

Optimizing the Roles of Information and Communications Technology in the Assessment of Learning Outcomes

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Abstract— This study aims to maximize the learning outcome assessment. The background are many weaknesses in the procurement of conventional tests, including the tendency of students to cheat, supervisors inconsistent with his duties in supervising the exam, and the risk of loss of student answer sheets for collecting the same time. Therefore, the authors took the initiative to take advantage of information and communication technology in order to overcome the weaknesses found in the conventional assessment system. In this case, the authors plan to create a web-based learning assessment by applying a computerized testing system. The core concept of this system is to transfer the questions that have been made from used paper into a computerized system using wireless media. In practice, the research has the stages of needs analysis, preparation of draft system, system testing, expert judgment, revision and improvement of the system. By using this system, the problems that have been created will be displayed to the computer or other supporting devices belonging to students at random. The weaknesses found in conventional testing systems can be minimized: minimize cheat, executed only with a system administrator, automatic timing by the system, and no risk of losing an answer sheet.

Keywords— *assessment, computer-based test, information communication technology, lecturer, students*

I. INTRODUCTION

One measure of the success of the learning process at a university is the result of the assessment. Assessment is not separated from the elements that support them are lecturers, students, materials, and assessment process. Teaching will not be complete without assesment being a measure of the success of the teaching and learning process,

and the exam is one part of the assessment [1]. On average, assessment activities account for 25% of the total workload of teaching activities. In addition, the workload on other activities decreases as the assessment activity is conducted [2].

Assessment of learning is the assessment that becomes public and results in statements or symbols about how well students are learning. It often contributes to pivotal decisions that will affect students' futures. It is important, then, that the underlying logic and measurement of assessment of learning be credible and defensible [3].

However, if the execution of the test is done in general with a number of examinees in the classroom to do the written questions and supervised by a number of supervisors, there may be many weaknesses. Some of the disadvantages of conventional test execution are (1) the tendency of students to cheat, (2) supervisors who are not disciplined by their duties; (3) poor time management because of the lack of consistency of the exam time, and (4) the risk of missing the answer sheet.

Meanwhile, the advancement of information and communicatoin (ICT) technology brings a profitable ease for the education world. Information technology is not just limited to computer technology (hardware and software) used to process and store information, but also includes communications technology to transmit information [4]. From this definition it appears that in the information communication technology there is a close relationship between the technology that processes data and communications that transfer the results of data processing.

With the technology of internet science seekers not only easy to get the source of knowledge in the form of quality learning materials; And build discussion forums with experts

from around the world. With information technology can also be developed an information system. An information system collect, processes, stores, analyzes, and dissemination information for specific purpose “Application” [5].

Even with good data storage and processing evaluation activities in learning can be done, either as a question exercise or as an official evaluation (exam).

ICT-based assessments offer many advantages over paper-based assessments. The computer-based assessment system allows the implementation of the test to be tailored to the request so as to enable students to take the exam at any time. Students also get instant value feedback from the system. [6]. Computer-based testing environments offer a number of advantages for instructors (lecturer) including less photocopying, more flexibility, and immediate score reporting just a few [7]. Delevering assessments via ICT becomes increasingly prevalent in the domain of educational assessment because changes are made in an assessment methodology that reflects a practical change in pedagogical methods [8][9][10].

To overcome the weakness of conventional assessment, in this research will be delivered how the process of applying the test by utilizing this ICT, and what benefits are obtained after using this method.

II. METHOD

The author uses observational techniques to explore the problems that arise in the assessment process in learning. Then the results of these observations are used to develop an existing problem-solving plan. The research scenarios to be conducted are as follows:

The instruments used for the implementation of the action include (a) the lecturer and student appraisal sheets on the system made and (b) the value of the result of the subject of the student subject. The monitoring instruments / observations of the action execution are (a) the observation sheet of the test implementation with the new system, (b) the obstacles encountered in applying the new system, and (c) the suggestion of the system users for further development.

The research data were collected using observation and documentation techniques. Observations were made during the testing process with the new system performed while the document from the test results on the students was taken for analysis. The additional data required is a constraint in applying this system and also a suggestion sheet of the users so that the system will be developed and perfected.

Once the data has been obtained, the authors will perform data analysis using qualitative methods. Qualitative analysis is done by analyzing the observation sheets and questionnaires that have been given to lecturers and students as system users. The analysis is performed on the ease of system usability, the completeness of the system layout, the readability of the instrument and the effectiveness of the system usage. The results of the questionnaires that have been given to the user and the subject of the study will be analyzed and then described and displayed into diagrammatic form.

The results of the questionnaire are also used to analyze effectiveness of the system. The questionnaires to be spread include 2 kinds of questionnaires for students and questionnaires for lecturers. The results of the two types of questionnaires were analyzed to determine whether the use of web-based test system was effective or not, and also to obtain the errors found by the respondents.

III. RESULT AND DISCUSSION

The authors made observations when the exam was conducted, and conducted interviews with lecturers about the implementation of the assessment conducted. From the results of observation and interviews, found several weaknesses of conventional testing systems include the following: (1) students who tend to cheat with various kinds of cheating; (2) less than maximal supervisory role; (3) excessive use of paper; (4) the risk of loss of exam papers; (5) the correction process is done manually which is susceptible to error correction and takes a long time.

To reduce the weakness, the authors utilize information communication technology (ICT) to develop a web-based test system or better known as computerized based test (CBT).

The first thing to do is to observe the conventional exams, interviews with several lecturers, collect exam documents, and conduct literature studies on several related references. This step was done to determine what features should exist in the system to be developed.

After the need analysis, the next step is to create a draft system, as in Figure 1.

Figure 1 explains that the lecturer uploads the test question to the server. Then, when the test is done, the server takes the questions and transmits them via the internet accessed by the students through their online media. Students work directly and will get their exam results quickly.

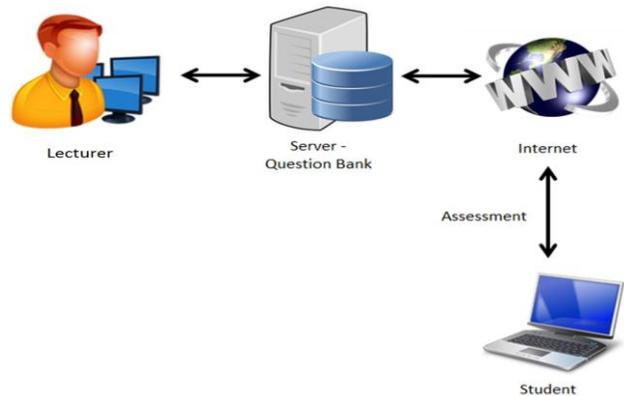


Fig 1. Draft of system

Based on the initial analysis, the next stage is to develop a prototype system that can meet the needs of users. But for the perfection of the system, the prototype is tested to potential users, ie students and lecturers. With prototype testing can be known whether all the functions of the system, can be used properly or not. In addition, system users can provide input for a better system.

The next step is to improve the system based on the notes and inputs obtained during the testing phase. A series of tests and improvements continues until the system meets the needs of users.

From some testing and improvements done, the software is made to have the following specifications:

- a. Login. For system security purposes, the system can only be used by successfully logged in users by entering keywords, student number and password. The keywords used are private so no one else knows.
- b. Bank questions. Lecturers can create questions that are uploaded / stored in the question bank on the server, and add them at any time, so that before the execution of the exam the teacher does not have to bother making new problems. Because the questions in the question bank will be used on each exam, the lecturer does not need to make any questions before the exam. But it would be better if the number of questions stored more than the number of questions that came out during the exam.
- c. Randomization of questions. The system can be randomly generated, so the possibility of cheating can be reduced.
- d. Inserting media. To complete the question, you can add a picture to the question given to the student. This developed system has not been able to use other media, voice or video.
- e. Control of time. Test time can be set automatically or manually.
- f. Auto correction. In accordance with the key answer made by the lecturer, then the system can automatically correct student answers, and provide value directly.
- g. Monitoring. Lecturer can monitor students' work, time, and results. So the teacher can know the student's ability and evaluate the way of learning that has been done.
- h. User. There are two users of this system, lecturer and students. Lecturers can define problem settings and monitor all student activities. While students can only do the problem according to the rules.

To find out whether the system built is able to overcome the weaknesses that exist in conventional tests, conducted by using questionnaires to the participants. The participants in this study were students and lecturers as users of the system. Participants are given the opportunity to try to use the developed system. Later, they were asked about the use of this scoring system.

Questions in the survey of students focused on 6 aspects, namely the ease of system use procedures, the clarity of the exam, honesty, support equipment, transparency in the assessment results, and time limitation. The results of a survey of 115 students can be seen in Figure 2.

Of these 6 aspects, 5 aspects were positively responded by most respondents. Students can use the system easily, and do not experience any constraints from logging into the system, working on the problem, until logout (72.22%). Writing or picture on questions and answer options can be read easily because the size of the appearance can be adjusted (81.67%).

Exam questions are randomly displayed among examinees, resulting in each student must be more honest without cheating (76.67%). Media, internet access, and other support equipment are not a problem for most students (56.67%). And almost all students responded positively to the test results that can be directly known (96.67%).

Only the time limitation of the question responded negatively by most students (66.67%). Students feel the time provided is not enough to do the problem. This can be overcome by the system with the time setting facility for the workmanship of the problem.

Meanwhile, the survey of lecturers is done by asking 3 aspects, advantages, ease of use, and types of exam question. The survey results of 7 lecturers can be seen in Figure 3.

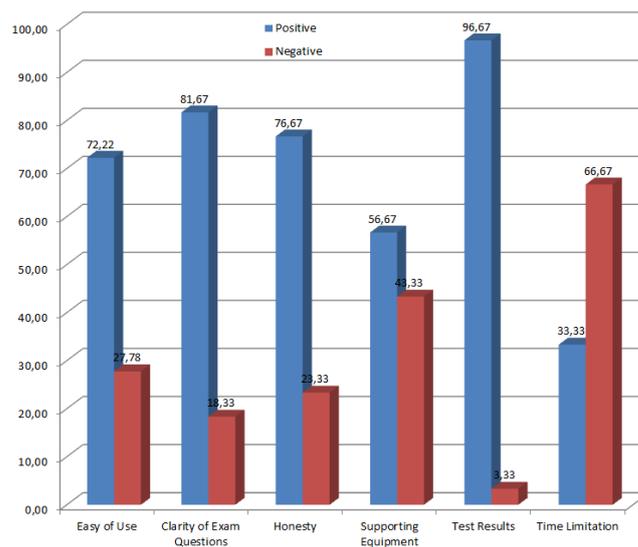


Fig 2. Survey result of students

Most lecturers (88.89%) claim to benefit from the system. Benefits perceived by lecturers, among others (1) questions made by lecturers and stored in the bank questions on the server can be used every test, and also lecturers are given the freedom of time to add questions, not just before the execution of the exam, (2) lecturers no longer need time to supervise the exam and correct student answers, because it has been done by the system automatically, (3) lecturers do not have to worry about losing the student answer sheet, because it is stored in the system and can be downloaded at any time. Implementation of the online exam also reduces many costs incurred, namely the cost of copying the question sheets, exam supervision fees, and correction fees.

Lecturers also feel easy to use this system (66.67%), namely (1) ease in using all the functions in the system, and (2) ease of making and storing questions into the server. The use of online examination system can be done easily because students and lecturers, as users, are familiar with computers

and the internet so in the implementation we did not experience any significant problems.

But the question form is only multiple choice type, most of the lecturers consider as the weakness of the system (82.00%), because it is only suitable for measuring the ability of students' knowledge and understanding, not for high sphere.

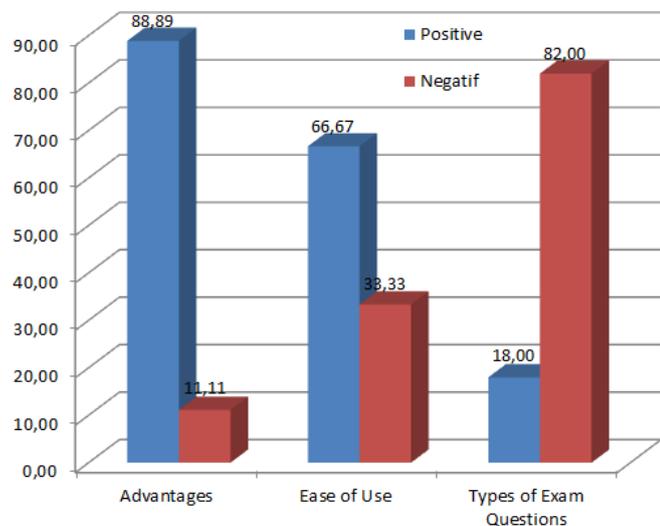


Fig 3. Survey result of lecturer

IV. CONCLUSION

From the stage of research that has been implemented, the authors make the conclusion that ICT role and can be utilized optimally in the world of teaching, especially in the test system. Computer-based test systems can overcome the weaknesses that exist in conventional tests, namely (1) the tendency of students to cheat does not occur because the question is given randomly to each examinee, (2) the execution of the exam does not require a special exam supervisor, only one system administrators who oversee the running of the system, so there is no longer an undisciplined problem of the exam supervisor; (3) poor time management because of the inconsistency of processing time will be solved by automatic time setting by the system, and (4) there is no risk of losing answer sheets, because students' answers are stored on the server and can be downloaded at any time.

There are some notes from this research, that the computer-based test system developed can only be used to test with multiple choice questions, and still needs to be developed to include other types of problems, such as matching and essay. This study did not compare students' test results using paper-based test and computer-based tests. Previous research revealed that examinees performed better on paper and pencil test (PPT) than computer-based tests (CBT) with ratio 24.6 to 23.6 [11]. Meanwhile, other studies have shown that there is no significant difference in these two test modes that will

likely result in the same test scores [12]. This is the same as another study revealed that there is not any difference between CBT and PPT if the test administration condition is equivalent except the influence of students' preference in computer-based test rather than paper-based test mode [13][14][15].

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