Blended Learning Media in Biology Classroom

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Abstract: This study aims at developing valid, practical, and effective Blended based learning packages in Biology classrom for grade 11 senior high school level. This study developed two packages; 1) learning media based on Blended Learning and 2) the learning instruments such as lesson plans and learning material. The developent model used to develop these packages are Hannafin and Peck Model. The model consists of four stages; need assessment, designing, development and implementation. The result of the need assessment shows that the need to develop blended based learning media for Biology subject in order to improve students' self-learning skill and explore their skill personally. In addition, it is expected that the students can learn Biology everytime and everywhere.

1. Introduction

The current education paradigm is changing, the learning orientation from the outside-guide becomes self-guided and from knowledge-as-possession to knowledge-as-construction. Similarly, science learning is expected to develop reasoning and systematic thinking ability [1]. It should be taught based on the nature of science learning includes 3 domains: cognitive, affective and psychomotor [2]. According to *National Science Teachers Association*, the demand for 21st century science learning is to prepare learners with skills such as creative, innovative, critical, problem solving, communication, collaboration, ICT literacy and leadership. The ability to think critically and skills using ICT are the basic needs that learners must have to face the competition in globalization era.

Biology as one of the science subjects taught in high school level in grade 11. It becomes one of the difficult subjects since it involve process which are difficult to observe directly by the students. Therefore, it requires an independent learning media students can use outside the classroom without having the teacher as a guidance. One of them is Blended learning. Pragaswati [3] describes the results of his research about development of English-speaking Website on Biology on human reproduction system based on Blended Learning in SMA Negeri 5 Malang. It shows that the activity and learning outcomes of students have increased. Blended learning is a learning strategy that can develop the ability to think critically and accommodate students to optimize the use of information and technology and to improve the learning outcomes. A study by Yaman and Graf [4] on the Evaluation of An International Blended Learning Cooperation at Hacettepe University, Turky and The University of Technology Dortmun, Germany, found that the results of the evaluation was increase the learning outcomes at the two different universities.

Blended learning is combination of in classroom and online learning. It is required e-learning media that can support the learning. It should has more visual content [5]. Therefore, it is very necessary to develop a media used for blended learning as a source of learning and as a place where the students can interact with the teacher and with the other students. The initial observation in the

school revealed that some biology teachers have done blended learning in a simple and not systematic. For instance, they were using e-mail facilities to collect student tasks. It indicates that the facilities to develop e-learning media is sufficient as can be seen by the existing of the computer lab, Wi-Fi and internet access in the school area. Based on the existing phenomenon, it is necessary to develop a blended learning media on biology learning that motivate students to learn independently and build a broader learning community and the improvement of student learning outcomes.

2. Literature Review

Blended learning is a learning that combines face-to-face and online learning. Blended learning is also known as a hybrid learning. This term implies a mixture, mixing or a combination of learning. Thorne [6] states it represents an opportunity to integrate the innovative and technological advances offered by online learning with the interaction and participation offered in the best of traditional learning. Bersin [7] defines blended learning as:

"the combination of different training "media" (technologies, activities, and types of events) to create an optimum training program for a specific audience. The term "blended" means that traditional instructor-led training is being supplemented with other electronic formats. In the context of this book, blended learning programs use many different forms of e-learning, perhaps complemented with instructor-led training and other live formats"

Based on these opinions, Blended learning combines traditional learning characteristics and electronic learning environments, such as web-based learning, video streaming, synchronous and asynchronous audio communications with traditional "face-to-face" learning. Many researchers point out that blended learning has certain advantages such as flexibility and comfort in learning environments, increased learning levels, increased understanding of learning, and increased interest in learning, quality and low cost interactions [8, 9, 10].

The importance of using the internet and computers is gradually increasing in biology learning. The learning activities conducted for several hours are not effective enough because of time constraints. Blended learning model can be a solution to solve this problem. It does not mean that the model can solely solve the problem, but also the supporting factors when the Blended learning implements such as the use of learning media that can be integrated with the model. Students can learn the multimedia applications provided to cover the shortcomings of learning in the classroom. In addition, other advantages is that the students can learn about the subject before going to class. They can discuss online, establish good communication with teachers and with other students [5]. Blended learning focuses on optimizing the achievement of learning objectives by applying technological learning to match self-learning styles to transfer skills to the right people and tight timing [11].

Blended learning combines some content including multimedia technology, CD ROM video streaming; virtual classrooms, voicemail, email and conference calls, online text animation and video streaming. It becomes the most appropriate solution for adapting the learning to fit the learning style of the learners and the teaching style of the teacher [6]. In addition, other studies conducted in Turky confirm that blended learning is also effective for use in secondary education [5]. While Sjukur [12] works on the influence of Blended Learning towards motivation and students' learning achievement in vocational School level show that there are differences and improvements in learning motivation and learning achievement do students who are taught by blended learning in SMK Negeri 1 Satu Tanah Bumbu.

3. Method

This research is developmental research using Hannafin and Peck model. It consists of three stages: requirement analysis phase, design stage, and development and implementation stage. The subject were grade 11 students of SMA Negeri 1 Barru in academic year 2013/2014. The data collection techniques are questionnaires, interviews, observations, and documentation which is then analyzed descriptively.

4. Result and Discussion

Based on the purpose of this study which is to develop blended learning media which is valid, practical, and effective in Biology subject. The first step is to obtain the results of the needs analysis of conditions that are needed for students. One of them is the ease and flexibility to get information and knowledge about human reproduction system which is a basic competence on biology subject. This material for some students is still considered taboo, so a media that can help achieve the basic competence are needed. Thus, the observation to know how far the students' knowledge of the material of the human reproductive system have been done and resulting the learning needs of students as follows.

1. The need to gain knowledge and information as well as animations, videos and examples of images of the human reproductive system.
2. Students environment, namely:
   a. The curriculum demands to integrate IT (Information and Technology) in teaching and learning activities. However, the learning process in the classroom is still lacking in integrating the IT
   b. IT facilities in schools are sufficient with the presence of computer lab and the internet access with Wi-Fi. However, it is only used for computer learning only.
   c. Students' learning environment outside the school supports IT learning, such as personal computers, laptops, modems and other gadgets.
3. The research subject and the experiment.
   a. Having a heterogeneous ability and understanding of biological learning and also has different social and economic backgrounds.
   b. Generally the students aged between 16-17 years or more. At this age, the students are at the stage of formal operational cognitive development. The implication of the learning is that the students are considered capable using hypotheses in terms of solving problem which is relevant to the responding environment. In addition, they are considered to have the capacity to use abstract principles, so that they can learn the material well.
   c. Generally, the students know to use computers and internet. They even already used them for their tasks, online games, and social media
4. Result of need analysis of development
   a. The need analysis of development is conducted to look at the issues related to the product developed, such as: (1) the importance of media and tools developed for biology subject, (2) the availability of sufficient time for program development, (3) products that have possibility to be developed.
   b. The demand for curriculum development is to integrate IT in every subject. It can assist in conveying information to students, especially abstract objects or concepts. Blended learning media can bridge the students' abstraction by presenting more concrete substitute object so that the media and tools developed are considered essential for improving the quality of biology learning

The development of blended learning media does not take a long time. Note that program developers are people who understand the use of the web in the development and understand the content of the developed media. The resulting product allows to be developed in a mass because it requires only one prototype and then duplicated in the user manual.

5. Conclusion

The result of need analysis indicates the need to develop blended learning based learning media for Biology subject. So that it can improve self-study ability of students, give flexibility and freedom in exploring its ability independently. In addition, the students can learn about biology anytime and anywhere.

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