Evaluating Student Support Systems for International Information Technology Students

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ABSTRACT

The academic success of every student is important for any educational institute. This is especially the case for international students, who are usually paying high course fees and are adapting to what is often a completely alien education system. When students do fail their courses, it is important that their studies be placed back on track as quickly as possible. This paper evaluates two related mechanisms to do this, performance contracts, and student mentoring. With performance contracts, students are put on notice, via a formal contract, that they must improve their performance (attendance and/or pass rate) if they are to continue their enrolment at the institution. With student mentoring, students are paired with a lecturer who regularly meets with and monitors the student. The student mentoring system was found to work, but was no better than the previous systems in terms of improving outcomes.

Keywords: International students; academic success; student support; mentoring

1. INTRODUCTION

The context for this research is the Information Technology Programme at the Auckland Institute of Studies (AIS). The IT Programme at AIS offers two level-7 qualifications: the three-year Bachelor of Information Technology (BIT) and the one-year Graduate Diploma in Information Technology (GDIT). There are three academic semesters in a calendar year and each semester lasts 13 weeks. Students typically take two or three courses in each semester. The majority of the IT students are international students, and most domestic students are immigrants who have studied in other, non-Western academic settings.

It is within the institution's interests for students to pass their courses. There is a real impact on students' lives when they fail: they must find the funds to re-enrol in the failed course, and a high failure rate can threaten their student visa. The institution's reputation can be harmed by a high failure rate, as students are left feeling unsupported or that the institution is only interested in their money. Finally, NZQA sets target course pass rates, which are expected to be met.

When an international student fails a course, it can be due to one or more factors. The student could be unfamiliar or unprepared for the New Zealand style of education. The student could be suffering from emotional, domestic or financial stress. Or the student might simply have under-estimated the amount of study commitment needed to pass a particular course.

Whatever the cause of the failure, it is important that the student's programme of study be put back on track as soon as possible. While that ostensibly means repeating the failed course, without additional support it is by no means certain that the student won't fail it again.

Various methods of student support have been described in the literature. These include peer support, performance contracts, support groups and mentoring (Bettinger, Boatman, & Long, 2013). In this paper, we compare the effectiveness of performance contracts with that of staff mentoring.

The origin of the word 'mentor' can be traced back to Greek methodology (Crisp & Cruz, 2009). According to Roberts (2000), mentoring is formalising a process where a more knowledgeable and expert person provides a supportive role of overseeing and encouraging learning within a less experienced and knowledgeable person to facilitate that person's career and personal development. Luna and Cullen (1995) have shown that mentoring relationships can be formal or informal, long-term or short-term, planned or spontaneous. Informal relationships can be hard to quantify and are therefore not recognised by institutions. However, the formal relationship is a more recognised form of mentoring relationship within organizations and educational institutes. The initial studies show that consistent interaction with the objective of helping students to build their skills guides student support systems (Cox et al., 2010; Lillis, 2011; Wood & Turner, 2010). These interactions result in not only helping the students but also shaping the student support process. The students who are engaged in learning and academic determination, that is, who are academically thriving, are psychologically engaged in the learning process and not merely engaged in behaviours (Schreiner, 2010). Lerner's (2005) positive youth development framework states that the individuals can thrive through positive relationships. Psychology also establishes that individual learner behaviours can change through interaction with mentors (Farrington et al., 2012; Lerner, 2006). A lot of studies have been carried out on the impact of mentoring ranging from retention and graduation rates to satisfaction with the educational environment. These studies have found that mentoring has a positive relationship with student retention, grades and university environment (Campbell & Campbell, 1997; Kahveci, Southerland, & Gilmer, 2006; Pagan & Edwards-Wilson, 2002). A notable study by Hadjioannou, Shelton, Fu, and Dhanarattigannon (2007) was conducted on PhD students and concluded that strategies such as observations, self-reflection, emails and group discussions were useful to explore peer mentoring relationships. It was helpful in acquiring knowledge around academic settings, skills to navigate through a doctoral program, improve academic

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writing and emotional support to reduce stress and anxiety associated with doctoral work.

Mentoring thus becomes an integral part of pastoral care. The mentoring process provides an assurance to students that they are not alone while dealing with routine or extraordinary circumstances (Fletcher & Mullen, 2012). Research (Crisp & Cruz, 2009) have confirmed that mentoring has positive effects on young people in a variety of personal, academic, and professional situations. The mentoring allows young people to learn from experienced counterparts and assists in their personal growth and development, and helps create social and economic opportunities. At the tertiary education level, the role of advisors is quite prominent. This role is usually limited to providing guidance to students around academic progress. However, the role of the mentor is broader and also includes sharing guidance, experience and expertise. The relationship between mentor and the student generally evolves over time. Students want to engage with a mentor who shares a similar background. Nowadays, students in New Zealand are coming from diverse backgrounds both locally and internationally. This diversity adds an extra layer of complexity for mentors and the students. For a lot of international students, it is their first venture into the world outside of their homes. Those international students are more susceptible to making wrong choices and require a supporting role model.

Another approach to support is performance contract support systems, as was previously used at AIS. Academically weak students were placed on a performance contract. Performance contracts involve student signing a formal contract, which lays out the study expectations the students must fulfil and warns them that their continued enrolment might be in jeopardy if their performance does not improve. Students were handed a form each week, with the students being required to get lecturers' signatures at the end of each class certifying that the student had attended the class, and had participated in class activities. These forms were collected each week and the performance of these students reported to staff.

The performance contract system was felt to be unsatisfactory, however, because it placed all of the burden of performance monitoring onto the student, without necessarily addressing the causes of the student's poor performance. Furthermore, the requirement of the student to get lecturers' signatures at the end of each class was potentially embarrassing to the student, as it marked them out as a student who was having problems performing. To address these shortcomings, we altered the performance contract system.

2. METHODOLOGY

2.1 Altering the Performance Contract System

We modified the performance contract system by abolishing the weekly student report forms, and with it the need for students to get lecturer signatures. Instead, performance contract students are now required to meet with a lecturer mentor at least once per week. At the beginning of each semester, a review meeting is held that identifies students who had performance concerns in the previous semester. This is usually those students who failed at least one course. A lecturer is then selected on a volunteer basis to mentor the student for the new semester. The students are contacted in the first week of the semester and asked to meet with the Head of Programme, who explains the performance contract process, the reasons the student is being placed on a performance contract, and what the expectations on the student are. These meetings must be done as early as possible, as it takes time for the student and mentor to build the kind of rapport that is needed for effective mentoring. The student and lecturer-mentor then set up a weekly meeting time. During these meetings the mentor will attempt to identify the causes of their poor performance, and guide the student in overcoming those issues. The mentor submits a weekly report form to the Head of Programme as part of the ongoing monitoring process. This form describes the progress the student has made, which issues, if any, have been identified, and how the student and mentor intend to overcome those issues. These changes were introduced at the beginning of semester 2, 2016. That is, students on performance contracts prior to semester 2 2016 were not mentored, while students from semester 2 2016 onwards were. It is important to note that not all students who fail a course one semester are automatically placed onto a performance contract the following semester. Instead, the list of course failures is examined at the end of each semester and discussed in a meeting involving all of the lecturers. Only those students whom are felt will benefit are selected for the mentoring programme. Students who are not assigned a mentor usually fail because of another reason, for example a recent bereavement, or a mistake regarding the timing of exams.

2.2 Evaluating the Changes

We evaluated the effect of these changes by comparing the course outcomes of two groups of performance contract students, from two distinct periods of time. The first period we selected was from 2013 to 2015, when only performance contracts without mentoring was used. The second was the three semester period from the introduction of mentors, that is, semester 2 2016 to semester 3 2017. We verified that there were no students present in both groups, as this would introduce a bias into our data which would confound the results. Overall passing rates within the performance contract groups were measured. As we explained above, not all students who fail are automatically placed on a performance contract: there are therefore some semesters in the past when no students were under performance contracts.

Our analysis attempted to answer three questions:

1) Did intervention or performance contracts improve outcomes while the student was under contract?
2) If there are benefits of these interventions, did the benefits 'stick', that is, did the benefits continue after the student came off-contract?
3) Was there a difference between the results before the changes to the performance contact system and after?

3. RESULTS

The pass rates for each performance contract / mentored group the semester *before* being placed on a performance contract are presented in Table 1. That is, these are the pass rates for the students who failed in one semester and were therefore placed on a performance contract the following semester. The number of courses are totals for enrolments in that group, that is, the total number of courses enrolled in by all of the students who were placed under performance contracts the *following* semester. As would be expected, the overall percentage pass rate is low, as these are students who were not performing.

Table 1: Pass rates of performance contract students before being placed on a performance contract. "Students" is the number of students in the group. "Courses Enrolled" is the total number of courses enrolled in by all students. "Courses Passed" is the total number of courses passed by all students.

Semester Before Contract	Students	Courses Enrolled	Courses Passed	%
1 2013	3	8	3	37.5
2 2013	2	5	3	60
3 2013	5	13	5	38.5
1 2015	10	30	19	63
3 2015	2	5	1	20
1 2016	3	9	6	66.7
2 2016	5	12	5	41.7
3 2016	2	4	2	50

The pass rates of these groups of students in the following semesters, that is, while they were on performance contracts, are presented in Table 2. That is, the pass rate for semester 2 2013 is for the group of students who under-performed in semester 1 2013. Thus the results for semester 2 2013 in Table 2 can be compared to the results for semester 1 2013 in Table 1, as these results are for the same group of students, the results for semester 3 2013 in Table 2 can be compared to those for semester 2 2013 in Table 1, the results for semester 1 2014 in Table 2 to semester 3 in 2013, and so on.

As expected, the pass rates in Table 2 are higher than those in Table 1, with the exception of the semester 2 2013 cohort. This is also the smallest group in the sample (2 students) and thus the results are more easily skewed. Thus there is some evidence that intervention produces improved performance during the period of intervention.

Table 2: Pass rates of performance contract students while on a performance contract. Column headings are as in Table 1.

Semester Under Contract	Courses Enrolled	Courses Passed	%
2 2013	7	5	71.4
3 2013	4	2	50
1 2014	9	6	66.7
2 2015	19	14	73.7
1 2016	5	4	80
2 2016	6	5	83.3
3 2016	11	9	81.8
1 2017	3	2	66.7

The course pass rates in Table 3 present the results for these student groups the semester *after* they were on performance contracts. As before, the results for each semester in Table 3 can be compared to the results of the preceding semester in Table 2.

Table 3: Pass rates of performance contract students the semester after being on a performance contract. Column headings are as in Table 1.

Semester After Contract	Courses Enrolled	Courses Passed	%
3 2013	6	6	100
1 2014	4	4	100
2 2014	11	9	81.8
3 2015	20	19	95
2 2016	5	2	40
3 2016	5	4	80
1 2017	9	8	88.9
2 2017	5	4	80

The course pass rates remain high, in some cases higher than the preceding semester. None of the pass rates drop down as low as the original semester pass rates. That is, none of the student groups have pass rates *after* being on performance contracts as low as the pass rates *before* being placed on performance contracts. The results for semester 2 2016 are low (40 %), but compared to the rates for semester 3 2015 (20 %), which is the semester before intervention for this cohort, the students as a group were still performing better.

For ease of comparison, we include Table 4, which shows the pass rates for each group. That is, each row in Table 4 represents one cohort of students who were placed on performance contracts.

Table 4: Comparison of pass rates for each group. Column "Semester of Intervention" is the semester during which the students were on performance contract. Column "Results Before" are the pass rates (%) for the semester before the students were under contract. Column "Results During" are the pass rates (%) for the semester on performance contract (see Table 2). Column "Results After" are the pass rates for the semester after performance contract (see Table 3).

Semester of Intervention	Number of Students	Courses Passed Before (%)	Courses Passed During (%)	Courses Passed After (%)
2 2013	3	37.5	71.4	100
3 2013	2	60	50	100
1 2014	5	38.5	66.7	81.8
2 2015	10	63	73.7	95
1 2016	2	20	80	40
2 2016	3	66.7	83.3	80
3 2016	5	41.7	81.8	88.9
1 2017	2	50	66.7	80

These results are plotted in Figure 1 below. In this plot, results, in terms of pass rates within the cohort, are grouped by cohort. Each cohort is labelled by the semester in which they were under performance contract.

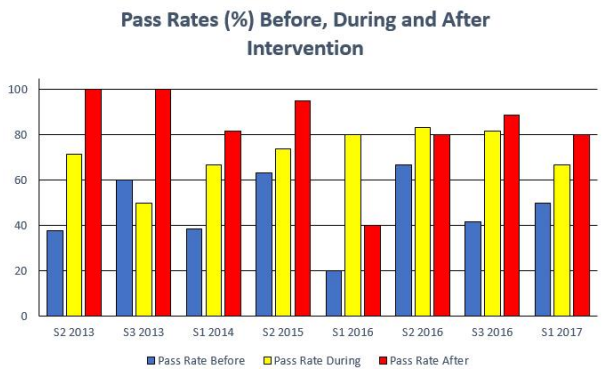

Figure 1 Pass rates before, during and after performance contract. Dates on x-axis are the semester students were under performance contracts.

4. DISCUSSION

In the Introduction of this paper, we posed three questions. To attempt to answer these questions, we carried out four comparisons (*t*-tests) of the pass rates:

1) The pass rates for the semester *before* performance contracts with the pass rates for the semester *during* performance contracts.
2) The pass rates for the semester *during* performance contracts with the pass rates for the semester *after* performance contracts.
3) The pass rates for the semester during performance contracts for the groups *without* mentors, with the groups *with* mentors.
4) The pass rates for the semester after performance contracts for the groups *without* mentors, with the groups *with* mentors.

Did intervention or performance contracts improve outcomes while the student was under contract?

The course pass rates for students who were placed on performance contracts improved. There was a significant difference found in comparison 1 above (p=0.1). That is, the pass rates were significantly better for the semester when students were on performance contracts than the semester before. Thus, intervention of either type produces better course outcomes for students, in terms of passing rates.

If there are benefits of these interventions, did the benefits 'stick', that is, did the benefits continue after the student came off contract?

The improved performance for the students remained after the performance contracts. There was no significant difference found in comparison 2 above (p=0.1). That is, the improvement in pass rates remained for at least one semester after students were placed on a performance contract. Thus, the benefits of being on a performance contract "stuck" with the students for at least one semester. As many of our students are doing the three-semester GDIT, this is enough, as the semester after they are on a performance contract, they are usually completing their qualifications.

Was there a difference between the results before the changes to the performance contact system and after?

There was no significant difference shown for comparison 3 above (p=0.1) That is, having a mentor did not overall produce better results during the semester students were on performance contracts compared to the results of students who did not have mentors.

The same result was found for comparison 4. That is, there was no significant difference in course pass rates the semester after performance contracts for the groups with mentors and the groups without mentors.

These results show that intervention of either form continues to produce improved results both during the period of the performance contract and after.

However, it should be noted that the lowest course pass rate while under performance contracts was also the smallest group, and was before mentoring was introduced. It is possible that mentoring would have prevented those two students from under-performing again.

As the form of the intervention does not seem to make any difference to passing rates, this raises the question, would the students have improved their performance anyway? As most of the IT students are international students, they are under considerable pressure to perform: studying in New Zealand is expensive, and persistent under-performance will place their student visas in jeopardy. While it would be possible to investigate this experimentally, by randomly dividing under-performing students into groups who do and do not receive intervention, it is not ethical to do so.

Further research is therefore needed. While this paper has examined only pass rates, it is unknown whether the course marks are the same. That is, are the grades achieved by students with mentors significantly different to the grades achieved by students without mentors? Does mentoring improve attendance in courses? What are the students' perceptions of the mentoring process? These are all questions that will be investigated in the near future.

We have also expanded the criteria for which students are assigned mentors. While only students who under-perform are placed on performance contracts, we are currently evaluating the effect of mentoring students from two additional groups: GDIT students who do not have an IT-related qualification or background; and any student who enters the IT Programme under special admission. This mentoring is being done for the students' first semester of study. Results are being gathered and will be reported later.

5. CONCLUSIONS

For many years it has been standard practice in academia to place students on probation who fail courses the preceding semester. This was unsatisfactory for several reasons, not the least being that it was never clear how this was intended to raise the students' performance. Therefore, many institutions lately have introduced the process of mentoring. Rather than just issuing students with notifications, students were assigned a staff mentor, and were required to meet with their mentor at least once per week. This approach has improved the student pass rates, for students who attended the meetings with their mentors. Moreover, we have split the performance evaluation into two phases 'during mentoring' and 'after mentoring'. Our study in this paper has found that mentoring is helpful to students not only during the mentoring sessions but the skills and knowledge learnt during this process stay with students.

However, this mentoring approach places additional responsibilities on lecturers/mentoring staff. Staff spent substantial amount of time with students while coaching them and trying to find solutions to their problems and this time must be recognised by the institution otherwise this approach can be less effective. This approach can only be implemented on less

motivated or underperforming students and is not scalable to all students due to limited availability of resources.

Overall, targeted mentoring, as a means of putting under-performing students back on track, is effective, but resource-intensive. As there is no significant difference between using mentors and not using mentors, more research must be carried out to determine whether the benefits are worth the resource costs.

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