

Fostering Enduring Peer Learning Groups for 1st Year Students

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ABSTRACT

CONTEXT

The University of Southern Queensland (UniSQ) has a high proportion of students learning in physical isolation from their peers through digital platforms. This physical isolation has impeded the peer network development which often occurs organically in traditional classroom and on-campus environments. Tertiary students have reported higher rates of social isolation and have expressed a desire for social connection (Lemay, Bazelais, & Doleck, 2021). There is a clear need for high quality online learning experiences that harness the affective and socially constructive benefits of collaborative learning (Altinay, 2017).

PURPOSE OR GOAL

This study aims to increase student retention through strategic assessment design that fosters the formation of enduring virtual study groups among peers who may be located in different areas. It is hypothesised that students who are exposed to collaborative peer experiences in their first year of study, and independently continue working in peer groups feel a greater sense of belonging to their fellow students and the university. Hence, these students are less likely to drop out of tertiary study. The secondary aim is to clearly delineate the difference between collaboration and collusion for students working in these peer groups through strategic assessment design.

APPROACH OR METHODOLOGY/METHODS

A component of each assessment in first year courses will be dedicated to students constructively learning from each other in peer learning networks. This is different from standard group work because the aim is to equip students with the skills to undertake individual assignments via social learning. Students will also be asked to voluntarily complete surveys at the start and end of the semester, and then six months after the end of the semester. Three surveys are used to assess any systematic change to a student's sense of belonging, and the success of forming enduring peer study groups.

ACTUAL OR ANTICIPATED OUTCOMES

Survey data for two first-year engineering courses corresponding to the start and end of semester surveys has been analysed thus far. Although the number of students represented in these surveys is relatively small, the metrics related to a sense of student belonging have shown some improvement from the start to end of semester in these courses.

CONCLUSIONS/RECOMMENDATIONS/SUMMARY

The initial results and analysis show some positive (if tentative) findings. The study is currently being run in two more first year engineering courses, after which we will have sufficient survey data to make more definitive conclusions and recommendations.

KEYWORDS Peer learning, assessment, belonging, retention

Introduction

The University of Southern Queensland (UniSQ) has a significant proportion of students learning in physical isolation from their peers through digital platforms. This physical isolation has impeded the peer learning network development which often occurs organically in traditional classroom and on-campus environments. Tertiary students have reported higher rates of social isolation and have expressed a desire for social connection (Lemay, Bazelais, & Doleck, 2021). There is a clear need for high quality online learning experiences that harness the affective and socially constructive benefits of collaborative learning (Altinay, 2017). Simultaneously, many universities have prioritised student retention in their short- and long-term academic plans. Perceived social integration in tertiary education has been shown to affect a student's sense of belonging to a career, which increases engagement with course content and reduces the risk of dropping out (Maluenda-Albornoz, Infante-Villagrán, Galve-González, Flores-Oyarzo, & Berrios-Riquelme, 2022).

The study discussed in this paper aims to increase student retention through strategic assessment design that fosters the formation of enduring study groups among peers. This involves conducting preliminary surveys to identify pre-existing socio-academic relationships. The development of new socio-economic connections is fostered through assessment instruments that, by virtue of their design, require evidence of collaboration. The formation of collaborative groups is achieved through an evolving confluence of student preferences (e.g. who do students prefer to collaborate with?). Collaborative experiences are captured and tracked over the semester and beyond using surveys to analyse the extent to which collaborative assessment throughout the semester contributed to students voluntarily collaborating on other assessments in the future. These survey results will be used to justify a framework that explains the relationships between compatibility factors, the usefulness of collaborative assessment design, enduring socio-academic relationships and student retention.

Literature Review

Several articles have explored the importance of socio-academic factors and student retention. One study explicitly used the withdrawal rate as an indicator of social isolation (Ali & Smith, 2015). A widely adopted retention model developed by (Tinto, 1993) suggests that a student's decision to depart tertiary study may be explained by both social and academic factors. Subsequent empirical tests of the model using structural equation modelling have shown that Tinto's model does have some predictive power of student retention, where about 34% of retention variance was explained (Chrysikos, Ahmed, & Ward, 2017). These results suggest that Tinto's model may require better definition of model variables, or that further variables may be necessary to increase the explanatory power of the model. (Maluenda-Albornoz, Infante-Villagrán, Galve-González, Flores-Oyarzo, & Berrios-Riquelme, 2022) similarly conducted an empirical study to develop a model that explored the relationships between social and academic factors and drop out intention. Their study broadened the social explanatory variables into perceptions of social isolation, social support and a sense of belonging. An electronic questionnaire using a Likert-type scale was used to capture these perceptions. Their model explained 38.7% of the retention variance. (Rovai, 2003) developed the composite persistence model that focused on retention of distance education students. This model incorporates external factors that add to Tinto's model. Furthermore, there is an elaboration of internal factors, including pedagogy, which is relevant to the study discussed in this paper. The composite model was empirically tested by (Kogut Eliasquevici, Seruffo, & Resque, 2017) using a Bayesian Network. The study found a strong link between students actively participating in a study group and the probability of a "regular" grade being increased to a "good" grade, which provides a justification for assessment design that fosters the formation of study groups.

The predictors of effective socio-academic relationships have been explored in the literature. Having a similar background and competency has been found to be helpful in peer forming (Carrell, Sacerdote, & West, 2013). Similar results were found in peer groups containing

language barriers and a mix of local and international students reporting a lower sense of belonging to their university and profession (Gardner, Goldfinch, & Willey, 2017). These studies may be used as a basis for initiating student connections, however enduring student relationships require voluntary connections.

The existing literature has provided significant insights and useful models for student retention. However, the usefulness of strategic collaborative assessment design in forming enduring study groups (especially among distance students) represents a significant research gap. The relationship between student attributes, the formation of study groups, a student's sense of belonging and student retention will be investigated in this study, potentially culminating in a new model.

Methodology

Formation of Peer Learning Groups

In all cases, students were allowed to choose their own groups rather than being allocated to groups by academic staff. This self-selection was deemed important because if the groups are to endure beyond the lifetime of the project, the members of that group will benefit from having some affinity with each other. Students made a choice of group via a Moodle Choice resource in the Learning Management System (LMS).

We initially started with a fixed group size of two, which has the advantage that group meetings are usually short because only the work of two students needs to be reviewed. However, for some courses, this proved impractical and disruptive due to some students dropping the course or not attending a scheduled group meeting, in which case the remaining student in the group was forced to find a new group. We settled on a minimum group size of 2 students and a maximum group size of 5 students, and scheduled group meetings were allowed to go ahead provided at least 2 students from the group attended. This proved more practical and drastically reduced the instances of student churn between groups.

The intention was that students would remain in the same group for all assignments of a course provided the group size remained viable throughout. However, students were allowed to move to a different group if they wished without providing a reason.

Assessment

Each assignment in the chosen courses comprised an individual component (typically worth 80-85% of the total marks) and a group component (worth the remainder of the marks). The group component was intended to foster the formation and maintenance of peer learning groups, and therefore we purposely designed this component so that students could easily obtain the maximum marks for it simply by preparing in advance as required by the assignment task, attending their scheduled group meeting and submitting basic evidence of their participation. There was no requirement for the student to attend the meeting prepared with the "correct" answer, and it was explicitly communicated to students that provided they prepared and participated (with evidence), they would be awarded the full marks for the group component. Our vision was students would comment on and discuss the prepared working of other students in the meetings, thereby facilitating social learning, and students would see the value in continuing this type of peer learning.

The required group work differed based upon the type of assignment, but fell into one of the following categories:

- *Peer video review*: Students send a concise video recording explaining their initial attempt at a complex question to their peer, and the peer provides thoughtful feedback during a scheduled joint meeting.
- *Similar problem*: A problem similar to one part of the main individual assignment task was given to students to prepare an answer for and discuss in the group meeting.

- *Incorrect sample solution:* A sample solution to one part of the main individual assignment task was given to students to prepare an analysis of and discuss in the group meeting. The sample solution contained significant errors and omissions, and students were asked to comment on these defects without discussing a correct solution.
- *Open discussion:* For open assignments, for example an assignment in which students conceive their own idea for a system and design it under certain specified constraints, students discussed their approach to one aspect of the assignment to gain an understanding from fellow students about whether they were on the right track.

Student Surveys

In order to measure changes to the student sense of belonging over time, three student surveys were developed for each course included in the study. Ethics approval was requested and granted by the university for the surveys. These surveys were given codes A, B and C as illustrated in Table 1. Only students who complete the A survey were invited to respond to the B survey, and only students who completed both the A and B surveys were invited to complete the C survey.

Table 1: Student Surveys for Each Course Included in the Study

Survey Code	Meaning
A	Start of semester survey
B	End of semester survey
C	End of semester + 3 months survey

The surveys were voluntary for students to take and approved by a human ethics panel. They comprised a number of questions classified into groups as seen in Table 2. Questions in the “Belonging” and “Level of Social Support and Isolation” groups were each presented as a Likert item.

Table 2: Question Groups and Questions Included in the Surveys

Question Group	Example Questions
Demographics	Age Gender First-in-family to study at university Domestic or international student Major of study
Study Behaviour	Current GPA Aspirational grade for current course Preference to study alone or in a study group Preference to learn synchronously or asynchronously
Belonging (7-level Likert item)	I feel like a real part of the School of Engineering People in the School of Engineering notice when I’m good at something

	<p>Teaching staff in the School of Engineering value my opinions</p> <p>Most teaching staff in the School of Engineering are interested in me</p> <p>There is at least one faculty member or staff in the School of Engineering that I can talk to if I have a problem</p> <p>There is at least one other student in the School of Engineering that I can talk to if I have a problem</p> <p>I am treated with as much respect as other students</p> <p>I can really be myself in the School of Engineering</p>
<p>Level of Social Support and Isolation (5-level Likert item)</p>	<p>Friendliness of other students</p> <p>Supportiveness of other students</p> <p>Sense of alienation/belonging towards your fellow students</p> <p>Availability of teaching staff</p> <p>Helpfulness of teaching staff</p> <p>Level of empathy of teaching staff</p>

Results

At the time of writing, A and B (i.e. start of semester and end of semester) surveys have been conducted on two separate first year engineering courses, so the results presented in this paper are preliminary.

Table 3 shows the number of responses for the students surveys for these courses.

Table 3: Number of Responses to Student Surveys

Course	Number of Students who Completed A Survey	Number of Students who Completed A and B Surveys
ELE1801 (Semester 2 2022)	23	13
ELE1801 (Semester 3 2022)	12	6
Overall	35	19

In the following, we have only analysed survey responses for which the same student completed both A and B surveys i.e. if a student completed the A survey for a course, but not the follow-up B survey, we have removed that student's responses from the analysis. This means we are able to compare 'before' and 'after' responses fairly. However, as seen from Table 3, there was significant attrition in the response rate in moving from the A to the B survey, and the following results reflect the before and after responses of just 19 students in total. This number will increase once the data for more courses are added to the analysis.

Since there are currently only 19 student responses in total, the responses from the Level of Social Support and Isolation group are more meaningful to analyse than those from the Belonging group (see Table 2) since they involve a 5-level Likert scale rather than a 7-level Likert scale. Figure 1 illustrates column charts of frequency of student ratings for four of the questions from the Level of Social Support and Isolation group for both the A and B surveys.

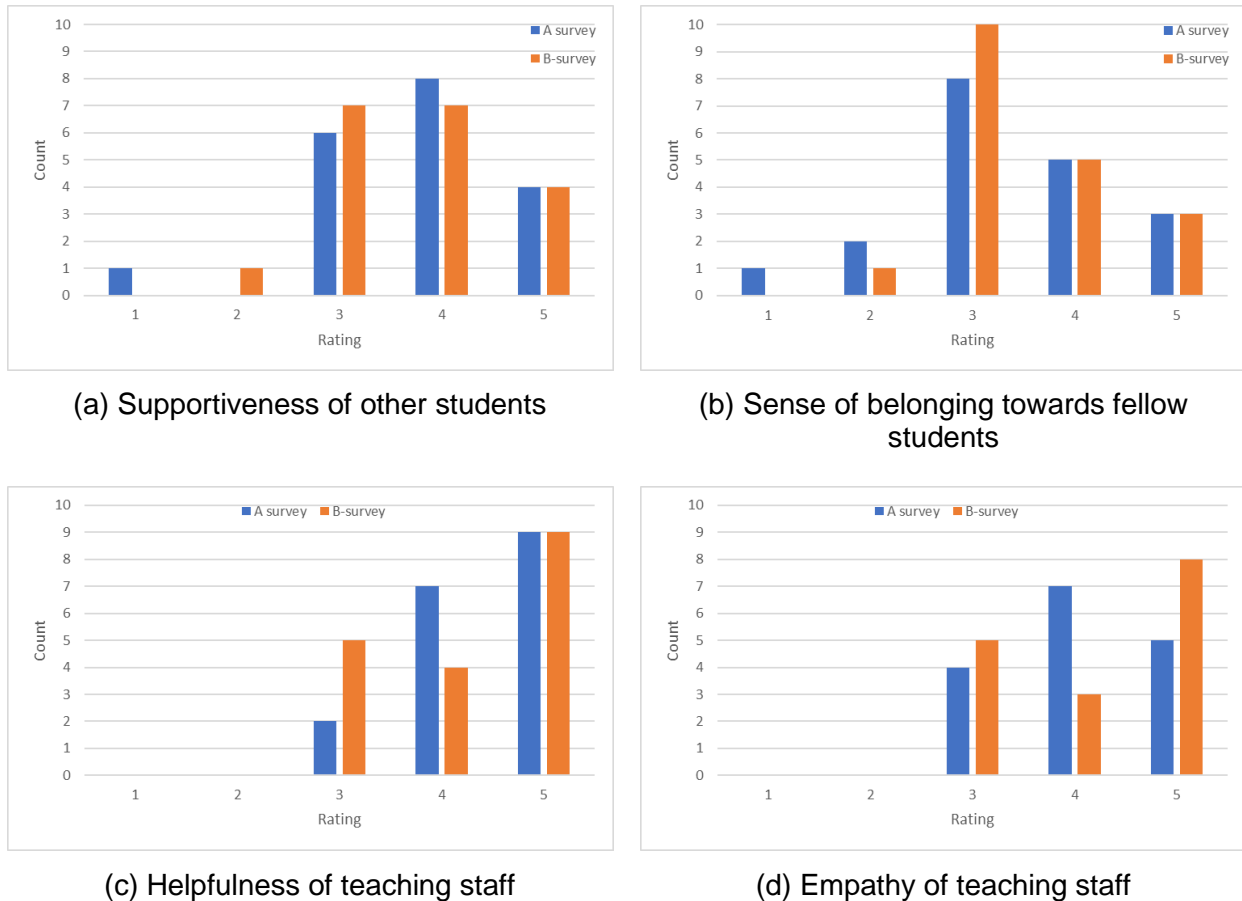


Figure 1: Column Charts of Frequency of Student Ratings for Various Questions from the Level of Social Support and Isolation Question Group

There is a small improvement in mean rating for the “Sense of Belonging towards fellow students” question (Figure 1(b)) and the “Empathy of teaching staff” question (Figure 1(d)) from the A to B survey, although a larger data set is required to confirm these observations.

The distribution of the ratings to all four questions are relatively consistent between the corresponding A and B surveys. For example, considering Figure 1(b) which show the distribution of the ratings for the “Sense of Belonging towards fellow students”, the distribution is unimodal and the mode is the mid-rating of 3 for both the A and B surveys.

One very interesting observation is the difference in the distribution shape for Figure 1(a) and (b) versus Figure 1(c) and (d). In Figure 1(c) and (d), which are questions related to teaching staff, the rating distribution is heavily skewed towards higher ratings, whereas in Figure 1(a) and (b), which are questions related to fellow students, the ratings are more widely spread across the scale.

Figure 2 illustrates a column chart of frequency of student ratings for the question “I feel like a real part of the School of Engineering” from the Belonging group for both the A and B surveys. As discussed previously, response for this question are according to a 7-level Likert scale and so

difficult to meaningfully interpret when there are only 19 responses. However, the mean rating does improve from the A to B survey.

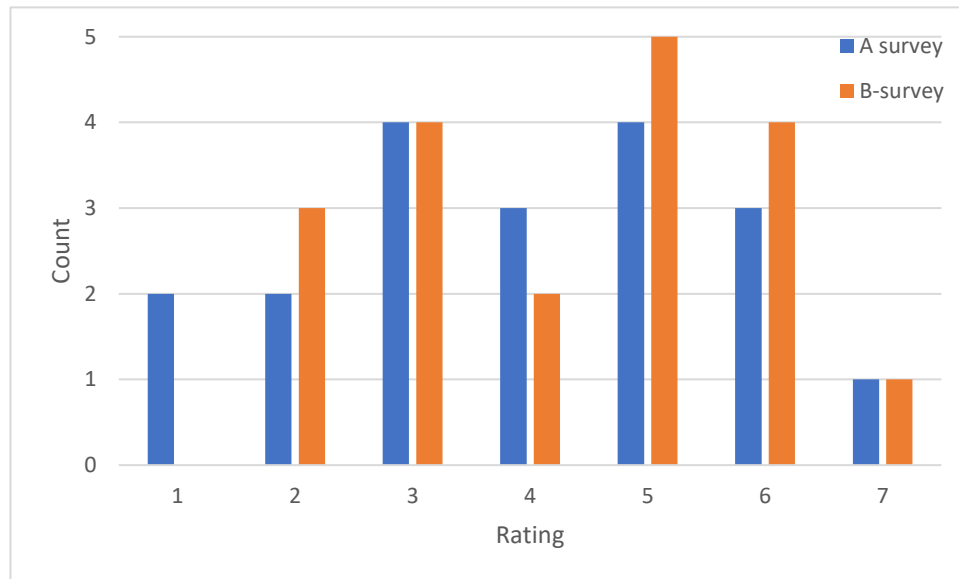


Figure 2: Column Chart of Frequency of Ratings for Whether Students Feel Like a Real Part of the School of Engineering

Conclusion

The initial results and analysis show some positive (if tentative) findings, specifically that metrics related to a student's sense of belonging to the university and their fellow students improved over the semester after working on assessments that included a collaborative component with their peers. Despite the correlation, causation is not implied. The study is currently being run in two more first year engineering courses, after which we believe we will have sufficient survey data to make more definitive conclusions and recommendations.

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