

Computer Based Test Using Tcexam As An Instrument Learning Evaluation

Ambiyar, Muhammad Luthfi Hamzah, Astri Ayu Purwati, Eki Saputra

Abstract: In today's digital era, technology has changed the method of appraisers significantly, especially in the field of education moving towards the use of Computer Based Test (CBT). CBT is a test or assessment that uses computers either using their own network or using the internet. This study used TCEXAM, an Open Source system for electronic exams that allowed educators and trainers to write, schedule, deliver, and report quizzes, tests and exams. This research was conducted by using Descriptive Analysis and ANOVA Test which were generated through questionnaires to 73 students consisting of 28 students using Paper Based Test and 45 students using Computer Based Test in E-Commerce Course. The results showed that 83.70% of the students who used CBT responded and strongly agreed that CBT provided effective, practical and efficient impact on learning outcomes. ANOVA test results also demonstrated that there were different responses from students using PBT and CBT as indicated by the sig value for effective measurement (0.004), practical (0.009) and efficient (0.000) $<\alpha = 0.05$. The Gap value of comparison obtained is 0.793 in which students who used CBT typically agreed (average response 4,126) while students who used PBT typically answered quite agree (the average value of the lower response is 3.333). Based on the results of this study, it was concluded that the use of CBT obtained a very good response for students because the learning evaluation process became very effective, practical and efficient.

Index Terms : Computer Based Test, TCEXAM, Learning Evaluation Instrument, E-Commerce Course.

1. INTRODUCTION

In this technological era, all processes in everyday life become easy since the rapid development of technology. Technology becomes very essential for all organizations to support their activities. One sector getting the impact of rapid technology is the education sector. The role of information technology is very instrumental in improving teachers' competence and the teaching and learning process in organizations, colleges, schools [1]. Test is a measuring instrument commonly employed in evaluation and assessment systems. Widoyoko (2015) defines the test as a number of statements that must be given a response to measure a person's ability level [7]. Furthermore, Rahmlow & Woodley (1979) assert three functions of a test in education, namely: (1) as a tool for decision making, (2) as a facilitator of learning, and (3) as a tool to increase motivation. As a decision making tool, a test acts as a discriminator, which means a tool to determine who can and who cannot show or demonstrate the learning quality on an object properly. The role of the test as a facilitator of learning indicates that a student needs to recognize the value or benefits of learning in relation to a test situation. Meanwhile, the role of the test as a tool to increase student motivation implies that motivated students will increase the frequency of learning [8]. Interest and motivation to develop and implement computer-based tests (CBT) in learning assessment in educational institutions has increased in recent years. Providing computer assessments is becoming more and more common in the education assessment domain as changes are made in assessment methodologies that reflect practical changes in

the pedagogical method [3] [4] [5]. Chuan Yan Piaw applied achievement tests, psychological tests and motivation questionnaires in the design of the four Solomon groups to test the validity of CBT and its impact on test performance and motivation. This finding provides evidence for the problem of CBT validity in educational and psychological assessment [6]. TCEXAM is an Open Source for digital testing which is also called CBA (Computer Based Assessment) and CBT (Computer Based Test) which allows lecturers to make, schedule, deliver, and report quizzes, tests and exams electronically. TCEXAM is a web based Web-Based with independent platform and language. TCEXAM makes all stages of assessment automatically: author, schedule, shipment and report. It's easy to use and neither require expensive hardware to run, nor additional commercial software. Users connect to the TCEXAM system by using public Web browsers such as Mozilla Firefox or Chrome and others. The general advantages of TCEXAM, compared to traditional Pen-Paper Testing (PPT), include: increasing shipping, administration and efficiency assessments; reducing costs for many elements of the testing cycle; improving test security resulting from electronic transmission and encryption; consistency and reliability; processing test revision more quickly and more controlled with shorter response times; making decision more quickly as a result of direct assessment and reporting; administration of unbiased tests and assessments; fewer response entries and recognition errors; less misunderstanding caused by the testing process; improving translation and localization with the availability of universal content; new and sophisticated types of goods; increasing candidate acceptance and satisfaction; evolutionary step towards future testing methodology [2]. This research analyzed the comparison of CBT, which uses a computer, to PBT, which uses paper. The current situation occurring at Pelita Indonesia College was that the lecturers conduct learning evaluation mostly through the traditional method, which combined written essay exams and practice exams. Recently, the number of students increases drastically and conventional evaluation methods seemed to be irrelevant since it took much times to conduct evaluation and assessment. The solution for examination in a large class is an automated testing system

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using a computer either using its own network or using the internet. The statement of the problem in this study was 1) Are there differences between classes which apply PBT and classes which apply CBT in responding to the effectiveness, practicality and efficiency of the use of these two learning assessment methods? 2) How significant is the difference?

2 RESEARCH METHOD

This study was conducted at Pelita Indonesia College of Computer Science. The population was all sixth semester students at Pelita Indonesia College of Computer Science who took Computer Networks subject with a total of 73 respondents. Based on the number of population, it was possible to take all of the population to be samples (census sample). The design of this study was a descriptive research. Descriptive research is a study of a problem in the community and procedures that apply in certain communities and situations, including the activities of relationships, attitudes, views, processes that are ongoing and the effects of a phenomenon [9]. This study also used ANOVA Test to see comparisons between classes that applied PBT learning evaluation with classes that applied CBT learning evaluation. The data was collected through an anonymous questionnaire. In the introductory section, participants were introduced to the research objectives and were asked to participate by filling out a questionnaire. The questions were obtained from the variable indicators consisting of the effectiveness of use, practical value and efficiency of use. The class interval assessment criteria for descriptive analysis of respondents' responses use the following table: Furthermore, the development of the CBT model in this study is as follows:

TABLE 2
RESULTS OF ANALYSIS OF THE RESPONSE FREQUENCY OF RESPONDENTS USING CBT

| INDICATORS | SCORE | | | | |
|---------------|-------|-------|-------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 |
| Effectiveness | 0 | 0 | 6 | 26 | 13 |
| Percentage | 0 | 0.00 | 13.33 | 57.78 | 28.89 |
| Practical | 0 | 11.00 | 1.00 | 21.00 | 12.00 |
| Percentage | 0 | 24.44 | 2.22 | 46.67 | 26.67 |
| Efficiency | 0 | 0.00 | 4.00 | 16.00 | 25.00 |
| Percentage | 0 | 0.00 | 8.89 | 35.56 | 55.56 |

3 RESULT AND DISCUSSIONS

Based on the table of frequency analysis result above, it is revealed that most of the students responded "agree" and "strongly agree" for each indicator of usage level measurement, such as effectiveness, practical and efficiency. The percentages for each indicator are 57.78% and 28.89% for effectiveness, 46.67 % and 26.67% for practical and 35.56% and 55.6% for efficiency. The average score of the total respondents who answered agree and strongly agree is 83.70%. It demonstrates that most of respondents in this study agreed to the use of CBT assessment methods in the learning process Table 3 above displays the results of ANOVA test for the three indicators of measurement of effectiveness, practical and efficiency, which respectively obtained the score of F test 9,027, 7,113 and 21,938 > F table 3.13 and sig values of respectively 0.004, 0.009 and 0.000 < $\alpha = 0.05$. This means that there is a significant difference between the responses of students who used CBT with students who used PBT. The difference can be seen from the average response of respondents. Students who used CBT were in the interval "agree" obtained a value of 4,126 while those who used PBT obtained a lower average response value of 3,333 which is in the interval of quite agree. The results of gap analysis also demonstrates that there is a gap of 0.793 between the two categories of respondents measured.

TABLE 1

DETERMINATION OF CLASS INTERVALS

| Average Calculated Score | Variables |
|--------------------------|-------------------|
| 1,00 – 1,79 | Strongly disagree |
| 1,80 – 2,59 | Disagree |
| 2,60 – 3,39 | Quite agree |
| 3,40 – 4,19 | Agree |
| 4,20 – 5,00 | Strongly agree |

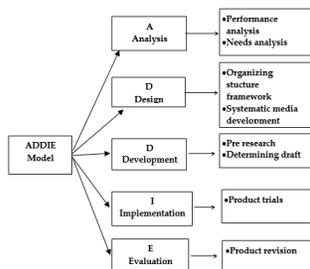


Fig. 1. Stages of Research and Development

TABLE 3
RESULTS OF DESCRIPTIVE AND ANOVA OF COMPARISONS BETWEEN STUDENTS WHO USE PBT AND CBT

| CATEGORIES | EFFECTIVE | PRACTICAL | EFFICIENT | AVERAGE | NOTE |
|------------|-----------|-----------|-----------|---------|-------|
| CBT | 4.156 | 3.756 | 4.467 | 4.126 | AGREE |
| PBT | 3.464 | 3.036 | 3.500 | 3.333 | AGREE |
| F TEST | 9.027 | 7.113 | 21.938 | | QUITE |
| SIG | 0.004 | 0.009 | 0.000 | | |

The development of an evaluation program into CBT with TCEXAM software facilitated to students who took E-commerce courses at Management Study Programs at Pelita Indonesia College of Economics, Pekanbaru, was conducted based on the development procedures. The process of creating CBT with TCEXAM software was executed in accordance with the development process based on the stages of analysis, planning, product development, limited testing, revision and evaluation. The analysis phase was conducted by interviewing the lecturers of E-Commerce subject. The initial situation for conducting this research was that the evaluation program performed by the lecturer still used paper and written answer sheets (paper based test). The design phase includes preparing the structural framework of the evaluation program that will be created, determining the systematic development of evaluation programs and designing evaluation tools to achieve these core competencies. To organize the structural framework, the researcher analyzed the material to be displayed, determined the design of the display, determined the question of evaluation and designed the concept. When the systematic development of the media was determined, the interface display design, index display and evaluation display were produced. Then, an evaluation tool in the form of an instrument was designed. The development phase resulted in a CBT draft with TCEXAM software through the pre-research phase. The intended pre-study was to validate the product to media experts and material experts. The validation results were used as a draft and editing was performed in order to conduct the next stage, namely the implementation or trial stage. After being tested in small groups and revising the product based on the input given by students, the product was tested into a large group to reveal the achievement of student learning outcomes and the new response from students. Based on the data obtained, the average score of students' response from the three aspects that were asked, namely the effectiveness, practicality and efficiency of the use of CBT is "agree" which means that after the applying CBT in the learning evaluation, students argue that CBT is very helpful for them during the implementation of the exam. Based on the analysis results above, it can be concluded that TCEXAM software is suitable to be used as an evaluation program in E-Commerce subject. This computer-based evaluation program has several advantages compared to paper-based tests, including permitting work at the right time for students, reducing the time for test assessment and making written reports, eliminating logistics work such as distributing and storing tests using paper, providing feedback, giving values, time constraints, randomly randomized questions, both question and answer numbers. As a result, it

can minimize fraud. It can be filled with multimedia, such as pictures, sounds, and videos, and test participants can immediately find out the results. Computer-based tests also have disadvantages such as to be dependent on equipments such as computers, require adequate computer laboratories. If the CBT system gets troubles, the implementation of CBT will be delayed. After that, it is necessary for students to master computer knowledge and skills. Meanwhile, paper tests do not require special equipment and can be done anywhere.

4 CONCLUSION

Based on the research on computer-based learning evaluation instruments which implement TCEXAM, it can be concluded as follows:

1. The use of CBT in learning evaluation gets a good response for students in conducting learning evaluation which is effective in assessing student learning outcomes.
2. This study also allows students to immediately reveal how far the understanding of the material that has been conveyed by the lecturers from the test results using CBT
3. And the efficiency in evaluating learning is observed in the duration which can be saved by using CBT when it is compared to using traditional methods namely PBT which takes longer.

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