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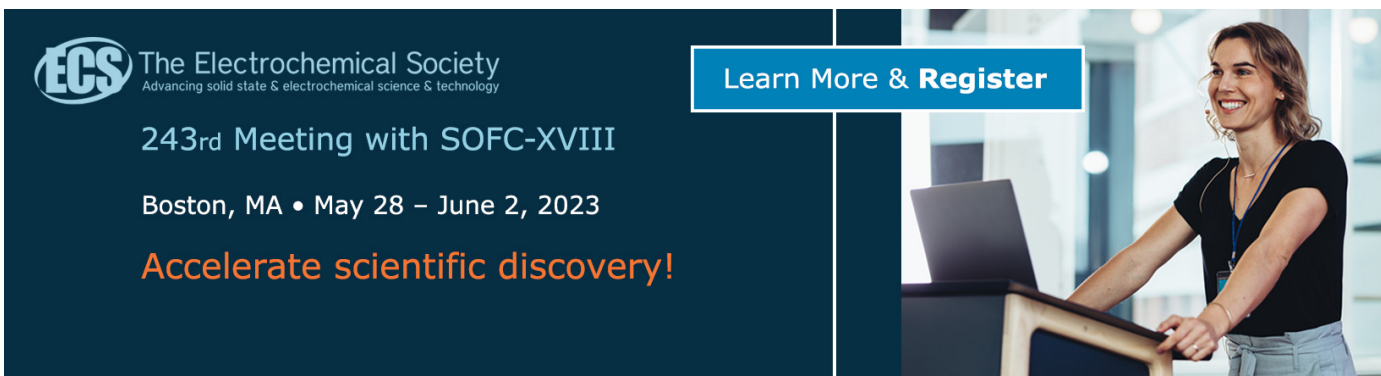
The needs analysis of basic physics learning devices based on hybrid learning

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The needs analysis of basic physics learning devices based on hybrid learning

M Ma'ruf, Y Handayani, D H Marisda and R Riskawati¹

Departemen Pendidikan Fisika Universitas Muhammadiyah Makassar, Jl. Sultan Alauddin No. 259 Makassar, Indonesia

maruf@unismuh.ac.id

Abstract. The research is a qualitative descriptive study as a preliminary study. The location of his research was at the department of physical education, University of Muhammadiyah Makassar. The purpose of his research is to analyze the level of needs of basic physics learning devices based on hybrid learning, and the research subjects consisted of 6 lecturers and 39 temporary students and had contracted basic physics courses at the Department of Physics Education at the University of Muhammadiyah Makassar. The technique of collecting data in the preliminary study activities was carried out through non-test instruments in the form of questionnaires, observations, and interviews. The data from the questionnaire were analyzed quantitatively based on the number of frequencies in the Likert scale category of each questionnaire item. The interview data and the results of the observations were analyzed descriptively qualitatively. Data analysis techniques used are observational data analyzed by making data percentage of the results of observations of each aspect measured, then the data is presented in the form of pie graphs. The results of the study show that the role of information and communication technology has not been maximized in basic physics learning effectively and efficiently for both lecturers and students, while the demands of 21st-century learning are expecting the role of ICT in learning especially by using hybrid learning.

1. Introduction

The trend of change and innovation in the world of education will continue to occur and develop in the 21st century entering today. These changes include easier access to learning resources, more options for using and utilizing ICTs, increasing media and multimedia roles in learning activities, more flexible learning time, using computer-based learning, using television/video, mobile learning, e-learning, online curriculum, e-library. The trend of change and innovation has enormous implications for education, changes in renewal and learning technologies, changes in learning and learning, more control of learning to learners, and demands integration of ICTs in learning activities [1].

Teachers in Indonesia are trained in a 'conventional way,' hence, not ready to prepare the younger generations for entrance into the twenty-first-century complex life and work environment. The pedagogical transformation of a teacher can be facilitated through teacher professional development. [2][3].

Hybrid or blended learning refers to a combination of face-to-face learning, including but not confined to lectures and online learning [4][5][6][7]. Hybrid e-learning classes include some traditional face-to-face lecturing by instructors. It is still a critical role of the instructor to affect learners' acceptance of the hybrid nature of the course. The instructor's role becomes a mix between being a lecturer who



focuses on delivering the instruction and being a facilitator who motivates and guides his/her students. Therefore, the instructor's support of a learner-centered class environment is important to the success of hybrid e-learning initiatives. Instructor's attitude toward e-learning and his/her control of e-learning information technologies influence learners' acceptance of hybrid e-learning [8].

Other than that, the current state of the debate between proponents of connectionism and defenders of traditional, symbolic modeling is used as the basis of an argument for the potential usefulness of hybrid models, in which principles of both connectionist and symbolic models are combined. The possible merits of hybrid models are illustrated by showing how a hybrid model of aspects of expertise development in physics problem solving might be superior to existing models. In the hybrid model, which is capable of solving simple mechanics problems and of learning from its own solutions, a distributed memory module is linked to a classical production system. In the distributed memory module, associations between problem statements and useful subgoals are stored. These subgoals serve to guide the inference process carried out by the production system, making the system's solutions more efficient as learning proceeds. The results of a simulation experiment indicate that the trained system's solutions closely correspond to those generated by human experts and that the hybrid model probably offers a better account of the development and nature of expert reasoning than existing symbolic models [9].

One of the educational institutions and educational staff of the University of Muhammadiyah Makassar, whose students are prospective teachers, has a very important role in the quality of students as future teachers. therefore, information technology competencies are highly expected, especially for aspiring physics teachers. because now it is a very difficult challenge for prospective teachers, especially physics, to become teachers who are able to utilize information technology well as a form to meet the needs of the 21st century. The purpose of his research is to analyze the level of needs of basic physics learning devices based on hybrid learning.

2. Method

The research is a qualitative descriptive study as a preliminary study. The location of his research was at the department of physical education, University of Muhammadiyah Makassar. The research subjects consisted of 6 lecturers and 39 temporary students and had contracted basic physics courses at the Department of Physics Education at the University of Muhammadiyah Makassar.

The technique of collecting data in the preliminary study activities was carried out through non-test instruments in the form of questionnaires, observations, and interviews. The data from the questionnaire were analyzed quantitatively based on the number of frequencies in the Likert scale category of each questionnaire item, while the interview data and the results of the observations were analyzed descriptive-qualitatively. Data analysis techniques used are observational data analyzed by making data percentage of the results of observations of each aspect measured, then the data is presented in the form of pie graphs.

3. Result and discussion

3.1. Result description

Preliminary observations conducted by researchers to determine the utilization of information and communication technology carried out by students and lecturers of physics education at the University of Muhammadiyah Makassar. Of the 39 students observed, 33 (84.62%) chose to use the internet for friendship applications such as Facebook, Twitter, Instagram, WhatsApp, while the remaining 6 students (15.38%) chose to browse or search for reference materials for their needs learning process, the data can be seen in figure 1.

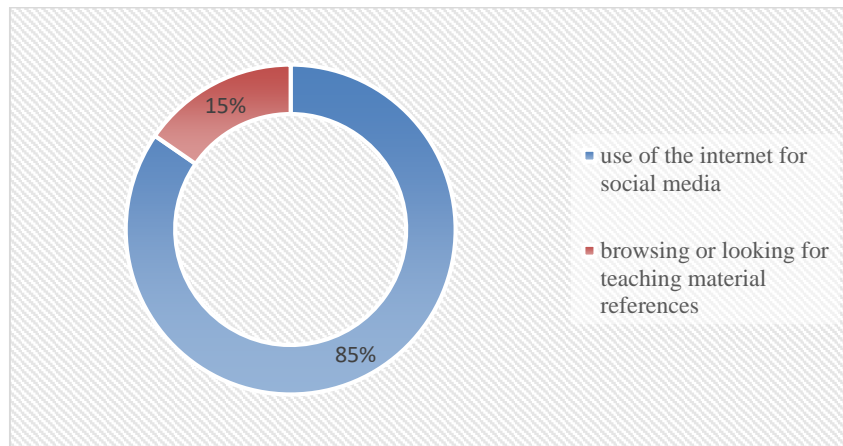


Figure 1. Percentage of observations ICT utilization for prospective physics teachers.

Observations for lecturers were from 6 lecturers observed, there were 2 (33.33%) who chose to use e-learning for the lecture process, and the remaining 4 (66.67%) who chose to use classroom learning without being online. From these results, it can be concluded that the use of information technology and communication has not been maximized by both students and lecturers. One of the influencing factors is the lack of ability to use technology and a lack of high awareness about the importance of technology. The data can be seen in figure 2.

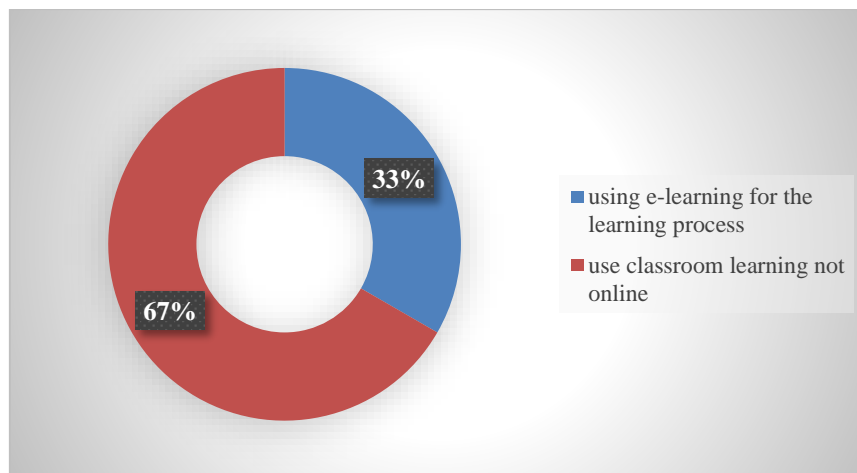


Figure 2. Percentage of observations ICT utilization in learning

The results of other observations aimed at 39 students in the physics education department of the University of Muhammadiyah Makassar obtained data (71.79%) stating that basic physics subjects were not interesting, and only (28.21%) students stated basic physics courses interesting. There are several factors that make them say basic physics courses are not interesting, including student textbooks 32.14%, student activity sheets 28.57%, learning activities 21.43%, learning media 10.71%, and lecturers 7.14%, for more details can be seen in figure 3.

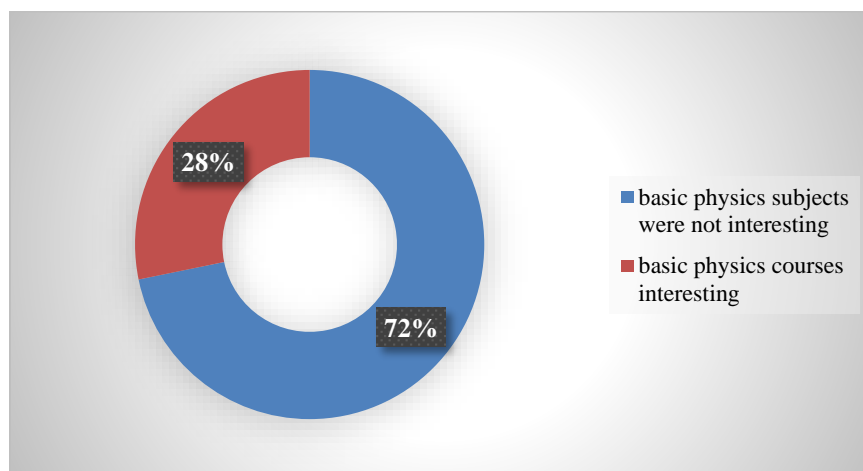


Figure 3. Percentage observation of interest in basic physics

3.2. Discussion.

The high percentage of student textbooks, student activity sheets, and learning activities show that it is necessary to manage learning activities along with learning media that are more in line with the character of students and basic physics courses. Based on the findings of these observations, which show a tendency that is not good, these problems need to be addressed immediately, so that prospective teacher students master physics in a comprehensive manner.

Not achieving the maximum learning objectives because of these problems, which researchers tried to overcome by developing a hybrid learning-based learning tool that combines offline classroom learning and online on-line learning [11]. According to the results of the study [12], the learning process cannot be carried out in an online learning system in total or in its entirety, especially for science fields, this is due to the characteristics of the material that demands an offline learning system (learning in class, in the laboratory, in the field, etc.).

Hybrid learning-based learning is very helpful for students in learning new things or sciences with more interesting and easy to understand appearance. In accessing and utilizing this learning, the role of the internet is very necessary, because through the internet someone can send files or upload files that they want to publish, with the internet also someone can access the files they want to search [13].

Hybrid learning tries to combine several types of learning models that already exist. Along with developments in information and communication technology, especially in network technology such as the internet, generally, the learning models combined are in the form of face-to-face learning and online learning models [14].

The results of this study are also in line with the results of research on using multimedia learning modules in a hybrid-online course in electricity and magnetism [15]. In this study, a report of the results from a controlled study utilizing modules on electricity and magnetism as a part of a blended hybrid-online course. They asked students in the experimental section to view the MLMs prior to attending the face-to-face class and to make sure this would not result in additional instructional time, and we reduced the weekly class time by one-third. They found that despite reduced class time, student-learning outcomes were not hindered; in fact, the implementation of the UIUC MLMs resulted in a positive effect on student performance on conceptual tests and classroom discussion questions.

4. Conclusion

The results of the study show that the role of information and communication technology has not been maximized in basic physics learning effectively and efficiently for both lecturers and students, while the demands of 21st-century learning are expecting the role of ICT in learning, especially by using hybrid learning. Furthermore, the recommendation of this research is to design a hybrid learning model that combines digital technology and mobile learning technology as a new challenge in 21st-century learning.

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