

The Effectiveness of IT Usage in Accounting Education

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Abstract— Output of learning at the college, influenced by the input and the learning process. Quality of input is the quality of students who enter as a student, while the quality of the process is the quality of the educational process in college. IT utilization is proposed as one tool that can enhance learning and ease of understanding, especially in the teaching of accounting. The study was conducted on the learning process of accounting, ie the introductory accounting courses, which provide basic competencies that must be mastered by the students to understand the material of intermediate and advanced accounting. Experiments were conducted to test the effect of interaction between the quality of the input with the quality of teaching to learning outcomes, as indicated by academic achievement. The results provide empirical evidence that the use of IT in the teaching method of accounting moderate the influence of the quality of input to output, that is student achievement, while the lecturer does not become moderating variable. The research also found that in a group that uses accounting game software, continuance intention to use accounting game software influenced by perceived usefulness, perceived ease of use, and perceived enjoyment. Thus, this study provides empirical evidence that supports the theory of Technology Acceptance Model.

Keywords— accounting, learning, game software, technology acceptance model

I. INTRODUCTION

Educational purposes, including in higher education to produce quality graduates is highly dependent on the quality of educational inputs and processes organized by the college. Input quality is the quality of individual who is accepted as a student at the college. Quality of inputs is the potential of individuals, whose success in learning depends on the learning process organized by the college. Good quality of learning will develop the potential of students to become graduates who meet high quality standards. The components of learning, which is composed of students, teachers or lecturers, learning materials, teaching methods, instructional media, and evaluation of learning, need to be prepared so as to produce quality learning process.

In the field of accounting, the basic learning materials is the concept of the basic accounting equation and double-entry system. This material became the foundation for further

learning accounting. Therefore, success in providing understanding and skills regarding the basic equation is a key success factor accounting learning process as a whole.

In the learning process of accounting, a method that is widely used is the conventional method. Lecturer rely on text books and exercises therein. Accounting books that do not interest had also been expressed by some observers of education, especially accounting. Demski (2007) find that most of the students stated that textbooks that they use in learning is boring. Furthermore, the success of the learning process of accounting depends on the expertise of lecturers in transferring understanding of the material and to train students so as to have a good understanding and high skills about the accounting records. Lecturers are also very important role in creating passion student learning.

In the world of education has actually been known alternative learning method is the method of the game. The game creates a pleasant atmosphere and challenging, then the use of the method is expected to make learning the game to be fun and not boring. The game also makes learning materials become apparent so that students are expected to be easier to understand the learning material, development of information technology today provides support for the development of game-based learning method that is more creative, interesting, and animatif. Researchers who suggest the use of IT to improve the effectiveness of learning accounting, among others, Elliot (1992), Pincus (1997), and Goldwater and Fogarty (2007).

This study will demonstrate empirically that the use of accounting game software moderating influence the quality of input toward quality of output. Then the model approach Technology Acceptance Model of Davis (1989) will be used to explain how the interest of students to use the software-based games is formed. We have did similar study (Purnamasari & Christmastuti, 2014), but with different research methods. Previous studies using laboratory experiments that only treat participants, that is students of beginning semester and students of final semester, with using of accounting game software, in the laboratory testing. While the present study, using field experiments that test the actual treatments in the class for one full semester and also measure achievement or student results after followed the course Introduction to Accounting 1.

II. LITERATURE REVIEWS

II.1 Game Based Learning Model

Learning is a system that aims to help the learning process of the students, which is designed in such a way to support the learning process of learners internally (Gagne & Briggs, 1979). As a system, the learning process consists of the

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components are interlinked and interact. According to Bahari et al (1997) components of learning consist of: students, teachers or lecturers, learning materials, teaching methods, instructional media, and evaluation of learning. The learning process needs to be conducted in an interactive, inspiring, fun, challenging, and motivating learners to participate actively.

This study focuses on students, teachers, learning materials, teaching methods and instructional media. Students are the subjects of learning that have intellect and free will. Each student has a unique individual characteristics and growing including emotional development, moral, intellectual and social. These developments affect the ability of students as subjects of education (Sunarto and Hartono, 2002). In this study, the peculiarities of the students seen from its academic potential.

The second component, lecturers, has an important role as a class managers, to organize all the activities in the learning process. Lecturers prepare learning materials, delivered material and determine methods of teaching and learning media to convey the material, as well as an evaluation.

Learning methods required lecturers to deliver learning materials. The learning method is the means used in the learning process so that learning objectives can be achieved (Suryobroto, 1986; Djamarah, 1991). A variety of learning methods can be used in the learning process in accordance with the learning materials and characteristics of students so that learning outcomes can be achieved effectively.

One method of learning that puts students as subjects of the learning process is constructivism (Sunyoto et al, 2012). According to constructivism, knowledge is a construction (formation) in the self-learners. Knowledge can not be transferred away from the teacher to the student, but is a cognitive process in which a process of assimilation and accommodation forming a the knowledge scheme of the individual.

Constructivism gives liveliness to the man to learn to find their own competence, knowledge, or technology, and other things needed to develop himself. One method of learning that suits constructivism is a game. With the game, learners play an active role in constructing of her knowledge by solving problems that designed with the game. In addition, the game has a goal, a challenge, and competition. Students who normally live in the younger age groups generally have an interest to play the game is very high. This is the key factor why gaming potential as effective learning media (Facer, 2003).

Ginnis (2008) states that the game is effectively changed the dynamics of class and usually creates a greater willingness to learn and behave. Games can be useful for: (1) creating a more flexible working relationships between students, (2) break the ice between students and teachers, (3) increasing or decreasing the energy level, to refocus attention, and (5) trained thinking skills with ease.

With the game method, learning materials that may be considered difficult, serious, and boring integrated with the concept of the game which contains properties fun, not serious, not boring. Thus it is expected that learning which is not uplifting, complex and tedious turned into the opposite.

II.2 IT Support and Technology Acceptance Model Theory (TAM)

IT developments are currently making the design more interesting game. IT-based gaming excellence include: 1) enables animation design which increases the attractiveness of the game, 2) can load tutorial, information, and assistance to enable students to learn independently, 3) give feedback in real time, 4) storing and displaying history so that students can evaluate the development of his ability.

To achieve the learning objectives, a gaming software must be designed properly so successfully integrate the learning material in a game. Furthermore, the interest of students to use the software game, according to the theory of Technology Acceptance Model / TAM (Davis, 1989) influenced by perceived usefulness and perceived ease of use.

Davis (1989) first introduced the TAM as a theoretical extension of Theory of Reason Action / TRA (Fishbein & Ajzen, 1975). TRA is a well-known model in the social psychology domain, which suggests that a person's behaviour is determined by the individual's intention to perform the behaviour. PU was defined as "the degree to which individuals believe that using a particular system can enhance their job performance" (Davis, 1989), while PEOU was defined as "the degree to which individuals believe that using a particular system will be effortless" (Shih, 2008). PEOU selain berpengaruh langsung pada minat menggunakan teknologi, juga dihipotesiskan sebagai prediktor dari perceived usefulness.

TAM has been extended by the addition of other constructs such as computer self-efficacy (Compeau and Higgins, 1995; Shih, 2006) and perceived enjoyment (Davis et al, 1992; Ha et al, 2007). Computer self-efficacy is defined as individual judgments regarding their computer skills (Compeau and Higgins, 1995). Computer self-efficacy is significant in the use of systems and even in helping individuals more easily acquire many of the skills associated with effective computer use. Venkatesh and Davis (2000) found that individual computer self-efficacy is a strong determinant of PEOU.

Perceived enjoyment is defined as "the extent to which the activity of using computers is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated" (Davis et al, 1992). PE is referred to as an intrinsic motivation variable such as the doing of an activity for satisfactions rather than for some outcomes or results. In contrast, extrinsic motivation, such as PU is a construct that measures how user's productivity and effectiveness have been improved by using the product (Ryan & Deci, 2000). Davis et al (1992) found that usefulness and enjoyment were significant determinants of behavioral intention. While Venkatesh (2000) proposes enjoyment as a determinant of perceived ease of use. Games must, of course, provide customers with enjoyment, as part of their basic nature. Thus a TAM for game systems must incorporate enjoyment, including interest, pleasure, and fun, as an influence on attitude (Ha et al, 2007).

II.3 Hypothesis

This study aims to prove empirically that the components interact with each other-learning component in determining the learning outcomes. Potential students as subjects of learning (Sunarto & Hartono, 2002) will interacted with other learning components in determining the success of learning. In this study the main focus was on the lecturer and teaching methods.

Lecturer is a class manager (Bahari et al, 1997), so the quality of the learning process is hypothesized very dependent on the lecturer. However, in education in college, is said that the role of the lecturer is a facilitator. Likewise in accounting education. Students are required to learn more independently. Therefore, teaching and learning in the classroom along with lecturers not the main determinant of student success. Learning is more tend to constructivism. Therefore, the learning method uses accounting games software are hypothesized to have a role as important as the professor as a facilitator of student learning. Academic potential of students will interact with the learning method in determining the learning outcomes of students. Therefore compiled hypotheses 1 and 2 below:

H1: The use of game software moderate the influence of students' academic potential to the student achievement

H2: Lecturer moderate the influence of the academic potential of students to learning achievement

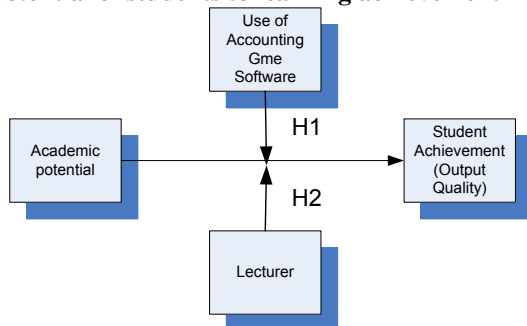


Fig 1 Learning Components Interaction Model

As a medium of learning, accounting game software need to be designed so as to increase the interest of students to use it. Based on the TRA (Fishbein & Ajzen, 1975), the interest of students to the accounting game software, will encourage more frequent behavior to learn to use the help of accounting game software . It is expected to increase academic achievement. Therefore, the following hypotheses are arranged

H3: Intention to use accounting game software influence on student achievement

Based on TAM theory, interest in using technology is influenced by perceived usefulness and perceived ease of use (Davis, 1989). Further development of TAM also include variables perceived enjoyment as variables that affect interest in using technology (Davis et al, 1992; Ryan & Deci, 200; HA et al, 2007) and computer self-efficacy (Compeau & Higgins, 1995; Venkatesh & Davis, 2000)

H4a: Intention to use accounting games software are influenced by the perceived usefulness, perceived ease of use, perceived enjoyment, and computer self-efficacy

H4b: Perceived ease of use affect the perceived usefulness on accounting game software

H4c: Perceived enjoyment influence the perceived usefulness on accounting game software

H4d: Perceived enjoyment affect the perceived ease of use on accounting game software

H4e: Computer self-efficacy influence the perceived ease of use on accounting game software

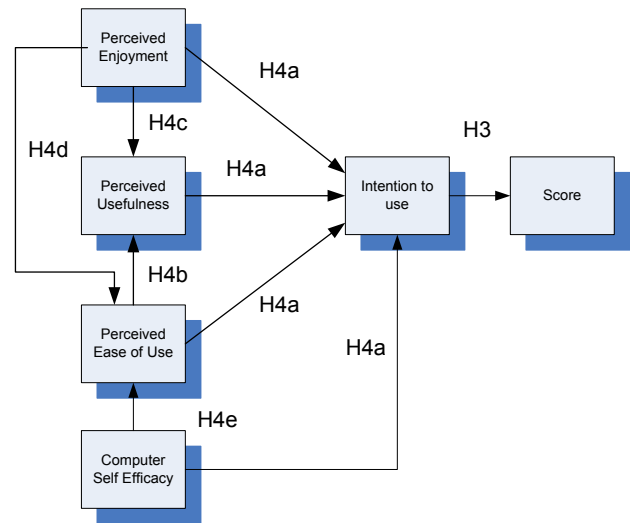


Fig. 2 Technology Acceptance Model of Accounting Game Software

III. RESEARCH METHODOLOGY

III.1 Research Design

The study used an experimental method to determine the effect of the use of accounting game software in the learning process on student achievement accounting. Experiments conducted is a field experiment types, namely that provide treatments in real terms in the actual learning process. Participants were accounting students at the Catholic University Soegijapranata Indonesia who are taking courses for basic concepts of accounting, namely Accounting Introduction 1. Experiments performed in the first semester of the academic year 2014-2015. The number of participants as much as 186 people. During one semester, done treatments use methods of learning with accounting game software. Participants are divided into five classes, each class taught by different lecturer. After the learning process for one semester is done, then student achievement is measured, which is proxied by student's score.

Participants were divided into 2 groups. The first group get treatments of the use of accounting game software, as many as 64 people. While the second group was the control group that did not get treatments the use of game software accounting, as

many as 122 people. The learning process in group 2 using the conventional method of face-to-face lecturers and students with just books and practice question as learning tools. At the end of the semester, students in the group who received treatments use accounting game software, were also asked to fill out questionnaires used to measure the perceived enjoyment, perceived usefulness, perceived ease of use of accounting game software, as well as the intention to using it.

III.2 Data Analysis

Hypothesis testing is done using Partial Least Square method of Structural Equation Modelling (PLS-SEM) which is an alternative method of testing structural equation modeling. The use of this method enables simultaneous testing of relationships between latent constructs in linear and non-linear relationship.

PLS-SEM simultaneously produce two tests, namely: testing the measurement model is often referred to as the outer model, and testing the structural model is often referred to as inner models. Analysis of outer models aiming to test the reliability and validity of the indicators that make up the construct. While analysis of the inner workings of the model aims to test the strength of estimates between latent variables or constructs. PLS also does not require the many number of samples, that are also widely used for research experiments.

Variable Definition

Input Quality

Input quality is the quality of individuals who received as a student at a college. Quality is measured by the value that is used for university admission. There are two ways of selection, the first is track of achievement and the second is regular lines. Track of achievement using the average value of the prospective student report in high school. While regular lines using the entrance test score. Therefore, two values that are used can not be converted to the same value, then the test for both groups of students with two incoming lines is conducted separately. The number of participants from track of achievement as many as 136 people, while the participants were regular lines as many as 50 people.

Learning Method with Game Accounting Software

Accounting game software used in the research is the application that researchers previously developed to support the learning process, especially accounting basic equation of matter and double entry accounting system. Dummy variable is used to distinguish between groups of students who received treatments using software with a control group that is not using the game software accounting.

Lecturer

Students are divided into five classes, each taught by a different professor. Dummy variable is used to distinguish lecturer (a score of 1 to 5).

Output Quality

The output quality is the ability of a student after a learning process. Output quality is student achievement measured by student score. The final score consists of the score's of midterms, final exams score, and the assignment score.

TAM Variables

Measurement of study variables were adopted from previous studies with adjustments to be applied to game accounting software. Measurement of Perceived usefulness variables and perceived ease of use were adopted from Davis (1989). Measurement of computer selfefficacy variables were adopted from Compeau and Higgins (1995). Measurement of continuence intention were adopted from Mathieson (1991) and Bhattacharjee (2001). While perceived enjoyment measurement were adopted from Davis et al (1992). All the items were measured using a Likert scale, with a 5-point scale from "strongly disagree" to "strongly agree".

IV. RESEARCH RESULT

Testing hypotheses 1 and 2 to test the moderating influence of the accounting lecturer and methods of accounting teaching using accounting game software in the relations of input quality and output quality, made respectively to the group of students who enter college through achievement's track and that through the test or regular lines. The test results on the regular track student group showed that there is interaction between the entrance test score with the use of game software in the learning process accounting effect on student output value (p-value 0.008). The output quality is the ability of a student after a learning process.

While the quality of the input (entrance test score) had no effect on the output (p-value 0.405). Interaction between the lecturer with the entrance test score of 10% effect on the alpha but not at alpha 5% (p-value 0.079).

TABLE I
TEST RESULTS ON THE LEARNING COMPONENT INTERACTION MODEL ON REGULER-TRACK STUDENT GROUP

| | Original Sample (O) | Sample Mean (M) | Standard Error (STERR) | T Statistics (O/STERR) | P Values |
|------------------|---------------------|-----------------|------------------------|------------------------|----------|
| TEST -> SKOR | -0.171 | -0.154 | 0.205 | 0.834 | 0.405 |
| TM_DOSEN -> SKOR | 0.278 | 0.262 | 0.158 | 1.762 | 0.079 |
| TM_USAGE -> SKOR | 0.363 | 0.354 | 0.137 | 2.643 | 0.008 |

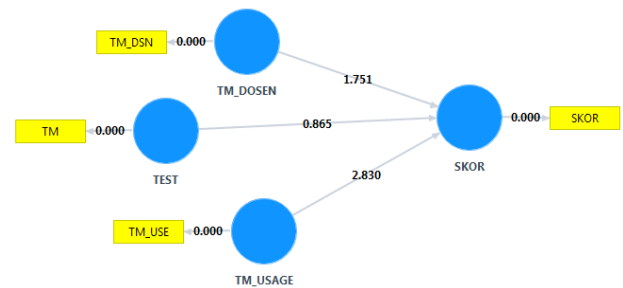


Fig. 3 Ouput Model on the Learning Component Interaction Model on Reguler-Track Student Group

The same tests, carried out on track student achievement group showed consistent results, namely that the interaction between the quality of the input with the use of accounting game software effect on the quality of output / students' score (p-value 0.000). Similarly, lecturer interaction with the quality of the input does not affect the quality of the output (p-value 0.137), similar to findings in the test or regular group.

Different results with regular track student group is that the quality of the input as measured by the average value in high school turned out to affect the quality of the output (p-value 0.001). Differences in these results may show that the junior high school grades are used as a measure of the quality of the input better reflect the true academic potential, compared to the entrance test. The logic is the entrance test is the measurement at one point only, while grades are measurements during the learning process in high school so that further describe the quality of students.

TABLE II
TEST RESULTS ON THE LEARNING COMPONENT INTERACTION MODEL ON ACHIEVEMENT -TRACK STUDENT GROUP

| | Original Sample (O) | Sample Mean (M) | Standard Error (STERR) | T Statistics (O/STERR) | P Values |
|------------------|---------------------|-----------------|------------------------|------------------------|----------|
| TPA -> Score | 0.267 | 0.267 | 0.081 | 3.284 | 0.001 |
| TPA Lec -> Score | -0.136 | -0.134 | 0.091 | 1.488 | 0.137 |
| TPA Use -> Score | 0.235 | 0.238 | 0.067 | 3.533 | 0.000 |

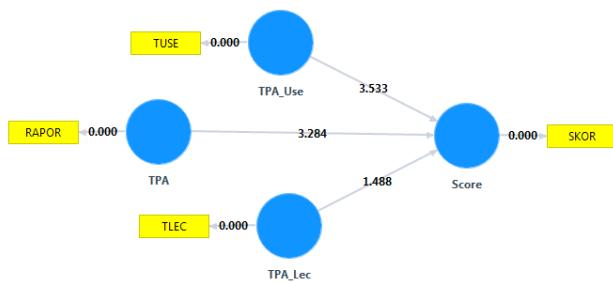


Fig. 4 Output Model on the Learning Component Interaction Model on Achievement -Track Student Group

Overall testing provides empirical evidence supporting the hypothesis 1, while the second hypothesis is not supported.

The next test was to determine the effect of intention to using the game software accounting on student achievement and the factors that affect the interests of students using accounting game software, showed the following results:

- 1) Intention to use accounting game software does not affect the student achievement or output quality (p-value 0,266), so the hypothesis 3 is not supported.
- 2) Test the hypothesis 4a found that perceived computer self-efficacy and perceived ease of use does not affect the intention to use the accounting game software (p-value 0,817 and 0,728). While the perceived enjoyment and perceived usefulness influence the intention to use accounting game software (p-value 0,011 and 0,036).
- 3) Test the hypothesis 4b found that perceived ease of use affect the perceive usefulness of accounting game software (p-value 0,003).
- 4) Test the hypothesis 4c found that perceived enjoyment influence the perceived usefulness of accounting game software (p-value 0,000).
- 5) Test the hypothesis 4d found that perceived enjoyment affect the perceived ease of use accounting game software (p-value 0,000).
- 6) Test the hypothesis 4e found that perceived computer self efficacy does not affect the perceived ease of use accounting game software (p-value 0,121).

TABLE III
TEST RESULTS ON TAM

| | Original Sample (O) | Sample Mean (M) | Standard Error (STERR) | T Statistics (O/STERR) | P Values |
|--|---------------------|-----------------|------------------------|------------------------|----------|
| Intention to use -> Skor | 0.148 | 0.151 | 0.133 | 1.114 | 0.266 |
| Perceived Computer Efficacy -> Intention to use | -0.037 | -0.022 | 0.159 | 0.231 | 0.817 |
| Perceived Computer Efficacy -> Perceived Ease of Use | 0.234 | 0.211 | 0.151 | 1.552 | 0.121 |
| Perceived Ease of Use -> Intention to use | -0.068 | -0.043 | 0.195 | 0.348 | 0.728 |
| Perceived Ease of Use -> Perceived Usefulness | 0.280 | 0.284 | 0.095 | 2.949 | 0.003 |
| Perceived Enjoyment -> Intention to use | 0.368 | 0.374 | 0.144 | 2.549 | 0.011 |
| Perceived Enjoyment -> Perceived Ease of Use | 0.669 | 0.680 | 0.072 | 9.335 | 0.000 |
| Perceived Enjoyment -> Perceived Usefulness | 0.624 | 0.620 | 0.090 | 6.960 | 0.000 |
| Perceived Usefulness -> Intention to use | 0.398 | 0.358 | 0.189 | 2.105 | 0.036 |

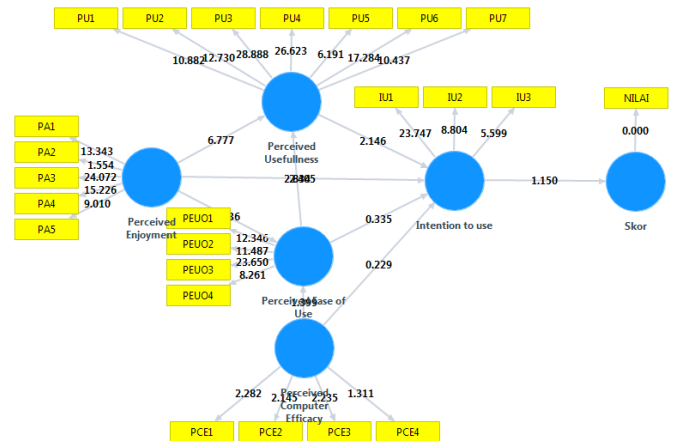


Fig 5 Output Model of TAM

V. CONCLUSION

This study provides empirical evidence that the use of the method of learning the game, in this case the game software accounting, affect the achievement of students. The inputs quality, that is students' academic potential, interact with the use of learning methods. The use of accounting game software improve the positive influence of students' academic potential on the quality of output, that is the student achievement. This finding is consistent with previous studies that suggest the use of IT in teaching accounting Elliot (1992), Pincus (1997), and Goldwater and Fogarty (2007).

Intention to use the accounting game software arises because students feel enjoy when learning with use of the software game and feel the benefits of using it. Students feel the benefits of learning with using game software. Intention to use game is also influenced by the perceived ease of use in using the software. Perceived ease of use does not directly affect interest in using the software but affect the interest through perceived usefulness. This finding supports the theory TAM (Davis, 1989) and the idea that the game makes students enjoy studying accounting (Facer, 2003, Ginnis, 2008).

Tests on a group of students who use accounting game software can not prove the influence of intention to using the software on student achievement. Because testing is done on a group of students who use accounting game software, while testing the interaction model shows the effect of the interaction between the quality of the input with the use of learning methods on the quality of output or student achievement, so it mean that: 1) the use of accounting game software improve student achievement, 2) when students alike have been using the accounting games software, learning

achievement will be determined by other factors, one of which is the academic potential of each student, with reference to the results of hypothesis 1's verification.

The results showed also that the lecturer does not affect the learning process. This supports the idea that in the college learning process, lecturer function more as facilitators. The success of the learning process is more dependent on student independence in learning. However, these results can also be caused due to the quality of the four lecturers that administer an introductory accounting courses have the same quality. Thus does not cause differences in the impact on the learning process. To investigate further lecturers variable, research will be encouraged to develop indicators to measure the lecturers quality variable.

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