

Integration problem based learning based bioentrepreneurship to improve entrepreneurial character and science process skills

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Abstract: 4C skills are very much needed in the 21st century and the era of the industrial revolution 4.0. The 21st century is marked by the era of the industrial revolution 4.0 as the century of openness or the century of globalization. The demands of the times require students to have soft and hard skills. Mastery of hard skills and soft skills can be realized through the integration of entrepreneurial character and science process skills (KPS) in learning. Entrepreneurial character is the character of an entrepreneur who is implemented in the entrepreneurial process. Meanwhile, science process skills are intellectual skills to acquire, develop and apply scientific concepts, principles, laws and theories, both in the form of mental skills, physical skills and social skills. Efforts to improve the soft skills and hard skills of students can be done through various methods, one of which is through Problem Based Learning (PBL). Through the PBL model, students are guided to construct their own knowledge so that learning becomes more meaningful. Teachers are expected to be able to train and integrate entrepreneurial character and science process skills. Bioentrepreneurship is a contextual biology learning approach that links the material being studied with objects or natural phenomena that exist around the lives of students. Thus, in addition to obtaining subject matter, students also have the opportunity to learn the process of processing a material into a product that is useful, has economic value and fosters interest in entrepreneurship. Through the integration of Problem Based Learning based on Bioentrepreneurship, it is hoped that it can improve the entrepreneurial character and science process skills. So as to encourage the growth of new innovators and entrepreneurs to improve student learning outcomes and science process skills.

Keywords: PBL, bioentrepreneurship, entrepreneurship character, KPS

INTRODUCTION

4C skills are needed in the 21st century and the era of the industrial revolution 4.0. The 21st century is marked by the era of the industrial revolution 4.0 as the century of openness or the century of globalization. This means that human life in the 21st century undergoes fundamental changes that are different from the order of life in the previous century. Technological developments and the internet have removed many jobs, but have also given rise to new ones. Machines or robots have replaced a lot of human labor which will result in new unemployment. Life in this century requires quality human resources produced by professionally managed institutions so that they are able to produce superior results that are different from previous times. These all-new demands call for various breakthroughs in thinking, drafting concepts, and actions. In other words, a new paradigm is needed in dealing with new challenges. In the context of learning creativity, entrepreneurial character and science process skills need to be developed. Therefore, teachers are required to have the ability to provide learning to meet the needs of human resources in the 21st century.

The demands of the times require students to have soft and hard skills. Hard skills are usually also referred to as intellectual intelligence, namely the skills needed to support doing a job, including in the form of knowledge, both general and specific. While soft skills are usually referred to as emotional intelligence, namely competence to develop and maximize the performance of students, including psychological, emotional and spiritual skills. These

skills can be trained through learning in educational institutions. Education must be oriented to the preparation of human resources to be able to compete and have quality competencies. Elfinfri, et al. (2010) suggested that soft skills and hard skills can be said to be all characteristics that cause the functioning of hard skills. If a person masters these two skills well, then the knowledge and skills he masters can bring prosperity not only to himself, but also to the community and the surrounding environment. Arief (2012) added that college graduates must have hard skills and soft skills to be successful in their work. This ability will help individuals apply the knowledge gained in college to the world of work. Therefore, education and teaching implementers must also equip students with these hard skills and soft skills .

Mastery of hard skills and soft skills can be realized through the integration of entrepreneurial character and science process skills in learning. Entrepreneurial character is the character of an entrepreneur who is implemented in the entrepreneurial process. Becoming an entrepreneur is the main capital to change the mindset (mindset) of students in utilizing the development of science and technology as an opportunity to hone their hard and soft skills . A successful entrepreneur must have science process skills. According to Nugraha (2005) science process skills are intellectual skills to acquire, develop and apply scientific concepts, principles, laws and theories, both in the form of mental skills, physical skills and social skills. In integrating entrepreneurial character and science process skills, there is an increase and balance of soft skills and hard skills covering aspects of knowledge competence, skills and entrepreneurial characteristics. Dharma (2019) and the International Training Center ILO (2005) further explain that a successful entrepreneur must have three competencies, namely knowledge, skills, and entrepreneurial nature. Efforts to improve the soft skills and hard skills of students can be done through various methods, one of which is through Problem Based Learning (PBL). This is in line with Kropf (2013) that the 21st century society needs to be able to develop competitive skills that focus on developing entrepreneurial character and science process skills.

Through the PBL model, students are guided to construct their own knowledge so that learning becomes more meaningful. Teachers are expected to be able to train and integrate entrepreneurial character and science process skills. Through this learning, students are trained to be able to solve as complex as any given problem through the development of innovation and creativity respectively. Sagala (2009) states that learning is said to be successful if the learning is able to grow science process skills which are characterized by critical, creative, logical, objective and systematic thinking. So that these skills must be taught and instilled from an early age to students in schools. PBL becomes learning that can be a means to direct learning more contextually, full of meaning and become a means to develop intellectual values.

Today, educators are faced with serious challenges in creating an atmosphere and student learning outcomes. Teachers play a very important role in teaching and learning activities. Therefore, the learning carried out by the teacher is expected to be able to invite and train students to be able to integrate entrepreneurial characters and science process skills. Science process skills are the ability to use thoughts, reason, and actions efficiently and effectively to achieve a certain result, including creativity. Science process skills require the integration of other abilities such as entrepreneurial character whose implementation can be integrated with the PBL model. The existence of good cooperation between teachers and students in terms of exchanging concepts, knowledge, and skills will make teachers and students feel satisfied with the learning process that takes place. Arends (2008) suggests that the essence of PBL is to present students with authentic and meaningful problem situations that can serve as springboards for investigation and inquiry. While students are responsible for learning that takes place through the process of building the meaning of knowledge and concepts that students acquire.

The low interest in entrepreneurial activities of the Indonesian people is one of the causes of high unemployment. The need to shape the entrepreneurial spirit of students, to change their mindset, so that after becoming graduates they have planned to form entrepreneurship or create their own jobs. According to Lestari (2018), the application of bioentrepreneurship learning in science subjects makes students able to learn the process of processing a material into a useful product, selling value and fostering interest in learning. The bioentrepreneurship approach is a contextual biology learning approach, namely a biology learning approach that links the material being studied with objects or natural phenomena that exist around the lives of students. Thus, in addition to obtaining subject matter, students also have the opportunity to learn the process of processing a material into a product that is useful, has economic value and fosters interest in entrepreneurship. Through the Integration of Problem Based Learning Based on Bioentrepreneurship, it is hoped that it can improve the entrepreneurial character and science process skills. So as to encourage the growth of new innovators and entrepreneurs to improve student learning outcomes and science process skills.

DISCUSSION

Based on the analysis of review articles on five journals, information was obtained from the research results of Mujab, et al. (2019) shows that the application of bioentrepreneurship learning on kefir fermentation biotechnology materials can increase students' learning motivation. This is also reinforced by the research of Aqil, et al. (2019) there was an increase in students' interest in entrepreneurship and life skills before and after the application of Bioentrepreneurship learning . The application of Bioentrepreneurship learning is very effectively integrated with a problem based learning model. Because this learning model is able to increase students' attention and active role in the problem-based learning process.

Hidayah, et al. (2016) suggested that: (1) PBL has a positive and significant effect on science process skills; (2) PBL has a positive and significant effect on science learning outcomes. (3) PBL has a positive and significant effect on science process skills and science learning outcomes. The overall test and results of this study indicate that PBL has a positive and significant effect on science process skills and science cognitive learning outcomes. Furthermore, this is also reinforced by research by Akben (2019) which states that pre-service teacher candidates successfully prepare daily life scenarios that are in accordance with their course achievements, using a problem based learning model . But they should include more expressions in these scenarios that allow students to think, synthesize their knowledge and develop their creativity.

The results of Handayono's research, et al. (2016) show that: (1) there are significant differences in learning outcomes between students who are taught using inquiry learning , problem-based learning , and conventional methods , (2) there are significant differences in learning outcomes between students with high learning motivation and low, (3) there is no significant interaction between learning methods and learning motivation on learning outcomes, (4) there is no significant difference in learning outcomes between students who are taught using the inquiry learning method and the conversion method, (5) there is no difference in results significant learning outcomes between students who are taught using the problem-based learning method with the conventional method, and (6) there is no significant difference in learning outcomes between students who are taught using the inquiry learning method and problem-based learning . Based on the article review, it was found that bioentrepreneurship learning can be integrated with problem based learning to improve the entrepreneurial character and science process skills.

Bioentrepreneurship learning links science learning with entrepreneurship learning with the school curriculum so as to create contextual learning. The application of bioentrepreneurship learning in science subjects makes students able to learn the process of processing a material into a useful product, selling value and fostering interest in learning. Bioentrepreneurship learning is carried out in a real way by utilizing the surrounding environment and equipping students in processing a product so that learning is more meaningful and fun and can increase student learning motivation. Bioentrepreneurship learning can be integrated with the PBL learning model in its implementation. The steps of the problem based learning method are as follows: (1) Orientation of students to the problem; (2) organize students to learn; (3) guiding individual and group investigations; (4) develop and present the work; and (5) analyze and evaluate the problem solving process.

Entrepreneurial character is the character of an entrepreneur who is implemented in the entrepreneurial process. According to Dharma (2019) and the International Training Center of the ILO (2005) the entrepreneurial character is divided into three dimensions, namely: mindset, hearset and action set . Thus, entrepreneurial character education is education regarding the basic values that build a person's personality in the entrepreneurial process, consisting of moral knowing/mindset, moral feeling hearset , and moral action/actionset , which are formed due to both heredity and environmental influences. And used as a basis for perspective, think, behave, and act.

Dharma (2019) and the International Training Center of the ILO (2005) further explain that a successful entrepreneur must have three competencies, namely knowledge, skills, and entrepreneurial nature. These three competencies are interrelated. The relationship between the three competencies is described as follows.

Competence is the mastery of knowledge, skills, and traits. Knowledge is a collection of information that is stored in the brain and can be recalled if needed.

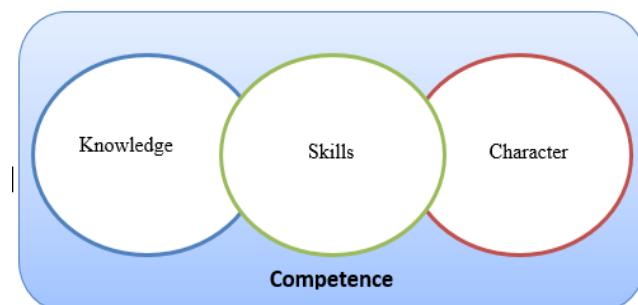


Figure 1. Entrepreneurial character values.

According to E. Mulyasa (2004) the process skills approach is a learning approach that emphasizes the learning process, activity and creativity of students in acquiring knowledge, skills, values and attitudes, and applying them in everyday life. So, process skills are an approach in learning that provides opportunities for students to carry out an interaction in concrete objects to the discovery of concepts. Based on the several definitions of process skills, it can be concluded that the process skills approach is a learning approach that provides opportunities for students to process scientifically with the aim of developing and improving students' abilities to discover and present their own facts, concepts, values and attitudes within students.

Furthermore, according to Oemar (1995) there are 7 types of abilities to be developed through the learning process based on the process skills approach, namely:

1. Observe; Students must be able to use their senses by seeing, hearing, touching, smelling, and feeling. Students can collect relevant data through the ability to observe.
2. Classify/classify; students must be skilled at recognizing the differences and similarities in the results of their observations of an object.
3. Interpret (interpret); students must have the skills to interpret facts, data, information, or events. These skills are needed to carry out simple experiments or research.
4. predict; students must have the skills to connect data, facts, and information. Students must present their hypothesis.
5. Apply; Students must be able to apply the concepts they have learned to new situations or experiences.
6. Planning research; students must be able to determine the problems and variables to be studied, the objectives, and the scope of the research.
7. Communicating; Students must be able to compile and submit reports systematically and convey the results.

The integration of Problem Based Learning based on bioentrepreneurship is expected to improve the entrepreneurial character and science process skills. The PBL approach expects students as learners to be able to solve the problems they face independently under a teacher facilitator. With the implementation of the PBL approach in the learning process, it has also been proven to be able to increase student learning independence so that the dependence on learning on the teacher as a learning resource decreases.

CONCLUSION

Based on the results of the article review, it can be concluded that the application of Bioentrepreneurship learning can increase student learning motivation, life skills and student entrepreneurial interest. PBL has a positive and significant effect on science process skills. The integration of Problem Based Learning based on Bioentrepreneurship is expected to improve the entrepreneurial character and science process skills. Based on these conclusions, several suggestions can be made as follows: 1). In carrying out this PBL approach, interesting problems should be proposed according to the interests and concerns of students. 2). It is necessary to develop a directed learning scenario by involving teachers and students so that the learning process with the PBL approach can run effectively.

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