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To cite this article: Y Maryuningsih *et al* 2020 *J. Phys.: Conf. Ser.* **1521** 042010

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Contribution of internet resources to mastery genetic concept on prospective teachers

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Abstract. The use of the internet and smartphones in learning is interdependence because of its function which provides various learning resources. This study aims to determine the role of the internet as a learning resource for prospective teacher on concepts mastery, using a correlation design with Pearson correlational statistical tests to describe and measure the degree of association between the two variables, namely the prospective duration of the online teacher and the acquisition of concepts. The subjects of this study were semester 5 (five) students majoring in biology education totalling 99 students at one of the university in West Java. The study was conducted on Genetic course in mobile learning with Gen 21 CS application in 3 (three) Genetic course activities. The results showed that online duration correlated with mastery of concepts. The highest correlation with a correlation value of 0.37 in the third activity, with the value of the level of significance of the category is low, which means that besides the duration of online there are other things that contribute to concept mastery.

1. Introduction

Smartphones are cellular telephony devices that are owned by all prospective teachers. The use of smartphones in everyday life is inseparable. The use of smartphones with their features can be used as tools, sources and learning materials. With the rise of paid mobile learning applications, mobile devices are widely used in digital-based and rapidly developing mobile learning because they allow users to more easily access content material and build interesting interactions with others. Several studies have shown that learning using the internet is a fast and fun learning process according to students [1], learning processes using technology and effective in group work [2] especially learning with online discussion forums using smartphone application facilities can improve critical thinking skills [3], and learning outcomes using information technology show differences in the dynamics of mobile learning between smartphone and laptop users, with the results of learning outcomes impacting smartphone users compared to laptop users [4]. This shows the great influence of smartphones for a learner by using the internet as a learning resource.

Increase in global access to online learning environments, internet roles and connections influence academic success and learning experience [5]. The influence of the internet is positively correlated with interactions, related to student satisfaction in learning performance [1]. Mobile learning is a trend that appears in learning by utilizing mobile technology that offers flexibility in teaching and learning. Technology and pedagogical integration as the focus of needs in learning in higher education in educational institutions requires the development of mobile learning applications so that many mobile



learning applications are created with needs that vary depending on the developer. One such application is Gen 21 CS which has been developed by researchers as a mobile learning application.

A pedagogical model for science education bridges the educational context through a mobile learning approach [6], by utilizing the internet as a learning strategy so that the goal of mastering concepts can be realized. For this reason, Pearson's correlation test needs to be done to determine the relationship between online duration by utilizing the internet as a source of learning for mastery of concepts. The role of the internet is widely reported to increase interest and enthusiasm for learning, but it is not yet known how much it contributes to improving mastery concepts.

2. Methods

This study aims to determine the relationship of online duration as an activity to find relevant learning resources for prospective teachers on mastering concepts. This study used a correlation design with correlational statistical tests to describe and measure the degree of association between the two variables [7]. The subjects in this study were 99 5th semester prospective teachers in one private on university in West Java. The study was conducted in the 2018-2019 academic year. Prospective teachers who are the subjects of research receive Genetic subjects by applying the internet as a learning resource. Prospective teachers who are the subjects of research joint Genetic subjects by applying the internet as a learning resource. The study was conducted on Genetic course in mobile learning with Gen 21 CS application in 3 (three) Genetic week activities. Two instruments were needed, namely for duration of prospective teachers when online in network learning activities (mobile learning) and concept mastery on genetics test. Three activities carried out by mobile learning are divided into online discussion themes, namely 1) genetic abnormalities in humans, 2) changes in the number and structure of chromosomes and 3) regulation of gene expression about genetic engineering that produces genetically modified organisms (GMO). The duration of the discussion recorded in the Gen 21 CS learning application dashboard is the time used by participants when online and unit tests conducted at the end of each mobile learning activity which is concept mastery on genetic. Data were analyzed by Pearson correlation test and regression test, to determine the relationship between online duration and mastery concept on genetics in prospective teachers.

3. Result and Discussion

Learning is conducted with mobile learning by using the Gen 21 CS application that has been developed by researchers and applied to genetic lectures with three week activities by utilizing the internet as a learning resource to find answers to problems discussed in online discussion activities and concept mastery unit tests in applications Gen 21 CS, obtained the average online duration and mastery concept on genetics are described in Table 1 below.

Table 1. Mean online duration and mastering concepts on genetics

| Activities | Mean | |
|------------|-----------------|-------------------------------|
| | Online duration | Mastering concepts on genetic |
| 1 | 00:45:52 | 44.26 |
| 2 | 01:20:25 | 72.76 |
| 3 | 02:15:45 | 82.67 |

Table 1 shows that there is an increase in the relationship between online duration and mastering concepts on genetic in each learning activity. Table 1 also shows an increase in mastery learning at the longest online duration. This shows that online activities which are activities to find relevant learning resources, can improve the mastery concepts and mastery learning in students. The longest online duration was found in the third online discussion activity with the theme of gene expression about genetic engineering that produced genetically modified organisms (GMOs). This shows that the selection of discussion themes which are developments and applicative of genetics is interesting material to be discussed and participants are interested in developing discussion material by providing the latest research examples in the field of molecular genetics. Online discussions conducted with the Gen 21 CS

application can also improve mastery concept on genetics. This is in line with previous research that has been done using social media applications can improve critical thinking skills [3]. The relationship of online duration in mobile learning activities with Gen 21 CS applications and mastery concept on genetics was carried out through a correlation test. Table 2 shows the results of the correlation test between online duration in mobile learning activities and mastery concept on genetics.

Table 2. Relationship between online duration and mastery concepts

| Activities | R count | R table 5% | Categories | R ² |
|------------|---------|------------|-----------------|----------------|
| 1 | 0.02 | 0.19 | Not significant | 0.00 |
| 2 | 0.15 | | Not significant | 0.02 |
| 3 | 0.37 | | Significant | 0.14 |

Table 2 shows that the calculated R increases from each activity and the highest correlation value in the third activity with R_{count} is higher than R_{table} . In the first and second online discussion activities, with a conceptual theme, participants did not use the internet to search for answers to discussion material because the concept was discussed in ordinary classroom learning. While in the third activity, participants were very active contributing to giving opinions in accordance with the discussion material. The opinions expressed in the online discussion forum activities originated from the internet and participants were also actively involved in developing discussion material in accordance with the direction of rapidly developing molecular genetic research. Increasing the calculated R correlation from the first activity to the next activity increases from the correlation 0.02 to 0.37. This shows that there is an increase in the correlation between online duration and mastery concepts. In the third activity, there was a significant increase in correlation. This shows that the more the online duration use of the internet as a learning resource, the more mastery concept for prospective teachers increases. Segment correlation is described in Figure 1 below.

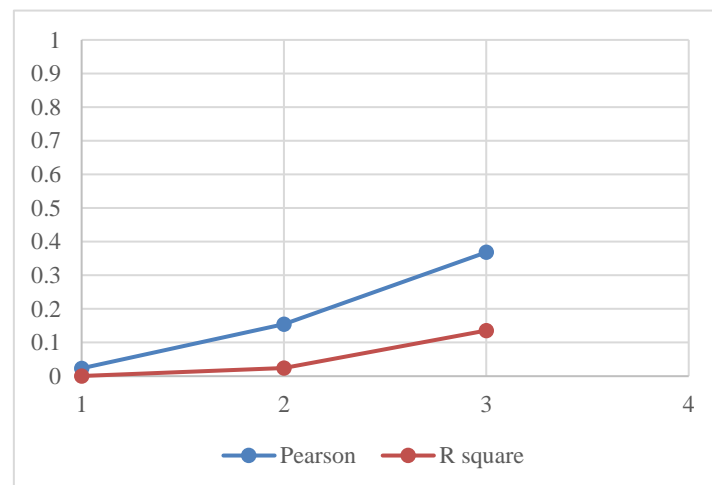


Figure 1. Graph of the relationship between online duration and mastery genetics concept

In Figure 1, it can be seen that there is an increase in the correlation between the online duration of the use of the internet as a learning resource with the concept understanding on genetics from the first activity to the next activity, this shows that the more learning activities that use the internet as learning resources. Mobile learning activities using smartphones that are owned then using the internet as a learning resource influence the mastery of concepts. This proves that the internet as a learning resource has a positive correlation with improving learning outcomes. For this reason, it is necessary to implement mobile learning to strengthen learning that takes place in the classroom.

Blended learning, with the use of the internet as a learning resource is a future learning model [8]. Learning by using the internet, is a learning trend in higher education [9], and is a lifelong and informal learning process. Currently the use of the internet as a learning resource is a challenge for learning in the future, so prospective teachers need to be equipped and trained in learning science by utilizing the internet as a source learning [10]. The time spent online depends on how much the prospective teacher wants to answer all questions and make solutions to all problems in learning by using the internet as the source of all the answers to the problem [10]. Learning with the use of the internet needs to be trained in the learning process learning and the need for an environment that supports technological facilities [11-14].

Good learning in blended learning and mobile learning in higher education that is applied to prospective teachers is a pedagogical model that has a vision of the future by training and providing prospective teacher digital skills that utilize the internet in learning science can open insight to find and get answers to all questions in a learning environment. With the use of the internet as a learning resource, there is not only an improvement in learner' mastery concept that are owned but also can foster other skills, such as ICT, digital and social media skills [15, 16].

The widespread use of the internet at all levels of education makes the learning process without time and space constraints. Whenever you can study. Even with the application of an online discussion forum which is also used as a discussion tool, making discussions can be done anytime and anywhere without being limited to class conversations. Gen 21 CS mobile learning application that has been developed by the author becomes a learning tool for prospective teachers oriented to online discussion forums can be done anytime and anywhere. An online discussion by utilizing the internet as a learning tool in discussions, discussing problems and the direction of development of various researches that have been carried out by experts, makes this application expected to provide several skills and can meet targeted learning goals such as mastering concepts and providing critical thinking skills and other skills

The gen 21 CS application can be used as a mobile learning media as an amplifier of ordinary learning activities carried out in the classroom. Applications that are oriented to online discussion forums need to be applied in mobile learning by integrating several learning models or strategies that are in accordance with the content of the material discussed in the discussion forum. This application as a learning tool such as social media oriented learning in general is available either free or paid which is widely available. So far, the use of social media as a means of discussion in mobile learning has also been done, such as the use of online discussion forums that can improve critical thinking skills in prospective teachers [3] but it is not yet known the relationship between the duration of discussion on a mobile can improve some skills needed, such as critical thinking skills and other skills needed in the 21st century. The skills needed in accordance with the needs of the 21st century include several 21st century skills domains which consist of critical thinking, communication, innovative creative thinking and collaboration team work [17], so it is necessary to integrate some content in a smartphone-based mobile learning application that facilitates online discussion forums and can provide some of the skills needed by students.

4. Conclusion

In this study it can be concluded that there is a correlation between the duration of online using the internet as a learning resource with concept mastery on genetics. So far the use of smartphones with mobile learning applications has been widely available, but there are not many mobile learning applications that facilitate group discussions that are integrated with various material content that provides the skills needed. For this reason, research is needed to collaborate on online duration, forums group discussion, mastery of concepts and thinking skills.

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Acknowledgments

Author would like to thanks to the research participants are prospective biology teachers in the Islamic State College of Religion in West Java where researcher conduct research.