DISTANCE STUDENTS' PERCEPTION ON THE QUALITY OF COMPUTER–ASSISTED INSTRUCTION PROGRAM IN OPERATION RESEARCH COURSE

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ABSTRACT

Universitas Terbuka (UT) is a distance education institution that implements communication technology in various ways. In accordance with the implementation of this technology, UT uses both printed and non-printed materials designed as self-learning materials. These learning materials provide students not only with explanations of a subject but also with instructional learning purposes, examples, practices, summaries, formative tests, feedbacks, and learning instructions. Computer Assisted instruction (CAI) as a technology based learning material can be used as a supplement to the main learning material. For instance, Operation Research is mainly delivered to students through modules but it is completed by the CAI program. In order to improve the quality of the CAI program, an evaluation is needed, especially the evaluation that invites students' opinion. It is important to ask the students how the CAI program can help them comprehend a topic and which part of the program should be improved. The aim of this study is to figure out whether there are differences between students' expectation and students' perception toward the quality of the CAI program, namely the Operation Research. Some questionnaires were given to 41 respondents in Jakarta. Purposive sampling was chosen as a sampling technique with a criterion that each respondent has passed Operation Research Subject examination. From 30 questionnaires sent back and analyzed it can be concluded that there are some differences between students' expectation and students' perception toward the quality of the CAI program.

Keywords: perception, expectation, quality, CAI program.

Education is a basic need as well as a basic right for every citizen without distinguishing age, social status, gender, religion and other things that discriminate one person to another. It is to say that everybody has a right to receive educational services. It is the government's responsibility to provide education for all citizens without any exception. The most appropriate way to give education services to all citizens all over the country is using distance education, because not like in conventional education, a routine face to face class meeting is not needed in distance education. Therefore, everybody especially he/she who lives in rural area has an opportunity to follow this education.

Indonesia is an archipelago country which has 7 million km^2 in width; consist of 17.459 islands with 220 million people spread over the country. This geographical condition has caused some people who live in villages not easy to go to higher education. To solve this problem, UT is expected to be able to fulfill the need of higher education both for they who are fresh graduate from high schools and they who don't have a chance to go to any university, because they live in remote area.

As a distance learning institution, UT implements a distance learning system in which teachers and learners are separated physically. This will demand higher effort from the students to be successful in their learning because they have to be self learners. To help they learn, UT has developed integrated course materials and they are continuously improved to make the students easier to learn the materials and to make the materials up to date. These materials, of course, are designed as self learning materials that can be learned by the students with less help from other people, such as teachers. The materials provide students not only with explanations of a subject but also with instructional learning purposes, examples, practices, summaries, formative tests, feedbacks, and learning instructions.

UT uses printed materials as the main learning materials and non printed materials as supplements. The forms of non printed materials are video, interactive video, audio, and computer assisted instruction (CAI). These materials are used to give more detail explanations about a "difficult to learn" subject that have been explained in printed material.

One of the subjects that difficult to be learned by the students is Operation Research. This course is mainly delivered in printed materials and completed by a CAI program as non printed materials. In this subject, math is a difficult part for the students. To make the CAI program better, an evaluation from the side of its users' view is needed. It is important to understand students' perception and expectation on the CAI program. Thus, the aim of this study is to figure out whether there are differences between student's expectation and students' perception on the quality of the CAI program.

THEORETICAL BACKGROUND

Distance education has been defined in various ways. In its most basic level, distance education takes place when a content provider and a learner are separated by physical distance. Technology acts as an interface for face-to-face communication, bridging the instructional gap (Smith, 1998). However, in today's environment, distance education may be better defined as education in which the students and the instructors, while physically separated are intellectually connected via technology (Burke, 1998).

Distance education has come into being more than a decade ago. However, as the development of technology progresses overtime, the mode of communication has changed substantially. Studies show that distance education is a cost-effective mode of instructional delivery. This is because it increases learner access by accommodating the schedule of non-traditional student body such as adults with job and family responsibilities.

As mentioned before, unfortunate situation caused by the separation of students and teachers can be decreased via technology. Technology is evolving at rapid pace, fuelled by faster, smaller, more powerful, and less expensive components that are easier to use. Archer (1998) reported that technology can improve student's achievement. Technology also has positive benefit for students, but it depends on how technology is used. Cradler, et al (2002) described how technology can be used to support and influence student learning: "Research and evaluation shows that technology can enable the development of critical thinking skills when students use technology presentation and communication tools".

One way to use technology in delivering learning materials is by using computer-assisted instruction (CAI). CAI could be of great help because of the drill-and-practice, tutorial, or simulation activities offered either by themselves or as supplements to traditional teacher directed instruction (Cotton, 2001). Cotton found in her study that computer software provides many instructional benefits and CAI can have a much greater impact on student learning. CAI is also flexible in meaning that it can correspond to the ability of learning of a student. Students who have a faster ability to understand a topic can finish learning faster than other students that have lower ability to understand a topic. There is evidence that CAI is also beneficial for slow learners as well (Torgeness &Young, 1983). One explanation for this may be that computer is more attractive and motivating to the students. It seems to promote engagement. The students prefer program with higher interaction requirements as well as the use of animation, sound, and voice features (Hitchcock & Noonan, 2000). The tasks on the computer can be adjusted and customized to fit the needs of each individual student. The difficulty level can be adjusted either up or down and as the student progresses the levels can be increased, giving the student a sense of accomplishment and pride (Zimmerman, 1988).

Assessing the quality of learning material in distance education is important because students have to learn autonomously. The quality of learning materials needs to be assessed by the students, including the quality of CAI. Applying the consumer behavior theory in education, students are the consumers purchasing the service provided by education; therefore, students have the right to obtain the best quality education. Student's expectation of education quality, including the learning materials, must be high which means that the materials should be interesting and easy to be learned.

Meanwhile, perception is a process of taking information of a stimulus from the environment and changes it into psychological appreciation (Van den Ban, 1999). Perception also can be defined as experience of an object, event or relationship that is acquired by concluding information and interpret message. Consumer perception is become an important factor of a success or failure of a product on market.

METHODS

This research is designed as an explanatory research which is aimed at analyzing the gap between students' perception and students' expectation toward the quality of a CAI program. Data collection started with preparing and reduplicating the CAI program. Two pairs of questionnaires were designed to ask respondents' expectation and perception toward the quality of CAI program. The first pair of the questionnaires is about students' expectation of

how the quality of a CAI program should be and the second pair is about respondents' perception on the quality of Operations Research CAI program. Probability sampling with simple random sampling was chosen as a sampling technique. The students who have passed Operations Research subject were selected as respondents. A CAI program and 2 pairs of questionnaires are given to each respondent. Respondents used the CAI program and answered the questions in two weeks. From 45 questionnaires, only 30 questionnaires were sent back by the students.

RESULT AND DISCUSSION

Collected data was analyzed to find gaps between students' expectation and students' perception on the quality of Operation Research CAI program. And to identify which part of the program that need to be revised or completed. This analysis used *paired t-test* to compare average score of students' expectation and students' perception toward CAI program. Therefore hypothesis in this research are:

H0: there is not any difference between average score of students' expectation and students' perception.

H1: there is any difference between average score of students' expectation and students' perception.

The questionnaires to collect data about students' perception were designed by using five-option Likert scale to be able to use *paired t-test* in analysis. This test was done by using computer with SPSS PC for Windows Release 12 as the software. Result of the data analysis of the students' answers to 40 questions about their expectation and their perception, by using paired *t-test* can be seen on table 1.

Table 1. Mean Differences between Students' Expectation and Students' Perception (n=30)

Measured Items	Expectation (mean)	Perception (mean)	Gap (H-P)	Sig (2-*tailed*)
Menu lay out	4,7000	4,0667	,6333	,000
Content is systematically structured	4,5333	4,2333	,3000	,010
Navigation directory is clear	4,6333	4,3667	,2667	,018
Access to links is easy	4,6000	4,2667	,3333	,010
The use of language is effective	4,6333	4,2333	,4000	,005
Message is easy to understand	4,6000	4,3333	,2667	,058
Text illustration is impressive	4,3333	3,9333	,3333	,039
Graphic illustration is impressive	4,2000	3,8333	,3667	,014
Color combination is impressive	4,1000	3,8667	,2333	*,229*
Animation is impressive	3,9333	3,7667	,1667	*,344*
Sound is clear	4,5667	4,1333	,4333	,010
Music illustration is good	3,9000	3,7000	,2000	*,264*
Picture is sharp	4,0667	3,9667	,1000	*,448*
Content is in line with students' competencies stated in BMP/modules	4,6333	4,2333	,4000	,001
Learning goal is clear	4,6333	4,2667	,3667	,003
Content delivery is easy to understand	4,7000	4,3667	,3333	,023
Content is correct	4,7333	4,1333	,6000	,000
Exercise is included	4,6333	4,3667	,2667	,043
Feedback is included	4,6000	4,3667	,2333	,050
Test is included	4,6000	4,4667	,1333	*,255*

To count gap in each item on table 1 is that the average score of students' expectation minus the average score of students' perception. Generally, gaps that have positive scores show that students' expectation of a CAI program is higher than their perception on Operation Research CAI program. With other words, Operation Research CAI program is still not be able to meet students' expectation in every measured item. Statistically comparison between students' expectation and perception after using *paired t-test* shows that there is a significant difference for 15 items, with *p value* < 0,05 at 95% *confidence interval.* The result of the analysis shows that, for the 15 items (item no. 1,2,3,4,5,6,7,8,11,14,15,16,17,18,19), H1 can be accepted or in other words there is a significant difference between students' expectation and perception. The other 5 items, these are item no. 9, 10, 12, 13, 20 do not show significant difference between students' expectation and perception, with *p value* > 0,05 at 95% confidence interval. This result shows that H0 be accepted or in other words there is no significant difference between students' expectation and perception. This indicate that statistically what expected by students on the 5 items are in the line with their perception toward the quality of the CAI program. The items order from the smallest to the biggest differences of students' expectation and perception can be seen in table 2.

Table 2. Gap Sequence of Each item

Measured Item	Gap
Menu lay out	,6333
Content is correct	,6000
Sound is clear	,4333
Content in line with the competences stated in BMP/modules	,4000
The use of language is effective	,4000
Graphic illustration is impressive	,3667
Learning goal is clear	,3667
Access to link is easy	,3333
Text illustration is impressive	,3333
Content delivery is easy to understand	,3333
Content is systematically structured	,3000
Navigation directory is clear	,2667
Message is easy to understand	,2667
Exercise is included	,2667
F*eedback* is included	,2333

Table 2 shows that the attributes are the biggest weakness from Operation Research CAI Program and it also means that their perception toward these attributes is not in the line with their expectation.

Based on the 15th item, menu layout is on the top of the list. It means that according to the students, the placement of menu on screen is not good or event confusing. Therefore, an improvement in menu layout is needed to make the students easier to comprehend the subject. The other items also need to be improved seriously.

CONCLUSION

This research is to analyze differences between students' expectation and perception toward Operation Research CAI program. To measure students expectation and perception, 20

question items about students' expectation and 20 question items about students' perception, have been identified. The analysis result shows that there is 5 items in line students' expectation, these are color combination is impressive (item 9th), animation is impressive (item 10th), music illustration is good (item 12th), picture is sharp (item 13th), and test is included (item 20th). These show that about the color, students like the chosen color. Animation added to the program has met students' expectation. Meanwhile, about music and picture have also met students' expectation. The selection of good music together with sharp pictures can also help students to comprehend the subject easier. The last item is about the test included in the program and it has met students' expectation and can help students to learn the subject.

Analysis on the 15 items shows that there is a significant difference between students' expectation and perception. Menu layout is on the on the top of the list because it has a biggest gap. This shows that menu layout is still make the students difficult to understand the subject. In CAI program, a good menu layout will help students easier to use the program. Hence, because this item has the biggest gap, so an improvement on the menu is badly needed. Other items also need to be improved, like the content has to be correct, sound has to be clear, competencies need to be more suitable, and the use of language need to be in our concerned.

Like other researches, this research has some limitations. One of the limitation is that this research uses the students who have passed Operation Research subject without identifying how long the students have passed the subject. This can give an impact to students' answers, because the longer they have passed the subject the more difficult the students to re-learn the subject in CAI program. Hence, it will be better if in another research, researcher uses students who are studying the subject as samples, so that students' answer will be more accurate. The second limitation is that the use of questionnaire will allow students to learn CAI in different time, opportunity, and condition. It will be better if the research use experiment method, so that students answer can be collected in the same time.

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