

**EFFECTS OF TASK-BASED VIDEO LECTURE
ON INTERACTION, ENGAGEMENT
AND ACHIEVEMENT IN A FLIPPED
CLASSROOM ENVIRONMENT AMONG
ACCOUNTING STUDENTS**

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ACCOUNTING STUDENTS**

by

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**KESAN VIDEO PENGAJARAN BERASASKAN TUGASAN TERHADAP
INTERAKSI, PENGLIBATAN DAN PENCAPAIAN DALAM
PERSEKITARAN BILIK DARJAH TERBALIK DI KALANGAN
PELAJAR PERAKAUNAN**

ABSTRAK

Politeknik Malaysia masih lagi mengamalkan persekitaran pembelajaran secara traditional terutamanya dalam pengajaran Pengenalan Kepada Perakaunan. Walaupun pembelajaran secara aktif telah dilaksanakan, pelajar masih kurang berinteraksi dan melibatkan diri serta memperolehi pencapaian pada tahap sederhana. Oleh itu, kajian ini mengkaji kesan video pengajaran berasaskan tugas terhadap interaksi, penglibatan dan pencapaian dalam persekitaran bilik darjah terbalik di kalangan pelajar perakaunan. Teori kognitif pembelajaran multimedia (CTML), untuk komponen multimedia, dan teori algo-heuristik (AHT) pembelajaran pelajar, menyediakan rangka kerja teori secara menyeluruh. Satu reka bentuk kuasi-eksperimen menggabungkan ujian pra dan ujian pasca (pencapaian) dan ujian pasca sahaja (interaksi dan penglibatan) dengan nilai kebolehpercayaan 0.924 telah digunakan keatas sampel 140 orang pelajar di salah sebuah institusi politeknik Utara Semenanjung Malaysia. Pelajar telah dibahagikan kepada dua kumpulan, video pengajaran berasaskan tugas dan video pengajaran tanpa tugas. Para pelajar menonton video pada masa lapang mereka di makmal komputer dan kemudian menghadiri kelas dengan aktiviti pembelajaran secara aktif. Dalam proses pengajaran dan pembelajaran bilik darjah terbalik, pelajar menduduki ujian pra sebelum menonton video pengajaran, kemudian mengambil ujian pasca sebelum

aktiviti dalam kelas bermula, dan akhirnya menjawab soal selidik berkaitan interaksi dan penglibatan. Data diskriptif dianalisa dan analisis kovarians (ANCOVA) mendedahkan kesan utama yang signifikan pada ujian pra dan ujian pasca antara video pengajaran berasaskan tugas dan tanpa tugas, $F(1,135) = 14.65, p < 0.05$. Kesan ini menunjukkan bahawa video pengajaran berasaskan tugas boleh meningkatkan pencapaian pelajar apabila mempelajari kursus Pengenalan Kepada Perakaunan. Analisis varians sehala (ANOVA) menunjukkan terdapat perbezaan yang signifikan antara kumpulan untuk interaksi pelajar $F(1,136)=4.438, p=0.037$, kecuali interaksi pelajar dengan bahan pengajaran $F(1,136)=1.730, p=0.19$. Walaubagaimanapun tidak terdapat perbezaan yang signifikan penglibatan pelajar $F(1,136)=1.230, p=0.269$, kecuali penglibatan pelajar secara agentik $F(1,136)=4.010, p=0.047$. Sumbangan penyelidikan ini telah mendalamkan kefahaman tentang komponen multimedia dengan model konseptual yang membantu penyelidik lain memahami sebab mengapa komponen multimedia seperti video pengajaran berasaskan tugas dalam persekitaran bilik darjah terbalik boleh meningkatkan pencapaian pelajar, interaksi pelajar dengan rakan-rakan, dan pensyarah dan juga penglibatan agentik pelajar. Di samping itu, garis panduan disediakan kepada reka bentuk dan pembangunan video pengajaran berasaskan tugas dalam persekitaran bilik darjah terbalik melalui dua fasa, yang boleh membantu pelajar belajar dari video sebelum kelas dan seterusnya menggunakan sepenuhnya masa kelas untuk menyiapkan tugas dan tutorial dengan lebih interaksi dan penglibatan pelajar secara agentik, yang mana tidak seperti video pengajaran tanpa tugas.

**EFFECTS OF TASK-BASED VIDEO LECTURES ON INTERACTION,
ENGAGEMENT AND ACHIEVEMENT IN A FLIPPED CLASSROOM
ENVIRONMENT AMONG ACCOUNTING STUDENTS**

ABSTRACT

Malaysian polytechnics continue to practice a traditional learning environment, especially when teaching the Fundamentals of Accounting. Although active learning activities have been implemented, students' seem to lack interaction and engagement and have only average achievement. Therefore, this research investigates the effects of task-based video lectures on interaction, engagement and achievement in a flipped classroom environment among accounting students'. The cognitive theory of multimedia learning (CTML) and algo-heuristic Theory (AHT) of student learning provide a comprehensive theoretical framework. A quasi-experimental design incorporating pre-test and post-test (achievement) and post-test only (interaction and engagement) instruments with an overall 0.924 reliability value were used with a sample of 140 students' at a Malaysian Northern Peninsular polytechnic institution. Students' were divided into two groups, task-based and non task-based video lectures. The students' watched the video lecture in their free time in a computer lab and then attended the class with active learning activities. In the flipped teaching and learning process, students' completed the pre-test before watching the video lecture, then took the post-test before in-class activities began, and finally filled out a questionnaire on students' interaction and engagement. The descriptive data was analysed, and an analysis of covariance (ANCOVA) revealed significant effects on achievement between task-based and non task-based video

lecture groups $F(1,135)= 14.65, p=0.00; p<0.05$. This effects suggests that the task-based video lecture could improve students' achievement when learning the Fundamentals of Accounting. One-way analysis of variance (ANOVA) revealed a significant difference between the groups for students' interaction $F(1,136)=4.438, p=0.037$, except for student-material interaction $F(1,136)=1.730, p=0.19$. There was no significant difference in students' engagement $F(1,136)=1.230, p=0.269$, however, except for students' agentic engagement $F(1,136)=4.010, p=0.047$. The contribution of this research provides a deep insight into the multimedia component with a conceptual model that helps other researchers understand the reasons why a multimedia component such as task-based video lecture in a flipped classroom environment can improve students' achievement; students' interaction with peers and lecturer; and students' agentic engagement. In addition, guidelines are provided on the design and development of task-based video lectures in a flipped classroom environment with two phases, which could help students' learn from the video lecture before class and, therefore, make the most of class time to complete the assignment and tutorial with greater peers and lecturer interaction and students' agentic engagement, in contrast to the non task-based video lecture setting.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

The Fundamentals of Accounting module is the most important foundation module in the Diploma in Accountancy course in Malaysian polytechnics. It is the most difficult subject matter in the field of accounting (Shoulders & Hicks, 2008); students' need to know how to build, understand and interpret a financial statement in order to complete the learning objectives (Deberg & Chapman, 2012). Compared with other countries, accounting students' in Malaysia are relatively lacking in knowledge and understanding, which leads to less interaction and engagement and lower average achievement (Salwa, Amariah Hanum, Haslin, Jamil & Nurizzah, 2013; Sangster, Franklin, Alwis, Abdul-Rahim, & Stoner, 2014; Siti Noridah, 2012; Siti Zuraidah, Rozinah & Nur Eliza, 2014a). This is because the traditional teaching continues to be used in Malaysian learning environments (Siti Noridah, 2012).

As well as the traditional approach, Malaysian higher education institutions currently also use web-based learning, virtual learning and blended learning when teaching accounting (Jamaliah & Steven, 2013; Azleen Shabrina & Nor Aziah, 2015). Arguably, the potential for the use of multimedia components, such as video lectures, to change teaching and learning approaches is enormous. The use of multimedia components, such as educational videos and video lectures as teaching and learning tools, has increased potential through their availability on platforms such as EDUWEBTV and YouTube, as well as experiential-based videos and screencast video lectures (Ng, Fong & Ong, 2010; Sethela, Azian & Yeoh, 2014;

Khalid, Ong, Choy & Lim, 2013; Siti Zuraidah et al. 2014a). Ng et al. (2010) found that students' engagement may remain less than satisfactory, however, if the instructional video by itself does not improve learning. Thus, students' interaction might not be enhanced by just using or showing a video in class (Sethela et al. 2014); this could lead to a level of achievement similar to traditional classroom approaches (Siti Zuraidah et al. 2014a).

In order to enhance students' interaction, engagement and achievement, the "flipped" classroom approach has been applied by researchers (Philips & Trainor, 2014; Siti Zuraidah, et. al. 2014a; Peter & Wilson, 2013). This approach has attracted a lot of attention in the educational profession and in the media (Leicht, Zappe, Messner & Litzinger, 2012). In this approach, traditional learning practices inside the classroom (e.g. exposure to new knowledge in the class) and outside (e.g. tutorials and assignments) are "reversed". Hence, students' are exposed to new knowledge before class time, and come prepared with the existing knowledge so that they can spend time in class solving problems or doing assignments with their peers in a collaborative atmosphere (Hamdan, McKnight, McKnight, & Arfstorm, 2013).

The main mode of instruction used in the flipped classroom approach is the video lecture. This is a widely used technique aimed at exposing students' to new knowledge and preparation prior to class. Educators have been recording instructional videos for nearly as long as the format has existed. In the past few years, free online video hosting services, such as YouTube, have encouraged people to produce instructional videos on a large scale (Guo, Kim, & Rubin, 2014). Therefore, in recent times, various types of video lectures have been developed for

students' to gain new knowledge before a class begins, such as video lectures, movie lectures, webinars, lecture captures, video lectures with and without the lecturer's image and well-established e-learning technology, such as lecture recordings (Long, Logan, & Waugh, 2014; Lyons, Reysen & Pierce, 2012; Rolf, Reuter, Abel & Hamborg, 2014).

1.2 Background of the study

Polytechnics have shifted from traditional education to outcome-based education, which focuses on programme learning outcomes and course learning outcomes (Bakhtiar and Yusmadi, 2012). In order to achieve the planned learning outcomes, Malaysian polytechnic lecturers use problem-based learning, project-based learning and student-centred learning methods and develop effective instruction based on course learning outcomes (Murugan, Ruhizan and Vaina Malar, 2011). Thus, the Curriculum Information Document Online System (known as CIDOS) and the Learning Management System (LMS) platform were developed by the Malaysian Department of Polytechnic Education (Murugan et al. 2011); however, these are not fully utilised by lecturers (Bakhtiar and Yusmadi, 2012) and the traditional learning environment remains unchanged, although the education system in polytechnics has changed.

Currently, accounting education emphasises basic skills to develop student competencies and prepare graduates to enter the working world. Knowledge, skills and attitude (KSAs) are the competencies needed by accounting graduates in today's environment. Nearly 20 years ago, Adler and Milne (1997) identified that student attributes, such as knowledge, skills and attitudes (KSAs), are considered desirable

for competent accounting professionals and lifelong learners in order to support the effectiveness of accounting course activities. Siriwardane, Kin, Hu, and Low (2014) found that some skills and attitudes were rated higher than knowledge in the accounting field, and they suggested inculcating students' with KSAs in the accounting curricula.

Therefore, as suggested by Holtzblatt and Tschakert (2011), to use video lectures in accounting education to develop these competencies, students' should be given the freedom to create their own learning, making them responsible and building a sense of control (Stefanou, Stolk, Prince, Chen & Lord, 2013) and ownership when learning without the constraints of time and distance (Wang, 2007) because they do not solely rely on lecture notes or other learning material. Throughout this period of autonomy, using video lectures as learning material, students' would be able to add skills throughout the learning process, such as knowledge (understanding, problem solving and application), skills (writing, planning and implementing) and attitude (willingness, motivation and desire to learn), to develop their competency for lifelong learning and employment.

Learning occurs when students' are prepared, in terms of knowledge, or have an overview of the topic covered in class. Thus, students' need to be assisted in a manner that suits their learning style in order to engage and raise their desire to learn about the subject matter (Bond, Czernkowski & Wells, 2012). By using video lectures, students' can be prepared for active learning activities by studying new materials prior to class (Roach, 2014). This ensures positive learning outcomes that are parallel with the positive interaction and active engagement of students' by

engaging in discussions related to learning the Fundamentals of Accounting (Weil, 2013).

Students' interaction and engagement can be developed by using appropriate active learning strategies and learning tools incorporated into accounting courses (Procópio de Araujo & Slomski, 2013; Kingry, Havard, Robinson, & Islam, 2015) for higher achievement to meet the needs of industry and develop accounting skills for successful business operations (Umeji & Obi, 2014). Currently, polytechnics implement Outcome Based Education (OBE), which enables students' to gain interpersonal skills through group learning, which not only helps them but also others in the learning process (National Research Council, 2012). Therefore, it is important for lecturers to develop quality instructional and learning material that has a positive effect on student motivation (Naaj, Nachouki, & Ankit, 2012) that encourages them to learn (Waterman Schwartz & Conti, 2008). Studies by Safiah, Jasmine and Fauziah (2013) and Nek Kamal, Salomawati, and Ahmad Zainal Abidin, (2010) show that polytechnic students' are motivated to learn when they engage in class with their own interest in learning new knowledge, with the lecturer playing their role effectively in an active learning environment.

1.3 Problem statement

Kahl (2013) found that Malaysian students' at higher education level lacked basic knowledge because their learning was exam-oriented and did not reflect what they had learnt at secondary school. This could be one responsible factor for student results in the Fundamentals of Accounting at polytechnics being only average (Wan Mustaffa, Moriza, Haniza & Ahmad Zia, 2014). The results show that the minimum

pass mark was 40% and the ratio between continuous assessment (i.e. quizzes, tests and assignments) and final examinations was 50:50) (Appendix A-i). In particular, students' were not competent with accounting skills and faced difficulties connecting what they were taught in class with what they were trying to apply when doing homework (Young, 2011). Hence, based on a preliminary study, more than 50% of the students' did not complete all the tutorials given to them (Appendix A-ii), and in a simple quiz, less than 30% of the students' could answer all the questions, including the Diploma in Accountancy (DAT) students', who should know basic accounting concepts and be able to use them in their accounting courses (Appendix A-iii). Most of the students' said they understood what was taught in class but could not apply it to the questions posed to them. Furthermore, they could not remember the basic concepts they had learnt, did not keep notes and textbooks on the Fundamentals of Accounting subject and on their study for the final examination. This shows that students' are unable to prepare the correct Adjusted Financial Statements, which contributes to a higher percentage of failure on the accounting course (Salwa, et al. 2013).

According to Kingry, et al. (2015), accounting students' with prior accounting knowledge tend to disengage in class because they already possess knowledge of the material being presented. According to Siti Noridah (2012), however, only students' who understand engage, and low performing students' who are moderately happy in class (Safiah, et al. 2013) become passive listeners and note takers because of the lectures given (McManus, Subramaniam, & James, 2012; Siti Zuraidah, Rozinah & Nur Eliza, 2014b). Indeed, not all lecturers interact with their students' (Bentley, Brewer, & Eaton, 2009), while students' who interact less with

the learning material, by failing to do accounting exercises, have lower grades (Doumen, Broeckmans, & Masui, 2013) and students' who interact with their peers could not complete their accounting assignments (Turner & Baskerville, 2013). Without these interactions, accounting graduates are unable to develop and transfer knowledge and skills to their workplace (Howieson, Hancock, Segal, Kavanagh, Tempone & Kent, 2014).

In addition, six lecturers in Fundamentals of Accounting were interviewed and asked questions that mainly focused on the challenges and difficulties of teaching the course. All the lecturers found most of the students' lacked a basic understanding of the financial accounting course, especially in adjustment accounts. As a result, students' who did not pass the Fundamentals of Accounting course have, in turn, their motivation to aim for higher achievements affected. The lecturers acknowledged that the majority of students' pass the Fundamentals of Accounting course without possessing accounting competencies.

Therefore, the problems are summarised as follows:

- i) Most students' lack understanding of the Fundamentals of Accounting concepts and have difficulties in completing tutorials outside the class or in classroom exercises. Therefore, flipped classrooms provide an environment in which students' spend more time on solving problems with the lecturer and peers in class (Bergmann & Sams, 2012).
- ii) Students' who do not complete tasks set in the classroom do not try to complete them after class with their peers, meet the lecturers or refer to their learning materials. Thus, to encourage students' interaction, using task-based

video lectures, students' are able to review the video lecture, prepare and actively participate for in-class activities (Nwosisi, Ferreira, Rosenberg, & Walsh, 2016).

- iii) Students' are unable to progress in their learning when it comes to applying the accounting concepts and are unable to memorise the accounting format. Hence, this research helps students' apply the basic concepts and understanding by watching the video along with a task to solve a different problem from the tutorial and assignments in the classroom (Fee & Budde-Sung, 2014)
- iv) Most students' are silent in class, focus only on accounting exercises and have little interaction with peers, lecturers and materials, as well as not engaging with the learning environment. Therefore, for students' to actively participate in class while doing the tutorial and assignment, watching a task-based video lecture helps students' to identify topics that are difficult to understand and also help the lecturer to focus on a topic of discussion in the classroom to encourage students' to participate in class (Rozinah & Siti Zuraidah, 2014).

Therefore, the design and development and the use of task-based video lectures in a flipped classroom environment could encourage students' interact more, enhancing their engagement throughout the learning process and have a higher level of achievement with knowledge acquisition, understanding and skills when learning the Fundamentals of Accounting.

1.4 Research objectives

The research objectives are as follows:

1. To design and develop task-based and non task-based video lectures in a flipped classroom setting to investigate interaction, engagement and achievement among accounting students.
2. To investigate the differences in students' interaction between task-based and non task-based video lecture groups when learning the Fundamentals of Accounting.
3. To investigate the differences in students' engagement between task-based and non task-based video lecture groups when learning the Fundamentals of Accounting.
4. To investigate the differences in students' achievement between task-based and non task-based video lecture groups when learning the Fundamentals of Accounting.

1.5 Research questions

1. Do significant differences exist in students' interaction between task-based and non task-based video lecture groups when learning the Fundamentals of Accounting?
2. Do significant differences exist in students' engagement between task-based and non task-based video lectures groups when learning the Fundamentals of Accounting?
3. Do significant differences exist in students' achievement between task-based and non task-based video lectures groups when learning the Fundamentals of Accounting?

1.6 Research hypothesis

H_{O1}. There is no significant difference in students' interaction between task-based and non task-based video lectures groups when learning the Fundamentals of Accounting.

H_{O1a}. There is no significant difference in student–student interaction between task-based and non task-based video lecture groups when learning the Fundamentals of Accounting.

H_{O1b}. There is no significant difference in student–material interaction between task-based and non task-based video lecture groups when learning the Fundamentals of Accounting.

H_{O1c}. There is no significant difference in student–lecturer interaction between task-based and non task-based video lecture groups when learning the Fundamentals of Accounting.

H_{O2}. There is no difference in students' engagement between task-based and non task-based video lecture groups when learning the Fundamentals of Accounting.

H_{O2a}. There is no significant difference in behavioural engagement between task-based and non task-based video lecture groups when learning the Fundamentals of Accounting.

H_{O2b}. There is no significant difference in agentic engagement between task-based and non task-based video lecture groups when learning the Fundamentals of Accounting.

H_{O2c}. There is no significant difference in cognitive engagement between task-based and non task-based video lecture groups when learning the Fundamentals of Accounting.

H_{02d}. There is no significant difference in emotional engagement between task-based and non task-based video lecture groups when learning the Fundamentals of Accounting.

H₀₃. There is no significant difference in students' achievement between task-based and non task-based video lecture groups when learning the Fundamentals of Accounting.

1.7 Theoretical framework and research framework

1.7.1. Theoretical framework

Numerous studies on education-related topics have focused on the implementation of flipped classrooms, blended learning, massive open online courses (MOOCs) and online learning. Higher education institutions have adopted video as an instructional tool and applied the cognitive theory of multimedia learning (CTML) (Mayer, 2001) to design and develop video as a teaching and learning resource. Multimedia instruction is a lecture delivered by the lecturer together with text, graphics or video that foster learning (Lamb, 2015). Therefore, using a video lecture in this study, as one of the forms of multimedia learning resources, allows CTML to be used as the basis for the study, including component, principle and strategy (Mayer, 2001) in examining the effects between those elements (i.e. video and task) and student interaction, engagement and achievement in a flipped classroom environment.

Mayer (2001) stated that there are three kinds of multimedia material model presentation: processed from start; when students' start to use the material to finish; and when the integrated learning outcome is obtained. In this research, knowledge

acquisition is obtained prior to class by adding tasks when the students' start to watch the video lecture, which could encourage their interaction, engagement and achievement throughout the learning process. In addition, this research applies five cognitive processes and three learning strategies: segmenting, signalling and weeding in CTML in developing multimedia.

The relationships of variables in the theoretical framework, as shown in Figure 1.1, are constructed based on the above arguments and their relation to the development of task-based video lectures, when student watch a video lecture and complete a task before class, on students' interaction, engagement and achievement according to AHT (Landa, 1983) and CTML (Mayer, 2001).

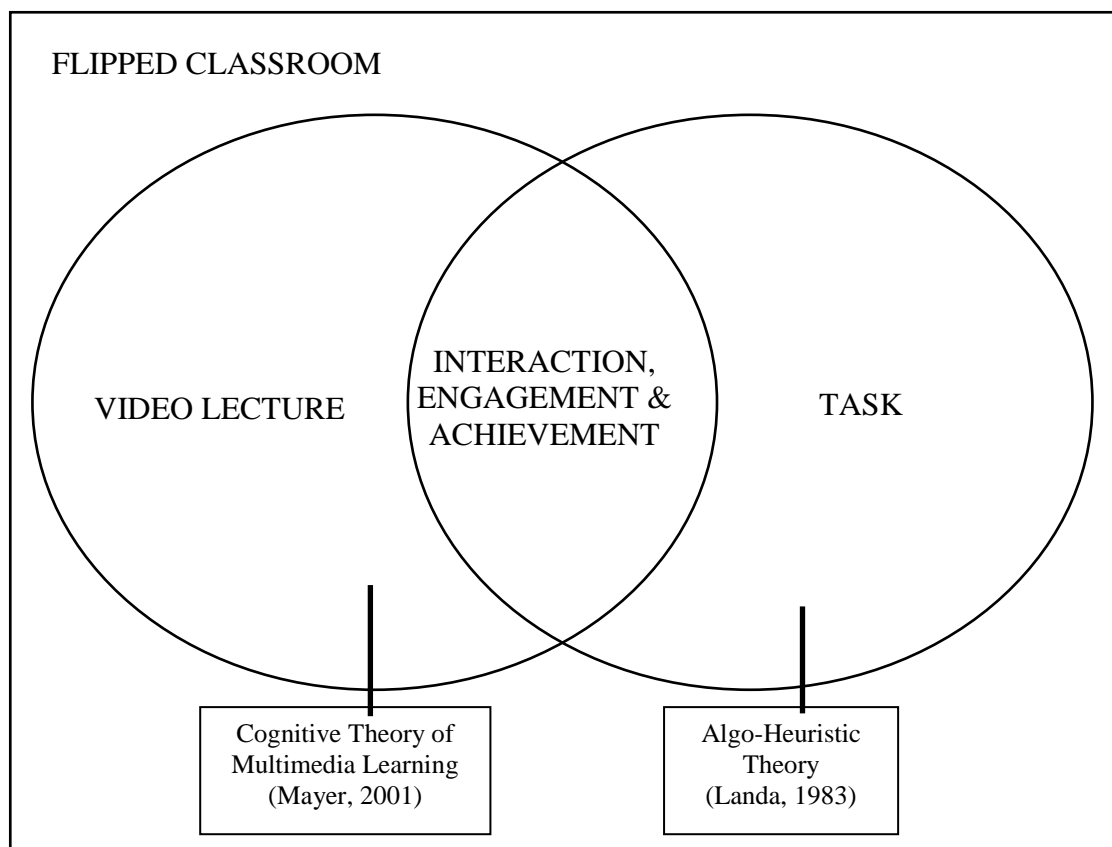


Figure 1.1 Theoretical framework

Algo-heuristic theory is one of the most dominant hypotheses on mental functioning in terms of mental operations and knowledge units. This theory holds that individuals may grasp the technical knowledge about a certain subject, but still be unable to apply that knowledge in problem solving (Landa, 1998). Therefore, the use of CTML in the design and development of a video lecture helps students' with verbal and visual learning style (Chen, Wang & Chen, 2014) and AHT helps students' with kinaesthetic learning style (Fat, 2007) to develop their knowledge by applying it to problem solving in class. For example, a student might know the formula and format of adjustment accounts, but this does not mean that they are able to calculate and record them. The student might not understand how to apply formulas and formats to solve problems on calculating and recording financial statements and, because of this, could become passive and have lower or average achievement (Nik Nazli & Maliah, 2013).

Therefore, AHT and CTML develop knowledge meant for processes and operations in the context of problems by watching the video with a task, so that knowledge can be applied skilfully and with a better understanding during in-class activities with increased interaction and engagement throughout the learning process (Ibrahim, 2012; Chen & Wu, 2013). The adoption of CTML and AHT is because of one reason, the ability of a video lecture with a task to add knowledge acquisition before class to encourage students' interaction, engagement and improve student achievement in a flipped classroom environment.

1.7.2. Research framework

The research framework of this research is illustrated in Figure 1.2. The framework represents the effects of task-based and non task-based video lectures on students' interaction, engagement and achievement in a flipped classroom environment. The use of video lectures (with or without a task) has been described in the literature on how video lectures are implemented in the flipped classroom environment and the effects throughout the learning process on students' interaction, engagement and achievement. Thus, the effects of the independent and dependent variables are based on the relationship of CTML and AHT to the design and development of the video lectures. Therefore, this could encourage student–student, student–material and student–lecturer interaction; behavioural, emotional, cognitive and agentic engagement before class; and during in-class activities and students' pre- and post-test achievement before and after watching the video lectures.

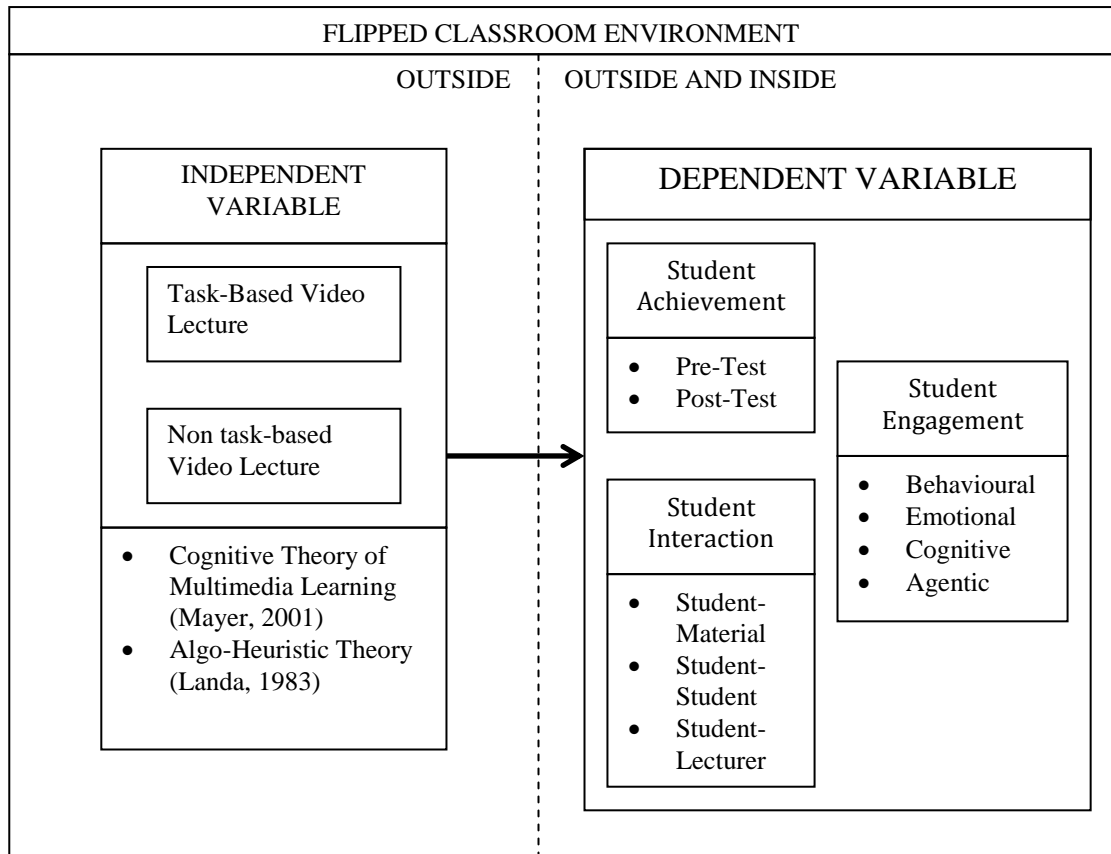


Figure 1.2 Research framework

1.8 Significance of the research

This research is of significance to various groups in the field of accounting education in general, and in cognition and instructional design, as well as video lecture development, specifically:

- i) The results of this research can help researchers and lecturers in the field to compare findings in order to improve concepts, definitions and theories related to cognition, multimedia instructional design, multimedia learning principles and instructional processes in a flipped classroom environment.
- ii) Some useful guidelines and the instructional design theory and principle created for the draft video review based on the CTML and three principles of CTML (segmenting, signalling and weeding) can help lecturers in various

fields to design instructional material and develop video lectures.

- iii) The findings of this research can be useful for policy makers in polytechnics or institutions of higher learning that offer accounting programmes by incorporating the use of multimedia-based learning based into the heuristic approach. This means that the strategies of the teaching and learning process in learning the Fundamentals of Accounting need to be included in the programme syllabus and course learning outcomes.
- iv) A simple and easy design and development of task-based video lectures has been created based on need analysis findings. The process and procedures for creating video lectures forms an important output for lecturers who should be their own instructional designers and developers for teaching and learning material, for accounting courses in general, and for the Fundamentals of Accounting course in particular.
- v) The instructional design and development has the potential to guide students' to become learners and provide them with the opportunity to learn how to become independent thinkers by actively interacting with the content being studied.
- vi) Heuristic learning used in the design and development of the task-based video lectures could help students' apply what has been learnt and practise it with the video lectures before class and then completing the tutorial and assignment during in-class activities.
- vii) The instructional strategies used not only benefit students' in terms of learning the Fundamentals of Accounting course, but also develop their financial accounting skills in preparation to meet the needs of the industry in general, and in the accounting field, specifically.

1.9 Limitations of the research

The research is subject to several limitations:

- i) The research was conducted at the Commerce Department in one of the polytechnics in northern Peninsular Malaysia. The polytechnic was selected because of researcher accessibility to the sample. The samples were limited to 140 first-semester students' registered on the Fundamentals of Accounting course. They have a similar polytechnic entry level and accounting knowledge. Thus, purposive sampling was conducted because of the implementation of learning instruction in the teaching and learning process (Barr, 2013; Sri Sumarwati, Jailani & Kiong, 2013).
- ii) Mayer's principles used in this research are limited to only three, namely segmenting, signalling and weeding of the design and development of video lectures. These three principles were used for editing the video that was developed, such as screencast and slidecast and also to existing video from YouTube.
- iii) A variety of teaching and learning materials are used in the flipped classroom environment, including lecture videos, e-books, PowerPoint slides, web pages, podcast and related material from the internet. In this research, the learning materials are limited to video lectures, because they are the main material in flipped classroom learning.
- iv) This research merely compares the effects of using task-based and non task-based video lectures in a flipped classroom on the students' interaction, engagement and achievement variables, which has not been widely discussed and argued in previous studies on the use of multimedia components such as video lectures in a flipped classroom environment using those variables.

1.10 Operational definitions

1.10.1 Students' interaction

According to Anderson (2003), interactions can be student-teacher, student-student or student-material. Whatever the form, it needs to be suitable to the delivery method, students' and environment that could increase students' ability to interact in learning the Fundamentals of Accounting throughout the flipped learning process. Therefore, in this research, students' interaction refers to the influence of task-based and non task-based video lectures in a flipped classroom on the following interactions.

i) Student-Student interaction

In this research, student-student interaction refers to interaction that exists with peers in class throughout the teaching and learning activities of the Fundamentals of Accounting in a flipped classroom environment.

ii) Student-Material interaction

In this research, student-student interaction refers to student reviews of the video lecture while watching and completing the before-class task.

iii) Student-Lecturer interaction

In this research, student-student interaction refers to student face-to-face interaction with the lecturer throughout the entire process of teaching and learning in the Fundamentals of Accounting.

1.10.2 Students' engagement

According to Moore, Gillett and Steele (2014), in the flipped classroom, students' engagement with the video lecture is measured using a written assignment

before the class to show whether students' engaged with the key content, and the changes in students' engagement and attitudes during class time. Therefore, in this research, students' engagement refers to the following definitions that influence task-based and non task-based video lectures.

i) Behavioural engagement

In this research, this refers to students' attention and interest, which represent their feelings on the video-lecture content and activities done in class.

ii) Emotional engagement

In this research, this refers to the students' feeling of having fun and being comfortable in the flipped environment in learning the Fundamentals of Accounting.

iii) Cognitive engagement

In this research, this refers to students' ability to use their prior knowledge, gained before class by watching the video lecture, to complete the tutorial and assignment during class activities.

iv) Agentic engagement

In this research, this is students' letting the lecturer know their needs to focus on any particular topic that they lack an understanding of before class (i.e. task completion) and to express their opinion and feeling (i.e. in-class activities) in a flipped classroom environment.

1.10.3 Students' achievement

According to Flumerfelt and Green (2013), achievement is measured by “the examination of instructional practice and the use of instructional technology” (p.1). Therefore, in this research, achievement refers to the levels students' attain in learning adjustment accounts after viewing a task-based or non task-based video lecture prior to class. Pre-test and post-test questions on adjustment accounts were used to compare the students' achievements before and after watching the video lectures.

1.10.4 Video lectures

According to Zhang, Zhou, Briggs and Nunamaker (2006), the video lecture is one of the multimedia learning components. It is a lecture with an integrated instructional video, such as lecture notes and PowerPoint slides, where students' can see and hear the lecture and read the lecture notes. In this research, the video lecture is divided into two types: task-based and non task-based.

i) Task-based video lecture

In this research, a task-based video lecture is defined as a screencast video, slidecast video or existing YouTube video that needs to be watched with a hands-on assigned task to be completed prior to the in-class activities.

ii) Non task-based video lecture

In this research, a non task-based video lecture is the same video lecture as the task-based video lecture, but without a hands-on task to be completed.

1.10.5 Flipped classroom

According to Little (2015), “The flipped classroom seeks to remove didactic instruction from the classroom and deliver it via electronic videos outside of the classroom, leaving contact time free for more interactive and engaging teaching and learning activities” (p.265). In this research, flipped classroom refers to the flipped process of learning the Fundamentals of Accounting, which consists of two phases. The first is the students’ watching video lectures outside the classroom in their free time in a computer lab before the lesson. In the task-based video lecture, tasks are given to be completed before proceeding to another video lecture. The second phase is in-class activities, such as assignments and tutorials, done inside the classroom with active learning activities (i.e., cooperative learning).

1.11 Summary

This chapter introduces the background of the research of using task-based and non task-based video lectures in a flipped classroom environment that affects students’ interaction, engagement and achievement in learning the Fundamentals of Accounting. The main research highlights problems and proposes several solutions to these problems that are related to students’ interaction, engagement and achievement in learning the Fundamentals of Accounting. The objectives, questions and hypotheses of the research, as well as the theoretical, conceptual and research framework, are explained in this chapter. This research is significant to various groups who include the field of accounting education as well as instructional design and development in their work. In addition, this research is subject to several limitations, such as towards polytechnic institutions, CTML design principles,

teaching and learning material and the effects of using task-based and non task-based video lectures. Finally, the operational definitions of the variables used in this research, such as video lecture, students' interaction, engagement and achievement in flipped classroom have been explained in detail.

The second chapter reviews the literature about the main variables and the flipped classroom setting; the educational setting of the Fundamentals of Accounting course in Malaysian polytechnic education, which relates to the learning theories and model used in this research as a base to design and develop the video lecture; and the effects on students' interaction, engagement and achievement.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses a number of relevant studies from a variety of disciplines and sources. Literature reviews on these studies mainly focus on the concepts, theories, models and previous studies related to the variables of this research.

2.2 The Fundamentals of Accounting course in polytechnics

A lack of interest in the Fundamentals of Accounting course is common among most of Malaysian accounting students'. The main reason for this is that accounting courses involve calculating and preparing financial statements, which students' find difficult to understand to develop their accounting skill (Nik Nazli & Maliah, 2013; Salwa, et al. 2013). They involve a level of difficulty similar to learning mathematics, whereby students' need to memorise formulas and analyse questions to solve problems (Bigelow, 2013). Students' of accounting are averse to the format and calculations of accounting problems, which are considered complicated to solve (Gracia & Frandsen, 2013). Phillips and Graeff (2014) agree that accounting students' memorise solutions to similar problems and concepts without understanding the basic concepts, in order to pass the course.

This situation also occurs in Malaysian accounting education, which continues to have a passive learning environment in which students' are not encouraged by lecturers to participate in the classroom (Nik Nazli & Maliah, 2013).

For example, students' can pass the course solely by doing many exercises and tutorials. When students' are unable to complete their exercises correctly, they may have negative perceptions of accounting, fear and worry about failing the course, lack of motivation, and a failure to see the relevance of accounting studies with real-life experience, as they are working hard to memorise only enough material to pass the examination (Phillips & Graeff, 2014).

A study conducted on non-accounting students' in one of Malaysia's public universities found that the factors that contribute most significantly to failure on the Fundamentals of Accounting course are that it is considered a non-preference course, lecturers are not available to provide academic guidance after class hours, the questions in the final exams are unclear and difficult to understand, students' do not have adequate time to answer the final exam questions, and assessments are not in line with the course outcome (Salwa et al. 2013). These factors may also contribute to both accounting and non-accounting students' in polytechnics being required to take Fundamentals of Accounting as a compulsory course.

Students' pursuing a Diploma of Accountancy do not necessarily need to have taken at their secondary level, Principles of Accounting in Sijil Pelajaran Malaysia (SPM). This is due to the entry requirements to the Commerce Department at the polytechnic being the same for each programme:

The following lists the requirements for admission to commerce programmes in polytechnics:

1. Malaysian citizen
2. A pass in SPM with minimum requirements as follows: