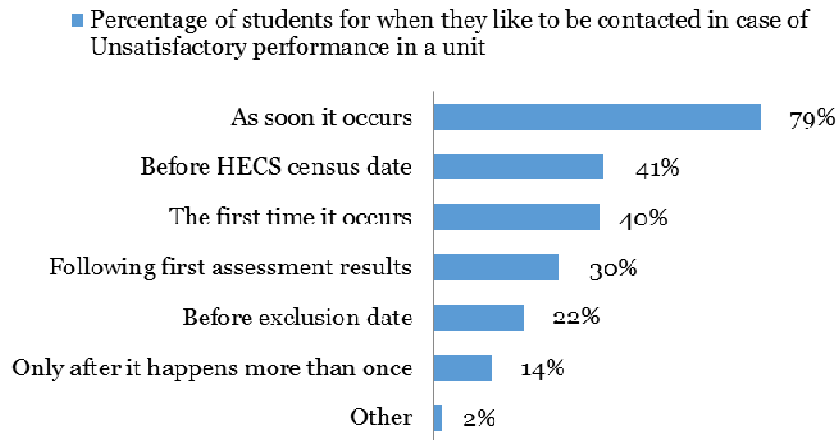
According to the self-reported employment status (Q1.8), 11% worked less than 5 hours, 19% worked between 5-10 hours, 7% worked between 11-15 hours, 14% worked between 16-20 hours, 15% worked more than 20 hours, and one-third (34%) did not work in semester 1, 2014. To report the other responsibilities such as a carer or similar (Q1.9), most of the respondents (88%) reported that they do not have a responsibility in semester 1, 2014. Eleven percent (11%) reported that they have the “other responsibilities”, which are listed in Appendix II. For Q1.10, 11% reported that they have a physical or diagnosed learning disability.

Students in PHYSXXX, MATHXXX, and COMPXXX are not separated out because all students are from first year units within the faculty of science and engineering and student characteristics in each group are very similar (i.e. younger school leavers with similar gender distribution and working hours).

## Section 2-Early Alerts

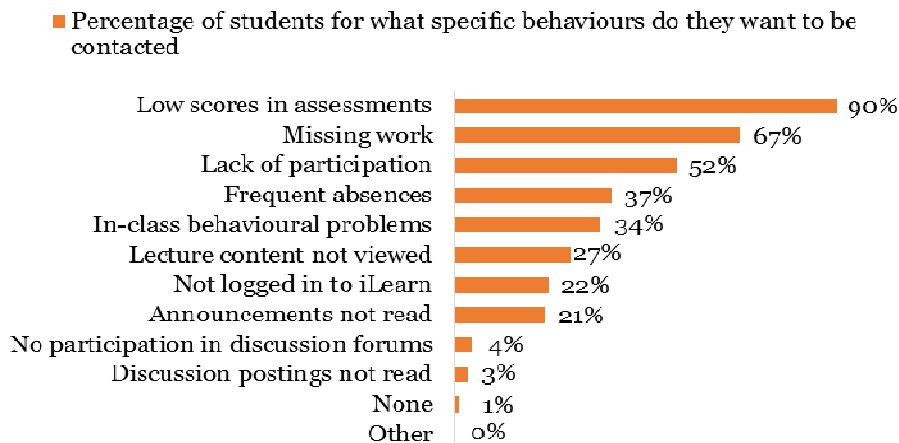
Section 2 aimed to identify student preferences to allow possible design of *alerts* in future offerings and other units. Students were informed that this section is for future planning only and no alerts in the current offerings of these units will be provided. Questions include whether a student wants to receive an early alert, when, how, and in what form they want that alert to take.

Of the 70 respondents who did the alerts section, 63 students (90%) want to be contacted if their performance in the respective unit is unsatisfactory, and only 7 students (10%) would not like to be contacted. Figure 1 shows the summary of responses to a multiple response question for N=63 (students who want to be contacted): *When you like to be contacted* (Q2.1). We noted that majority students (79%) like to be contacted as soon as their performance in the respective unit is unsatisfactory.



**Figure 1: When students' like to be contacted? (Q2.1)**

Figure 2 shows the summary of responses to a multiple response question for N=67: *what specific behaviours students' like to be contacted* (Q2.2). We noted that majority students like to be contacted for low assessment scores (90%), missing work (67%), and lack of participation/effort (52%).



**Figure 2: For what specific behaviours students' like to be contacted? (Q2.2)**

In a follow up question we learnt that 53 students (82%) wanted to be advised about opportunities to seek assistance via email, followed by face-to-face (25 students, 38%), and mobile/cell phone (19 students, 29%). Only 4 students (6%) wanted to be advised via letter/post card by post (snail mail) and 1 student wanted to be advised via home telephone (Q2.3).

When asked about student preferences for seeking help (Q2.4), 76% students preferred to *talking with the unit convener/lecturer/tutor to work out a plan to improve their grade*; 54% *meeting with a tutor(s)* (54%); 51% students said they preferred to *receive a written plan from the unit convener/lecturer*; 40% said that they can *manage themselves*; 36% think *getting an email/letter about how they are doing in a class is enough*; 33% think *talking with a counselor/support services about how to work through their problems* is sufficient; 30% said *attending a workshop/seminar* and *meeting with other students to form a study group* would motivate them to seek help; followed by 19% said *getting a phone call from unit convener/lecturer*; and 18% preferred *actively participating in discussion forums to get information from the unit convener/lecturer/tutor(s) and other students on how to improve* would motivate them to seek help. Therefore, the results suggest that most activities requiring a student to interact with his/her instructor will improve their academic performance.

### Section 3-Institutional Factors

Section 3 aimed to understand student awareness of university support services and whether they would prefer to have access to a small document such as learning support guide other than unit guide that outlines the support services available, expectations of students, and processes at the university. Participants were allowed to select all that apply when answering why they chose to enroll in their current institution (Q3.1). *Program of study choices* and *good reputation* were the most often selected followed by *proximity to home* and the *only university I got accepted*.

Of the 69 respondents, 56 students (81%) said that they were not aware of the available university support services. Only 13 students (19%) were aware of the available support services (Q3.2). They were asked to name at least three (3) support services they are aware of in a free text entry. We performed some pre-processing on the data and considered the frequency of term usage. For a better visual representation to displays terms in varying sizes according to their frequency we have used Wordle™ available at <http://www.wordle.net/> to create a word cloud (Figure 3). We can see that students were most aware of campus wellbeing and counseling, followed by services related to health, study skills, and employment.



Figure 3: Word Cloud for university support services students were aware of (Q3.2)

A total of 12 (18%) students said they are currently taking advantage of university support services and 56 students (82%) said that they are not taking advantage of any university support services (Q3.3). Over three quarters of students (56, 82%) said that they would like to have access to a learning support guide other than unit guide. Only 12 students (18%) responded that they do not need any such document (Q3.4).

### Section 4-Unit Specific Information

Section 4 aimed to identify unit specific learning and teaching factors that influence why the student chose to study at that institution.

Of the 78 respondents (section 4), 48 students (62%) were studying 4 units followed by 16 students (21%) studying 3 units, 9 students (12%) taking 2 units and only 5 students (6%) were doing a single unit (Q4.1). Based on the entry in Q4.1 students were asked to enter the unit ID (Q4.2) for each unit they studied in S1 2014 followed by unit specific questions (Q4.3-4.14). For this paper, the analyses of the questions (Q4.3-4.14) are reported only for COMPXXX (43 students), PHYSXXX (17 students) and MATHXXX (15 students). To present the total numbers, the results for COMPXXX are presented first, followed by results for PHYSXXX and MATHXXX. A total of 39, 15, and 14 are doing these units for the first time; 4, 2, and 1 are repeating students (Q4.3). In addition, 8, 9, and 11 students said they had the prior knowledge of the

unit and 34, 8, and 4 don't (Q4.4). For Q4.5, 37, 16, and 13 students had read the unit guide and 6 from COMPXXX, 1 from PHYSXXX, and 2 from MATHXXX had not. Student comments for why they have not read the unit guide are in Appendix III. A total of 29, 10, and 11 said that they completely understand the unit requirements; 14, 7, and 4 partially (Q4.6).

Student abilities and skills	COMP115		PHYS143		MATH135	
	Mean	SD	Mean	SD	Mean	SD
Academic ability	4.0	0.83	3.9	0.70	4.4	0.63
Competitiveness	3.5	1.10	3.6	0.79	4.0	1.00
Computer skills	4.0	0.84	3.8	0.64	3.5	1.19
Problem solving skills	3.9	0.91	4.0	0.50	4.4	0.63
Programming ability	3.3	1.12	3.2	0.83	3.1	1.19
Critical thinking skills	3.9	0.81	4.2	0.44	4.2	0.68
Ability to manage my time effectively	3.0	1.13	3.4	1.17	3.4	1.12
Interpersonal skills	3.7	0.89	3.8	0.81	3.3	1.23

**Table 2: The standard deviation (SD) and average student skills and abilities (Q4.7)**

Table 2 shows the standard deviation and average abilities and skills of students based on a 5 point likert scale (Q4.7). We noted that students from the three units have multiple abilities and skills to undertake the respective units. Respondents are asked about the unit preparedness (Q4.8); 26%, 65%, and 60% students said that they are quite well prepared to undertake this unit, 26%, 24%, and 20% said fairly well, 26%, 6%, and 13% said very well and 2% in COMPXXX said unsure and 19%, 6%, and 7% said they are very little prepared to undertake this unit. For Q4.9, a total of 9, 5, and 5 students had experience in the subject content(s) outside the unit and 34, 12, and, 10 had not.

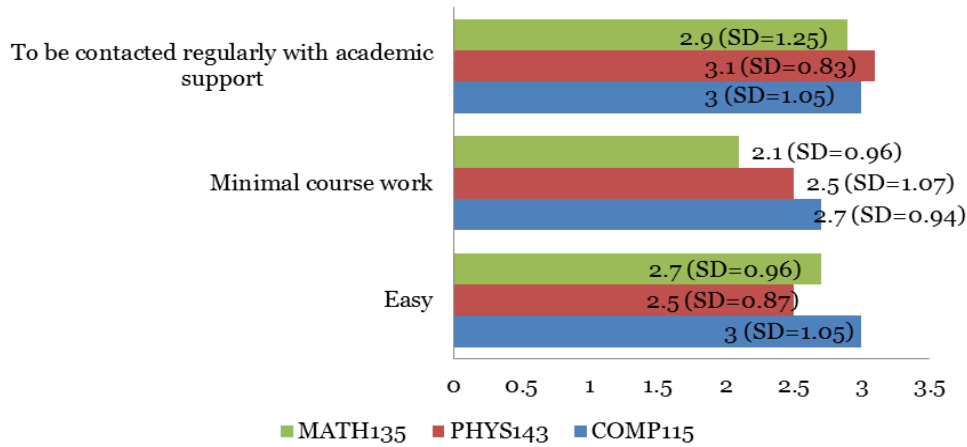
**Table 3: Factors affecting student performance in the respective unit (Q4.12)**

Factors	COMPXXX	PHYSXXX	MATHXXX
Family responsibility/commitments	16%	29%	40%
Emotional health	37%	47%	60%
Physical health	14%	6%	20%
Financial issues	12%	18%	33%
Felt under-prepared for this unit	9%	12%	20%
Communication skills	9%	0%	7%
Issue with the convener/lecturer/tutor	0%	0%	7%
Lack of student academic support	5%	6%	13%
Religious commitments/activities	0%	0%	0%
Social coping skills/social life style	5%	12%	13%
Problems with daily travel	12%	29%	20%
Paid work commitments	16%	0%	20%
Other	9%	0%	13%

Q4.10 was a multiple response question. For COMPXXX (N=43), respondents were asked to select all that apply when conveying the reason(s) for why they are taking this unit. *Degree requirement* (36/43) was the most often selected followed by *want to learn more about the subject content(s)* (14/43). One student selected *other* and gave the reason for taking this unit as *curiosity, interest, and for variety*. For PHYSXXX (N=17), *degree requirement* (15/17) was the most often selected followed by *want to learn more about the subject content(s)* (5/17). One student selected *other* and gave the reason for taking this unit as *force to take*. For MATHXXX (N=15), *degree requirement* (13/15) was the most often selected followed by *want to learn more about the subject content(s)* (9/15). Therefore, we noted that all three units are compulsory units for the students.

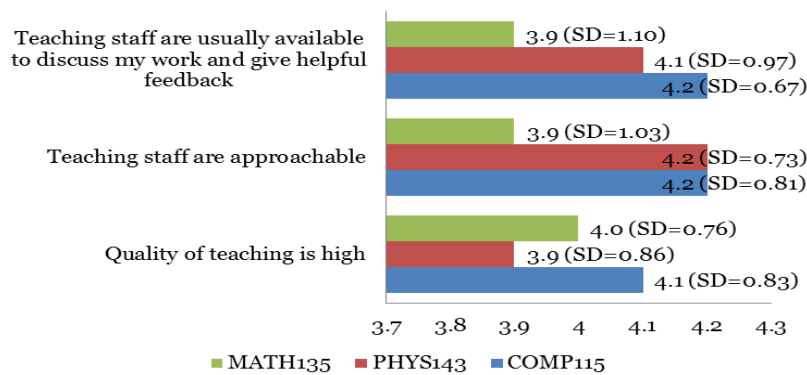
The results to Q4.11 regarding the motivation in the unit shows that the average motivation of students ranged from 3-4.3 out of a maximum 5 for COMPXXX, PHYSXXX, and MATHXXX respectively (see Appendix IV). A total of 24, 9, and 12 students thought there are factors that may affect their academic performance in the unit (Q4.12). Those students who marked yes were further asked to report the factors which can affect their academic performance in the respective unit (Table 3).

Figure 4 shows the means for the results regarding the expectations of the unit (Q4.13). At the beginning of the semester, more students expected course(s) to be easier and have minimal coursework.



**Figure 4: Student expectations (Q4.13)**

Figure 5 shows the means for the results to Q4.14 regarding the expectation(s) from the teaching staff in the respective units such as teaching staff are approachable and available to give feedback.



**Figure 5: Student expectations from the teaching staff (Q4.14)**

## Discussion

Student academic success has become a pivotal focus of attention as institutions locate themselves in a competitive HE environment. A number of factors such as diversity of abilities, age groups, gender, and educational backgrounds have contributed to the student academic success in higher education (Carey 2005; Kuh, Nelson, and Umbach 2004). Our study sought to determine if there were external factors that made it difficult for them to succeed. Our analysis of the demographics (section 1) indicated that there were some students (15%) who worked more than 20 hours a week while the majority of students (19%) worked between 5-10 hours and had no financial or carer responsibilities or any physical/diagnosed learning disability (Q1.8-1.10). This suggests that lack of academic success is more likely due to a problem



relating to either the institutional environment, the unit/course, or a personal factor. To gain some insight on the possible factors they felt might influence their academic performance, students from the three units mentioned problems with daily travel, paid work commitments, financial issues, and emotional health issues (Q4.12). Travel problems could be considered an institutional or personal factor. Emotional health is a personal factor. Financial issues may be the result of not having sufficient paid work (i.e. 5-10 hours per week may not be enough), however the response that paid work was a possible hindrance to their success, seems to contradict the minimal number of hours worked. Maybe it is the lack of paid work and the stress of financial concerns that are the issue.

There has been relatively little attention directed at the importance of timing in determining the effectiveness of any intervention. The sooner an intervention can be arranged, the more time a student has to address the problem. A series of studies using absenteeism as an indicator of performance in the classroom have consistently pointed to the importance of providing feedback to the student early in the semester (Bevitt, Baldwin, and Calvert 2010). Campbell (2007) references Astin's theory of student involvement, which suggests that most activities requiring a student to interact with his/her instructor improve student retention and academic performance. The receipt of an email from an instructor indicating that a student's performance is problematic creates a situation in which the student is more likely to address the issue directly with the instructor (Singell and Waddell 2010). These interactions develop the students' academic engagement, potentially resulting in better retention rates. This is in line with the results to our research question about opinions and preferences of students with respect to the use of early alerts (section 2). In answering the research question, the majority of students from all three units want to be contacted if their performance in the respective unit is unsatisfactory. They want to be contacted as soon as it occurs (when to be contacted?), for low assessment scores, missing work, and lack of participation/effort (why to be contacted?) and they want to be contacted via email (how to be contacted?) rather than face-to-face, phone call, or letter/post card (Q2.1-2.3). For preferences to seek help, more students preferred to talk with the unit convener/lecturer/tutor to work out a plan to improve their grade(s) (Q2.4).

Often institutions already have support services tailored to their student population needs. Many institutions offer student services, such as access to a writing and numeracy center, employment, medical services, and campus wellbeing. Unfortunately, these services are often under-utilized by the students who could benefit from them the most (Tinto 2012). One way in which institutions can improve both the academic performance and retention of students is by encouraging student utilization of campus support services. Research clearly suggests that there is a positive relationship between utilization of campus support services and persistence to program or degree completion (Churchill and Iwai 1981; Pascarella and Terenzini 1991). In particular, students who seek and receive academic support have been found to improve both their academic performance and their academic self-efficacy. They develop a greater sense of self-perceived control of academic outcomes, and develop higher self-expectations for future academic success (Smith, Walter, and Hoey 1992). Our analysis of section 3 shows that only 13% of students are aware of the university support services (Q3.2). Effective interventions will connect existing services to students who may not even know they need these services. With this in mind, we encourage students to take advantage of the resources offered at their institution and designed specifically for that institution's student body. However, it has also been found that students under-utilize academic support services especially those students who are in most need of support (Q3.3). At-risk students, in particular, have trouble recognizing that they are experiencing academic difficulty and are often reluctant to seek help even if they do recognize their difficulty (Fusch 2011; Kinnear et al. 2008). Institutions which initiate active individual contact with students (rather than provide services which require students to self-refer) retain more students than institutions that do not (Simpson 2005). From our findings of this study and in agreement with the literature, we suggest that institutions should deliver academic support intrusively by initiating contact with students and bringing support services to them rather than offering services and hoping that students will come and take advantage of them on their own.

Students from different departments have different levels of motivations (Q4.11) such as, COMPXXX students persist even when an assessment task is challenging for them (mean =3.8). PHYSXXX students thought they have to work too hard to succeed in this unit (mean =4.1) and MATHXXX students responded that to accomplish their goals, it is important that they do well in this unit (mean =4.3). Students from the three units have some similar factors affecting their academic performances such as problems with daily travel, paid work commitments, financial issues, and emotional health issues (Q4.12).

Our findings for Q4.7, 4.11, and 4.12 are consistent with a comprehensive review of the research literature by Tinto (2012) and Miller and Murray (2005). According to them, institutions with low rates of student retention are those in which students generally report low rates of student-faculty contact, academically under-prepared, inadequate academic advising, and low motivation. Conversely, institutions with high rates of retention are most frequently those which are marked by relatively high rates of such interactions (Miller and Murray 2005; Tinto 2012).

## Conclusions, Limitations and Future Work

Findings of this research study have practical implications for faculty (such as instructors/unit supervisors/conveners, student advisors, student support officers) and students. By monitoring student performance and participation in a course, as well as examining how this relates to grades, faculty can potentially spot areas of the course to improve. Such improvements in the course allow for the continual improvements that accrediting bodies are recommending. From a review of the existing student retention/success literature and the preliminary analysis reported in this paper, some factors from each section of the survey (demographics, alerts, institutional factors, and unit specific information) are repeatedly mentioned as key to identify at-risk students and provide interventions, transform pedagogical approaches, and help students gain insight into their own learning. This paper reports a small scale, exploratory study; indicating that students persist when they are making progress towards their educational and career goals, when they are satisfied with the quality of educational programs, services and environment (Tinto 2012).

The results presented are limited to three units in the Faculty of Science and Engineering. While these units collectively had over 800 students enrolled, the views of just over 10% of the students were obtained. This is a common limitation of online voluntary surveys (Atif, Richards and Bilgin 2012). In our institution students' response to online questionnaires has very low response rate (around 20%) and this is currently under investigation by our university's Senate Learning and Teaching Committee. While the numbers are lower than we had hoped, we note that when the respondents' grades were analyzed, all grades (from fail to high distinction) were represented in percentages similar to the overall results for each unit. Thus we have some confidence that students covering the full range of academic abilities were sampled. In view of the positive findings in these three units, we are currently deploying the surveys in more units/subjects across our institution. Understanding students' perceptions of the early alert process is important for us in moving forward to meet the bigger goals of the project i.e., to identify students at risk, understanding why they are at risk, designing interventions accordingly to reduce that risk, and finally closing the loop by tracking the effectiveness of the applied intervention(s). In addition, how to collect, collate, and integrate data residing in different university systems to track many aspects of student performance and behaviour to develop new information systems such as intelligent early warning systems to predict/increase retention.

The positive attitudes of students to the concept of early alerts, provides encouragement to develop a flexible and generalizable predictive student early alert system that uses machine intelligence and statistical analysis to identify at-risk students proactively. Future work of this project is to develop a model that will allow integration of data stored in different systems and to use a methodology to generate a predictive model that can accommodate the variety in learning contexts across different units/subjects.

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## APPENDIX I

### Section 1: Student Demographics

- 1.1 Student ID \_\_\_\_\_
- 1.2 I am male/female/I don't identify as male or female
- 1.3 My age (in years):18 or younger/19-24/25-34/35-49/50 or older/prefer not to say
- 1.4 My first language is English/Other than English
- 1.5 I am an International student/Aboriginal or Torres Strait Islander student/Neither
- 1.6 My student status is: First year, first semester student in S1-2014/I came from another university in S1-2014/ First year student, second semester student in S1-2014/2<sup>nd</sup> year student/3<sup>rd</sup> year student/Other
- 1.7 I am enrolled with faculty of Arts/Business and Economics/Human Sciences/Sciences
- 1.8 How many hours are you working per week at the moment: <5/5-10/11-15/16-20/>20/Not working
- 1.9 Do you have other responsibilities such as, a carer or similar. Yes/No If YES, please provide the details
- 1.10 Do you have any physical disability or a diagnosed learning disability? Yes/No

### Section 2: Alerts

NOTE: Questions 2.1 - 2.4 ask your preferences to allow the possible design of Alerts in future offerings and other units. This section is for future planning only and we will not be providing alerts in the current offerings of these units.

2.1 Would you like to be contacted if your performance in this unit is unsatisfactory? Yes/No. If Yes, when you like to be contacted? (Mark all that applies)

As soon it occurs/The first time it occurs/Only after it happens more than once/Following first assessment results/Before HECS census date/Before exclusion date/Other (Please describe)

2.2 For what specific behaviours do you want to be contacted? (Mark all that applies)

Frequent absences/Lack of participation or effort/Low scores in assessment tasks/Missing work/Not logged in to iLearn for more than a week/Discussion postings not read/No participation in discussion forums/Announcements not read/Lecture content or lecture resources not viewed/In-class behavioural problems/None/Other (Please describe)

2.3 How would you like to be advised about opportunities to seek assistance? (Mark all that applies)

Email/Letter or post card by post (snail mail) informing me about opportunities to seek assistance/Mobile or cell phone/Home telephone/Face-to-face/Other (Please describe)

2.4 From the following strategies, which do you think would motivate you to seek help? (Mark all that applies)

Talking with the unit convener or lecturer to work out a plan to improve my grade/Meeting with a tutor(s)/Receiving a specific written plan on how to improve my grade from the unit convener or lecturer/Meeting with other students that are also having problems in the class to form a study group/ Talking with a counselor or support services about how to work through my problems/Attending a workshop or

seminars with other students to go over improvement strategies/Getting an email or letter about how I am doing in a class is enough/Getting a phone call from unit convener or lecturer or tutor to help me work through my options/ Actively participating in discussion forums/Manage myself/Other (Please describe)

### Section 3: Institutional Factors

3.1 What led you to enrol at MQ? (Mark all that applies)

Close to home/Had the program I wanted to study/Affordable/Good reputation/Only university I got accepted/A family member attended or is attending/Other (Please describe)

3.2 Are you aware of the available university support services? Yes/No. If YES, please name some.

3.3 Are you currently taking advantage of any university support services? Yes/No. If YES, which ones.

3.4 Do you want to be facilitated with a learning support guide (other than unit guide)? Yes/No

### Section 4: Unit Specific Information

4.1 This semester, I am studying 1/2/3/4 units.

4.2 Enter the unit ID.

4.3 I am doing this unit for the first time Yes/No. If NO, when you did this unit (semester and year)

4.4 I have some prior knowledge of this unit Yes/No. If YES, please specify your content knowledge

4.5 I have read the unit guide Yes/No. If NO, please provide a reason

4.6 I understand the unit requirements. Completely/Partially/Not at all

4.7 I have the following skills/ability to undertake this unit. Rate yourself on each of the following traits on a scale of 1 (not competent), 2 (somewhat competent), 3 (uncertain), 4 (competent) and 5 (highly competent). (Mark one in each row)

Academic ability, Competitiveness, Computer skills, Problem solving skills, Programming ability, Critical thinking skills, Ability to manage my time effectively, Interpersonal skills

4.8 I feel well prepared to undertake this unit. Not at all/Very little/Fairly well/Quite well/Very well/Unsure

4.9 I have experience in the subject content(s) outside this unit Yes/No. If YES, please provide further information.

4.10 I am taking this unit because: (Mark all that applies)

Degree requirement/Want to learn more about the subject content(s)/Planet unit/Other (Please describe)

4.11 How would you rate your motivation in this unit, on a scale of 1 (not true), 2 (slightly true), 3 (moderately true), 4 (mostly true) and 5 (very true)? (Mark one in each row)

I am motivated to do my required work in this unit/I feel confident that I will do well in this unit/I have to work too hard to succeed in this unit/ To accomplish my goals, it is important that I do well in this unit/I persist even when an assessment task is challenging for me

4.12 Do you think there are factors that may affect your academic performance in this unit? Yes/No. If YES, which of the following factors can affect your academic performance in this unit? (Mark all that applies)

Family responsibility or commitments/Emotional health (lack of motivation, fear of failure etc.)/Physical health/Financial issues/Felt under-prepared for this unit/Communication skills/Issue with the convener or lecturer/Lack of student academic support/Religious commitments or activities/Social coping skills or social life style/Problems with daily travel/Paid work commitments/Other (Please describe.)

4.13 How would you rate your expectations of this unit, on a scale of 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree) and 5 (strongly agree)? (Mark one in each row)

Easy/Minimal course work/To be contacted regularly with academic support

4.14 How would you rate your expectation(s) from the teaching staff in this unit, on a scale of 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree) and 5 (strongly agree)? (Mark one in each row)

Quality of teaching is high/Teaching staff are approachable/Teaching staff are usually available to discuss my work and give helpful feedback

Is there anything else you would like us to know? Yes/No. If YES, please describe.

**APPENDIX II**

Q1.9 Do you have other responsibilities such as, a carer or similar? (If YES, please provide the details)

<b>Comment</b>	<b>Number of Students</b>
Part time job	2
Cricket player	1
Father	1
Working 40 hours/week	1
I am married with 3 kids, all under 12	1
Self-represented in legal proceedings	1
Working 4 casual jobs	1
Carer	1
<b>Total</b>	<b>9</b>

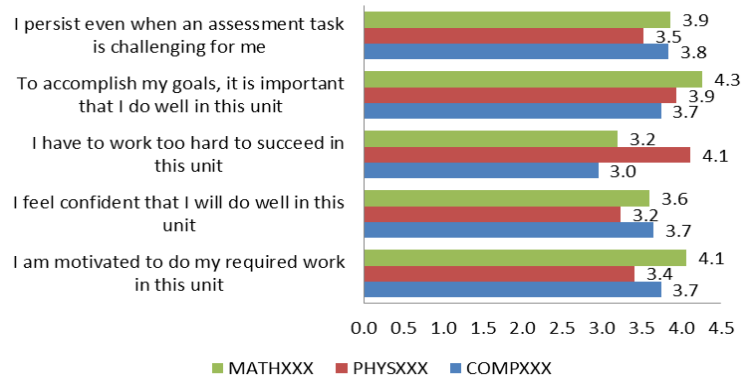
**APPENDIX III**

Q4.5 I have read the unit/course guide.

<b>Comment (COMPXXX)</b>	<b>Number of Students</b>
Not bothered	1
Skimmed	1
Just didn't	1
It wasn't/isn't a necessity right now	1
Was not required to	1
Too long	1
<b>Total</b>	<b>6</b>
<b>Comment (PHYSXXX)</b>	<b>Number of Students</b>
Too long	1
<b>Total</b>	<b>1</b>
<b>Comment (MATHXXX)</b>	<b>Number of Students</b>
I read some bits... too long	1
Didn't think was necessary	1
<b>Total</b>	<b>2</b>

**APPENDIX IV**

Figure A-IV is the bar chart showing mean for the results to Q4.11 regarding the motivation in the unit.



**Figure A-IV: The average student motivation (Q4.11)**