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Continuous Team Assessment to Improve Student Engagement and Active Learning

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A strategy of continuous team assessment over three years, comprising of a series of tests and a major project, was introduced into scheduled tutorial classes in an attempt to improve flagging attendance and low student motivation. The assessment tasks were designed to be undertaken in teams of two students, with ongoing feedback as an integral component. After a single semester of implementation, attendance at tutorials improved (to nearly double the previous year), and this rate was sustained over a three year period. Average assessment marks rose a full grade compared to the previous student cohort, and this was also sustained over the same period. Students' output improved, and they were actively engaged in their work and with their colleagues. These results indicate the change in assessment strategy achieved the desired outcomes of improving student engagement and active learning.

Keywords

Curriculum improvement, student engagement, continuous assessment, active learning, evaluation



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A strategy of continuous team assessment over three years, comprising of a series of tests and a major project, was introduced into scheduled tutorial classes in an attempt to improve flagging attendance and low student motivation. The assessment tasks were designed to be undertaken in teams of two students, with ongoing feedback as an integral component. After a single semester of implementation, attendance at tutorials improved (to nearly double the previous year), and this rate was sustained over a three year period. Average assessment marks rose a full grade compared to the previous student cohort, and this was also sustained over the same period. Students' output improved, and they were actively engaged in their work and with their colleagues. These results indicate the change in assessment strategy achieved the desired outcomes of improving student engagement and active learning.

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Introduction

Teaching economics can be rather challenging because the content matter is complex, technical and often abstract. As a result, students may become easily discouraged, and attendance at lectures and tutorials becomes a difficult issue to manage. Economics teaching research shows that student absenteeism has a negative impact on final grade or scores performance (Stanca, 2006). There is an opportunity cost in missing classes and this can be translated as full attendance at lectures and tutorials potentially providing an increased grade score compared to those whose attendance is less consistent (Romer, 1993). Indeed, there exists an inverse relationship between students' academic performance and lack of participation in the formal learning process (Marburger, 2006). Student engagement is also heavily compromised, impacting negatively not only on active learning within the university setting, but in terms of engagement with the wider community. Thus, student engagement becomes a central plank of the learning and teaching process because it provides vital

“information about individuals’ intrinsic involvement with their learning, and the extent to which they are making use of available educational opportunities ... enhances knowledge about learning processes ... and provides excellent diagnostic measures for learning enhancement activities” (ACER, 2009, p. 4).

Students studying the Bachelor of Business degree program at a multi-campus Australian university undertake an intermediate Microeconomics unit (Managerial Economics and Strategy) in their second year of undergraduate study. The learning objectives of this unit include students gaining experience in applying key Microeconomics concepts in the discipline, application of an economic decision-making framework to a wide range of managerial economic problems and developing their teamwork skills in order to effectively perform in future academic life and in the world of employment. In 2006, there was ample evidence of poor student engagement in the unit, culminating in poor active learning practices. Disinterest manifested itself as poor attendance at lectures and tutorials and low overall final grades (in comparison to previous years). Furthermore, many students reported a lack of satisfaction in the subject. The lecturer's observations also indicated that they did not appear to work effectively in teams, nor to work in a co-ordinated and disciplined manner when it came to completing the team assignments and presentations. This was based mostly on the quality of submitted work, presentations, observations of teamwork in the classroom, and results obtained in tests and final year examination scores. These shortcomings were exacerbated by poor attendance in both lectures and tutorials.

In formal institutionally-administered surveys from 2006, students evaluated the unit poorly, partly due to unforeseen changes in teaching staff during the semester which had created a negative environment in which the students felt that they were unable to fully engage with the unit. Students also reported a lack of timely feedback, and a lack of engagement and stimulation, due at least partly to insufficient time in tutorial classes. To respond to these issues, a major restructure in content and delivery was undertaken, and a number of changes were made to the unit, designed to ensure that students felt more engaged so as to create a learning environment that promoted active learning and continuous intellectual stimulation, thus ensuring dynamic, well organised and efficient student teamwork.

Prior to implementing the proposed changes, the key literature was consulted to ascertain areas where effective improvements could be made. During the implementation, a small evaluation

project was undertaken to determine whether these strategies were having the desired effect. This paper describes the outcome of the changes, after a period of three years of continuous evaluation, in which student satisfaction, engagement, active learning and progressive scores were closely monitored. These measures were taken in order to identify a number of practices that provide continuous student engagement, stimulus and active learning in economics units.

Student engagement, active learning and teamwork

Student engagement has been at the centre of academic discussions in Australian tertiary institutions for the last decade and a half. The term relates to how much time, effort and energy students utilise in order to make their learning at university more beneficial:

“The concept of engagement embraces a specific understanding of the relationship between students and institutions. Institutions are responsible for creating environments that make learning possible, and that afford opportunities to learn. The final responsibility for learning, however, rests with students” (Krause and Coates, 2008, p. 494).

Student engagement can also be a proxy to describe how well students participate in daily academic life. This may include routine activities such as attending lectures, completing and submitting assignments, forming relationships with other students and academics, and participating in activities that involve the university interacting with the wider community. This notion implies that when the student is “academically engaged” she or he will derive an educational benefit or premium. It is also associated with how students interact with their educational institution, but more recently, the concept has evolved to encompass issues related to teaching, students’ learning experience, and how students are connected with the broader community (ACER, 2009, p. 3). These activities include the time students spend on campus attending lectures and tutorials, time allocated to studying and revising work, and interaction with colleagues and instructors in an educational way (Krause, 2005).

A number of studies link student absenteeism and successful performance in economics courses, showing that students who attend classes on a regular basis perform significantly better than those who do not. Early economics teaching research conducted by Schmidt (1983) and Park and Kerr (1990) indicates that those who regularly attend lectures, tutorials and informal educational sessions, perform considerably better than those who do not. These results were consistent in terms of various measures of student performance and attendance (Schmidt, 1983, p. 27). Romer (1993) in a study on student performance found that absenteeism was as high as 47% in economic classes in American elite universities, with a very strong statistical relationship between attending classes and student success. Full attendance at lectures and tutorials provides better results in the unit overall, compared to those whose attendance was highly inconsistent. Romer’s premise, based on his experience and that of his economics teaching colleagues, was that attendance was “far from perfect”. His research developed three key questions related to absenteeism in lectures and tutorials. The first related to the extent of absenteeism, the second related to its impact on learning, and the third question considered means and ways of dealing with the issue. He concluded that:

“At the very least, exhortations to attend class seem called for, and those exhortations can be backed up with data” (Romer, 1993, p. 173).

Recent work on the relationship between class attendance and student performance in economics found that poor attendance had a negative impact on final grades or scores. Stanca (2006) used a large panel data set for Introductory Microeconomics students. The aim was to consider the effect of unobservable factors correlated with attendance, such as ability, effort and motivation. He found that the panel estimators strongly indicated that attendance in lectures and tutorials had a positive and significant impact on academic performance. Furthermore, Stanca found that lecture and class attendance had a similar effect on performance of individual students. Overall, after controlling for unobservable student characteristics, the results indicate that teaching has an important independent effect on learning and that student attendance at lectures enhances the process of learning. Stanca calculated that a student could lose up to half a percentage point in test scores if he/she missed one single lecture:

“The opportunity cost of missing lectures is relevant not only in absolute terms but also in relative terms” (Stanca, 2006, pp. 263-4).

Marburger (2006) examined the effect of enforcing an attendance policy on absenteeism and student performance. This work supports Romer’s findings (1993) and conclude that a policy of mandatory attendance reduced absenteeism and clearly improved student performance in terms of scores in the final exam.

Rather than forcing attendance by making this mandatory, attendance can be promoted by the inclusion of assessment within scheduled class time. Continuous or ongoing assessment in tutorials gives both the student and the lecturer detailed up-to-date information on the students’ development and learning requirements, and the formative nature of this assessment gives students feedback on their progress during semester when they still have time to modify their practice. This strategy provides a level of flexibility to the lecturer, in that it gives them time to implement pedagogical changes before semester scores are completed. This assessment technique has been applied using a variety of pedagogical techniques. Isaksson (2008) successfully applied continuous assessment in the form of “five-minute” essays which encouraged students to remain engaged in lectures. These essays asked students to detail and explain at the start of the lecture what they had learned in the previous lectures and tutorials.

Teamwork now plays an increasingly important role in the teaching of economics, as well as many other disciplines. In economics, teamwork has many advantages, including modelling respect for colleagues’ diversity of opinions and differences in tackling and solving complex microeconomic problems. Successful teams can create a learning environment that encourages interdependence, responsibility, collegiality and trust amongst colleagues. The role of the lecturer/tutor is to ensure that active learning is at the centre of the curriculum and that team members make a conscious effort to work with their peers as an effective and integral part of their learning, thereby forming effective working and learning relationships. Hence, the role of the teacher serves more as a mentor and guide than lecturer or tutor. Successful teamwork can also assist students in sharing the experience and complexity of the course, as it provides a structured opportunity to form study groups, either in or out of class (Becker, 1997) or online using learning technologies such as Blackboard. Furthermore, team collaboration assists students in developing problem-solving skills

that are of a technical nature. Such skills are often applied by discussion and the implementation, application and at times testing of different alternatives and methods in trying to solve economic problems. Development of teamwork and problem solving skills are closely linked to employability skills, defined as:

“skills required not only to gain employment, but also to progress within an enterprise so as to achieve one’s potential and contribute successfully to enterprise strategic directions” (DEST, 2002, p. 3).

An employability skill or generic skill learned or applied in one workplace will also be applicable in another. For example, teamwork skills utilised in a government economics department can easily be transferable and applied in an economics role in private enterprise. Such employability or generic skills are demanded by both employers and employees, to enable responses and adaptation to a rapidly changing and uncertain labour market (DEST, 2002).

The use of group work in higher education has strong pedagogical, social and employment advantages. The difficulty lies in that there needs to be some method that effectively measures, accounts and monitors teamwork in an efficient and fair manner (Cheng and Warren, 2000). Different types of approaches have been implemented to determine the effectiveness of teamwork and how both teams and individuals have performed.

Wilson (2005) carried out research on team-based performance in senior and graduate level managerial finance courses. *He conducted a team-based, guided design exercise annually between 1985 and 2002.* His findings show that *team-based exercises and structured group problem-solving activities enhance learning.* He concluded that students who work in teams are much more likely to reach superior decisions than individual students left to their own knowledge (Wilson, 2005).

A different approach

Prior to the commencement of this study, the unit was taught in a very traditional and teacher-centred manner – students were expected to attend a two-hour lecture and a one-hour tutorial each week. Tutorials were mostly focused on recapping the lecture material, explaining some concepts in greater depth and answering student questions. While students were expected to present the outcomes of a group project in tutorials, very little other active learning took place in these sessions.

To encourage greater student attendance and meaningful class participation, particularly in tutorials, a strategy of continuous assessment was introduced. This consisted of pairing students into teams of two, and requiring them to collaborate on multiple choice tests, problem solving activities and a group assignment. A test was also conducted in tutorials which had to be completed by students individually. Pair allocation occurred during the first week of semester, within the tutorial sessions. Students were encouraged to form their own teams, although the tutor allocated any remaining students to teams, especially where students were shy or reticent to approach colleagues. The rationale for pair work at such an early stage of the course was to prepare students to work collaboratively, in order to have some form of experience that can be connected to future employment. Most job tasks in employment are now performed in teams and

this is a good introduction for students to familiarise themselves with the concept of “long-term” group work (a common practice in the majority of employment arrangements). Another reason for requiring students to work through problems in pairs, including workshop tests, is that the concepts developed in Managerial Economics and Strategy are complex and technical. Collaboration allows students to solve problems by discussion and applying different options and methods.

For their group assignment, teams selected a project from a supplied list of 10 possible projects, with the only restriction being that none is taken by more than one team in each tutorial group. Students then worked on preparing a report (demonstrating analytical and application skills) and an oral presentation, with marks allocated to both the “product” (the report and presentation) and the process (evidence of effective teamwork). Marks were awarded equally to both members of the team, although students who were unhappy with this arrangement were invited to meet with the unit co-ordinator to discuss this. Over the three years, very few students took up this opportunity.

Due to scheduling pressures, only one team could present their work each week, with final presentations beginning as early as week 6 of semester and continuing through to week 12. This meant that some teams had significantly less time to work on their reports compared others; however, they then had more time free for exam preparation or for assessment tasks for other units. Students were made aware of this during week 1, and were able to select when they preferred to present their work (i.e. negotiate their own due date). Again over the three year period of observation, this practice did not pose any difficulties for students, and no complaints were received.

A total of four new tests (paper-based, with multiple-choice questions) were introduced throughout the semester. While students were required to submit their test papers individually, they were encouraged and expected to work collaboratively with their team partner on their answers. Students did not have to agree on the final answers, but were expected to discuss these with their partner, and hopefully assist each other. The lecturer observing this practice believed it helped build trust and collaboration when completing the tests. The impact of this was that over the three year period strong bonds were built between peers, so much so that many of them chose to work together in other units. The addition of tests into the tutorials also reinforced the expectation that attendance at all classes is compulsory. Over the three year period, attendance was high and continuous.

Staffing

This economics unit has a relatively small enrolment of 30 to 40 students each year, in two tutorial groups, so is taught by a single academic staff member who takes on the role of unit convenor, lecturer and tutor. This does allow for observational comparisons by the lecturer across different student cohorts.

Evaluation

In order to evaluate whether these modifications were having the desired impact, a small evaluation project was undertaken. Key questions were:

1. How effective are these changes in further developing students’ teamwork skills?

2. Is the standard of the submitted project reports better than previous cohorts? Is the overall mark better than the previous cohort?
3. Did any issues relating to team assessment arise? Do students think this is a fair assessment strategy?

Methods

Data from a variety of sources was sought over a two year period in order to answer these key questions, as set out in Table 1.

Table 1: Data collection methods

Method	Year of study	Purpose
Focus group interviews with students (during semester)	Year 1	Group reflections on teamwork process and teamwork skills Identifying issues related to assessment Group feedback on personal engagement with the project (and the unit so far)
Student questionnaire (end of semester)	Year 1 & Year 2	Individual feedback on team experience Self-assessment of learning outcomes (e.g. teamwork skills, independence) Satisfaction or otherwise with the unit so far (especially the assessment strategy) Suggestions for improvement
Feedback from teaching staff	Year 1 & Year 2	Reporting on student comments, complaints, questions etc. Staff perceptions of student engagement during tutorial sessions Staff judgement on overall standard of presentations and submitted work
Data on student attendance and average grades of student cohort	Year 1 & Year 2	Comparing attendance rates with previous years Comparing average grades with previous years

Results and discussion

Student focus group interviews: Year 1 of study

Two focus group interviews were conducted during the last 30 minutes of scheduled tutorial classes, after the tutor had left the room. Participation was completely optional and voluntary, and the interviews were conducted by an educational developer (and second author of this paper) who had no role in assessment of student work. Interviews consisted of key questions asked of the groups, but also encouraged feedback on any aspects of the unit.

Students reported high levels of satisfaction with the group work assignment processes, with collaborating with a partner on their tests, and with the changes to the unit made since the previous year. One group did raise an issue of unequal participation, but could not suggest a model which would work better than the current strategy of shared marks. Students seemed happy with the opportunity just to share their frustration, rather than wanting to change the assessment model.

Students were satisfied with the staggered team presentations throughout semester, and were more concerned with the choice of topic rather than the date of the presentation – most used the topics to make their selection, rather than the timing in semester.

Student questionnaires: Years 1 and 2 of study

Paper-based questionnaires were administered during tutorials in the penultimate week of semester (week 11) in both years of the study. These had information required by the local research ethics committee forming the front page, and students were assured verbally that participation was completely voluntary.

In Year 1 of the study, 23 completed questionnaires were returned (from an enrolment of 29, giving a 79% response rate), but many of these only contained responses to multiple choice questions. In Year 2, the same questionnaire was administered to students and 28 completed questionnaires were returned (from an enrolment of 37, giving a response rate of 78%), but representing a 100% response rate of those present at tutorials on that day. For both years, very few responses to open-ended questions were received, and most of these were single-word responses. Responses to questions about lecture or tutorial attendance were necessarily skewed (albeit only slightly), since the questionnaire was administered in tutorials, meaning that students who did not attend class were not included in this survey; however, we can still find some information on attendance motivations (at least for those who did attend during this week).

In both years, students were generally satisfied with their overall experience in the unit. In Year 1 of the study, when asked about the specific changes introduced to strengthen the collaborative work, students provided very positive responses. In both years, the teamwork and collaborative activities were easily the most popular feature.

In both years, most students chose their partner (or were approached by someone else), and even those who were put into teams by the lecturers were happy with the process and the outcome. Overwhelmingly, students were happy to collaborate with their team partner on the tests, even collaborating with another team if their own partner was absent. No negative comments were raised on this question, with several students finding the experience helpful to their learning (for example, “It was beneficial because I learned more”). Most students liked the timing of the tests (scheduled throughout semester), although a few did nominate timing as an issue, particularly the last test for semester.

In both years, students were happy with the time allowed for the team project, and with the staggered assessment schedule where some teams delivered their final presentation early in semester, and others did not do so until the final teaching week. While the questionnaire did not specifically ask about project topics, several students mentioned the interesting topics as the most enjoyable aspect of the unit (although one listed them as the least enjoyable aspect).

In Year 1 of the study, some concerns were raised with the assessment strategy, although by far the majority of students were happy with the current situation. Those who did raise concerns expressed dissatisfaction when one member of the partnership did not put in equal (or any) effort, yet received the same marks for the final product.

Generally, students seem to really enjoy this unit. They particularly liked the class discussions, and identified working with colleagues as a highlight.

Three year feedback from teaching staff

The unit convenor (who also lectured and tutored in this unit) reported that the changes had a positive effect in terms of student engagement and interest and that this was sustained over the three year period. Requiring students to work in groups from the beginning of semester ensured that the “isolation factor” of working alone in economics was minimised. Over the three years, this practice fostered an atmosphere of friendly collegiality and seemed to make the subject more interesting and relevant to students. The requirement for students to present their findings to their colleagues and receive feedback also helped to increase attendance at class and to improve student discussion, active learning and engagement.

Attendance was recorded at tutorial classes, but not at lectures (although the lecturer believed that attendance had improved markedly from the previous year and was maintained over the subsequent years). Table 2 shows tutorial attendance figures for 2006 to 2009 cohorts, together with average semester marks for each year. Attendance is calculated as the percentage of enrolled students attending tutorial classes over the 12-week semester.

Table 2: Comparison of attendance and final marks before and after curriculum redesign

Year of study		Enrolment	Attendance	Average final mark (whole cohort)	Statistical significance (compared with 2006 marks)
2006	Tutorial 1	20	45%	59 ± 10.7%	
	Tutorial 2	13	46%		
Curriculum redesign changes					
2007 (Year 1)	Tutorial 1	18	83%	69 ± 8.1%	p<0.0001
	Tutorial 2	11	73%		
2008 (Year 2)	Tutorial 1	24	85%	71 ± 8.1%	p<0.0001
	Tutorial 2	13	73%		
2009 (Post-study)	Tutorial 1	18	83%	74 ± 7.4%	p<0.0001
	Tutorial 2	14	74%		

Statistical analysis: Unpaired t-test

The curriculum changes resulted in an increase in tutorial attendance from 45% to over 73% (and up to 85% in the larger classes), sustained over the following two years. There was a highly significant increase in average grades from 59% to 69%, also sustained over the following two

years. Of course, these grades are from completely different student cohorts, so direct comparisons are not always useful, but the sustained and marked improvement over three separate cohorts does strongly indicate improved learning outcomes. The unit has been taught by the same lecturer for the past four years, and student demographics have been unchanged across that time, so it is unlikely that such marked improvements are the result of changes in teacher enthusiasm or student abilities.

These results clearly indicate a significant improvement in average final marks, which we believe to be at least partly due to improvement in attendance rates, supporting the evidence of Romer (1993) Williams (2005), Marburger (2006) and Isaksson (2008) among others. Both students and the lecturer reported that students were actively involved in the learning process and engaged more with the subject and with each other. This level of engagement was sustained over the three year period (compared to previous cohorts), which is also likely to have contributed to the improvement in overall marks.

Conclusions

This project began with an identified problem of poor student engagement with their studies in a Managerial Economics project, and a desire to use the scholarly literature in the field to inform strategies to improve outcomes for students. Students performed poorly in assessed group work, which was perceived to be due to a number of factors, including lack of motivation, poor attendance and poor discipline related to preparing and submitting work on time. Feedback from institutionally-administered surveys supported these perceptions.

Using the work of Romer (1993) and Marburger (2006), which reported that increased class attendance led to demonstrated improvements in student grades, a strategy of continuous assessment was conducted within scheduled classes, similar to the strategy employed with success by Isaksson (2008). We can report similar success, in that tutorial attendance rose (from 45% to around 80%), and the average class marks similarly showed a marked improvement, up a full grade (from 59% to 69%), and that these improvements have been sustained over a three year period.

This continuous assessment was conducted in pairs, in an attempt to improve students' teamwork skills. The unit convenor reported that students took their responsibilities in their team seriously and, with the exception of a single team (where one of the pair did not attend weekly tutorial classes), put a lot of effort into their team's presentation to their peers. Students accepted the importance of teamwork, with several mentioning this during the focus group interviews, recognising it as one of the skills asked about in employment interviews. They found the teamwork highly enjoyable, and stated that the collaborative activities were not only motivating, but helped with their learning.

From the student feedback, staff observations, and assessment and attendance figures, we are confident that the introduction of continuous team assessment with ongoing feedback into the tutorial classes has had the desired effect of improving student attendance and engagement, and has thereby improved the average grades of the students in this class.

The issue of "free-riders" or non-contributing students was not addressed in this paper, but is an obvious area for consideration in the next iteration of this unit.

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