

BUILDING CHARACTER OF STUDENTS OF PROSPECTIVE BIOLOGY TEACHERS THROUGH BLENDED LEARNING METHOD ON EMBRYOLOGY COURSE

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Abstract. This study is aimed at testing the learning effectiveness of embryology course with blended learning method which combines the learning with interactive multimedia uploaded on Learning Management System (LMS) Moodle and accessed on the internet (e-learning) and in-class learning. The subject of the study consists of 50 students of prospective biology teachers attending embryology course. The characters to be built are discipline, learning independence, liveliness in discussions, and enthusiasm in learning. The data collection was conducted through monitoring students' learning activities accessing e-learning system and observing their learning behavior in the class. The result of the study shows high effectiveness on embryology learning with blended learning method on building characters of learning independence, enthusiasm in learning, and liveliness in discussions. However, the effectiveness on building the character of discipline is moderate.

Keyword: blended learning, character building, e-learning, embryology, prospective biology teachers

I. INTRODUCTION

Character education has been a concern in many countries in order to prepare quality generations, not only for individual interests of citizens of a country, but also for citizens as a whole. For over twenty years, the Student Leader Fellowship Program (SLFP) at Northern Michigan University (NMU) had helped students explore their values, develop a sense of purpose based on those values, and improve leadership skills necessary to initiate socially responsible action at the community level (Barch *et al.*, 2012). In Philadelphia, service-learning program is used as an instructional approach for learning curricular objectives. Billig *et al.* (2008) showed that service-learning program could be an effective tool for reaching character education outcomes. A study in California showed that schools with higher total character education implementation tended to have higher academic scores on academic measures for the year prior to their application, the year of their application and the subsequent two years (Benninga *et al.*, 2003). Another study examined the effects of the living skills school-based intervention program as a method of improving school adjustment and the social lives of at-risk elementary school students. The results indicated that the

participants of living skills program showed improved functioning over time on all measures of school adjustment and social competency relative to a comparison group that did not receive the program (Prince *et al.*, 2010).

Indonesia sees character education as the main strategy in achieving the national education goal, namely "to educate the nation and develop the people entirely, namely Indonesians who believe and devote to God Almighty and are virtuous, have knowledge and skills, have physical and spiritual health, have solid and independent personalities, and have a sense of responsibility in terms of society and nationality". Overall, the implementation of character education for all education levels in Indonesia has been declared in the Strategic Plan of Ministry of Education and Culture of 2010-2014. Furthermore, as a part of the National Movement of the Mental Revolution/*Gerakan Nasional Revolusi Mental* (GNRM) and in order to strengthen the character of learners, the government issues Presidential Regulation No. 87 of 2017 on Character Education Strengthening

Building characters is the embodiment of the development of values and attitudes that are formally implemented against learners in schools



through indirect learning processes. In its practice, the development of values and attitudes are inserted across subjects and in each activity. According to Curriculum Center of National Education Department/ *Pusat Kurikulum Departemen Pendidikan Nasional* (as cited in Suryatini, 2011), which is reinforced by the Presidential Regulation No.87 of 2017, there are 18 types of values in character building, namely: religiousness, honesty, tolerance, discipline, hard work, creativity, independence, democracy, curiosity, spirit of nationality, love of the country, achievement appreciation, friendliness/communicative competence, love of peace, fondness for reading, environmental concern, social concern and responsibility. Building so many character values in learning processes is not an easy matter. Therefore, character building requires appropriate specific methods for the purpose of education can be achieved. Character building has the meaning of cultivating habituation of good things so that learners become aware (cognitive domain) about which is good and wrong, able to feel (affective domain) good values and usually to do them (behavioral domain). Therefore, character building is closely related to habits or habits that are continuously practiced or done (Nuh, 2016). Among many learning methods, the appropriate ones are exemplary method, habituation method, and praise-and-punishment method.

Although teachers are not the only determinants of educational success, they are the central point of education in learning processes. In this case, teachers are the actors who directly implement learning processes of their learners. Given the main learning method in character building is exemplary method, then a teacher is an example that should have character values that can be sensed by his/her learners in their school lives. The ownership of a person's character values cannot be necessarily acquired, yet it requires habituation. Therefore, before becoming a teacher, getting a character building simultaneously is very important for a prospective teacher to develop the ownership of the values of his/her characters.

In addition to the demand of the ownership of character values, a teacher is also required to

have four teacher competencies, namely pedagogical competence, personality competence, social competence, and professional competence. Septiani et al. (2016) suggests that if character values are implemented to the four teacher competencies, then prospective teachers will have good characters so that they have high competitiveness. The formulation of the implementation of character building in an attempt to improve the competence of prospective teachers is as follows: the character values which belong to the pedagogical competence are curiosity and fondness for reading; the character values which belong to the personality competence are religiousness, honesty, discipline, democracy, spirit of nationality, love of the country, environmental concern, and responsibility; the character values which belong to social competence are tolerance, achievement appreciation, friendliness/communicative competence, love of peace, and social concern; the character values which belong to professional competence are hard work, independence, and creativity. Similar to the character building in primary and secondary education levels, building character of prospective teachers at *Lembaga Pendidikan Tenaga Kependidikan* (LPTK) is also carried out in indirect learning processes, by inserting them in every course.

Embryology is one of the areas of study in Biology, which must be mastered by students of prospective biology teachers in LPTK in relation to the task that will be carried out in the future. In embryology lectures, the process of animal development is studied from the fertilized egg until the time of hatching or birth. The whole process of animal development from the zygote to the moment of hatching or birth is called embryogenesis. Embryogenesis occurs in a zygote that is not easily observed because of its relatively small size in which there are dynamic, complex events in three or four dimensional space (3-4D). This situation makes the abstract embryological concepts that are difficult to explain and understand. Thus, it is necessary to find an effective learning approach, which can concretize the abstract concepts of embryology, making it easier for students to build new



knowledge of the information they acquire during learning. The learning approach is through lab work or practical work, but the practice in embryology learning is often constrained on the difficulty of providing materials in the form of original/fresh embryo prepa-rations, as well as specific laboratory equipments.

Along with the times, the development of information technology with computer devices has penetrated education area. Integrating this technology wisely into the learning methodology helps to facilitate and accelerate learners' understanding. In terms of embryology lectures, a blended learning method has been developed that incur-porates self-learning through the access of teaching materials in the form of interactive multimedia via the internet (e-learning) with face-to-face learning in the classroom (Rusman et al., 2011). Although informa-tion technology has grown rapidly so as to enable a learner to learn independently, character building requires exemplary and habituation methods, that in-class learning cannot be abandoned. Prawiradilaga [2007, as cited in Rusman et al. (2011)] suggests that the figure of teachers (lecturers), though not as dominant as in the teaching paradigm, is still required for the develop-ment of behaviors or attitudes oriented to the norms of society. As described earlier, not all character values can be built in the learning of a subject. Character values targeted by embryology learning with blen-ded learning methods comprise discipline, learning independence, curiosity or enthu-siasm in learning, and communicative com-petence in the liveliness of discussion.

Based on the background that has been stated earlier, the problem formulation in this study is 'how is the effectiveness of embryology course learning with blended learning method in building the characters of prospective biology teachers?'. In order to answer the problem, this study is con-ducted to achieve the goal to know the level of effectiveness of embryology learning with blended learning method in building the character of discipline, learning inde-pendence, curiosity or enthusiasm in learn-ing, and the liveliness of discussion.

II. METHODOLOGY

The subjects of the study were 48 stu-dents of biology education study program involved in embryology lectures that took place with blended learning method. Embryology materials covering 6 main subjects (History and Development of Embryology, Reproductive System, Ferti-lization, Cleavage and Blastulation, Gastru-lation, Organogenesis) were translated into an interactive multimedia form that com-bined text, images, animated movies, video, and sound. This interactive multimedia was then uploaded into the Learning Manage-ment System (LMS) Moodle, which stu-dents could access through the internet with each password for each student who had access rights. In this LMS there was a menu tool that allows educators (lecturers/ researchers) to monitor accessing activities, including time, frequency and duration of access. Thus, the character of discipline could be monitored directly through the LMS. The subjects of the study were given independent learning tasks by accessing teaching materials within a week for each main subject. The learning outcomes were expressed in the form of summaries, which were then discussed in a in-class learning. The discussions were conducted in groups of 5. The results of the group discussions were then presented to get the response of the whole class. Characteristics of learning independence, enthusiasm in learning, and liveliness in discussions were assessed during in-class earning. The assessment was done by scoring using the rating scale method from 1 to 4. Score 4 means 'very good', 3 is 'good', 2 is 'enough', and 1 is 'deficient'. Each category for each valued variable was translated into definitions as outlined in the rubric.

The obtained data, either through LMS monitoring or observations during in-class learning, were collected during the embryo-logy learning program took place. The ownership of character values of the stu-dents were determined in the end of the semester by summing the scores and deter-mining the average value, then the catego-ries were defined for each character value. The level of effectiveness of Embryology course learning on character building was determined based on the



average score of character values: 3.10-4.00 = high effectiveness; 2.10-3.00 = moderate effectiveness; 0-2.00 = low effectiveness.

III. RESULT

The data collected in this study indicate that the embryology course learning with blended learning method, which combines e-learning with in-class learning, has high level of effectiveness in building some character values of students of biology prospective teachers, with the average score of learning independence of 3.40; enthuse-asm in learning of 3.36; communicative in discussions of 3.25. In contrast, the disci-pline character only scores 2.87 which be-longs to moderate effectiveness category. The score data of the character ownership during this embryology learning is presen-ted in detail in Table 1, while the picture of character development built during Em- bryology learning is presenter in Figure 1

IV. DISCUSSION

The result shows that embryology course learning with blended learning method, combining e-learning with in-class learning, has high effectiveness in building character values of learning independence, enthusiasm in learning, and communicative competence in discussions. Learning inde-pendence can be built through this learning method as e-learning provide convenience and freedom for the student to manage their own time, places, and ways to learn (Rusman et al., 2011). However, assign-ments given by lecturers related to teaching materials that they need to learn give a sense of attachment and responsibility of students to the material being learnt.

The students' enthusiasm in learning that appears high in this study is apparently driven by this learning method through the clarity and beauty of the display of teaching materials in the form of interactive multi-media. This is supported by the opinion of Darmawan (2012) which states that MMI presenting harmony display text, images, video, sound, and animation, able to enable students to learn with high motivation. This is supported by the

opinion of Darmawan (2012) which states that MMI presenting a harmony display of texts

Table 1. Average Scores of the Assessment of Character Values Developed during Embrvology Course Learning with

Character Values	Main Subjects of Embryology Courses					
	1	2	3	4	5	6
Discipline	3.00	2.98	2.92	2.81	2.73	2.77
Learning independence	3.00	4.00	4.00	2.56	3.23	3.58
Enthusiasm in learning	3.00	2.77	3.33	3.73	3.33	4.00
Communicative competence in discussions	3.27	3.38	3.35	3.38	3.35	3.35
Total	12.27	13.13	13.60	12.48	12.79	13.70
Average	3.07	3.28	3.40	3.2	3.20	3.43

Note : 1 = main subject of History and Development of Embryology

2 = main subject of Reproductive System

3 = main subject of Fertilization

4 = main subject of Cleavage and Blastulation

5 = main subject of Gastrulation

6 = main subject of Organogenesis

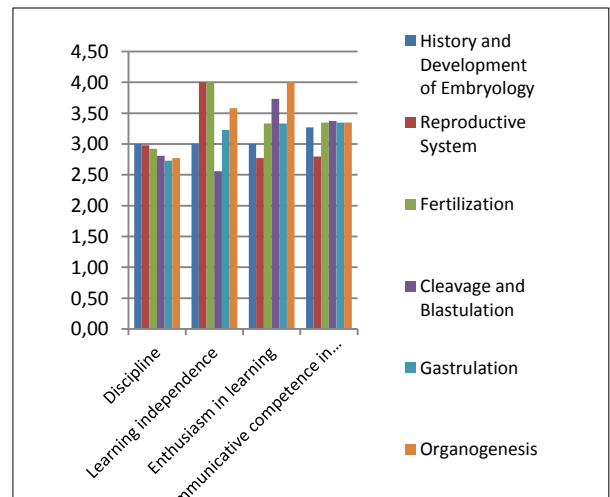


Figure 1. The chart of character development built during Embryology learning

, images, video, sounds, and animations is able to empower students to learn with high motivation. As for the character of communicative compe-tence in discussions which may be highly motivated by students' desires in putting their interpretations of MMI they have learnt in their real learning



community. Rusman et al. (2011) suggest that though e-learning provide convenience for students to independently acquire learning anytime and anywhere, students as human beings still have desires to be in a real learning community, and this is considered important in learning. Thus, when they are in the community, students feel free to express their opinions directly. Unlike the characters of learning independence, enthusiasm in learning, and communicative competence in discussions, the effectiveness level of blended learning method in this study is not really high in building the character of discipline. This is probably related to the freedom that students gain in determining their time, places, and ways to learn. In the beginning of the learning program, the data shows high discipline level of students in initiating access to MMI teaching materials, but tends to decline in subsequent periods. However, this does not really matter, as long as the students still have senses of attachment and responsibility toward the material they learn.

V. CONCLUSION

Based on the present study, it can be concluded that embryology course learning with blended learning method, combining e-learning with in-class learning, has high effectiveness in building character values of students of prospective biology teachers on learning independence, enthusiasm in learning, communicative competence in discussions, and moderate effectiveness level in building discipline character.

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