USING ACTION RESEARCH TO ENHANCE STUDENTS' ENGAGEMENT IN LARGE ACCOUNTING LECTURES

Abstract

This paper reports on three cycles of an action research project applied to the development, implementation and refinement of a blended learning model with the purpose of enhancing students' engagement in the lectures of a large management accounting course. Engagement was defined and measured as in-class participation, concentration during lectures, and effort studying the content of the course. We obtained data from student surveys, the Blackboard system, the audience response system and lecturer/researcher observations. Results of our study find that engagement was enhanced with the implementation of our blended learning three cycle model. This study contributes to the accounting education literature through reporting evidence of an action research project and the effective implementation of a blended learning model that accounting educators can use.

Keywords: action research; blended learning; audience response system; pre-lecture material; students' engagement.

INTRODUCTION

Most universities have addressed growth in student enrollments by increasing the size of traditional lectures (Yazedjian and Kolkhorst 2007). Large lectures of up to 500 students are not uncommon at the undergraduate level in tertiary education (Exeter et al. 2010; Mulryan-Kyne 2010; Ramsden 2003; Robinson and Ritzko 2006). In a traditional lecture, knowledge, as content, is transmitted at a fast pace and students take the role of passive and anonymous recipients of information (Cronin Jones 2003; Moulding 2010; Ramsden 2003).

There is some empirical evidence that confirms lectures using a transmission model are ineffective (Knight and Wood 2005, cited by Dyson 2008). Despite their ineffectiveness for students' learning (Dyson 2008) the transmission model of lecturing is commonly used, in particular, in accounting courses. Accounting lectures are usually information-dense in which little is expected from students other than passively receive the knowledge (Bonk and Smith 1998; Coetzee and Schmulian 2012). Changing from the transmission model of lecturing to a more student-focused teaching strategy that includes activities to engage students during the lecture enables students to construct their own knowledge and understanding of content. Students can learn in deeper and more effective ways when they are actively engaged learners rather than passive receivers of information (Laurillard 1993, cited by Dowling, Godfrey, and Gyles 2010; Moulding 2010).

Our recent observations of accounting lectures confirmed findings of the extant literature (Cronin Jones 2003; Gray and Madson 2007; King and Robinson 2009; Moulding 2010; Mulryan-Kyne 2010; Yazedjian and Kolkhorst 2007). In our lectures we observed a general absence of participation in learning activities and a common lack of concentration of students who attended

the lectures. Our motivation for this study was to improve our practice as educators by adopting a systematic method to enhance students' engagement in our lectures of a management accounting course. The education literature suggests a student-focused teaching strategy has the potential to improve students' engagement in a lecture (Exeter et al. 2010; Mulryan-Kyne 2010; Ramsden 2003). We attempt to address the challenge of student engagement with the implementation of a blended learning model. Our context is a management accounting course delivered in an Australian university within an undergraduate Bachelor of Commerce program. Therefore, in this specific setting, our purpose is to answer the question: *"Is blended learning an effective way to enhance students' engagement in our large management accounting lectures?"*

An appropriate approach to answer this question is action research. The objective of action research is to facilitate a desired change within a social or organizational setting in which the researcher actively participates to solve a problem or to increase the effectiveness of the practice (Baker and Logan 2006; Cunningham 2008; Paisey and Paisey 2005). Our aim in this paper is to describe an action research project applied to the development, implementation and refinement of a blended learning model with the purpose of enhancing students' engagement in our lectures.

Consistent with an action research approach, there were three researchers in this study who each assumed different roles. One researcher implemented the action research project in the management accounting course and then evaluated the innovation by collecting and analyzing data gathered from the course. Another researcher assumed the role of member checking ensuring data were presented honestly and accurately[1] (Efron and Ravid 2013). The third researcher assumed the role of peer review to provide "a fresh pair of eyes" to review the data

[1] The researcher reviewed original data collected from the different sources to ensure the data was accurately reported in the analysis of each cycle.

and its interpretation and provide constructive feedback to determine the credibility of the interpretation and accuracy of the findings of the study (Efron and Ravid 2013). Efron and Ravid (2013) identified member checking and peer review as part of the most common methods to enhance trustworthiness of action research.

We report on the three cycles of the action research project. The first two cycles were conducted in a principle of management accounting (cost accounting) course and the third cycle in a more advanced undergraduate management accounting course. In the first cycle we investigated whether students like a change of passive to active learning as an effective way to improve their concentration and in-class participation. In the second cycle, we investigated whether flipping part of the content of the lecture, to have time for interactive learning activities during class meetings, is an effective way to improve in-class participation and concentration. In the third cycle, we refined our investigation using the term "blended learning" to include in-class participation and concentration, and also outside class students' effort to investigate whether blended learning is an effective way to enhance students' engagement in our large management accounting lectures. The refined innovation implemented in the third cycle involved the use of a blended learning (BL) model which consisted of two main components: online pre-lecture material (PLM) and an audience response system (ARS) for students to interactively answer multiple choice questions (MCQs) during class meetings.

The remainder of the paper is organized as follows. First, we outline the approach action research in the first section. Second, theoretical background and students' engagement is reviewed and discussed. Third, the three cycles of action research conducted and the implementation of the blended learning model is described. Fourth, results from four sources of data: audience response system, questionnaire administered to students, blackboard system (pre-

lecture material recordings), and observation during lectures are presented and discussed. Finally, findings, conclusions and reflections that may led to further research as the next cycle for this action research project, are summarized.

ACTION RESEARCH APPROACH

Action research is a constructivist, situational, practical, systematic and cyclical method that aims to continuously improve educational practice (Efron and Ravid 2013; Paisey and Paisey 2005). Unlike a positivistic approach in which the relationship between researchers and participants is expected to be neutral and objective, action research includes interventions in which the researcher's practice is the subject of the research (Bargal 2008; Cunningham 2008). Action research is different from experimental research. Experimental research strives for objectivity and internal validity testing hypotheses about cause and effect relationships between variables using a control group to compare a situation with and a situation without manipulation of one or more independent variables (Bielska 2011; Ross, Morrison, and Lowther 2005). On the other hand, action research is a naturalistic, situational and self-reflecting inquiry whose purpose is to understand a current situation in a specific social setting seeking to facilitate a change to solve a problem or to improve the situation in which the researcher is an active participant (Baker and Logan 2006; Bielska 2011; Cunningham 2008; Paisey and Paisey 2005).

The characteristics of action research explain the absence of hypotheses. Action research and its outcomes are specific to the context or setting and, therefore, cannot be generalized to other settings or support (or not support) a theory (Cunningham 2008). However, some researchers use what is called "action hypotheses" in action research. Instead of expectations or predictions developed as non-flexible traditional hypotheses that will be tested by the research, action

hypotheses are flexible and responsive to the situation and can be formulated as "In situation type X, goals of type Z can be achieved by strategies of type Y" (Titchen 2015, 8). Action hypotheses can be developed from theory or previous research or experience in the setting, can be tested and refined through the action research cycles, and they can help action researchers demonstrate the link between outcomes and strategies implemented to change a situation (Titchen 2015).

Action research is characterized as cyclical because it consists of a number of subsequent cycles or loops, each of them a sequence of stages: observation of a situation or problem that can be improved or solved; an action plan of activities that addresses the situation and includes the desired objectives; the implementation of the plan in the social situation (the classroom) that is addressed; evaluation of the results of the implementation; and reflection of the results achieved to determine what worked well and what did not according to the objectives of the plan, which in turn prompts a new cycle of improvement and becomes the first stage of the subsequent cycle (Paisey and Paisey 2005).

Despite critics of action research arguing that is not actually research but just a way to improve practice the use of action research is increasing (Paisey and Paisey 2005). In particular, in the field of education, action research is now recognized as a well-accepted methodology and there is a growing number of publications using action research in the higher education literature (Baker and Logan 2006). Examples of these publications in the last years are: developing environmental citizenship on campus through action research (Avriel-Avni 12/2015) and an action research process on university tutorial sessions with small groups: presentational tutorial sessions and online communication (Alcaraz-Salarirche, Gallardo-Gil, Herrera-Pastor, and Serván-Núñez 12/2011).

Action research has been used as a research method in accounting education literature. For example Kaplan (1998) using innovation action research developed two emerging management accounting approaches: activity-based costing and the balance scorecard (Cunningham 2008). Paisey and Paisey (2005) applied action research processes to assist in the development of students' research skills encouraging them to read primary documents by themselves. Cunningham (2008) provided an example of three cycles of action research to align classroom activities with course goals.

The justification for the use of action research in our research and the description of how this approach was implemented in our project will be explained in the third section of the paper.

THEORETICAL BACKGROUND

Theoretical Background

Ramsden (2003, 7) argues the aim of teaching "is to make student learning possible". It is important to understand how students learn in order to understand which teaching or pedagogical strategies are most effective. One of the main learning theories, which is broad based and empirically sound, is constructivism in its several forms (Biggs 2012). Constructivist theories explain that knowledge and understanding are actively constructed and re-constructed by the student's learning activities (Biggs 2012; Schunk 2004). Two contrasting ways of understanding how students relate to learning activities have become known as deep and surface approaches to learning. Since the seminal work of Marton (1975) and Marton and Säljö (1976) deep and surface approaches to learning have been extensively researched.

The surface approach to learning can be summarized as memorizing and reproducing information without understanding based on an extrinsic or instrumental motivation treating the learning task as externally imposed (Chin and Brown 2000; Fry, Ketteridge, and Marshall 2009; Laurillard 1993; Ramsden 2003). This approach is likely to be effective for learning activities that are inappropriately at a low cognitive level, such as rote learning, which results in unstructured fragmented outcomes without an integrated meaning (Biggs 2012; Fry et al. 2009; Ramsden 2003).

On the other hand, a deep approach to learning is focused on understanding, seeking meaning and relationships between concepts, and new ideas with previous knowledge and constructing new knowledge based on an intrinsic motivation to understand the subject (Chin and Brown 2000; Fry et al. 2009; Laurillard 1993). This approach is likely to be effective for learning activities that result in an appropriate outcome organized into a coherent whole (Biggs 2012; Ramsden 2003).

The use of a deep or surface approach is not a characteristic of the student. Every student is capable of using a deep or a surface approach depending on the educational environment in which the student learns. Students are able to change from one approach to the other as a response to the situation perceived from both the content and the context of the learning environment (Fry et al. 2009; Lucas and Mladenovic 2004; Ramsden 2003; Yonker 2011). To encourage a change of learning approach change the students' experiences, perceptions or conceptions by a change in the educational context or environment in which students learn (Ramsden 2003).

According to Ramsden (2003, 8) “teaching and learning in higher education are inextricably and elaborately linked”. This relationship between teaching and learning implies the teaching approach affects the learning approach. Prosser and Trigwell (1998) distinguish two broad conceptions of teaching based on the focus of the teaching approach: teacher-focused, which focuses on what the teacher does, and student-focused which focuses on what students do to achieve understanding.

There is evidence linking teaching approaches and learning approaches adopted by students. Teacher-focused strategies have been found to be closely related to a surface approach to learning (Fry et al. 2009; Richardson 2005b; Trigwell, Prosser, and Waterhouse 1997). Moreover, it can be argued that a teacher-focused approach encourages surface learning as a result of the effect on the student. For example, in the traditional lecture using a transmission model, students as passive recipients of information lose concentration after no more than 20 minutes of lecturing (Moulding 2010). Typical are the “glazed expression” (Cronin Jones 2003, 454) or blank looks in their face, and the tired or bored expressions (Gray and Madson 2007). Especially in large lecture-classes, interactions between students and lecturers are minimized leading students to feel anonymous. Anonymity encourages students to take a passive role, decreases motivation, and reduces active participation and engagement in class and with the course content (King and Robinson 2009; Mulryan-Kyne 2010; Yazedjian and Kolkhorst 2007).

On the other hand, student-focused teaching strategies have been found to encourage a deep approach to learning (Fry et al. 2009; Laurillard 1993; Prosser and Trigwell 1998; Ramsden 2003; Richardson 2005b; Trigwell et al. 1997). The student-focused approach is based on a learning model in which it is what students do to change their understanding and to construct new knowledge that is important not what teachers do (Biggs 2012; Ramsden 2003). From a

constructivist perspective, teaching strategies should encourage a deep approach and discourage a surface approach to learning. The change from a transmission model of learning to a student-focused teaching approach requires active learning, which can be achieved through a more interactive mode of teaching (Exeter et al. 2010; Mulryan-Kyne 2010). It is, therefore, reasonable to argue that students' engagement in their learning process is essential to achieve deep learning. Ramsden (2003, 60) states "good teaching implies engaging students in ways that are appropriate to the deployment of deep approaches".

Students' Engagement Concept

Student engagement is a far reaching construct (Zepke and Leach 2010) that is defined in many different ways in the education literature. From a meta-construct that includes behavioral, emotional and cognitive engagement (Betts 2012; Du 2011; Fredericks and McColskey 2012) to simply referring engagement as engagement in large classes (Ahlfeldt, Mehta, and Sellnow 2005; Jain and Farley 2012). For this study, engagement refers to students' active participation and concentration in class meetings (Dowling, Godfrey, and Gyles 2010; Jain and Farley 2012; King and Robinson 2009; Yazedjian and Kolkhorst 2007) and engagement with the course content through their effort studying the content of the course (Alexander 1999, cited by Dowling et al. 2010; Robinson and Ritzko 2006; Yazedjian and Kolkhorst 2007). If engagement promotes deep learning (Dowling et al. 2010; Laurillard 1993), it is reasonable to argue that enhancing students' participation and concentration in class, and effort studying the course content, will improve students' learning.

Enhancement of Students' Engagement

Engagement in the Lecture

The literature confirms that active participation in class meetings enhances students' engagement (Gill 2011; Jain and Farley 2012; Morton 2009; Yazedjian and Kolkhorst 2007). Active learning requires a shift away from the traditional lecture to create a more interactive and student-focused mode of teaching (Exeter et al. 2010; Mulryan-Kyne 2010). However, more interactive and student-focused learning requires time that the traditional lecture devotes to transmit knowledge or content.

One solution to free up class meeting time for learning activities is to use a flipped classroom (Brunsell and Horejsi 2013). The concept of flipped classroom is simple. Content from the traditional lecture is transmitted asynchronously online through listening to lectures or watching videos and reading lecture materials. Students have the flexibility to determine when and where they will watch or listen to the transmission. During class meeting time students engage in collaborative learning to solve problems. Advocates of flipped classroom argue that replacing passive learning with active learning in the classroom frees up time for engaging learning approach (Brown 2012; Brunsell and Horejsi 2013) and changes the traditional lecture into a more effective learning method (Berrett 2012).

However, there are issues associated with a flipped classroom that have to be addressed. Students may dislike "flipping" because they cannot continue passively receiving content in class (Berrett 2012). Many students may not watch the video online and then are unprepared to participate in hands-on activities and problem-solving exercises (Brunsell and Horejsi 2013; Milman 2012). The lay-out of many lecture theatres may not be appropriate for group activities required by flipped classroom. Flipping all content of an accounting lecture is something that the current culture of teaching at business schools may not be prepared to accept. However, it is possible to

flip part of the lecture, freeing up lecture time for learning activities using a blended learning (BL) approach.

Many authors define BL as combining face-to-face (FTF) lectures and online learning (Al-Huneidi and Schreurs 2012; Bliuc, Goodyear, and Ellis 2007; Du 2011; Vaughan 2007). However, it is not just the mix of lectures and online learning but the change from passive lectures to active FTF learning that is important. This study follows Bliuc et al. (2007, 234) who defined BL as "learning activities that involve a systematic combination of co-present interactions and technologically-mediated interactions between students, teachers and learning resources". To reduce the cognitive load of learners in the lecture, lower-level content of the lecture can be flipped online for students to learn before class, while lectures can focus on higher-levels of learning from Bloom's Taxonomy (Seery and Donnelly 2012; Shibley 2009, cited by Du 2011), such as understand or apply (meaningful learning) instead of remember (rote learning) (Mayer, Pintrich, and Wittrock 2001).

One of the most effective ways to promote active learning is asking questions (Morton 2009; Yazedjian and Kolkhorst 2007). For example, questions asked by the lecturer can be combined with an audience response system (ARS), such as clickers, to increase participation by answering multiple choice questions. The ARS preserves anonymity and encourages student to participate by answering questions in large classes (Addison, Wright, and Milner 2009; Caldwell 2007; Jain and Farley 2012; King and Robinson 2009). In addition, clickers are useful a) in sustaining concentration by breaking up lectures, b) in formative or summative assessment to reinforce learning, c) in providing feedback to students and to the lecturer about students' understanding of a concept (Caldwell 2007), and d) in encouraging inclusivity (Jain and Farley 2012).

Another activity that promotes an active learning environment is small group discussion (Du 2011; Moulding 2010; Yazedjian and Kolkhorst 2007). However, many students tend not to like in-class group participation because they prefer to be passive recipients of knowledge (Berrett 2012) and because they lose their anonymity (Addison et al. 2009; Mulryan-Kyne 2010).

Engagement with Course Content outside the Lecture

Engagement with the course content refers to the time and effort dedicated to interact with course materials outside the lecture (Exeter et al. 2010; Fredericks and McColskey 2012). Flexible delivery may increase student's engagement because students take responsibility for their own learning through being able to choose their learning style, study pace, and when, and where they learn (Dowling et al. 2010; Poon 2012). Particularly non-English speaking background (NESB) students are likely to rely on lecture recordings to achieve understanding (Mulligan and Kirkpatrick 2000). However, Brunsell and Horejsi (2013) reported that nearly a quarter of students self-reported that they didn't watch or listen to many of the recordings. Nonetheless, this problem was solved through regular online and in-class quizzes on the recorded content (Brunsell and Horejsi 2013). Therefore, formative or summative assessment using clickers can increase the engagement of students with the online content.

THE USE OF ACTION RESEARCH TO ENHANCE STUDENTS' ENGAGEMENT

The project commenced as a response to students' behavior in class during lectures of a principles of management accounting (cost accounting) course. The behavior which was consistent with a teacher-focused approach described in the literature (Cronin Jones 2003; Gray and Madson 2007; King and Robinson 2009; Moulding 2010; Mulryan-Kyne 2010; Yazedjian

and Kolkhorst 2007). Students were passive during the lecture where the transmission of content limited opportunities for student participation. A lack of concentration by students was apparent.

Following Fry, Ketteridge and Marshall (2009), Chin and Brown (2000), Laurillard (1993), Ramsden (2003), and Richardson (2005b) that a student-focused approach encourages a deep approach to learning which is focused on understanding, we planned to change the learning environment of our course to move from a teaching focused to a student-focused approach. Therefore, we started a project of continuous improvement of teaching and learning activities to enhance students' participation and concentration during class meetings. This project was subsequently formalized as an action research project aimed to enhance students' engagement in accounting lectures. Our purpose was consistent with the intention of action research conducted by teachers being described as a method to gain "a better understanding of their educational environment and improving the effectiveness of their teaching" (Bielska 2011, 191).

Using critical and reflective analysis, action research provides a systematic means of improving education with emphasis on the centrality of the practitioner-researcher (Cunningham 2008). However, there is some diversity in the models used in action research. Cunningham (2008) caution against using a model as a template for practice, but recommends following a step-by step process where the researcher should be opened to changes in short-term goals, research questions and criteria for success. With an open mind to the considerations made by Cunningham (2008) we chose the model used by Paisey and Paisey (2005) as a general framework for our action research project. This study achieved its aims in encouraging students to read primary documents such as accounting standards and exposure drafts. Their model emphasized data collection before deciding how teaching could be changed to respond to the problem identified and on the evaluation of the changes made (Baker and Logan 2006).

Paisey and Paisey (2005) suggest five steps for each cycle in their model:

1. Define the problem and frame research questions.
2. Collect data and decide how teaching could be changed.
3. Implement the selected changes to teaching
4. Monitor and evaluate the changes made.
5. Review and reflect upon the changes. Repeat cycle if necessary.

Using this model as a general framework that can be modified during the action research project, we developed three cycles for this project as shown in Figure 1.

INSERT FIGURE 1 HERE

In this section we provide a description and evaluation of the first two cycles and a description of the third cycle including how lessons learned from each cycle impact on the following cycle. In the following section we provide a complete evaluation of the third cycle.

First Cycle

1. *Background, Define the Problem and Frame the Research Question.*

For the last four semesters, one of the researchers was the coordinator and lecturer of the principles of management accounting (cost accounting) course at the Business School of an Australian university. The course is a second year course in the 3-year Bachelor of Commerce program. Each semester, the course has around 400 students enrolled of which approximately half are identified as non-English speaking background (NESB) students. Each week for thirteen weeks of the semester, the course is delivered in one two hour lecture (separated into two

streams) and one two hour tutorial. This course is a pre-requisite of a third year management accounting course.

The teaching approach in the course was initially a teacher-focused strategy using a transmission model to deliver highly dense quantitative content in cost accounting. The lecturer-researcher perceived that students appeared to be concentrating at the beginning of each lecture but after some time their concentrations appeared to fade and students looked tired, bored or preoccupied with other matters.

The problem identified was students' lack of concentration and limited participation during a lecture by either asking questions or responding to open questions posed by the lecturer. No more than two or three students asked or answered questions in any of the traditional transmission style lectures despites the effort of the lecturer encouraging students to ask questions or asking students open questions. We defined our research question for the first cycle as *"Do students like to use "clickers" as a learning activity that helps them to improve their concentration and in-class participation?"*

2. *Review of Literature to Identify Similar Experiences and Decide How Teaching Could Be Changed.*

From the education literature we identified the need to change from a transmission model of learning to a more interactive student-focused teaching approach (Exeter et al. 2010; Fry et al. 2009; Laurillard 1993; Mulryan-Kyne 2010; Ramsden 2003). We investigated how we can achieve more interactions during lectures when it seems that students do not want to interact. Recall that "clickers" provides one possible way to increase interactions during lectures.

Research has shown that there are many benefits of using ARS in lectures (Addison et al. 2009; Caldwell 2007; Jain and Farley 2012; King and Robinson 2009).

3. *Implementation of Selected Changes to Teaching*.

The decision to implement ARS in the course was made before the semester commenced. Students were asked to borrow a Response Card RF ("clicker") to answer multiple choice questions (MCQs) which were embedded in the power point presentation relating to content just delivered in the lecture.

4. *Monitor and Evaluate Changes Made*.

According to Paisey and Paisey (2005), there are different ways for the researcher to monitor changes implemented. They mentioned observation, informal discussions with students, and reflection upon changes observed in students' behavior as a result of the implementation of a teaching change.

To evaluate the first cycle we added a single question to a survey[2] based on whether they like using "clickers" in lecture classes. The range of responses was from 1: strongly disagree, to 5: strongly agree. We also asked students to answer two open questions in the survey: (a) what is working well in the course and (b) what they would like to change. From 386 students enrolled at that time in the course, 202 students (52 percent) responded the survey. The average score was 4.0 indicating that as average, students like using "clickers" in lecture classes. The distribution of responses to this question was as shown in Graph 1.

INSERT GRAPH 1 HERE

[2] The survey was administered in week seven of the course.

It seems reasonable to assume that students who like using ARS as a learning activity would like to participate in class meetings by answering questions using "clickers" and participation would improve their concentration.

In the open question “what is working well in the course?” 54 students made favorable comments[3], such as:

- "*clickers make the lecture more interactive and interesting"*

- *"clickers keep students enthusiastic in learning the course"*

-*" I like using clickers and interact with other students. It makes the class more dynamic and interesting than before"*

- *"We have feedback from using the clickers to answer questions"*

- *"Clickers make people actually do the exercises rather than sitting there and waiting for the answer"*

In addition, at the end of the semester we conducted a post course survey, which was a structured survey designed for all courses at the university. We asked students in an open question to comment on whether they perceived the use of "clickers" in lecture classes improved their learning. Of the 63 respondents, 24 comments to the open question were received. Examples of these comments were:

- *"Clickers is a really good method even though not many bring them. You are at least able to see if we have understood them, and explain again instantly"*

- *"The use of clickers in the lecture helped my learning as it provides feedback for my answers"*

- *"Clickers allow me to think and understand the lecture"*

[3] Only one unfavourable comment was included in "what would you like to change?" question, which was "my clicker does not work".

- *"The clickers in lectures were very useful in determining where I went wrong or right. Very important"*

There were no unfavorable comments on "clickers". Some students suggested the use of I Phone or IPod instead of the clicker device we used to answer the questions.

In addition, class meetings were evaluated through notes taken by the lecturer at the end of each lecture, recording what was observed during the lecture in terms of participation and concentration of students. Results from notes taken at the end of each lecture are summarized as follows:

- Students' participation substantially increased with the use of "clickers". From a maximum of three or four students participating in answering questions during class meetings in the previous four semesters of the same course (different cohorts) participation in the current semester increased 300 percent when using clickers. An average of 12 students participated answering MCQs in each weekly lecture-classes (two streams) during the semester. The average number of students that participated in each lecture was calculated adding the number of students recorded on the screen of each MCQ for each lecture-class and for all lectures, divided by the number of lecture-classes during the semester.

- Concentration appeared also to increase, which is consistent with findings of Eng, Lea and Cai (2013) who stated that "clickers" motivate students to stay alert and focused during class. According to the notes taken after lectures, when an MCQ was projected in the screen, most students (if not all) looked at the screen. This includes students who had appeared to be fading, or tired or pre-occupied. It seemed that at least they read the question and possibly tried to answer it.

5. *Review and Reflect Upon Change*.

Most of students (71 percent) liked the use of clickers during lecture classes. According to their comments, they perceived the use of clickers made lectures more interesting and interactive, and helped them in their understanding and learning of the course, which is consistent with findings of Eng, Lea and Cai (2013). From our observations we concluded that implementation of ARS improved students' participation in answering questions during the lecture classes and possibly improved their concentration, also consistent with findings of Eng, Lea and Cai (2013). With ARS, we achieved some interaction between lecturer and students changing a transmission or passive model of teaching to a more participative or active model of teaching. However, there were issues concerning clickers including:

- The use of MCQs embedded in the power point presentation and posted on the screen (approximately five per lecture) took time away from the lecture.
- Many students simply did not borrow the "clickers" from the library or they forgot to bring the "clickers" to the lecture.

Reflecting on the results and the evaluation method used in the first cycle prompted us to develop a second cycle in the following semester to address the problems observed in the first cycle, refine the research questions and improve the evaluation method.

Second cycle

1. *Background, Definition of the Problem and Research Question*.

We conducted the second cycle in the same course with the same lecturer but a different cohort of students (different semester). A total of 363 students were enrolled in the following semester

and the lecture was again separated into two streams. The problem we addressed in this second cycle was the lack of time available during the lecture to have MCQs answered by students using ARS. The time constraint problem affected the pace of the lecture in the previous semester. Topics were delivered probably without sufficient time to enable students to absorb and understand the content which, therefore, reduced their possible participation in using "clickers". If students cannot comprehend the topic during the lecture it would make more difficult for them to maintain concentration. The specific research question we addressed in this second cycle was: *"is flipping part of the content of the lecture, to have time for interactive learning activities during class meetings, an effective way to improve students' in class participation and concentration?"*

In addition, we decided to improve the evaluation in the second cycle in order to deepen our understanding of the results of the implementation of ARS.

2. *Reflections of Results of the First Cycle and Decisions Relating to Subsequent Changes*.

We realized that to have more time during lecture classes for interactive activities using ARS and, at the same time, to maintain content within each lecture, the basic concepts of each topic could be studied by students in their own time and location as pre-lecture material (PLM). We decided to review the content of each lecture to identify basic concepts that students can study by themselves by listening to a PLM recording, similar to lecture recordings, uploaded on the Blackboard system. Students also had power point pre-lecture material notes uploaded on Blackboard (the same as lecture notes). We expected students could study PLM in the same way many students do who choose not to attend lectures in person but rely on lecture recording and lecture notes to learn course content when and where they want.

3. *Implementation of the Changes*.

Before the commencement of the semester we reduced the content of each lecture by eliminating basic concepts and included them as PLM. We recorded PLM in the same way as lecture recordings. Students could see on the screen of their computer (or tablet) power point slides and exercises solved using a visualizer, whilst hearing the voice of the lecturer explaining the concepts. We uploaded on Blackboard both the PLM notes and PLM recordings, together with lecture notes for the following lecture. We also encouraged students to study the PLM before the lecture.

4. *Monitor and Evaluation of Changes Made*.

We evaluated the research question for the second cycle by collecting data from ARS and the Blackboard system. ARS provides data on the number of students participating using ARS in each class meeting and the results of their participation in answering MCQs. The Blackboard system provides data on the number of students that viewed PLM before the lecture. In addition, we conducted a survey at the end of the semester to gather students' perceptions relating to the usefulness of PLM and ARS.

From data collected from ARS, an average of 26 percent (94 students) participated in all lecture classes during the semester, which was a substantial increase compared with the previous semester.

The number of correct results for MCQs was obtained from the ARS and an average score was then calculated for all MCQs of each lecture class. Then, we determined the percentage over the number of students participating with “clickers” in each class meeting, which is shown in Graph

2. The average percentage of students who correctly answered MCQs in the ten lectures was 59 percent.

INSERT GRAPH 2 HERE

The Blackboard system collects data on the number of student views and dates each student accessed the PLM recordings. Unfortunately the system does not measure the amount of time each PLM file was accessed for. The time for each PLM recording varied between 20 and 40 minutes. Graph 3: shows the percentage of students that viewed PLM before each lecture. An average of 69 percent of students viewed PLM during the semester.

INSERT GRAPH 3 HERE

Perceptions of the usefulness for students' learning of PLM and ARS were evaluated through a survey conducted at the end of the semester. From 363 students enrolled in the course 137 responses were obtained. This was a response rate of approximately 38 percent. In compliance with the ethical clearance approved for this project, students participated voluntarily and anonymously by completing a questionnaire that included questions to capture their perceptions on the usefulness of PLM and ARS. Results can be summarized as follows:

- 69 percent of students perceived PLM was useful to prepare for their lecture and also useful to improve their understanding of the lecture content. 67 percent perceived PLM was very important for learning in the course.

- 71 percent of students perceived that ARS made participation easier. 83 percent perceived ARS was very useful to stimulate their interest in the content of lectures and helps them maintain their concentration during the lecture. 96 percent perceived the use of ARS during

class meetings gives them immediate and useful feedback on their understanding of the lecture content.

5. *Review and Reflect Upon Changes*.

We observed a substantial increase in students' participation during class meetings. We confirmed our observations through data collected from ARS. An average of 94 (26 percent) students enrolled in the course participated by answering questions during lecture classes[4].

We realized there was a positive trend in correct responses to the in-class MCQs. An improvement from 41 percent in the second lecture to 74 percent (Graph 2) in the last lecture indicated that students became increasingly accustomed to the evaluation of their understanding of lecture content. Breaking the lecture at intervals to display MCQs appeared to also help students maintain in-class concentration.

We considered the declining trend in the number of students that viewed PLM before the lecture to be somewhat disappointing. From 86 percent of students that viewed the PLM before lecture two only 55 percent viewed PLM before lecture 11 (Graph 3). We thought further investigation was needed in the following cycle to address this timing issue.

Following Bennet (2003), Kember (2003), and Richardson (2005b) who considered participants' perceptions are consistent with the actual effect of the elements of the innovation, we used student's perceptions as an appropriate measure of the effectiveness of the change implemented in the course. We found that students perceived PLM was useful to prepare for a lecture and to improve understanding of the lecture content. There was a possible contradiction between PLM

[4] However, it would be more relevant to measure participation as a percentage of students attending the lecture. This was not possible because attendance at lectures is not recorded. We decided to refine the measure of percentage of students participating by recording attendance at lectures in the following cycle.

usefulness and the decreasing trend of PLM's viewed before lectures that deserved further investigation.

Reflecting on the use of ARS, we found that answering questions using “clickers” stimulated the interest of students in the content of lectures and helped them to concentrate and participate during class. We found students highly valued ARS because of the immediate feedback they received on their understanding of the lecture content and how was their understanding compared with the rest of the class.

Reflecting on the results of the second cycle we concluded we achieved our aim of transforming, at least in part, a traditional and passive teaching to a more interactive learning approach through active participation using ARS. We freed up some time from the lecture flipping part of its content through PLM and made it available for MCQs. Even though MCQs were formative assessment not summative assessment, students were concentrated and made some effort to select the correct answer displayed in the graph on the screen as shown in the progressive increase of the percentage of correct answers throughout the semester.

We concluded that flipping part of the content of the lecture to use ARS, combined with MCQs during lecture-classes, students' in class participation and concentration were enhanced. Therefore, the research question for the second cycle was answered. However, there was still room for improvement. For example, we realized engagement should also include what students do outside class that in turn affects their in-class engagement. Despite participation was substantially increased using ARS, we perceived it can be further improved. Many students did not use “clickers” probably because they do not want to borrow them from the library or they forgot to bring them to the lecture, which prevented higher participation. In addition, we realized

that to have a better and more accurate understanding of the achievements of this project it was also needed an improvement of the evaluation of the results of the project. Therefore, we concluded that a third cycle was needed.

Third Cycle

1. *Background, Definition of the Problem and Research Question*.

The third cycle was conducted in a third year management accounting course that has the pre-requisite of the principles of management accounting course that was used in the first and second cycle. As a result, many students enrolled in this course had the experience of using PLM and ARS. 299 students were enrolled in this course of which one half were NESB students. The management accounting course is also delivered in one two hour lecture (separated in two streams) and one two hour tutorial each week during the thirteen weeks of the semester.

From a critical reflection on the evaluation of the second cycle, we realized that an improvement in the type of technology used was necessary to allow students to use their smart phones, tablets or laptops to answer in-class MCQs. It was reasonably expected that most students carry their smart phones with them; therefore, it would be easier for them to participate by answering in-class MCQs, which may substantially increase participation.

We also realized that additional motivation to study PLM before lecture was needed. In the first two cycles we focused in-class participation and concentration as in-class engagement. However, we realized it was also important that students dedicate some effort outside class to study PLM before the lecture to better prepare for the lecture, which may facilitate their in-class participation and concentration. Engagement should not only include in-class engagement but also engagement with the content of the course dedicating effort outside class. We refined our

research question for this cycle of the project including participation, concentration and effort as students' engagement, and using the term " blended learning (BL)" to include in-class interactions through ARS and online PLM. The research question for the third cycle was therefore defined as "*Is blended learning an effective way to enhance students' engagement in our large management accounting lectures?"*

In addition, we realized that the evaluation of the changes and innovations of teaching and learning activities should reflect the increased scope of the question.

2. *Reflections from Results of the Second Cycle and Literature Reviewed, and Decision of Subsequent Changes*.

We realized that a more integrated approach was needed in our research project in order to have a framework for the changes or innovations we are testing and the evaluation of these changes. We developed a model defined as "Blended Learning Model" following Bliuc et al. (2007) because the model consists on learning activities that includes a systematic combination of in-class interactions between students and lecturer through ARS, and online interactions between students and learning resources uploaded on Blackboard as PLM. We aimed to address the problems identified in the second cycle through improvements using this model.

The rationale of the BL model we developed in the third cycle is shown in Figure 2, in which students' engagement is defined as in-class students' participation and concentration, and students' effort studying the PLM before the lecture.

INSERT FIGURE 2 HERE

The BL model includes what students do in their own time before the lecture and what students do during the lecture class. Before the lecture students can independently study the PLM. Recall in the second cycle, participation was lower than expected and there was room for improvement. Therefore, we planned the following improvements for the third cycle:

Pre-lecture material (PLM). Similar to Shibley (2009, cited by Du 2011) and Seery and Donnelly (2012), the content of each lecture of the course was reviewed to identify lower-level knowledge (factual knowledge) from higher-level knowledge (conceptual knowledge) according to Bloom's taxonomy of learning (Bloom, Engelhart, Furst, Hill, and Krathwohl 1956; Mayer et al. 2001). BL methods are particularly useful for courses that include dense course material and have educational objectives that range from basic remembering to advanced understanding and applications (Brink 2013). Following Mayer et al. (2001), we identified in each lecture factual knowledge or basic elements students must know to be acquainted with the topic to include them as PLM, therefore, class meetings can be focused on both, more advanced concepts and their applications (Brink 2013), and learning activities such as MCQs using ARS. This basic knowledge includes, for example, knowledge of terms used in the lecture, definitions, and lists of characteristics or attributes of some specific term. A brief description of the learning objectives of the lecture and overview of the topic were also added to PLM. The PLM recordings were shortened to 20 minutes maximum. We planned to upload PLM on Blackboard one week before the lecture. The flexible delivery of this material aimed to increase students' engagement with the course content, especially NESB students (Dowling et al. 2010; Mulligan and Kirkpatrick 2000; Poon 2012).

Lecture MCQs answered through ARS. Following Brunsell and Horejsi's (2013) we re-designed the lectures improving the partial flipped classroom to increase active learning

experiences for students. At the beginning of each lecture we added two or three MCQs assessing recognition and recalling of PLM. Depending on students' answers general or more detailed feedback is provided to students by the lecturer. The lecture topic was divided into four or five sub-topics of approximately 15 to 20 minutes each, followed by one or two MCQs assessing understanding of the sub-topic to maintain students' concentration (Caldwell 2007; Moulding 2010), to facilitate participation (Addison et al. 2009; Jain and Farley 2012; King and Robinson 2009; Morton 2009) and to enhance understanding through feedback received (Caldwell 2007).

In addition, we added "responseware" capabilities of the ARS software, which allow students to answer in-class MCQs using not only the "clickers" but also their smart phones, tablets and laptops through Internet connections.

The blended learning (BL) model, action hypotheses and data collection. The BL change introduced in the third cycle was the development of a BL model, which included refined PLM and ARS. This model aimed to enhance students' engagement increasing in-class participation and concentration, and effort studying PLM outside class. We expected PLM MCQs may motivate students' effort to study PLM before lecture, especially because PLM recordings are shortened with more relevant content to facilitate improved understanding. In turn, improved understanding of the lecture content may increase in-class participation and concentration. We also expected that participation and concentration may be enhanced from lecture MCQs.

We planned to use data triangulation in the evaluation of the third cycle. We aimed to collect data from different methods or sources to evaluate whether students' participation, concentration

and effort was enhanced or not. From our reflections and literature reviewed, we defined the following measures for these three concepts:

1. ***Participation*.** Participation is defined as participation in class meetings by answering MCQs through the use of ARS (Addison et al. 2009; Caldwell 2007; Morton 2009). Participation was evaluated from: 1) Data collected from ARS system, which provides the number of students participating in class meetings by answering questions; 2) Students' perceptions of the usefulness of ARS collected from an end of semester students' survey, which is a key predictor of the belief that the use of a new technology enhances learning achievement (Mohr, Holtbrugge, and Berg 2012)**;** and 3) observations and reflection regarding students' participation during class meetings, which according to Bennet (2003), is also an appropriate method to evaluate participation.
2. ***Concentration.*** Concentration in lectures is defined as students staying alert focusing their attention to the topics covered in the lecture (Eng et al. 2013). Concentration was evaluated from: 1) Results of lecture MCQs related to the lecture content collected from the ARS system, which is appropriate for measuring a basic level of understanding and therefore concentration (Caldwell 2007); 2) Students' perception of the effect of PLM and ARS on their concentration in the lecture, collected from the students' survey, which are deemed to be consistent with the actual effect of the elements of the innovation (Kember 2003; Richardson 2005b); and 3) Observation of students' concentration by the lecturer-researcher's perception of the level of attention of students while explaining the topics of the lecture, which according to Bennet (2003), is an appropriate measure of in-class concentration because the lecturer is in a privileged position to assess the level of concentration of students in the lecture.

3. ***Effort.*** Effort is defined as time dedicated to study the PLM and lecture material. Study time is widely used in educational literature as a proxy for student effort (Chui, Martin, and Pike 2013). Effort was evaluated from: 1) The number of views of each PLM recording before lecture, for each student enrolled in the course, collected from the Blackboard system, which can reasonably be an independent measure of effort (Bennet 2003; McAllister and Guidice 2012); 2) Data collected from results of the lecture MCQs related to PLM, which according to Potter and Johnston (2006) is also appropriate to assess students' effort because a positive relationship exists between time on Blackboard and learning outcomes; and 3) Students' perceptions of their effort collected in the students' survey.

A summary of data collection methods and sources of data is shown in table 1.

INSERT TABLE 1 HERE

Action hypotheses[5]. Following Titchen (2015), in this cycle we developed action hypotheses from our understanding of the effect of the blended learning model in the enhancement of students' engagement in our management accounting course. This understanding is based on our experience on the previous two cycles and on literature reviewed on the topic. As a result, we developed the following action hypotheses:

- *Action hypothesis 1:* In large management accounting lectures, students' participation answering in-class MCQs may be enhanced by the use of ARS.
- *Action hypothesis 2:* In large management accounting lectures, in-class students' participation may be enhanced by the study of PLM before the lecture.

[5] Action hypotheses are not commonly used in action research. If used, different from experimental research in which hypotheses are not changed but tested, action hypotheses are flexible in response to the unexpected and, therefore, they are refined through the action research cycles (O'Grady 2008, 2010; Titchen 2015).

- *Action hypothesis 3:* In large management accounting lectures, students' concentration during lecture classes may be enhanced by using ARS to break the lecture with MCQs every 20 minutes.
- *Action hypothesis 4:* In large management accounting lectures, in-class students' concentration may be enhanced by the study of PLM before the lecture.
- *Action hypothesis 5:* In large management accounting lectures, students' effort to come better prepared to the lecture may be enhanced by PLM uploaded on Blackboard before the lecture and formative assessment of PLM through MCQs at the beginning of the lecture.

3. *Implementation of Selected Changes to Teaching*.

In addition to the information provided to students regarding PLM and ARS, in each lecture we give students the session identification number for them to connect to ARS using the WIFI Internet available in the lecture room. We advised students that before starting each lecture, they and the lecturer can evaluate their understanding of PLM through two or three MCQs. Also during the lecture class they and the lecturer can evaluate their understanding of the topics of the lecture by answering the MCQs and looking at the distribution of alternative correct/incorrect answers. We also explained to them that their perceptions about the effectiveness of the BL model for their learning, participation, concentration and effort will be asked through a voluntary and anonymous survey that will be conducted at the end of the semester.

MONITOR AND EVALUATION OF CHANGES MADE IN THE THIRD CYCLE

We analyzed data described in Table 1 to evaluate whether the BL model enhanced students' engagement in the management accounting lecture measured as in-class students' participation and concentration, and students' effort studying PLM outside class.

Participation

We used triangulated data from three sources to evaluate class meetings participation: ARS, a student survey and our observations and reflections. The focus of the evaluation was on action hypotheses one and two to investigate whether the use of ARS and PLM enhanced participation of students in class meetings.

In this cycle we recorded student attendance to calculate the percentage of participation[6]. Graph 4 shows the percentage of students participating each week from lecture one to eleven relative to the number of students attending the lecture (two streams).

INSERT GRAPH 4 HERE

Students' attendance in lectures ranged from 70 percent (210 students) in lecture one to 53 percent (150 students) in the last lecture, decreasing steadily during the semester. In terms of percentage, participation was variable as shown in Graph 4. Minimum participation was 30 percent in lecture-class two (two streams), maximum was 54 percent in lecture-classes three and five, and average including all lectures was 41 percent. The number of students participating ranged from 53 to 114 students with an average of 73 students.

Compared to a baseline of three to four students, observed by the same lecturer-researcher, answering questions posed to students in his lecture-classes before this project, and also in comparison with an average of 12 students answering MCQs using ARS in the first cycle, an improvement in students' participation is evident. However, compared to results from the second

[6] Attendance to lectures is not normally recorded; therefore, the lecturer-researcher used the time students have to answer in-class MCQs (after 20 minutes the lecture started) to count and record the number of students attending the lecture each week (two streams). We obtained the number of students who participated in each lecture from the ARS system.

cycle, participation in the third cycle was not as expected. We expected a higher participation of students using ARS because students could answer MCQs using their smart phones, tablets, laptops or clickers.

Participation of students in lecture-classes was also evaluated through a survey administered in lecture 11[7].

The survey instrument was based on other surveys such as the Australian Survey for Student Engagement (AUSSE) (Coates 2009), the eVALUate survey instrument developed by Curtin University for measuring students' perceptions of their engagement and learning outcomes (Oliver, Tucker, Gupta, and Yeo 2008), National Survey of Students Engagement (NSSE), CLASSE (Classroom Survey of Students Engagement), and the instrument developed by Richardson (2005a).

We asked students two questions regarding their participation in lecture-classes: *(1) How many lectures in this course have you participated in by answering MCQs using clickers, smart phones or laptops?*, and *(2) In other accounting courses that do not use clickers, how many lectures have you participated asking or answering questions?* Their responses are summarized in Graph 5. Graph 5 shows how students perceived their participation in classes using ARS compared with classes they do not use ARS. Series 1 shows the percentage of students who participated answering in-class MCQs using ARS. Series 2 shows percentage of students who participated asking or answering questions in other lectures without ARS.

INSERT GRAPH 5 HERE

[7] All students enrolled in the course were invited before lecture 11 to attend the lecture and participate in the survey through announcements on the course management system "Blackboard". In accordance with the ethical clearance approved for this project, students voluntarily and anonymously participated in the survey. 122 students attended lecture 11 and 96 students participated in the survey (79 percent of students attending the lecture).

65 percent of students reported participation in seven or more lectures using ARS to answer MCQs, which is higher than the average participation measured by the ARS system (41 percent).

70 percent of students strongly agreed or agreed with the statement *"The use of ARS has made me easier to participate in class"*, which was consistent with 65 percent of students that reported participation in seven or more lecture-classes using ARS.

Following Bennet (2003), Baker and Logan (2006), Cunningham (2008), and Paisey and Paisey (2005) in-class participation was also evaluated through observation made by the lecturer-researcher. It was evident many students were using their clickers, laptops, smart phones or tablets to answer MCQs posted on the screen. As encouraged by the lecturer-researcher, some students discussed with their classmates before selecting their alternative answer. For quantitative MCQs, many students were observed using calculators before answering the question. However, in some lectures the number of students answering only one specific question decreased to 10 to 15 students which was very low compared with the number of answers of the previous question with similar level of difficulty. To determine the cause of low participation the lecturer-researcher asked students if there were issues with their smart phones and students reported that they did lose connection during the class, so their answers did not go through the system. One of them said that after Internet connection was lost he did not continue trying to connect again. We concluded that even though practically all students attending the lecture had either smart phones, tablets or laptops there were possible internet connection issues which impacted on their participation.

The lecturer-researcher also observed a lack of participation from direct questions asked to the students. This is consistent with the literature that suggests students prefer to have a passive role

during class meetings (Cronin Jones 2003; Moulding 2010; Peek, Winking, and Peek 1995; Ramsden 2003) because they do not want to lose anonymity (Addison et al. 2009; Mulryan-Kyne 2010). In particular, from informal conversations with non-English speaking background (NESB) students and what we have also observed in small group classes (tutorials) NESB students generally do not want to participate because they do not want to expose their limitations in the use of English language or, because of their culture, they are accustomed to be passive recipients of knowledge. Recall, that in this course 50 percent of students are NESB students.

When ARS is used, what is preserved is anonymity, which can explain the usefulness of this system to enable higher participation at least answering MCQs posted by the lecturer and also participation with classmates exchanging some information to answer MCQs. Despite the issues observed in the use of smart phones, tablets and laptops in participating using ARS to answer in-class MCQs, participation was substantially increased compared with lectures without ARS and with the first cycle using ARS where part of the lecture content was not included as online PLM. Although participation did not increase compared with the second cycle (because of the issues discussed) it can be argued that action hypothesis one was supported by the triangulated data.

In the survey administered at the end of the semester, students provided their perceptions about the usefulness of participation during class meetings using ARS to answer MCQs. Of the students who responded to the survey 80 percent agreed or strongly agreed with the statement *"The use of MCQs and ARS during the lecture has given me immediate and useful feedback on my understanding of the lecture content"* and 82 percent agreed or strongly agreed with the statement *"I think ARS answering MCQs in class has been very useful for my learning in this course"*. Students also perceived the study of PLM helped them to participate during class meetings answering MCQs. 80 percent of students agreed or strongly agreed with the statement

"The study of pre-lecture material before the lecture has helped me to participate in the lecture more effectively answering MCQs". Action hypothesis two is supported only from the students' perceptions, however, students' perceptions are deemed to be consistent with the actual effects of the innovation (Kember 2003).

Concentration

We also used triangulated data from three sources to evaluate lecture-classes concentration: ARS, survey and observation/reflection. The focus of the evaluation was on action hypotheses three and four to investigate whether the use of ARS and PLM enhanced concentration of students during lecture-classes.

There is no objective baseline to compare concentration in the third cycle with concentration before starting the project or during the first cycle. Only the perception of the lecturer-researcher who observed in the previous four semesters, before starting the project, that students appeared to concentrate at the commencement of the lecture-class but after some time their concentration appeared to fade and students looked bored, tired or preoccupied with other matters.

To evaluate concentration in the third cycle we analyzed the results of MCQs related only to the lecture topics (PLM MCQs were not included). Graph 6 shows the average percentage of students who correctly answered lecture MCQs over the total number of student answers.

INSERT GRAPH 6 HERE

Compared to what was observed in the second cycle, in this cycle there was a positive trend until lecture five but after lecture five a negative trend until the last lecture. However, the average percentage of students who correctly answered lecture MCQs was 70 percent compared with 50

percent in the second cycle. Concentration on the topic taught just before the related MCQ is necessary to correctly answer the MCQ. Therefore, it can be argued that concentration of students in the third cycle was higher than the second cycle.

The perception of students related to in-class concentration also showed that students' concentration was enhanced. 81 percent of students agreed or strongly agreed with the statement *"The use of audience response system (ARS): clickers, smart phones and laptops to answer MCQs in class has been very useful to stimulate my interest in the content of lectures and it has helped me to keep my concentration during the lecture"*. In addition, students perceived the study of PLM helped them to concentrate during lecture-classes. 76 percent of students agreed or strongly agreed with the statement *"When I studied the pre-lecture material before the lecture it is easier for me to be more concentrated in the lecture"* and 71 percent of students agreed or strongly agreed with the statement "Pre-lecture material has made me easier to understand the content in lectures".

In addition, the lecturer-researcher observed students behavior during lecture classes and noted that breaking the lecture each 20 minutes with MCQs posted on the screen enhanced students concentration compared with the loss of concentration in lectures using the transmission model in which students appear to lose concentration after 20 minutes (Moulding 2010). Students looked more focused probably because they were trying to understand the topic knowing they could evaluate their understanding through the feedback of MCQs. Students appeared to concentrate when answering a MCQs while it was on the screen, then they waited expectantly for the distribution of correct/incorrect answers be displayed on the screen. Furthermore, the lecturer-researcher did not observe blank looks, or tired or bored expressions in the students

attending the class meeting, which is an indication of their concentration in the class meeting (Cronin Jones 2003; Gray and Madson 2007).

From the three sources of data we concluded that breaking the lecture using ARS and MCQs every 20 minutes enhanced students' concentration which support action hypothesis three. Students perceived studying PLM before the lecture helped them to understand the content of the lecture and concentrate in lecture-classes supporting action hypothesis four. However, this was the only source of data supporting action hypothesis four because we did not have another source to support or not this hypothesis.

Effort

We also used triangulated data from three sources to evaluate effort studying PLM before lecture-class: ARS, Blackboard system and student survey. The focus of the evaluation was on action hypotheses five and six to investigate whether the use of ARS and PLM enhanced effort of students studying PLM.

Effort is a component of students' engagement as defined in the third cycle. From ARS we identified one measure related to the study of PLM before the lecture as shown in Graph 7. The average percentage of students that correctly answered PLM MCQs related to PLM posted on the screen at the beginning of each lecture was 74 percent, which was even higher than the average percentage (of the same nine lectures) of students that correctly answered lecture MCQs. Compared with semesters without specific material to study before the lecture, we think this is evidence that students dedicated time (effort) to study PLM before the lecture.

INSERT GRAPH 7 HERE

From the Blackboard system we also identified the percentage of students who view the PLM recording before each lecture as shown in Graph 8.

INSERT GRAPH 8 HERE

An average of 80 percent of students enrolled in the course viewed PLM recording before the lecture compared with an average of 69 percent in the second cycle[8]. The reduction of time of each PLM may have encouraged students to view the whole recording. The results of the PLM MCQs may confirm that students looked at the whole recording. What surprised us is the high percentage of students viewing PLM before a lecture. This percentage corresponds to a number of students much higher than students attending the lecture. This means many students who rely on lecture recordings instead of attending face-to-face lectures also viewed PLM recording before lecture.

From the survey administered to the students in lecture 11, we collected students' perceptions regarding their effort studying PLM before lecture. Only 49 percent of students agreed or strongly agreed with the statement *"The use of pre-lecture material has increased my effort dedicated to this course which is helping me to achieve my expected final grade"* compared with 71 percent that agreed or strongly agreed with the statement *"In-class MCQs have increased my effort dedicated to this course which is helping me to achieve my expected final grade"*. This difference may indicate that students perceived effort increased more because of in-class MCQs rather than because of PLM. They did not perceive PLM recordings helped them to achieve their expected final grade. However, 73 percent of students agreed or strongly agreed with the statement *"I have received useful feedback on my understanding of the pre-lecture material*

[8] We cannot ensure that students who viewed PLM before lecture viewed the whole recording. The Blackboard did not provide a measure of the length of time the recording was open.

through the MCQs at the beginning of each lecture", which may indicate that even though they studied PLM before the lecture (because their understanding of PLM is the result of their study of PLM) they did not think PLM contributes to the achievement of their expected final grade.

From data collected by ARS and by Blackboard system, we concluded that PLM combined with PLM MCQs enhanced students effort studying PLM before each lecture compared with students who do not prepare the following lecture. We argue that this may support the action hypothesis five. However, this hypothesis was not totally supported. Data collected from the student survey indicated that students who studied PLM before the lecture did not perceive this study increased their effort dedicated to the course. Probably their perception is related to a different measure of effort dedicated to the course (e.g. preparing tutorial exercises, studying lecture material after the lecture, attending lectures etc.). Our definition of effort is only concerned with the effort of students in preparing for the next lecture to enable them to understand the lecture content and participate during class meetings.

BL Model

In agreement with Cunningham (2008) and Paisey and Paisey (2005), the use of action research helped us to develop a project of continuous improvement in the enhancement of students' engagement in our management accounting lectures. Following the steps suggested by Paisey and Paisey (2005) we were able to develop a blended learning (BL) model over the three cycles of our research project that can be used and refined in subsequent cycles of the research project or can be used in other action research projects that aim to enhance students' engagement in large classes.

Our BL model shows how the use of PLM and ARS in our lectures of two management accounting courses enhanced students' engagement in measured as students' participation and concentration during lecture-classes and students' effort studying PLM before the lecture to prepare for the lecture. Data analysis and reflection on the three components of students' engagement confirms that each was enhanced in our lecture-classes.

CONCLUSION, LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Large lecture classes and classroom participation are two terms not usually used in the same sentence! Large lectures where knowledge is intended to be transmitted and students take the role of passive recipients of information may be an effective method to facilitate students' learning, however the question remains how do you get students to participate in the large lecture? Previous research confirms that deeper learning can be achieved through actively engaging students in lectures (Dyson 2008; Gill 2011). This study reports on the three cycles of an action research project applied to the development, implementation and refinement of a BL model with the purpose of enhancing students' engagement in the lectures of a large management accounting course.

Our evidence obtained from data from student surveys, the Blackboard system, and the audience response system and lecturer/researcher observations suggests that the BL model does effectively enhanced students' engagement in a large lecture class. Students increased their participation in and concentration during the lecture. Students also increased their effort studying PLM and came to lectures having prepared in advance.

However, it cannot be assured that this is the optimal pedagogical approach to teach accounting. The advantage of action research as a research method is the continuous improvement that can

be achieved through additional cycles in the research process. In fact, reflecting on literature reviewed and the results of this action research project we agree that there is no best method of enhancing students' engagement. Only continuous improvement after considering the specific context of the innovation and reflecting on what did not work and what did can increase the likelihood of success in subsequent innovations.

Based on our findings of this study, we believe that students' engagement can be further enhanced. Participation and efforts are still far from optimal. It is also necessary to relate engagement to learning outcomes. There are further research opportunities in addressing the problems identified in our three cycle approach with the objective of further improvements of the blended learning model.

There are several limitations to this study. First, the data is specific to the setting of the innovation; therefore, the results cannot be generalized to other settings (Cunningham 2008). Second, there is no control group to assess the effectiveness of the innovation; as a result, causality of enhancement of students' engagement cannot be stated (McAllister and Guidice 2012). Third, the influence of the lecturer/researcher has over data collected possibly questions the reliability and validity of the data as objective rather than reflecting the views of the lecturer/researcher (Bennet 2003). The researchers in this study made every effort to address these limitations through multiple data collections and sources of evidence (Kember 2003; Mladenovic 2000).

The findings of this study contribute to the accounting education literature through the discussion of an action research project applied to a blended learning model in three cycles with the purpose of enhancing students' engagement in their courses. Accounting educators can use the three

cycle model discussed in this paper as a framework to enhance students' engagement in learning. Further research can apply this framework to other settings and build on the experiences discussed to develop additional innovations and evaluate them in a continuous process.

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The three cycles of the action research project:

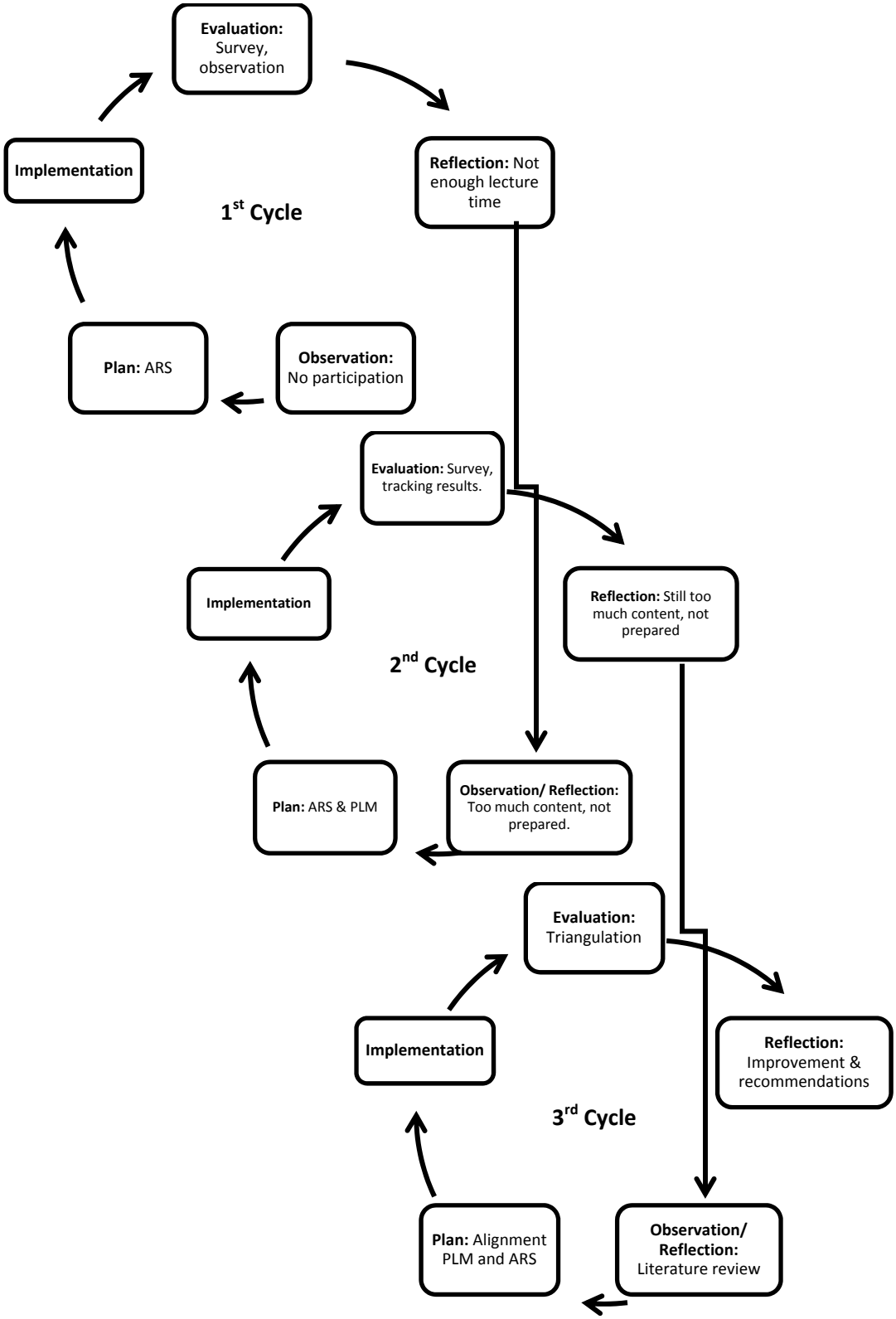
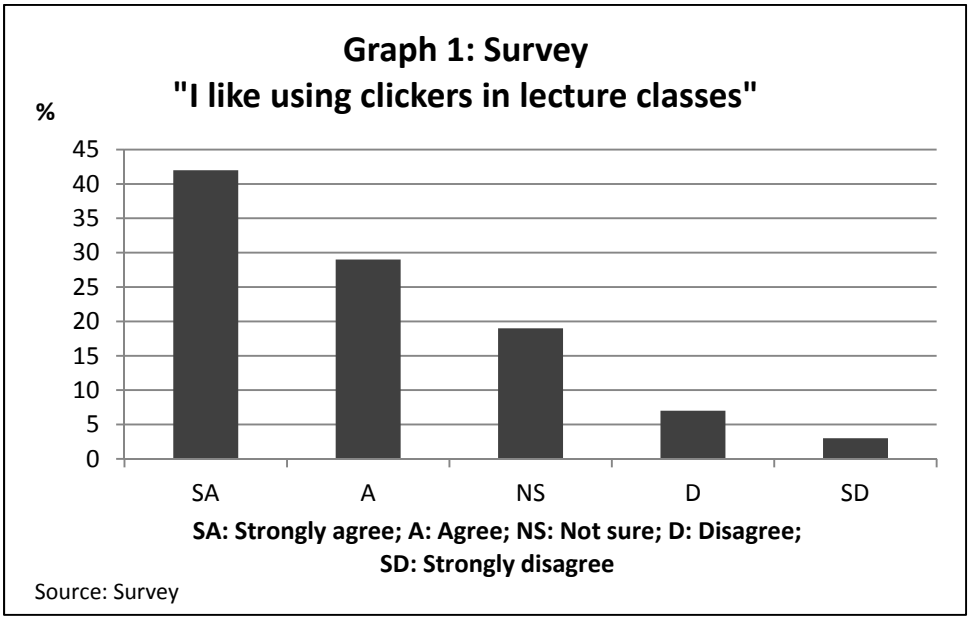
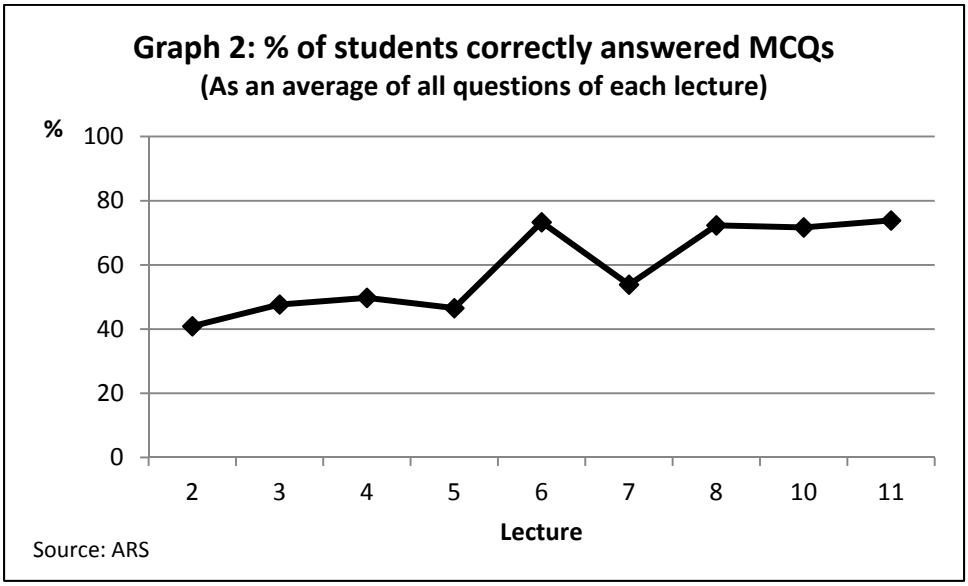
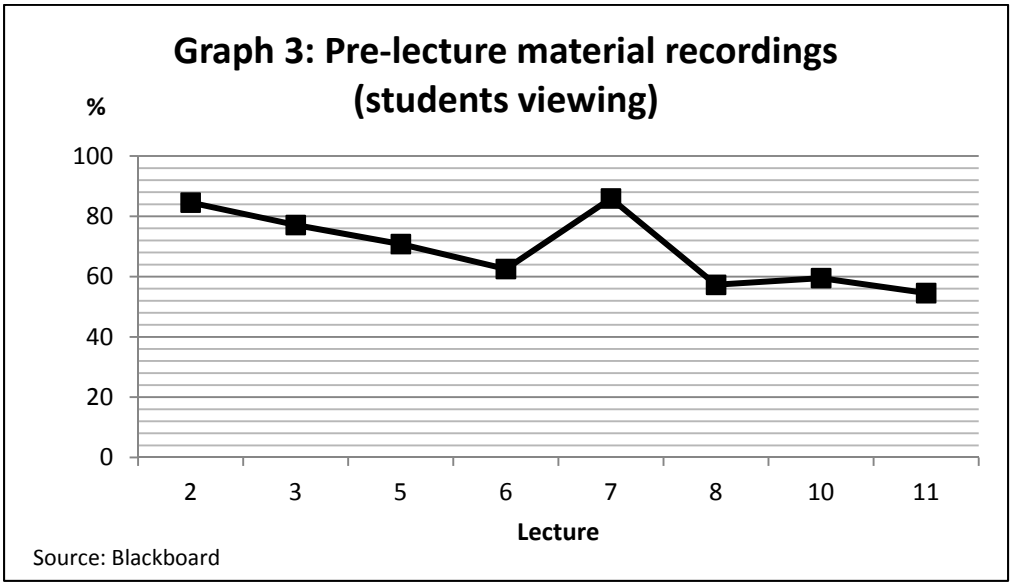


Figure 1


Graph 1: Survey
"I like using clickers in lecture classes"
%
45
40
35
30
25
20
15
10
5
0
SA
A
NS
D
SD
SA: Strongly agree; A: Agree; NS: Not sure; D: Disagree;
SD: Strongly disagree
Source: Survey


Graph 2: % of students correctly answered MCQs
(As an average of all questions of each lecture)
%
100
80
60
40
20
0
2
3
4
5
6
7
8
10
11
Lecture
Source: ARS



Source: Blackboard

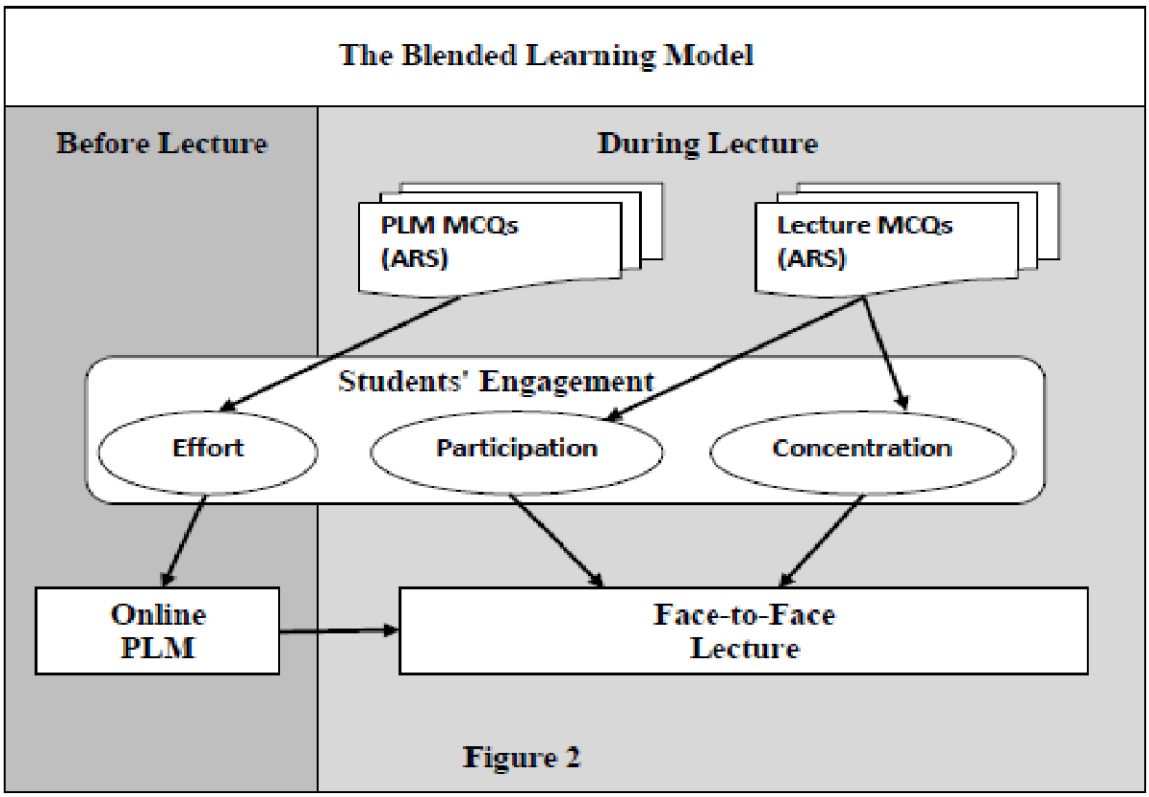
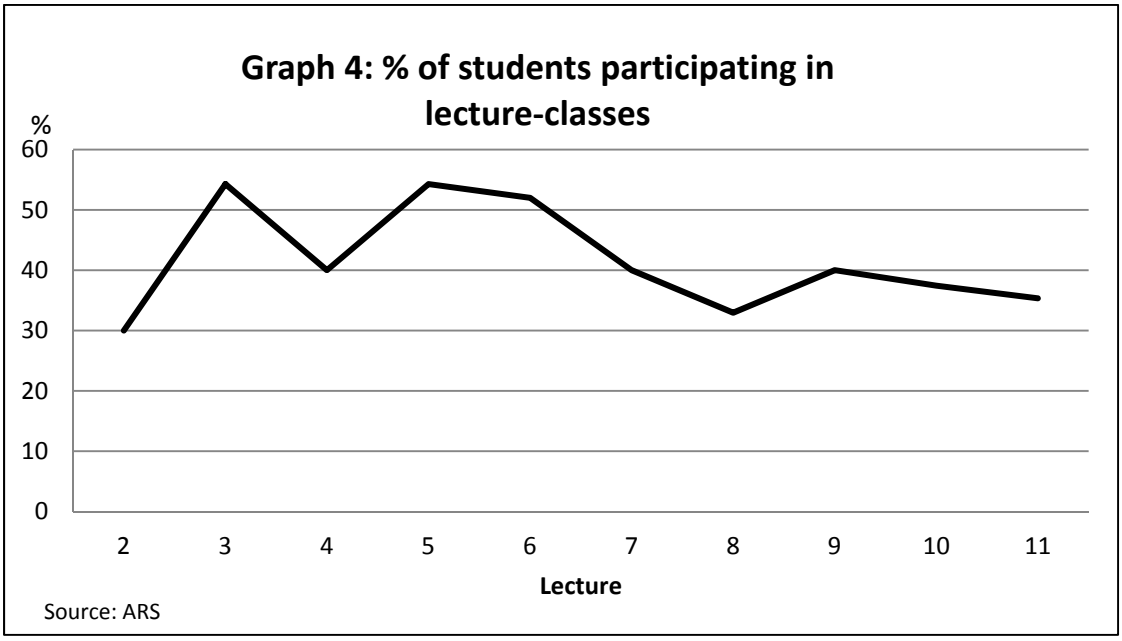
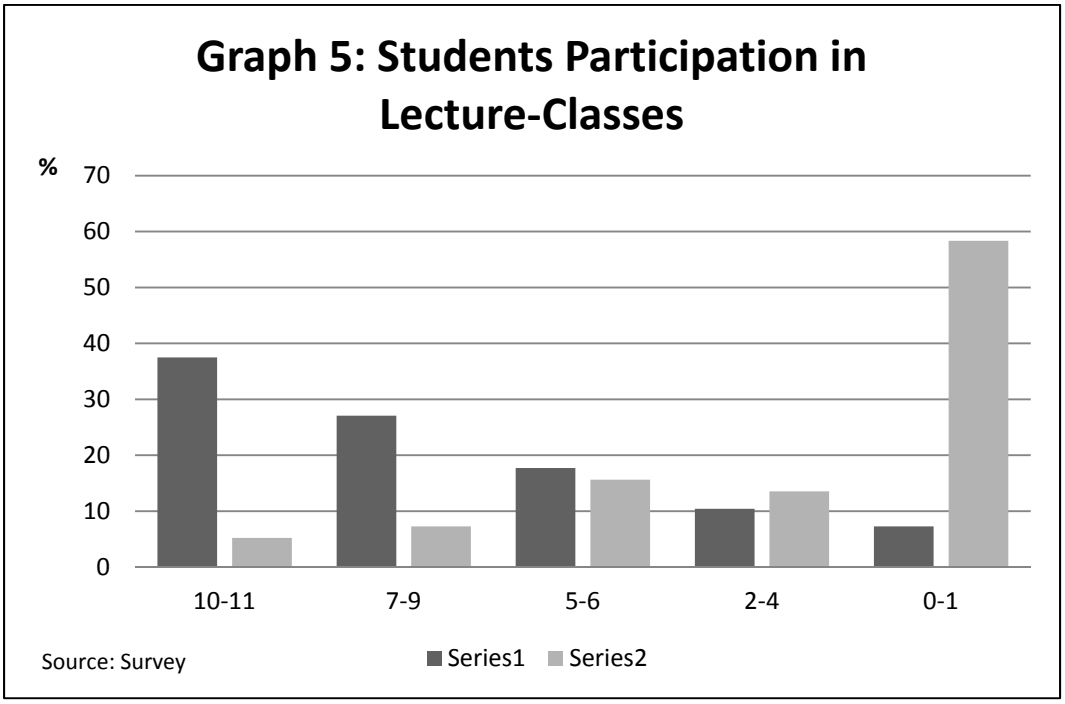

The Blended Learning Model
Before Lecture
During Lecture
PLM MCQs (ARS)
Lecture MCQs (ARS)
Students' Engagement
Effort
Participation
Concentration
Online PLM
Face-to-Face Lecture

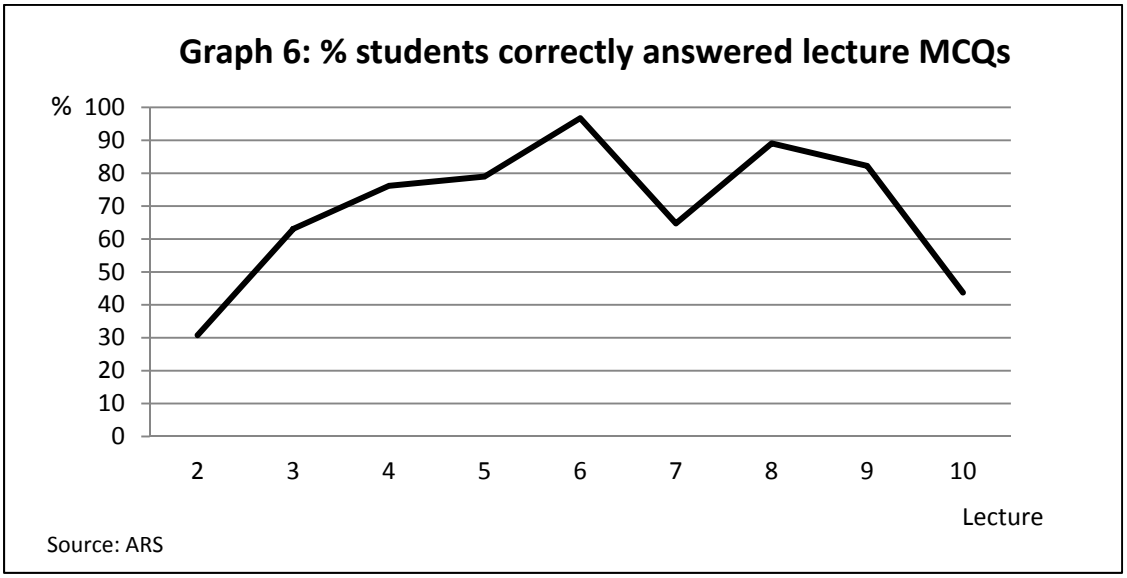
Figure 2

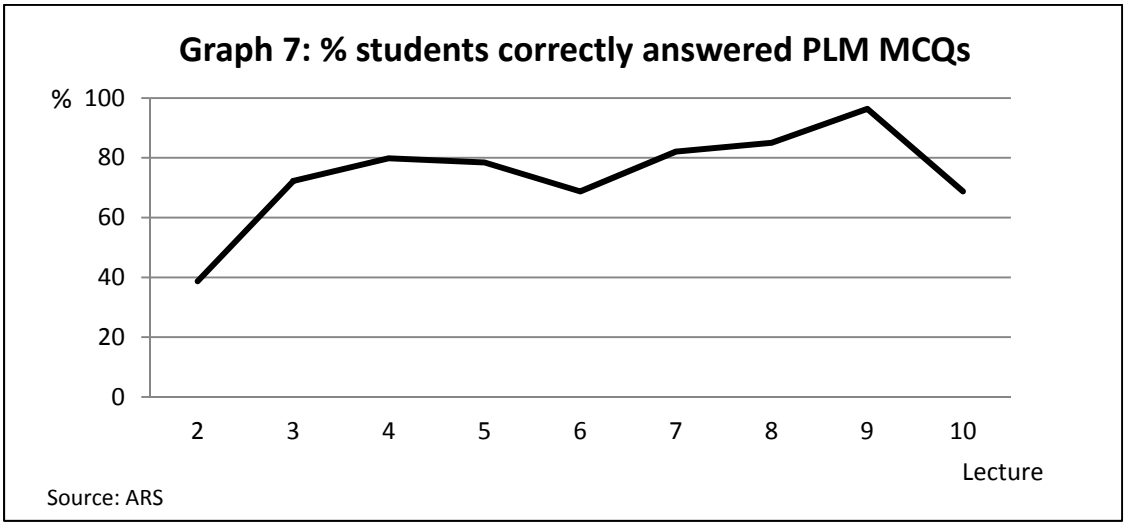
Table 1 - Data collection methods and sources of data

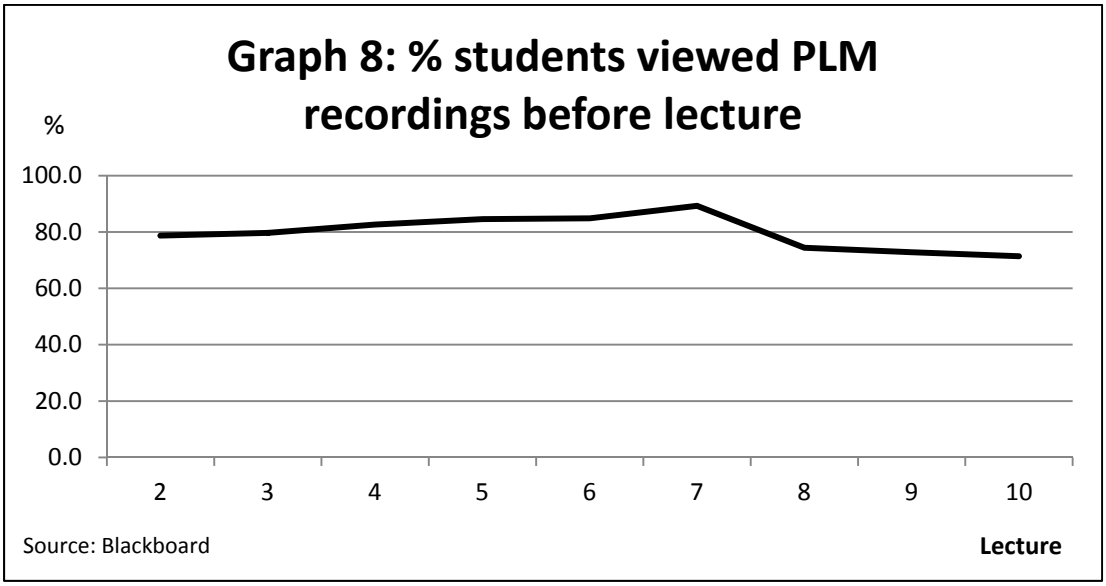
Focus of Data Collection	Data Collection Method	Source of Data
Participation	• Statistical records • Student survey • Observation/reflection	• Data from ARS: No. of students using ARS. • Students' perceptions regarding effect of PLM and ARS on participation in class. • Instructor observation of students' behavior in class meetings (participation).
Concentration	• Test results • Student survey • Observation/reflection	• Data from ARS: Correct answers to MCQs. • Students' perceptions regarding effect of PLM and ARS on concentration in class. • Instructor observation of students' behavior in class meetings (concentration).
Effort	• Test results • Review of statistical records • Student survey	• Data from ARS: Correct answers to PLM MCQs. • Data from Blackboard system: statistics tracking of viewing PLM recordings before lecture. • Students' perceptions regarding effort studying PLM.


Graph 4: % of students participating in lecture-classes
%
60
50
40
30
20
10
0
2
3
4
5
6
7
8
9
10
11
Lecture
Source: ARS


Graph 5: Students Participation in Lecture-Classes
%
70
60
50
40
30
20
10
0
10-11
7-9
5-6
2-4
0-1
Source: Survey
Series1
Series2


Graph 6: % students correctly answered lecture MCQs
%
100
90
80
70
60
50
40
30
20
10
0
2
3
4
5
6
7
8
9
10
Lecture
Source: ARS


Graph 7: % students correctly answered PLM MCQs
% 100
80
60
40
20
0
2
3
4
5
6
7
8
9
10
Lecture
Source: ARS


Graph 8: % students viewed PLM recordings before lecture
%
100.0
80.0
60.0
40.0
20.0
0.0
2
3
4
5
6
7
8
9
10
Source: Blackboard
Lecture

SURVEY

USING A BLENDED LEARNING (BL) METHOD TO IMPROVE STUDENTS' ENGAGEMENT IN A MANAGEMENT ACCOUNTING COURSE

Dear Student,

- I invite you to participate in a survey to gather feedback relating to perceptions of your learning experience and engagement in the blended learning method applied in this course during the semester. Your participation is anonymous.
- A Participant Information Sheet (available on Blackboard) contains information relating to this study.
- The blended learning (BL) method applied in this course includes two components:
  1. Online pre-lecture material recording and notes.
  2. Participative face-to-face lectures through the use of clickers, laptops and smart phones to answer MCQs.
- Your participation is voluntary; however, your feedback will be important to improve the BL design that will benefit students of this course in the following semester.
- Please answer all questions as explained below.

1. Some background information. Please tick the appropriate box.

Age	
< 20 years	
20-25 years	
26-35 years	
> 35 years	

Semester at UQ	
First	
Second	
Third	
More than 3	

International Student?	Yes		No	

Gender	
Female	
Male	

First Language	
English	
Other	

	4	5	6	7	Credit granted
• My grade in the pre-requisite course was					
• I expect my final grade in this course will be					

	≤ 4	4.1-5.0	5.1-6.0	6.1-7.0	No GPA (1st sem.)
• My GPA last semester was					

2. Description of your activities related to this course during the semester

	10-11	7-9	5-6	2-4	1-0
1.1 How many lectures have you attended in this course?					
1.2 How many lectures have you listened in lecture recordings Echo 360 of this course?					
2.1 For how many lectures in this course have you previously studied the pre-lecture material?					
2.2 How many pre-lecture material recordings have you listened either before or after the lecture?					
3.1 How many lectures in this course have you participated answering MCQs using clickers, smart phones or laptops?					
3.2 In other accounting courses that do not use clickers, how many lectures have you participated asking or answering questions?					

4 Your perception or preferences on the effect of Blended Learning Method (BL) on your engagement in lectures and with the content of this course

BL = Online Pre-Lecture Recordings + MCQs in lectures using ARS

Please tick the box according to the following scale:

SA = Strongly Agree	**A** = Agree	**NS** = Not Sure	**D** = Disagree	**SD** = Strongly Disagree

	SA	A	NS	D	SD
1.3 I have found that listening to lecture recordings (Echo 360) at a time that I choose is more valuable than attending a traditional face-to-face lecture.					
1.4 I prefer traditional lectures that focus on transmission of knowledge to pass assessment instead of participative BL lectures.					
1.5 Lecture recordings (Echo360) have been very useful for my learning in this course.					
2.3 Pre-lecture material has made me easier to understand the content in lectures.					
2.4 The use of pre-lecture material has increased my effort dedicated to this course which is helping me to achieve my expected final grade.					

	SA	A	NS	D	SD
2.5 When I studied the pre-lecture material before the lecture it is easier for me to be more concentrated in the lecture.					
2.6 The study of pre-lecture material before the lecture has helped me to participate in the lecture more effectively answering MCQs					
2.7 I think pre-lecture material is very useful for my learning in this course.					
2.8 I think pre-lecture material recording is not useful because we only need the PowerPoint pre-lecture material notes to study this material.					
3.3 The use of audience response system (ARS): clickers, smart phones and laptops to answer MCQs in class has been very useful to stimulate my interest in the content of lectures and it has helped me to keep my concentration during the lecture.					
3.4 In-class MCQs have increased my effort dedicated to this course which is helping me to achieve my expected final grade.					
3.5 The use of ARS has made me easier to participate in class.					
3.6 In-lecture MCQs have made me to come better prepared to the lectures.					
3.7 In-lecture MCQs have helped me to understand better the lecture content.					
3.8 I have received useful feedback on my understanding of the pre-lecture material through the MCQs at the beginning of each lecture.					
3.9 The use of MCQs and ARS during the lecture has given me immediate and useful feedback on my understanding of the lecture content.					
3.10 I think ARS answering MCQs in class has been very useful for my learning in this course.					
4.1 I prefer to work in class answering questions or solving problems alone rather than in a group.					
4.2 I usually collaborate with other students during lectures answering MCQs.					

5 Open Question

What improvements or changes would you make to the BL approach used in this course that may improve your engagement with the lectures and the content of the course?

You can continue writing in the next page