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Contribution of Production-Based Learning, Student Engagement, and Locus of Control towards Entrepreneurship Learning Outcomes in Engineering Education

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***Abstract*— This study was motivated by entrepreneurship learning outcomes in engineering education that could not have a significant positive impact on students' interest in entrepreneurship. Currently, entrepreneurship learning is boring, predictable, and has not provided a good learning experience. This study described and tested the contribution of production-based learning, student engagement, and locus of control to entrepreneurship learning outcomes. This research used a quantitative method. The population was all students who take the entrepreneurship course in engineering education for 2,600 people, and the sample is 307 students. The research instruments used a reliable and valid Likert scale and the test for assessing entrepreneurship learning outcomes. Data were analyzed using parametric statistics. The results obtained from this research; there is the contribution of production-based learning, student engagement, and locus of control to the entrepreneurship learning outcome. Production-based learning provides an opportunity for students to be directly involved in a collaborative learning process. Besides, the raising of internal locus of control, for the level of confidence of students in the learning process, has a good impact on the entrepreneurship learning outcome students. The process of learning entrepreneurship by applying production-based learning also becomes more meaningful. It gives an influence on external locus of control, such as job opportunities and readiness in the community to be well open. Thus, it also automatically contributes to the improvement of the quality of graduates in engineering education.**

***Keywords*— production-based learning; student engagement; locus of control; entrepreneurship learning outcomes, engineering education.**

I. INTRODUCTION

The development of entrepreneurial awareness [1] and motives for students [2] is a fundamental requirement to achieve an increase in the quality of human resources [3]. The goal is to produce educated people, independent, resilient, hardworking, unyielding, responsible, brave risks, respect time, able to exploit every opportunity, productive, and innovative. Education plays an essential role in producing successful entrepreneurs because education can contribute to the quality of understanding and change in mindset for students in engineering education; entrepreneurship education is no exception. Entrepreneurship education is an important issue in engineering education, because through engineering education graduates can be an economic driving force and become young technopreneur. The transfer of information and knowledge on entrepreneurial learning must be a concern for educators. It is because entrepreneurship education is boring, predictable, does not stimulate students actively involved, and gives low confidence to students on what they have in the entrepreneurial learning process, which can affect their lives.

Entrepreneurship development among students has been carried out by the government and education practitioners [4]. However, various efforts still often face challenges [5], both technical and non-technical aspects. The most difficult challenges faced when developing entrepreneurship among the students come from limited business sustainability [6], productive capital, and lack of knowledge of production [7], student engagement in entrepreneurship [8], weak self-control for entrepreneurship [9], lack of job skills [10], product quality, product-market guarantees, and small partnerships. These problems are a formidable challenge for students who want to develop their entrepreneurial spirit. The campus has an entrepreneurship program that has been well-organized and implemented [11-13], but most and many campus graduates are not capable of entrepreneurship. Most of the university graduates only rely on the diploma and competence of their respective fields to find work, and many of them did not get a decent job.

Based on data held by the Central Bureau of Statistics, Indonesia, about the Open Unemployment Rate starting from August 2017 for 7.04 million people or 5.50 percent [14], and finally in August 2018 for 7 million people or 5.34 percent [15], this figure includes unemployed education graduates. This data describes the weakness of university graduates in the competition in the labor market. This phenomenon appears with the current learning process that is still targeting value-oriented.

The learning model becomes the central part of the learning process, so that it is crucial to do a review in the form of needs analysis. If looking at the high unemployment rate of university graduates, especially in engineering education, certainly indicates the weakness of the learning process that occurred. In achieving learning outcomes in engineering education, students will experience the learning process. Learning that contains learning, and self-transforming processes resulted from efforts in the process [16]. Furthermore, learning is a behavioral change through activity, practice, and experience. Simply, entrepreneurship learning is how the transfer of knowledge and attitude changes as well as the right mindset about entrepreneurship. The teaching of entrepreneurship is an effort to form a self-confident person with insight capable of recognizing business opportunities and execution [17], also helping to inspire students, arouse emotions, and change mindsets [18]. Besides, entrepreneurship learning is also useful to help students know themselves and their work environment so they can take the direction of their career decisions [19, 20].

Learning outcomes are processes of individual change seen in the behavior of students' knowledge, understanding, attitudes, and skills [21]. From the opinion of the experts above, it merely defines that the learning outcomes of entrepreneurship learning are the ability which the students get after the entrepreneurship learning process that keeps them from being uninformed to the conscious part. It involves the psychological elements of the individual.

The process of entrepreneurship learning and entrepreneurial learning outcomes is, of course, also influenced by the learning model. One of the several engineering education learning models that are very relevant to entrepreneurial development in engineering is the Production-Based Learning Model. Production-based learning models give students the opportunity for students to collaborate and gather potential in the learning process that produces commercial products [22].

The production-based learning model provides opportunities for students to elaborate and explore skills in engineering education [22-27, 32]. These skills are critical thinking skills and work together [33]. It is highly relevant to learners' development in their learning experiences [34].

Besides, the emotional problems, behaviors, and learning difficulties above are at risk of impeding the learning process so that it decreases academic achievement. Therefore, the students need to increase their engagement in learning (Student engagement) on aspects of emotion, behavior, and cognitive to achieve academic achievement/outcomes optimally in the learning process. Student Engagement is the time and effort given for learning activities based on the desired outcomes of engineering education to encourage students to participate in such activities [35].

Four dimensions of Student Engagement are as follows:

- Agentic engagement, which is a constructive contribution of students to instruction or tasks that they receive in learning.
- Behavioral engagement, where student mobilize their efforts to pay attention to learning activities and smart in doing tasks and obey the norms and rules of engineering education to avoid any problems.
- Emotional engagement, which is illustrated by the positive emotions of students in teaching and learning activities with interest and enthusiasm or away from emotions of upset, anxious, and bored
- Cognitive engagement, which illustrated by the use of self-regulation and advanced learning techniques and in-depth learning activities undertaken by the students [36].

Student engagement in the entrepreneurship learning process in engineering education appears through the time and effort that students expand during their participation in academic/learning activities. This condition occurs as a result of a survey of students in America who have different learning experiences when not all are involved in learning experiences and learning activities [37].

Furthermore, locus of control is the extent that individuals feel that their actions have little influence on the living conditions they face; they believe that their actions influence circumstances and rewards. Locus of control in interpretation is how someone sees events in real conditions in his life as an impact of what they did, thus can be controlled (internal control), or as something that is not related to their behavior so that it is outside their control (external control) [38]. Based on the various definitions above, the definition of locus of control is a person's view of himself related to the results and efforts received so that they can control the events in his life. Internal locus of control means that individuals believe and have a high level of confidence that affects the lives of individuals, as well as external locus of control controls from the same outside also strongly influence one's individual life, one of which is fate and destiny [38].

People with an internal locus of control have strong beliefs in controlling their activities, while people with an external locus of control have strong beliefs outside themselves [39]. The Internal locus of control is explained as a result of events related to their behavior. In contrast, external locus of control is the general expectation that results and the strong influence of others and the outside environment as the determiner [40].

Theoretically, the internal locus of control is a view of individual beliefs. The events occur in life, influenced by behavior and efforts. Meanwhile, the external locus of control is the view of individual beliefs, forms of results, and efforts in achieving something influenced by luck. Thus, locus of control, both internally and externally, also has a role in influencing learning outcomes in engineering education.

The hypotheses in this study are as follows:

- H1: Production-based learning contributes significantly to entrepreneurship learning outcomes.
- H2: Student engagement contributes significantly to entrepreneurship learning outcomes.
- H3: locus of control contributes significantly to the entrepreneurship learning outcome.
- H4: Production-based learning, student engagement, and locus of control collectively contribute significantly to entrepreneurship learning outcomes.

II. Materials And Method

This research used a quantitative method of a descriptive correlational type. The instrument used was a rating scale of Likert's model.

A. Population and Sample

The research population was students who were studying entrepreneurship in engineering education for 2600 students of the Faculty of Engineering, Universitas Negeri Padang, with a sample of 307 students through a random sampling selection technique [41].

B. Research Instrument

The primary data collection instrument used in this study was in the form of a documentation study on entrepreneurship learning outcomes and questionnaires of production-based learning, student engagement, and locus of control. The questionnaires used a Likert scale model. The questionnaire consists of several statements formulated in the form of questions or statements with five choices of answers in the form of attitude scales and frequency scales adapted to the purpose of the question or statement. They are 1) Attitude Scale: strongly agree (SA), Agree (A), somewhat disagree (SD), disagree (DA), and strongly disagree (SDA); 2) Frequency Scale: always (A), often (O), sometimes (S), rarely (R), and never (N).The use of attitude scale and frequency scale referred to the need for each research variable. Following the nature of the questionnaire, the weight of the statement items/positive questions used a score of 5, 4, 3, 2, and 1. While the statement/negative question statements also used a score of 1, 2, 3, 4, and 5.

C. Techniques of Data Collection

The data collection conducted at Higher Education were as the following procedures:

- preparing the questionnaire production-based learning, student engagement, and locus of control,
- explaining the instrument and how to fill it,
- distributing instruments and invite students to fill them out, and
- collecting instruments according to the plan.

D. Techniques of Data Analysis

Data analysis used the SPSS version 22.00 program, which was integrated and included in it. The analysis process was with descriptive statistics, simple and multiple regressions.

III. Results and Discussion

Before performing the data analysis process, the research required normality, linearity, and multicollinearity tests where the results are as follows.

TABLE I
NORMALITY TEST

No.	Variable	Sig. (P)	Sig. alpha	Description
1	Entrepreneurship Learning outcomes (Y)	0.190	0.05	Normal
2	Production-based learning (X_1)	0.185		Normal
3	Student Engagement (X_2)	0.200		Normal
4	Locus of Control (X_3)	0.200		Normal

Normality testing performed with the Kolmogorov-Smirnov. If Asymp. Sig. or P-value > of 0.05 (significance level). The data was from a normally distributed population. The result of the normality test if value data Asymp. Sig. Production-based learning is 0.185, and student engagement is 0.200, the locus of control is 0.200, and entrepreneurship learning is 0.190. It means that all four data of research variables are normally distributed.

TABLE II
LINEARITY TEST

Variables	F	Significance Level	Conclusion
X_1 Y	9.673	0.009	Linear
X_2 Y	11.436	0.007	Linear
X_3 Y	10.567	0.008	Linear

Based on the above data, the relationship between production-based learning with the learning of entrepreneurship is linear. Students' engagement is also linear with the outcomes of entrepreneurship learning, while the relationship of locus of control with the entrepreneurship learning outcomes is also linear.

TABLE III
MULTICOLLINEARITY TEST

Variable (Constant)	Tolerance	VIF	Description
X_1	0.779	1.285	No multicollinearity
X_2	0.779	1.285	
X_3	0.779	1.285	

The next test is a multicollinearity test. It shows that the value VIF of production-based learning is 1.285, which means <10, the VIF1 value of student engagement is 1.219. It means the values <10, and VIF values of locus of control is 1.285, which means <10. Based on the result, it indicates that there is no multicollinearity between variables of scientific-based learning, student engagement, and locus of control.

Furthermore, the explanation of the results of hypothesis testing is as follows. In the first model, the analysis is the effect of production-based learning towards entrepreneurship learning outcomes. The results of the data analysis revealed that the production-based learning could predict 24.2% of entrepreneurship learning outcomes (R^2= 0.242). In the second model, the analysis shows that student engagement can predict 30.7% of entrepreneurship learning outcome variables (R^2= 0.307). In the third model, the analysis showed that the locus of control could predict 18.82% of entrepreneurship learning outcome variables (R^2= 0.188). In the fourth model, the analysis showed that production-based learning, student engagement, and locus of control were able to predict 36.5% of student entrepreneurship learning achievement (R^2= 0.365). The analysis of identifying the significance of the contribution of production-based learning, student engagement, and locus of control towards entrepreneurship learning outcomes is in the following tables.

TABLE IV
RESULTS OF THE TESTING OF PRODUCTION BASED LEARNING TO ENTREPRENEURSHIP LEARNING OUTCOMES.

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3939.559	1	3939.559	67.873	.000[a]
	Residual	12363.250	306	58.043		
	Total	16302.809	307			
a. Dependent Variable: entrepreneurship learning outcomes						
b. Predictors: (Constant), production-based learning						

Table 4 explains that the effect of production-based learning on entrepreneurship learning outcomes, from this table the Mean Square Regression (3939.559) and the Mean Square Residual (58.043), F = 67.873 and statistically significant (Sig = 0.000).

TABLE V
THE RESULTS OF THE TESTING OF STUDENT ENGAGEMENT TO ENTREPRENEURSHIP LEARNING OUTCOMES

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5006.067	3	2503.033	46.973	.000[a]
	Residual	11296.742	304	53.287		
	Total	16302,809	307			
a. Dependent Variable: entrepreneurship learning outcomes						
b. Predictors: (Constant), student engagement						

Table 5 explains that the effect of student engagement on entrepreneurship learning outcomes, from this table the Mean Square Regression (2503.033) and the Mean Square Residual (53,287), F = 46.973 and statistically significant (Sig = 0.000).

TABLE VI
THE RESULTS OF THE TESTING OF LOCUS OF CONTROL TO ENTREPRENEURSHIP LEARNING OUTCOMES

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1557.943	2	778.972	13.316	.000[a]
	Residual	12577.254	305	58.499		
	Total	14135.197	307			
a. Dependent Variable: entrepreneurship learning outcomes						
b. Predictors: (Constant), locus of control						

Table 6 explains that the effect of locus of control on entrepreneurship learning outcomes, from this table the Mean Square Regression (778.972) and the Mean Square Residual (58.499), F = 13.316 and statistically significant (Sig = 0.000).

TABLE VII
THE RESULTS OF THE TESTING OF PRODUCTION BASED LEARNING, STUDENT ENGAGEMENT AND LOCUS OF CONTROL TO ENTREPRENEURSHIP LEARNING OUTCOMES

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	8224,862	3	2741,621	70,237	0,000[b]
	Residual	14286,373	304	39,034		
	Total	22511,236	307			
a. Dependent Variable: entrepreneurship learning outcomes						
b. Predictors: (Constant), production-based learning, student engagement, and locus of control						

Table 7 explains that the effect of production-based learning, student engagement, and locus of control on entrepreneurship learning outcomes, from this table the Mean Square Regression (2741.621) and the Mean Square Residual (39.034), F = 70.237 and statistically significant (Sig = 0.000).

A. Production-Based Learning and Its Contribution to Entrepreneurship Learning Outcomes

Regression test results show that production-based learning contributes 24.2% to entrepreneurship learning outcomes. Significance also shows that production-based learning contributes to entrepreneurship learning outcomes. In the context of the curriculum and its implementation in the form of learning developed for courses, entrepreneurship should lead to the ability of innovation and more emphasis on skills (technical skills). The lesson should closer to the work area directly (direct purposes of learning).

Students who actively generate essential questions related to the planned product related to entrepreneurship lectures indeed tend to improve learning outcomes entrepreneurship [24-30]. Production-based learning is learning activities that optimize all competencies, to be able to communicate, collaborate, and work in achieving the curriculum and project targets that have commercial potential [22]. Similarly, students who master this production-based learning will improve the learning outcomes of entrepreneurship. Procedures or steps that require learners to learn actively, participate, and interact effectively to improve the competence of learners, one of which is undoubtedly the learning outcomes [42]. Student learning outcomes equally raise the effectiveness of students and lecturers in the learning process. Some studies show that production-based learning methods are effective in improving the learning process activities, with the percentage of lecturer responses reaching 91% and the percentage of student responses reaching 93% [24, 25]. Another finding also explains that production-based learning can improve the quality of learning outcomes [43]. Based on Learning that emphasizes the learning of production, students can produce products or services needed by the community. The application of a production-based learning model has an impact on students' competencies and competencies such as collaboration in learning ability, ability to produce the planned product, making a decision, and time management. A good lesson plan impacts future learning outcomes. Based on the previous presentation, it can be concluded that production-based learning in engineering education is able to predict whether good or not students' entrepreneurship learning outcomes.

B. Student Engagement and its Contribution to Entrepreneurship Learning Outcomes

Based on the results of data analysis, it shows the significance of the student engagement variable on entrepreneurship learning outcomes. The research findings also show that student engagement can predict 30,7% about success in entering entrepreneurship lectures. Reyes et al. revealed that when students have better student engagement, in the learning process, students will give full attention and participate in class discussions, and show interest and motivation during the lesson [44]. Student engagement can also measure how well students learn and, at the same time, be a reference to effective teaching. By knowing and understanding how well, learning and teaching processes are useful for students, teachers can provide evaluation and feedback on achievements and shortcomings in the learning process that they have undertaken. Student engagement is vital because it has several roles in the learning process. First, student engagement makes the learning process possible. The development of a knowledge or ability is not possible without the attention, effort, persistence, positive emotions, commitment, and active interaction with others in the learning process. Student engagement is a requirement of a productive learning experience. Next, student engagement serves to predict the functioning of an educational institution. Thus, student engagement can predict how well students are studying [45].

C. Locus of control and its Contribution to Entrepreneurship Learning Outcomes

Based on the results of research and analysis, it proves that there is a contribution locus of control towards entrepreneurship learning outcomes. Based on the results of the study, locus of control can explain 18.8% of students' entrepreneurship learning outcomes. It indicates that the locus of control has a role in improving students learning outcomes. Myers suggests that students who see themselves controlled internal locus of control tend to succeed in engineering education [46]. The exposure means that students who tend to the internal locus of control will do their best to achieve what they want [47]. Students who know themselves well will be able to control themselves well, because by knowing they will improve learning outcomes. Students with an internal locus of control have the characteristics of hard-working, always thinking effectively, and have the perception that success is proportionate with efforts. Students who have confidence that their participation influence all the results achieved in life, of course, also have the power to solve problems learning.

Contrary to students who tend to the external locus of control, when they face problems, they tend to surrender and lean towards fate. If it is left, it will because students do not want to try to achieve better learning outcomes [47]. The above explains that individuals need to increase their locus of control because it affects the learning outcomes. The above findings supported by the results of research, which found that there is a relationship between self-control had by individuals and their learning achievement [48]. If this condition is allowed, it can lead to conditions of academic stress among students [49, 50]. This condition happens because of pressure [51, 52] because of the unsatisfactory results of learning [53].

D. The contribution of Production-Based Learning, Student Engagement and Locus of Control to Entrepreneurship Learning Outcomes

The results show that production-based learning, student engagement, and locus of control collectively contribute significantly to entrepreneurship learning outcomes. This finding is obtained based on the series of data analyses that the regression coefficient of 0.604. The coefficient of determination (R Square) of production-based learning, student engagement, and locus of control on student Entrepreneurship Learning Outcomes is 0.365. There is the contribution of variables of production-based learning, student engagement, and locus of control collectively to the student entrepreneurship learning outcomes of 36.5%, while the rest (100% -36.5% = 63.5%) explained by other unexamined variables in this study. As some research it shows that the use of production-based learning can improve learning outcomes [24, 25]. The results of this study revealed that production-based learning, student engagement, and locus of control together could be a factor that affects student entrepreneurship learning outcomes. The use of production-based learning will have an impact on the well-being of students in this form of learning outcomes. It means that production-based learning can affect the learning outcomes obtained by students in engineering education [22].

Production-Based Learning is a learning innovation of engineering education, which facilitates the potential, talent, and ability of students to develop a project that is worth selling. This learning process emphasizes aspects of problem-solving, collaboration, work team communication, and creativity so that students are not only equipped with special science skills but also entrepreneurial abilities [54], with competencies oriented to produce a product. So that Production Based Learning includes active learning for competency-based education [55-57] integrated with knowledge, skills, and attitudes.

Production-Based Learning optimizes the potential of students to be able to explore and develop production activities of goods or services. Supported by Suryadi & Yuza who say [58], "Project-based learning is learning with an emphasis on work planning, work procedures and learning products that have value for sale or products according to specified construction standards," and according to Marlina, "Project-based learning is learning emphasized in the aspect of the integration of the concept of meaningfulness [59]. Meaning of meaning is that students understand the concepts taught through experience working on objects directly in the workshop or in the field (practical experience) so that they can produce products that meet industry standards "so that Production Based Learning is a procedure carried out by the teacher to assist students in developing competencies whose orientation is to produce a product based on industry standards with student-centered learning [60], especially in engineering education.

The learning conditions of entrepreneurship in the classroom indeed tend to be boring and uninteresting. Production-based learning with student-centered learning steps helps to overcome this saturation because students are in study groups, and collaboration and good teamwork occur, meaning learning and teaching must change [65]. This working group began to do a formulated and adjusted project following the curriculum. Indirectly the involvement of students in workgroups becomes very good and harmonious, which has an impact on students' locus of control. Through a good learning process in groups raises a high level of confidence for members in the group, because members in the group complement each other and help one another.

Teaching entrepreneurship through production-based learning also involves a process of interaction with consumers and direct practice of spaciousness [61-64]. This activity is perfect in shaping the character and competence of entrepreneurial students, indirectly impacting entrepreneurship learning outcomes. These learning outcomes also contain elements of character and understanding of basic concepts so that conceptually students can understand the meaning of entrepreneurship and practice directly [66] to feel the entrepreneurial values and character that occur during the entrepreneurship process.

Understanding the problems and character of students at the beginning of learning becomes essential [67], as a primary ingredient in thinking about entrepreneurship learning that is right on target, so students have a good understanding and knowledge of entrepreneurship [68], so that it impacts on learning outcomes [69]. A well-prepared Entrepreneurship learning, one of them is product-based so that it will indirectly provide learning readiness to students and provide space for other students to get involved in learning [70]. Through this process, the belief to be earnest in learning will grow in students, which will also affect maturity in thinking and working [71]. So that with no boring learning, especially entrepreneurship learning in engineering education, students are formed to have the ability to survive in society and have entrepreneurial competencies, indirectly that the character of entrepreneurship lives in the soul of graduates of engineering education.

IV. CONCLUSION

Learning outcomes in engineering education, especially in entrepreneurship learning, become a central issue because graduates from engineering education should be able to help reduce educated unemployment rates from college and vocational school graduates. Efforts start from graduates of engineering education by developing entrepreneurial competencies to produce a variety of simple and effective commercial products. Production-based learning models become one of the alternative ways of teaching that can realize various commercial products in question. Furthermore, it becomes crucial that this production-based learning model is also able to get students directly involved personally and in groups. This active student involvement also gives confidence that what he does will have a good impact in the future.

In short, the conclusion of the research are as follows: Production-based learning contributes significantly to entrepreneurship learning outcomes. Production-based learning has significance to entrepreneurship learning outcomes. Student Engagement contributes significantly to entrepreneurship learning outcomes. It means Student Engagement has significance to the learning outcomes of entrepreneurship. Locus of control contributes significantly to entrepreneurship learning outcomes. It means that the locus of control is meaningful to the learning outcomes of entrepreneurship. Production-based learning, student engagement, and locus of control equally contribute significantly to entrepreneurship learning outcomes. It defines that production-based learning, student engagement, and locus of control have significance to entrepreneurship learning outcomes. It means that the high level of Entrepreneurship Learning Outcomes is not only influenced by one variable only but also influenced collectively by the production-based learning, student engagement, and locus of control.

Furthermore, the research suggestions are as follows: Lecturers should continue to apply the production-based learning process. It is necessary to increase student engagement and internal locus of control for students in engineering education.

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