Implementation of STEM Approach at Course of Entrepreneurship: Feed for Increasing Goat Weight

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ABSTRACT
This qualitative research aims to describe the Implementation of the STEM Approach for Entrepreneurship Subjects in the Chemical Education Study Program at FKIP of Sriwijaya University, Feed Topic Types for Increasing the Weight of the Local Goat Growth Phase. Data collection methods used are document studies, observations, and interviews. Data were analyzed descriptively. The results of the study are as follows. (1) Students can apply the STEM Approach to Entrepreneurship Subjects in the Chemical Education Study Program Faculty of Teacher Training and Education Sriwijaya University (2) Students are facilitated by the Chemistry Education to plan entrepreneurial design, as evidenced by the facilities contained in the SAP and Syllabus in the Entrepreneurship Course. (3) The learning process using the STEM approach of Entrepreneurship Subjects in the Chemistry Education (4) Three teaching professors teach in the Indralaya and Palembang campus classes. (5) The cognitive learning outcomes of students in the Entrepreneurship Course in the first semester were all very satisfying. Thus, the Implementation of the Entrepreneurship STEM Approach for Entrepreneurship Subjects in the Chemistry Education Department at FKIP Sriwijaya University. Feed topic types for increasing the weight of the Local Goat Growth Phase has been running optimally.

***Keywords**: STEM, Course of entrepreneurship, Increasing goat weight.*

1. INTRODUCTION

Human resources are the main asset in building a nation. Humans will progress if education contributes to improving the life of the nation [1]. The government is committed to improving the quality of education in Indonesia through an education system with national education standards. The education system includes knowledge, attitudes, and skills based on the Semester Credit System. The higher education system in the Chemistry Education Study Program, Faculty of Teacher Training and Education, Sriwijaya University uses the Credit System Semester (SKS) which is guided by Government Regulation Number 19 of 2005 concerning National Education Standards. Based on Law Number 12 of 2012 Article 4 [2], students are required to think in creative and innovative. Entrepreneurship courses with a weight of 2 credits in the FKIP Chemical Education Study Program Sriwijaya University is a compulsory course for Chemistry Education students, which can make students think in creative and innovative ways. According to [3], Entrepreneurship Education is very important because students think in creative and innovative ways, so as to reduce unemployment. The Science, Technology, Engineering, Mathematics (STEM) approach is very important to do to guide creative and innovative students because this research starts from a problem. According to [4], [1], and [5] the STEM Approach consists of the following steps. 1) The existence of a problem, 2) The design or problem-solving plan, this design is evidence of creativity. 3) Testing of problem solving, and 4) Reporting or disseminating the results of the trial. [4], states that the STEM Approach becomes one unit and is not separated between S, T, E, and M. The four steps according to [4] serve as guidelines in the

implementation of entrepreneurial learning in this study, only limited to stage 3) trials only limited to problem solving trial design. STEM stage 4) reporting is implemented.

Based on the results of interviews with lecturer and document analyzed on the Entrepreneurship Subject in the Chemistry Education Study Program, the topic of feed types for increasing goat weight in the growth phase is very important. This topic is very important to be an example of learning because goat livestock are familiar to students in general. to increase the weight of the growth phase is the main topic in this STEM approach. Based on engineering in that approach, students master knowledge and skills [6], [7], and [8].

Based on the background, the results of interviews and documentation, learning in the Entrepreneurship Subject before this was more theoretical, not yet creative, innovative, and engineering, so qualitative research was carried out, observation, interviews, and documentation, the implementation of the STEM Approach in Entrepreneurship Courses in Chemistry Education Study Program with Feed Topics to Increase Goat Weight in the Growth Phase. The purpose of this study was to describe the implementation of the STEM Approach in Entrepreneurship in the Chemistry Education Study Program on Feed Topics for Increasing the Weight of Growth Phase Goats. The benefits of the results of this study are 1) for students to increase their engineering creativity, through the STEM approach, 2) for Entrepreneurship course leaders to guide learning with the STEM approach.

2. METHODS

This type of research is qualitative research, with data collection techniques in this study are interviews, observations, and documents. Determination of the location and sample of the study using purposive sampling method, this was done with the consideration of the Covid 19 outbreak. Chemistry Education FKIP Sriwijaya University. The STEM approach is limited without a trial stage. The data analysis methods used are data reduction, data presentation, and conclusion. Testing the validity of the data in this study was carried out by triangulation and check. This research was conducted in the even semester of the 2019/2020 academic year.

2.1. Interview

Interviews were conducted to obtain supporting data for Entrepreneurship lectures in the Chemical Education Study Program, FKIP Sriwijaya University.

2.2. Observation

The observation technique was carried out to obtain data on the implementation of the learning process using the STEM approach consisting of problems, problem solving design / design, (problem solving trials were not carried out because the learning approach was carried out in 100 minutes or 2 credits) and reporting.

a. Documentation

Documentation is carried out to obtain data on the learning process using the STEM approach in the form of photos of learning activities and the results of reporting learning activities using the STEM approach in the Chemistry Education Study Program, FKIP Sriwijaya University.

3. RESULTS AND DISCUSSION

3.1 Interview

Based on the results of interviews with course administrators with the initials KAW, IH, and BL, it was found that the learning appropriateness of the STEM Approach in Entrepreneurship courses in the Chemical Education Study Program on February 27, 2020, for material types of feed to increase the weight of the growth phase goats had gone well according to the stage problems, problem-solving plans, (problem-solving trials were not carried out due to limited lecture time) and reporting. The STEM approach to the material makes students creative, it's just that trials of the application of this type of goat feed which are constrained are not implemented. The results of the subsequent interviews with the Entrepreneurship course instructors, in the form of feed types were chemically modified by the intake of protein, carbohydrates, or fat from relevant feed sources to increase the weight of the goats in the growth phase. Interviews with the Coordinator of the Chemistry Education Study Program, FKIP Sriwijaya University showed that the material type Feed is very useful, makes students creative, and becomes a real entrepreneurial provision as a job apart from being a chemistry teacher. Sriwijaya University facilitates wifi for learning at the Indralaya and Palembang campuses, so students can search for secondary data for this type of goat feed. Syllabus and Eye Semester Program Plan Entrepreneurship courses are available at the Sriwijaya University FKIP Chemistry Education Study Program.

3.2 Observation

From the observations of the implementation of the STEM Approach in Entrepreneurship Subjects, students are grouped into 6. Each creative group seeks a solution to the problem in the form of types of feed to increase

the weight of the goats in the growth phase. After each group gets the type of feed, each group writes it in the WhatsApps Group Each group searches the internet and writes down designing the address of the place where the goat is kept. The group designs a plan for the cage where the goat is kept. The group designs the composition of the feed to increase the weight of the goat. The group threatens the number of times each day of giving the feed to increase the goat's weight. steps to identify the appropriate compound, element, and / or atom from the writing of the group This implementation activity is carried out by assessing the process and design results per group

3.3 Documentation

Based on the results of the documentation, there are photos, reporting files from the results of the creative work of 6 groups and videos of implementation activities or learning implementations of the STEM Approach Entrepreneurship course feed material to increase the weight of the goats in the growth phase. From the documentation, there are problem stages, problem-solving design / plans, and reporting as the STEM Approach.

4. RESULT AND DISCUSSION

Based on the STEM approach steps [4], all groups have implemented these steps. These steps make students creatively plan or design a plan for the goat pen, designing the goats entrepreneurial fund requirements. All groups report the group work results in writing, are presented to the class, and are videotaped by the group. Group 3 more fully reports on the chemistry of the chemical element determination of Potassium, Calcium, and Magnesium by Atomic Absorption Spectrometer, referring to the journal written by [9] This STEM approach is student-centered learning, student center, this is what curriculum 2013 wants. Lecture Program and Course Syllabus WiFi internet is available as a facility for the Chemistry Education Study Program FKIP Sriwijaya University. Based on the research results, the STEM approach is limited without the following trials .

Problem 1.

The problem raised by Group 1 consisted of YAH, RA, and SP., In the form of how to milled corn to increase the weight of the goats in the growth phase.

Plan / Design 1

The address plan for raising and caring for the goats is on Jalan Keramat Panjang No.5 RT 5 Palembang, and they have designed a goat pen. The plan for the composition of the milled corn mixture is 8% fish meal, 50% milled corn, 20% coffee bran, rice bran. 12%, 10% onggok, water and salt as needed. For feeding is measured according to the percentage of livestock body weight ranging from 3% of the body weight of the goat. Forage goats ranging from 0.8 to 1.2 kg per head per day with morning and evening feeding intervals. The chemical content of milled corn per 100 grams is 9.2 grams of protein; 3.9 grams of fat; carbohydrates 73.7 grams; vitamin A and water to taste. Chemical content of Onggok in the form of protein 2.89 grams; crude fiber 14.73 grams; fat 0.38 grams; and 20.31 grams of water. Chemical content of rice bran in the form of water 10%; crude fiber 10%; 7.5% protein; 2.25% fat. The content of fish meal in the form of protein is 40%; fat 5,65%; water 8.72%; crude fiber 2.38%. The chemical content of coffee bran in the form of protein 17.88%; 1.79% fat; [10]. The plan details the cost required for feed in the form of milled corn Rp. 14,000 / kg; fish meal Rp. 6000 / kg; coffee bran Rp. 2000 / kg; Onggok Rp. 5000 / kg; rice bran Rp. 2000 / kg

According to [5] the steps for preparing milled corn feed to increase the weight of the growth phase goats are: preparation of tools and materials; milled corn, fish meal, rice bran, coffee bran, Onggok, and water are mixed, stirred evenly, let stand for 10-20 minutes, put in an air plastic drum for about 14 days, the feed is ready to be given to the goat.

Reporting / presentation 1.

Group 1 reported and presented the results of the solution design for the additional feed problem for milled corn. This presentation was carried out in front of the class and was responded to by other students. Video and photo of the presentation as evidence of this presentation.

Problem 2

Group 2 consists of NH, AA, and MP. Planned types of jackfruit leaf feed for goat growth.

Plan / Design 2

Growth phase goat care plan at H. Faqih Usman street No.210 2-4 Ulu, Seberang Ulu one District, Palembang City. A floor plan of the cage where the maintenance is made. The composition of the feed includes jackfruit leaves and concentrate for 6-7 months old goats, fed 2x a day with a total of 5 kilograms a day (morning and afternoon) while in the afternoon they are fed green grass. The goat business cost plan is in the form of an initial capital for the goat pen (for 16 heads) of Rp. 4,000,000; cage equipment Rp. 1,000,000; water pump Rp. 500,000; superior male goat seeds Rp. 3,000,000; 10 superior female goat seeds Rp. 7,000,000; so that the total required is Rp. 15,500,000,. [12], [13], [11], [14], [15], and [16].

Reporting / presentation 2.

Group 2 reported and presented the design solutions for solving the problem of additional feed for jackfruit

leaves. This presentation was carried out in front of the class and other students responded to it, such as group 1. Videos, photos of presentations and hard copies of reports as evidence of this presentation.

Problem 3

Group 3 with the initials AS, CAM, UAS. The combination of feed, namely grass to increase the weight of the growth phase goats

Plan / design 3

The address plan for raising the goat is on Naskah III street Sukarami, Palembang City. The design of the plan for making a cage has been prepared. The composition of the feed is 80% grass and 20% complete ration or bran. Goats are fed 2 times a day, namely every morning at 8 and 3 in the afternoon. The amount of feed given can be estimated to be sufficient for the morning feed supply which is able to meet 60%, while 40% for the afternoon. Through analysis of leaves and grass contains macro and micro elements. Macro elements are Nitrogen, Phosphorus, Hydrogen, Potassium, Magnesium, Calcium, Carbon, Oxygen. Micro elements in the form of Boron, Chlorine, and Sodium. The identification of these chemical elements can be traced chemically from journals on google. The Potassium, Calcium, Magnesium test for this group was obtained from [17], and [9] using this fiber is a feature of the industrial revolution 4.0. The details of the cost in the form of land rent for 10 years amounting to Rp. 12,000,000; plans to build a goat pen by employing construction workers around Rp. 50,000 / day. For example, to open a goat livestock business as many as 20 heads, the size of the pen is about 6 meters by 6 meters. The per room distance is 150 cm by 60 cm. So, the cost of making 5 goat cages will cost Rp. 10,000,000, -. Purchase of goat seed per 10 months x 20 tails is the same as Rp. 8,000,000. drilling well construction costs Rp. 6,000,000, -; employee salary Rp. 1,000,000 per person one month. Steps for grass feed to increase the weight of growth phase goats Dissolve 200 mL EM4, 1 liter of Molasses, 5 liters of water, stir and store for a day to activate the bacteria in EM4, Chop the grass into smaller sizes, mix evenly, dry in the sun to half dry. After that, sprinkled with EM4 solution, this solution does not have to run out, as long as the basicity level is sufficient. The feed is put into a container, compact, and close tightly. Fermentation is carried out for 2 weeks. The feed is before given to the goats, aerated for 30 minutes [17], and [14]

Reporting / presentation 3.

Group 3 reported and presented the results of the design solutions for solving problems for additional grass problems such as groups 1 and 2.

Problem 4

Group 4 with the initials ME, RCL, and SA. Group 4 chose fine bran as feed to increase the weight of the growth phase goats.

Plan / design 4

The plan for raising the goat is located at Jalan Sultan Muhammad Mansyur s No. 1040 Ilir Barat I Subdistrict Palembang City, South Sumatra. Design of animal pens with a width of 7 meters and a length of 10 meters. Feed composition 80% fine bran, 10% vitamins (organic supplements), 10% water. Feeding goats one day with grass, for giving fine bran 2 times a day morning and evening. For vitamins containing A pathogens. Plan for the cost of land 10 meters by 7 meters Rp. 100,000.000; tools and materials for the cage Rp. 50,000. 000; fine bran feed Rp. 100,000 per sack; goat child Rp. 4,000.000 per four head. The total plan cost is Rp. 154,100.000, -. The steps for making feed. 1) prepare the tools and ingredients, mix the bran, vitamins, and water, stir until evenly the mixture is put into an airtight plastic drum. Group 4 takes references from the [2], and [4].

Reporting / presentation 4.

Group 4 reported and presented the results of the design solutions for solving problems for additional grass problems such as groups 1, 2 and 3.

Problem 5

Group 5 with the initials ADP, RH, and NEP. The feed chosen was additional cassava leaves to increase the weight of the growth phase goats

Plan / design 5

Goat Care Plan on Jalan Sultan Mansyur Lorong Lebak Keranji No.3 RT 12 Kec. Ilir Barat I Palembang. While the design plan is a location plan, not a goat pen. The plan to give 1 kilogram of cassava leaves per day gives the effect of additional goat weight during growth period of 21.4 grams per head per day. Giving additional 1.5 kilograms of cassava leaves per day gives an additional body weight of 23.2 grams per growth goat per day. One kilogram per day times 30 days equals 30 kilograms can add 642 grams to the goat's weight. 1.5 grams of cassava leaves, multiplied by 30 days is the same as 45 grams of cassava leaves, which can increase the weight of the goats during the growing period of 696 grams. The nutritional content of cassava is 23.36% dry matter; Crude protein 28.66%; TDR 6.1%; 19.6% crude fiber; Fat 9.4%, BeTh 34%; Ash 8.83%; Ca 1.9%, P 0.46%. The cost required to make cage 7 is Rp. 75,000,000, -; feed Rp. 800 to Rp. 1,200, - per day. Then there are many uses of cassava as animal feed, however, the basic use is due to the presence of cyanide acid which is toxic if consumed in certain amounts in a fresh state. To be used as feed, the cassava

is chopped first and then dried in the sun until the dry matter content is 80 to 90 percent. Such drying can reduce cyanide acid levels by 90%. Such feed is safe for goats and can be stored for stock

Reporting / presentation 5.

Group 5 reported and presented the results of the design solutions for solving problems for additional grass problems such as groups 1, 2, 3, and 4.

Problem 6

Group 6 with the initials FAS, DSA, and NYH. The feed used to increase the weight of local goats in the growth phase was green leaves.

Plan / design 6

Entrepreneurial plans for raising goats on Jalan Raya Way Hitam IV, Belitang District, East OKU Regency, South Sumatra Province. This group has compiled a design for the cage where the goat is cared for. The composition of the feed increases the goat's weight in the form of lamtoro leaves, straw and grass. Feed is given 3 times a day in the morning, afternoon and evening as much as 1 kilogram per day. Identification of chemical compounds that can be studied is the C8H10N2O4 compound, in the form of elements, namely C8, H10, N2, O4. The method of writing the elements like that is not yet precise, which is preferable to C, H2, N2 and O2. The atoms of the compound are in the form of C, H, N, and O. The detailed plan of the cost of increasing the weight of the goat is in the form of purchasing 10 goats worth Rp. 5,000,000, -; Making a simple cage with additional equipment worth Rp. 3,000,000, -. Green feed purchased for Rp. 60,000 times 9 months is the same as Rp. 1,080,000. The total planned expenditure for goat farming is Rp. 9,620,000, - . The procedure or steps for feeding green leaves in the form of grass, straw and lamtoro leaves are prepared, then mixed, then given to the goats 3 times a day in the morning, afternoon and evening. (Supratman et al, 2016).

5. CONCLUSIONS AND SUGGESTIONS

The results of the research are (1) Students have been able to apply the STEM Approach to Entrepreneurship Courses at FKIP Sriwijaya University, Feed for Increasing the Weight of Growth Phase Goats. (2) Students are facilitated by the Sriwijaya University FKIP, to plan entrepreneurial designs, it is evident that these facilities are contained in the SAP and Syllabus in the Entrepreneurship Course. (3) The learning process using the STEM approach for Entrepreneurship Subjects, Feed to Increase the Weight of Goats in the Growth Phase is effective due to the availability of facilities. (4) The cognitive learning outcomes of students in the Entrepreneurship Course in the first semester are all very satisfying. Implementation of the STEM Approach in Entrepreneurship Courses at FKIP Sriwijaya University, Feed for Increasing Goat Weight Growth Phase has been running optimally.

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