Analysis of Student Ability to Develop ICT-Based Teaching Materials (Case Study in Biology Education Study Program UIN Syarif Hidayatullah Jakarta)

Baiq Hana Susanti [1)]
[1]Biology Education, UIN Syarif Hidayatullah Jakarta
email: baiq.hana@uinjkt.ac.id

ABSTRACT

Global competitions require human resources that have competitive advantages, including in the field of education. UIN biology education program has responded by developing ICT-based lecture system. The development of the most up-to-date courses is e-learning, which is one of the learning system which use communication and information technology. Learning object becomes very important part. Students become accustomed to utilize the various learning sources available online. On the other hand, the ability to develop teaching materials is one of the required skill as professional teachers. The research purpose was to obtain more information about the ability of students to develop ICT-based teaching materials. This research used descriptive qualitative method, the assessment of teaching materials developed by students done before and after the lecture. The subject of research was the 25 students who were enrolled in Vertebrata courses. The validity of the teaching materials assessed by experts using specific instrument, students respond data also collected using questionnaire.The results showed that the average value given by the expert validators was 83 that fall into good category. While the average response of students to teaching materials fall into moderate category. Teaching materials developed by students before and after the lecture also showed significant changes. Before the lecture, all teaching materials developed by students are still in the form of power point. After attending lectures, the types of teaching materials developed by the students were varied. Those consist of wordpress (24%), wix (20%), webnode (12%), prezi (12%), android (8%), macromedia 3D Presentation, Power Point Inspiring, and Website UIN respectively by 4%.

Keywords: ICT-based learning materials, learning object, e-learning.

INTRODUCTION

The change of civilization towards a knowledge society requires the world community to master 21st century skills of understanding and utilizing information and communication technology (ICT Literacy Skills).

Education plays a very important and strategic role in building skilled society that has: (1) technology and media literacy; (2) effective communication; (3) critical thinking; (4) problem solving; and (5) collaboration. A strong and superior society in the information age is a society that controls and mastering ICT. However without strong learning tradition, ICT will only give pleasure, not science. With a strong learning tradition, all members of the community have a strong willingness to learn, always ready to change (open minded), and continue to study until the end of life (Chaeruman, 2009). Thus, mastering ICT is an absolute requirement to win the global competition. These conditions require human resources that have comparative and competitive skill.

Global human is a man who is faithful and devoted to God Almighty, able to compete, mastering science and technology, and have true identity. One of very strategic tools in improving the quality of human resources is through education.

In education, ICT has become part of a radical change in modes of educational information delivery. ICTs can play a critical role in constructing knowledge by allowing creating, managing, and sharing knowledge. Because of its significant role in producing and disseminating knowledge, educators and decision makers who use it to achieve educational goals must introduce the possible adverse effects it causes. The education system, both formal and non-formal, is a strong social institution with a mission to develop and encourages the behaviors and values desired by the public, especially young people.

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One of the of educational policy in Indonesia, as stated in RENSTRA Ministry of National Education is the use of Information and Communication Technlogy (ICT) in education, whether its integrated in learning, utilized in educational management , or use in various educational activities (Jardiknas, 2007). Furthermore, in the Long-Term Development Plan 2005-2025 the State Ministry of Research and Technology of the Republic of Indonesia on behalf of the government seeks to encourage cooperation between educational institutions, research institutions and industries in order to improve the quality of human resources as well as increase ability and competitiveness of domestic industries through education by means of ICT development in schools (Pustekom, 2006).

Government supports, teacher skills, lecturer and other educational practitioners skill in ICT are required to guarantee the successful implementation of ICT in education. With ICT literacy, education in Indonesia is expected to be more advanced and developed.

Data from the Directorate General of Higher Education as stated by Pannen (2005) showed that awareness in the utilization of ICT in the learning process in universities is still very low. Analysis of teaching grant proposal, only 29.69% of them use ICT based media. Availability of information technology-based media is also limited. Only 15.54% of state universities (PTN) and 16.09% of private universities (PTS) have the availability of information technology-based media, while about 16.65% of students and 14.59% of lecturers have access to information technology.

The survey results on the use of IT in 2004 showed that only 17.01% state universities, 15.44% private universities, 9.65% of lecturers, and 16.17% of students utilized ICT. Overall, these statistics show that the adoption of ICT in the world of higher education in Indonesia is still low (Wahid, 2005). Therefore, Syarif Hidayatullah Islamic University Jakarta as one of the state universities do not want to be left behind in benefiting the development of ICT to support and improve the quality of learning process, administration, and various other supporting activities. Infrastructure improvements, tools development to support teaching and learning process and administration, as well as the development of local content are carried out continuously.

Syarif Hidayatullah Islamic University Jakarta in its SWOT analysis stated that one of the weaknesses of the institute is the utilization of information and communication technology (ICT) for academic field that has not been optimal yet. This is due to the limited competence of ICT utilization among the academicians, hence one of the policy priorities in 2015-2016 is to try to increase the use of ICT in learning, by improving lecturer's teaching competency and learning by providing teaching skills for lecturers and learning skills for students (UIN Jakarta, 2015).

One of the Faculty in Islamic University of Syarif Hidayatullah Jakarta which is expected to be a leader in the utilization of ICT is the Faculty of Tarbiyah and Teacher Training (FITK). This faculty's task is to produce prospective teachers, so it is inevitably that the faculty has to prepare the students to be creative teacher candidates, who can upgrade themselves so as to make innovations in the learning process.

In addition, the phenomenon of ICT utilization in learning resonates increasingly. Even in the current 2013 curriculum, ICT plays a very important role in the implementation of learning. In the 2013 curriculum it is explained that the principle of whoever is a teacher, whoever is a student and everywhere is a class are applied in learning. Therefore, the utilization of ICT is required in order to increase the effectiveness and efficiency of learning. It means that the activities involved in learning such as material and task submission are carried out through ICT.

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The development of ICT in the world is rapid from time to time. That development is certainly a huge potential to improve the quality of education, because information technology stores unlimited information. This potency can be utilized for the benefit of education development that is no longer limited by time and space. It will certainly becomes a challenge for teachers to undertand, operate and explore ICT and apply them in learning. In addition, teachers should think more creative, innovative, and broad-minded so as to improve the quality of learning.

Therefore, teachers' skills in using ICT as learning resource should be trained and developed early. One strategic effort is to introduce stuedent teachers to multi-access, multi-source learning that not only utilizes conventional but also ICT-based learning resources. It is the responsibility of the institution to provide proper education to student teachers in order to receive ICT and be able to use ICT in the learning process.

Attractive learning can be obtained from the use of attractive teaching materials. Therefore, adequate skills are required from student teachers, to develop ICT-based teaching materials. From those several background, researcher interested to analyze ability of student in developing ICT-based teaching materials, after getting lecture based on learning object.

RESEARCH METHOD

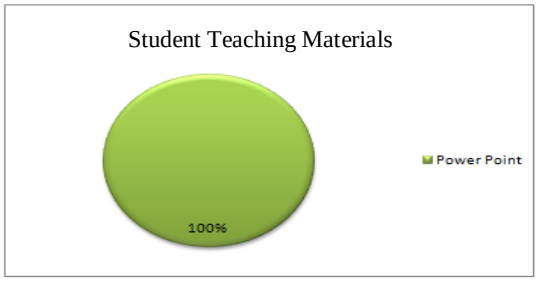
The research was conducted in Biology Education Study Program, FITK UIN Syarif Hidayatullah Jakarta. It is also conducted in highschool for data collection, data analysis and data interpretation. This research takes about 1 semester of academic year 2015/2016. The subject of this research is 25 students of Biology education program enrolled in Vertebrata course. The study conducted using descriptive qualitative method to describe the phenomena that exist, either natural or human engineering phenomenon (Sukmadinata, 2010).

The instrument used was assessment sheet for the developed teaching materials, this sheet was assessed by expert evaluator. Student's response data was also gathered through questionnaire. The questionnaire for student's responds filled using 4 likert scale. Data gathered twice, before and after being taught with learning object-based learning. The data then analyzed and processed descriptively.

RESULT AND DISCUSSION

Result

Students who enrolled in learning objects-based lectures were obliged to make appropriate teaching materials for high school (high school) students. Teaching materials that have been prepared by students are described in accordance with the form, function, and material. The results of the of teaching materials development by students prior the lecture are described in the diagram below.



Pic. 1. Type of teaching materials developed by students prior to lecture.

It is seen that all the students developed teaching materials in the form of power point. This prior instructional material, then assessed by two evaluators with an average result of 54.74 which fall into the quite well category. After the lecture was over, the students were asked to, once again, develop teaching materials with the same concept. The results of the development can be seen in the following diagram

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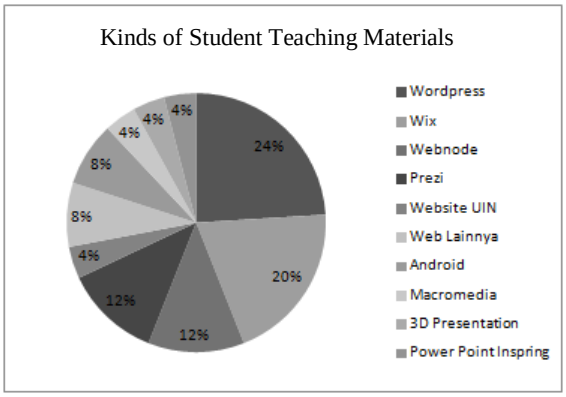

Pic 2. Type of teaching materials develop-ed by students after the lecture.

The type of teaching materials developed was then assessed by the evaluator, the results of the assessment are presented in Table 1 below.

Table 1. Assessment Result of Teaching Materials After Lecture

No	Type of Teaching Materials	Average Scores
1	Wordpress	81.5
2	Wix	81.8
3	Webnode	84.3
4	Prezi	79.2
5	Website UIN	82.0
6	Website Lain	87.5
7	Android	84.5
8	Macromedia	82.5
9	3D Presentation	80.0
10	PPT Inspiring	86.5
	Average	83

The teaching materials that have been produced by the students were then being tested to students from three high schools / Madrasah Aliyah, with the objectives to see students' responses. Each teaching material was assessed by three students from different schools. Sstudent's response was asessed using questionnaire with Likert scale 1-4. 1 indicates less good response, 2 is good enough, 3 good, and 4 is very good. The result of measurement can be seen in Table 2 below.

Table 2. Student's Respond Towards Developed Teaching Materials

No	Type of teaching materials	Ave. Score	Catagory
1	Wordpress	2.82	Quite Good
2	Wix	2.92	Quite Good
3	Webnode	2.86	Quite Good
4	Prezi	2.79	Quite Good
5	Website UIN	3.09	Good
6	Website Lain	2.31	Quite Good
7	Android	2.79	Quite Good
8	Macromedia	3.00	Good
9	3D Presentation	3.21	Good
10	PPT Inspiring	2.54	Quite Good
	Average	2.83	Quite Good

Discussion

One of educator's task is to provide a pleasant learning atmosphere. Educators need to find ways to make learning fun and put aside threats during the learning process. One way to make learning fun is to use fun teaching materials that is teaching materials that can make learners feel interested and happy to learn. This learning objects-based Vertebrata lecture have the ultimate goal to get information about the ability of students to develop teaching materials.

According to Prastowo (2013), teaching materials are divided based on form/type, way of work, nature, and substance (content). In terms of shape, the teaching materials are divided into printed materials, audio-visual materials or audio programs, audio-visual learning materials, and interactive teaching materials. In this case, the teaching materials developed by

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the students before the lecture, included into the audio-visual teaching materials (PPT). In the PPT, all students have added some supporting media such as video and image to support the materials. This is in accordance with Prastowo's (2013) opinion, which states that the hearing-sighting material is anything that allows audio signals to be combined with sequential motion pictures as well as film, video or compact disk.

However, different results were obtained after the application of Vertebrata learning based learning. Based on the observations, the form of teaching materials developed by students evolved from the mere subject matter point of view to the interactive teaching materials. Most of students combined several media within the developed teaching materials. Starting from text, images, graphics, animation, audio, and video. Prastowo (2013) stated that interactive teaching materials are combinations of two or more media (audio, text, graphics, images, animations, and videos) that manipulated or treated to control the nature of presentation.

The teaching materials developed allow students to interact either directly or indirectly with learners who use it. This interaction is possible with the existence of chating features for online access.

As for teaching materials that can be accessed without the internet offline, students who use it were given an evaluation material in the form of questions which upon answering, an expression would appear to respon the answer whether it was wright or wrong alongside with the reasons or arguments.

Teaching materials according to the way they work are divided into five which are learning materials that are not projected, projected teaching materials, audio teaching materials, video teaching materials, and computer-based teaching materials (Prastowo, 2013).

The results of observation on teaching materials developed by students before and after the lecture, according to how it works can generally be incorporated into teaching materials that needs computer as supporting media. That is, this resource can be used with the help of computer. However, there are some teaching materials that are not computer-assisted, but smartphone assisted with the android application system. Again, Prastowo (2013) stated that computer assissted teaching materials are various types of non-printing materials that require a computer to convey something to learn.

The next observations results was related to the type of teaching materials by nature. Prastowo (2013) argues that teaching materials by their nature are grouped into four, they are print-based teaching materials, technology-based materials, teaching materials used for practice or projects, and teaching materials for the purposes of human interaction. In this case, teaching materials developed by students both before and after the lecture were grouped into technology-based teaching materials. This is in accordance with the purpose of this study which requires students to be able to develop teaching materials based on Information and Communication Technology (ICT).

The developed teaching materials then grouped into teaching materials based on the substances. According Prastowo (2013), in general, instructional materials is the knowledge, skills, and attitudes that students must learn in order to achieve the desired skill and competence. In other words, learning materials can be divided into three types namely the material aspects of cognitive, affective, and psychomotor. All teaching materials that students developed grouped into cognitive type of materials.

All teaching materials require students to add thinking skills that include a simpler intellectual ability, such as remembering to problem-solving skills that require students to connect and incorporate some ideas, methods or procedures to solve the problem. Thus the cognitive aspect is the subtaxonomy that reveals the mental

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activity that often starts from the lowest level of knowledge to the highest level of creation.

The results of quantitative assessment of teaching materials developed before the lecture get an average result of 54.74. While after the lecture, the average result was 83. The highest score of the teaching materials developed before the lecture was 73.37 and the lowest was 35.71. After lecture, the highest score obtained by students was 94, while the lowest score was 77. Teaching materials using webnode gained the highest score among other types. The lowest score went to pretzi.

Assessment of teaching materials by expert evaluators included some indicators, which were the feasibility of content, language, presentation, media tools, and media usage. Based on the assessment results, as much as 77% of whole indicators observed in teaching materials developed before the lecture. Meanwhile, 94% of indicators observed were achieved after the lectures. Those significantly different result before and after lecturing implied that student's skill in developing teaching materials increased after the lecture.

From the aspect of content feasibility, the score illustrate that the teaching materials were made in line with the Competency Standards (SK) and Basic Competence (KD), the need for the teaching materials itself, the academically correctness of the substance, and the moral value that should contained in a teaching material. In addition, the teaching materials also added insight for students by utilizing varied, sophisticated, and relevant sources/ references.

Another good result coming from language indicator. It meant that the teaching materials has adequate clarity and easy to understand. The language used was acurately provide understanding since it correctly composed according to rules in Bahasa Indonesia. This meant that it has no typos, no spelling mistakes and written in correct grammar. In addition, a good learning resource in terms of language meant that the language has been used effectively and efficiently.

In terms of presentation, learning materials that are considered good was teaching material that has clarity of learning objectives. The material presented was also coherent and systematic. In addition, some components in teaching materials actively engage users for information, variations in how information is delivered, the introduction of each chapter or new section is arranged in different ways, generating user interest in using it. Teaching materials in terms of presentation is also considered good if give complete information.

The teaching materials get high scores in terms of media devices used when using full audio, visual, and audio visual media. In audio, the developed learning material were already using the narration, sound, backsound, and sound effects. The similar thing went to visual aspect, the good teaching materials used proper text, animation, pictures, ilustrations or consistent symbols. Another indicator for good teaching materials was originality. That is, the material was a result of creative work, they had a high creations value, and even if there were content modification they still showed personal touch.

The last aspect of good teaching materials indicators was the use of the device. That is, teaching materials should be able to be used easily by students. This aspect is divided into several components namely the navigation structure, the accuracy of software selection, compatibility, maintability, reality, reusability, and sharebility. Good teaching materials have navigation structure that is easy to remember by learners. In addition, teaching materials can be developed properly if tailored to the software in line with the purpose of the developing teaching materials. Based on the result, the teaching materials showed the highest score on the utilizing was the webnode, and the lowest value on the teaching materials utilizing prezi. This is because, webnode has more features that allow the development of good

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materials, compared with prezi which has fewer features. The materials also gain more likebility if the can be installed or run on various hardware and software, the device/program can be maintained or managed easily, the program is easy to run, and reliable.

Apart of expert validation, the developed teaching materials were also given to students to gain student's respond data. The results showed that generally students considered the products were quite good. The best respond given by student to the teaching materials which use wix (score 3.22 or in good catagory), the lowest respond given to pretzi with the score of 2.4 or in quite good catagory. Based on that result, it can be seen that there were similarity on judgment from expert validators and users in the term of website-based teaching materials as the best teaching material type. Wix and webnode has similar features wich optimize the use of website or online system.

CONCLUSION AND SUGGESTION

Conclusion

Based on the research results, it can be concluded several things as follows:

a. The type of teaching materials developed by students before the lecture is 100% using power point.
b. The ability to develop teaching materials before the lecture fall into enough catagory with an average score of 54.74.
c. Various teaching materials developed by students after the lectures are wordpress, wix, webnode, prezi, UIN website, other websites, android, macromedia, 3D presentation, and PPT inspiring.
d. Ability to develop student teaching materials after the lectures fall into the category of good with an average value of 83.

Suggestion

a. It needs to conduct further research by trying to develop teaching materials using social media.
b. It needs to enriched teaching materials with latest technology such as audio book and video book.

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