

Revitalization of Cooperation Character for Students Through Engineering Service Learning in the Digital Age

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ABSTRACT

Education has become one of the strategic ways in revitalizing the character of students to form the character of learners having a personal character of the 21st century, such as teenagers must have the ability to cooperate, have personal and social responsibilities, and be able to communicate interactively. Besides, they must be able to balance technological progress and social change, have leadership character, personal responsibility, and ethics. It becomes the driving force that the education process in the formal education path must consistently involve the affective domain and not just focus on the cognitive and psychomotor aspects. This research is a development of Brog and Gall research that learning in the 21st century requires an affective touch. This study uses a quantitative approach and descriptive method with data analysis techniques with descriptive statistics. The population is Indonesian and Korean students who take Engineering Service Learning with the number of 30 people. The results of this study indicate that the Engineering Service Learning process can build critical and creative thinking by 90.25%; increase motivation by 90.51%; and build cooperation character by 85.71%.

Keywords: *character, cooperation, engineering service, digital era*

1. INTRODUCTION

One of the demands of Academic Achievement in the 21st Century is Effective Communication, Teaming, Collaboration, Interpersonal Skills, Personal, Social and Civic Responsibility, and Interactive Communication [1]. Effective communication makes students be able to (a) work together in groups (collaboration), (b) take personal and social responsibility, (c) have interactive communication to survive in the present and future lives [2]. The Pacific Policy Research Center explains that students' challenges of the 21st century must be able to

compensate for technological advances in anticipating social change that will occur rapidly [3]. The Partnership for 21st Century Learning Skills & Century define that the characters or behaviors required by students in facing 21st century challenges include: (1) Leadership; (2) Personal Responsibility; (3) Ethics; (4) People skills; (5) Adaptability; (6) Self Direction; (7) Accountability; (8) Social Responsibility; (9) Personal Productivity [4]. The previous explanation becomes a reference about the importance of the educational process to form the students' character with the personal character of the 21st century. Students must have the ability to cooperate, have personal and social responsibilities, and be able to communicate interactively. Besides, they need to be able to balance technology progress and social change, have character leadership, personal responsibility, and ethics. Attention to character education has developed in the public-school system due to the increasing tendency for negative behavior among young people [5].

The teaching-learning process of formal classes consistently focuses on cognitive aspects and overrides the affective aspects [6] [7]. We need to improve it immediately and apply affective-aspects learning. Engineering Services Learning intend to build the character of collaboration (collaborative) in the affective domain to students. It becomes a strategic step towards global citizens according to government programs in learning 4.0. In service-learning, lecturers have an essential role in fostering the character of cooperation to create a strong and harmonious life [8]. The study emphasizes the characteristics of cooperation through service learning between Indonesia and Korea.

2. METHOD

The research method in this research is descriptive quantitative. The objects in this study are Indonesian and Korean students who take Engineering Service Learning. The study population is 40 Korean and Indonesian students with a sample of at least 30 students who took ESL. In this research, we need reliable data sources and appropriate techniques to obtain established standard data, namely through a questionnaire to 30 students, interviews, and observations. The data analysis uses descriptive statistics. This research has conducted a validity test and a reliability test on the questionnaire distributed. We distributed a validity test to random students who take ESL with 33 questionnaire items via Google form. The research question items are said to be valid if $r_{\text{arithmetic}} > r_{\text{table}}$. If $df = (N-2)$ or $df = (28-2)$, the value of r_{table} is 0.302. Results of testing instruments carried out with the help of the IBM SPSS version 20. The reliability test of the studied variable shows Cronbach's Alpha value >0.65 . It means that the instrument used has fulfilled the complete reliability criteria because it shows Cronbach's Alpha is 0.831.

3. RESULT AND DISCUSSION

3.1. Result

This research has conducted a survey using Google forms to ESL alumni through the WhatsApp group. The population was 40 people and the sample collected was 30 students. The respondent data consisted of 61% female and 39% male, with 94.5% of engineering students and 5.5% non-technical students. This research is a development of Brog and Gall research where learning in the 21st century is related to learning which must contain affective aspects. This study uses a quantitative approach to the descriptive method with statistical descriptive data analysis techniques.

This study measures the affective aspects of the learning process according to the demands of the 21st century. The results of this study are broadly related to the character of cooperation, however, in the character of cooperation a measure of how critical, creative thinking and student interest and motivation are involved in ESL learning activities. Level of creative critical thinking by 90.25; interesting and motivating by 90.51; and build cooperation character by 85.71%.

This study shows that there are some student' behavior during study ESL, such as understand the material better by connecting it with known things at 85.5%, find out information to be useful in real life by 100%, learn new information and new idea then process it using their own words by 100%, able to associate the obtained lesson with ESL of 94.5%, able to know similarities and differences between things learned for campus and things they already know at 94.5%, trying to understand how things they learned at school fit each other by 94.5%, trying to think of a topic and decide what they should study instead of studying the topic by only reading it at 83%, try to combine various information from subject matter in a new way by 94.5%, try out various information from the subject matter in a new way by 73.5%, apply theory in higher education to help others by 72.5%, and combine creative and theoretical thinking by 78%. It shows that the ESL was trained for high order thinking about 90.25%.

3.2. Discussion

The development of technology is very fast or disruptive or currently known as the new civilization of the industrial revolution 4.0. It changes human lifelines, such as economics, politics, culture, and social aspect. Caution in this change needs to be prepared by the nation and state of Indonesia, especially for the younger generation. It is because international politics events will come, and the developed countries will crush the other countries who are unable or not having the skill to manage technology. It is following the proverb of who controls the technology will master the resources. Indonesian teenagers must know the cautious aspects of the digital age. The results of this research emphasize more on the character of collaboration / collaborative learning in engineering school learning (ESL). Besides, this study measures the various skills gained in collaborative learning in ESL. The results of this study indicate that ESL can be a tool for the character building of 0.84%. Engineering Service Learning specifically can train children to think critically, solve problems, work hard, and work together, and the learning process makes students interested/motivated to do it.

Digital is a mathematical code media that can be projected and accessed by humans as users. The cognitive domain, according to Ki Hajar Dewantara, is known for Cipta, which means the cognitive domain from low order thinking to high order thinking [9]. Bruner state that knowledgeable people are skilled or capable of solving problems [10]. It starts from social interaction, hypothesis making, and ending with generalization. Based on Bruner's analysis, suitable learning is inquiry and discovery (<http://www.psych.nyu.edu/people/facultyBruner>) [11]. This study shows that there are some student' behavior during study ESL, such as understand the material better by connecting it with known things at 85.5%, find out information to be useful in real life by 100%, learn new information and new idea then process it using their own words by 100%, able to associate the obtained lesson with ESL of 94.5%, able to know similarities and differences between things learned for campus and things they already know at 94.5%, trying to understand how things they learned at school fit each other by 94.5%, trying to think of a topic and decide what they should study instead of studying the topic by only reading it at 83%, try to combine various information from subject matter in a new way by 94.5%, try out various information from the subject matter in a new way by 73.5%, apply theory in higher education to help others by 72.5%, and combine creative and theoretical thinking by 78%. It shows that the ESL was trained for high order thinking about 90.25%. It is according to the theory of Trilling and Fadel reveals that there are three 21st-century competencies that are often referred to as "rainbow 21st-century knowledge skills" namely [12]

- **“Life and Carrer Skill” Competency**

Education must be able to prepare teenagers having the skills to live and have a career. It means students should have the skills to live independently and ready for the world of work later. It will show that students able to apply their knowledge both from campus or from new information in real life.

- **“Learning and Innovation Skill” Competency**

Education must be able to create a learning process that develops young people's learning and innovation skills. This study measured learning and innovation skills of students to combine creative and theoretical thinking, process information and materials in new ways, and combine it to get a newness.

- **“Information Media and Technology” Competency**

Education must prepare youth as students to have skills in the use of information and technology media or information and technology media literacy. This research using media information and technology as well as manufacturing products with media and technology information to help problems in society. The learning process uses an approach as an effort to build knowledge that utilizing and understanding the environment is a path that must be taken by teachers and students in achieving instructional goals. This approach is the teacher's attempt to explain the subject matter and make it easier for students to understand teaching material. It is parallel with the understanding of the theory of constructivism that knowledge is our ownself construction (formation) [13]. It asserts that knowledge is not an imitation of reality or the real world and not a collection of a reality. Knowledge is a result of the cognitive construction of the reality of someone's activities. Knowledge is a human creation that experience-constructed and cannot transfer from someone's brain (lecturer) to someone else's brain (student). Samiawan (2002) says that learning is building (to construct) knowledge itself, after understanding, being digested and one's actions [14] [15].

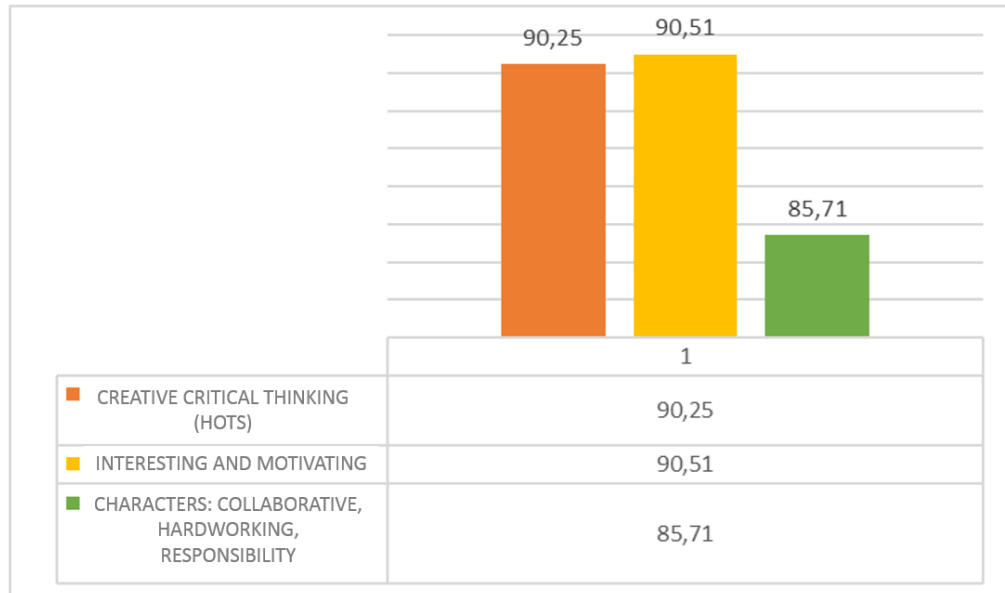


Table 1. Measurement results in the ESL process

4. CONCLUSION

The results of this research emphasize more on the character of collaboration / collaborative learning in engineering school learning (ESL). Besides, this study measures the various skills gained in collaborative learning in ESL. The results of this study indicate that ESL can be a tool for the character building of 0.84%. Engineering Service Learning specifically can train children to think critically, solve problems, work hard, and work together, and the learning process makes students interested/motivated to do it. Engineering Service Learning process can build critical and creative thinking by 90.25%; increase motivation by 90.51%; and build cooperation character by 85.71%.

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