Application of Information Technology-Based Startup E-Modules for Entrepreneurship Learning in Vocational Students Faculty Of Engineering Universitas Negeri Makassar

[1]Sapto Haryoko, [2]Hendra Jaya, [3]Putri Ida Sunaryathi, [4]Mantasia, [5]Sutarsi Suhaeb, [6]Iwan Suhardi

[1,2,3,4,5]Department of Electronics Engineering Education FT UNM
[6]Department of Informatics and Computer Engineering, FT UNM

***Abstract*- This study aims to (1) determine how much learning outcomes before and after the implementation of the Start-Up E-Module in the Mechatronics Vocational Education Study Program. (2) improve student learning outcomes after being taught using the Start-Up E-Module in the entrepreneurship course of the Mechatronics Vocational Education Study Program. This study uses a Pre pre-experimental design design in the form of a group Pretest-Posttest Design. Based on descriptive statistical analysis, it is found that there is a significant difference between the learning outcomes of entrepreneurship courses before and after the use of E-Modul Start-Up media. This can be seen in the average score obtained at the time of the pretest which is 57.42 and the average score at the time of the posttest is 87.53 while the results obtained by the N-Gain test showed that there was an average increase of 0.7 which is classified as high. So one of the efforts that can be made to improve learning outcomes in entrepreneurship course learning in Mechatronics Vocational Education Study Program students is to use E-Module Start-Up media in entrepreneurship course learning to be more interesting, and interactive and the quality of student learning can be improved.**

Keywords: **Vocational Education, E-Module Startup, Information Technology, Entrepreneurship.**

I. INTRODUCTION

College plays an important role in creating jobs, not only as educational institutions that provide an educated workforce, but also as initiators of innovation and entrepreneurship. In the era of globalization and increasingly tight job market competition, universities are required to not only focus on formal education in the classroom, but must also be able to provide students with skills that are relevant to the needs of industry and society. This can be done through developing an adaptive curriculum, improving the quality of learning, and integrating theory and practice.

The increase in the number of university graduates is not matched by the availability of employment opportunities, which in turn creates a residual labor force in the form of unemployment [1]; [2]; [3]; [4]; [5]. Formal education is less able to produce job-ready graduates [6]; [7] [8]. The third factor relates to the inability of graduates to meet the quality desired by the market [9]; [10].

One way college create jobs is through developing an entrepreneurial ecosystem within the campus environment. By providing facilities, training, mentoring, and access to investor networks, universities can encourage students and alumni to create startups and new businesses. Initiatives such as business incubators and startup competitions can spark the spirit of entrepreneurship and innovation, as well as provide real-world experience in running a business.

Entrepreneurial intentions can be built through education and can be fostered through the learning process [11] [12], because the better the learning regarding entrepreneurship education that students receive, the better the students' entrepreneurial intentions will be [13]; [14]. If education can provide sufficient knowledge and inspiration, then the intention to choose entrepreneurship as a career path will increase. Educational institutions are tasked with encouraging creative ideas in entrepreneurship, educating about entrepreneurship, and training entrepreneurial skills.

Entrepreneurship is undergoing a significant transformation, with the focus shifting towards startup development. Industrial revolution 4.0 itself is an era where digitalization, automation, and advanced technologies such as artificial intelligence (AI), Internet of Things (IoT), and big data are the main drivers in various industrial sectors. This provides a great opportunity for entrepreneurs to create innovative solutions that address changing market needs.

Integration between the university curriculum and industry needs is an important step that must be taken to ensure graduates not only have theoretical knowledge, but also practical skills that are relevant to the needs of the current job market. One effort that can be made is to introduce courses related to the latest technology, such as artificial intelligence, big data, Internet of Things (IoT), and others. Apart from that, it is also important to include learning about

entrepreneurship, innovation management and adaptation skills in the curriculum. This holistic and applicable education will equip students with the knowledge and skills needed to succeed in business in the digital era.

In the current digital era, the presence of learning media in teaching and learning activities is very important. One real example of innovation in the world of education is E-Modul (Electronic Module). Students will understand the broad learning material better by constructing the material into an E-Module. The use of the E-Module Start-Up learning media is an alternative method that encourages students to be active in the learning process, which emphasizes understanding concepts and gives students the opportunity to express opinions in entrepreneurship courses.

Modules as learning resources are tools that cannot be used by students alone, so learning resources can make it easier for students to gather information in learning activities [15]; [16]; [17] stated that learning resources have been created to make it easier for students to gain knowledge during teaching and learning activities in class. In this context, learning resources are instruments created with the aim of facilitating the learning process in the classroom. Educational resources are created by educators to assist in conveying the learning process to students. The teaching materials created by teachers must of course be adapted to class conditions or the subject matter being taught in class. Several research findings show that the use of modules in the learning process can improve academic results [18]; [19].

Based on the researcher's initial observations In learning entrepreneurship courses in the Mechatronics Vocational Education Study program, Makassar State University, it was discovered that the learning media used in this course used Power Point and LMS SyamOK, students' interest in learning was lacking because this entrepreneurship course had too much material explained and some Students still lack understanding and are less motivated to attend lectures, and the provision of material and assignments by lecturers is no longer relevant to the current situation and developments in the business world [20].

II. RESEARCH METHODS

This type of research is Pre-Experimental Design Research, because researchers want to reveal improvements in learning outcomes before and after treatment. The research location was carried out at Makassar State University at the Faculty of Engineering, Mechatronics Vocational Education Study Program. This research uses a Pre Experimental Design with the form of One Group Pretest-Posttest Design. The population in this study were students from the 2020 Makassar State University Vocational Mechatronics Education study program who had taken the Entrepreneurship course.

In this research, 17 people from the population will be sampled, who are Class of 2020 students of the Mechatronics Vocational Education study program at Makassar State University who have taken entrepreneurship courses.

Data collection technique

The data in this research is in the form of student learning outcome score data obtained from the pretest and posttest. The data collection technique in this research is the test technique. Student learning outcomes tests are given before and after treatment. Where, in this test, researchers created questions on a Google form and then distributed them to students for the control class and experimental class.

Research Instrument

The instrument used in this research is a multiple choice test instrument. This instrument is used to see student learning outcomes in entrepreneurship courses using the E-Module Start-Up learning media before being given treatment and after being given treatment. The researcher created an instrument based on indicators and a grid of questions. After that, the instrument was developed and then content validation was carried out (theoretically). Content validity is carried out through expert judgment, according to the Gregory model (Retnawati, 2016). The analysis results of the instrument validation results in this study used the Gregory test ($R \geq 0.75$) so it can be concluded that the instrument is suitable for use because the analysis results obtained are in accordance with Gregory's requirements.

Data analysis technique

The data obtained in this research was processed and analyzed using descriptive analysis techniques and inferential analysis. Descriptive analysis is intended to describe students' understanding of concepts before and after students are taught using the Start-Up E-Module learning media. The inferential analysis carried out in this research is the Validity Test and Reliability Test, Normality Test, and N-gain Test.

III. RESEARCH RESULTS AND DISCUSSION

Research result

The research results were carried out based on research procedures. The stages carried out include (1) preparation stage, (2) implementation stage, (3) final stage. The results of initial observations are that learning for entrepreneurship courses in the Mechatronics Vocational Education study program is carried out offline and online using the learning media used, namely power point for offline and Syam-Ok LMS media for online, apart from that, students' lack of interest in learning about the subject This is because learning tends to be dominated by material that must be explained so that students are still less motivated and understand the lecture material.

The implementation stage carried out was in the form of creating Start-Up E-Module learning media . The Startup E-Module learning media consists of learning materials for entrepreneurship courses, including regarding Startups, technology business incubators.

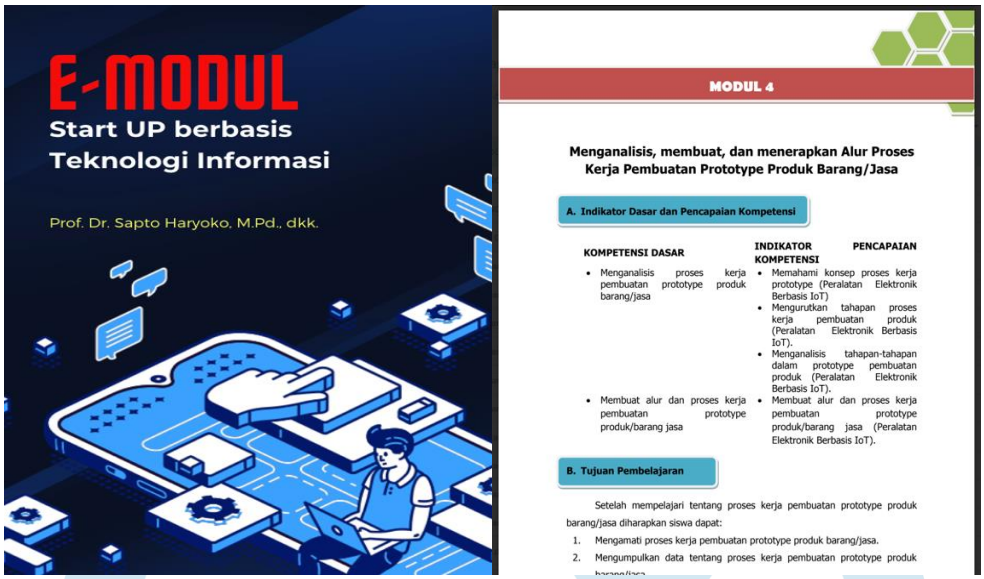

Figure 4.1 Display of the Information Technology-Based Startup E-Modules for Entrepreneurship learning media

E-Module Start-Up learning media, researchers also created a guide for creating E-Module Start-Up learning media to make it easier for students to design or modify their own startup materials according to their wishes. The media was validated by 2 media experts who are experts in this field. Media validation was carried out to find out whether the media created was suitable or not to be used or applied to students.

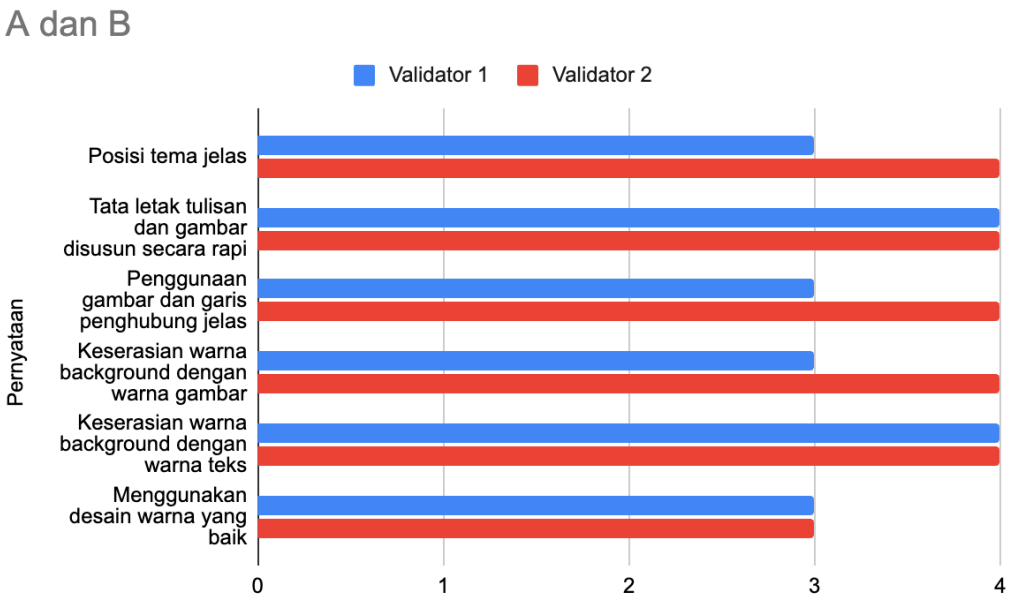

Figure 4.1 Appraisal Aspect Validator Assessment

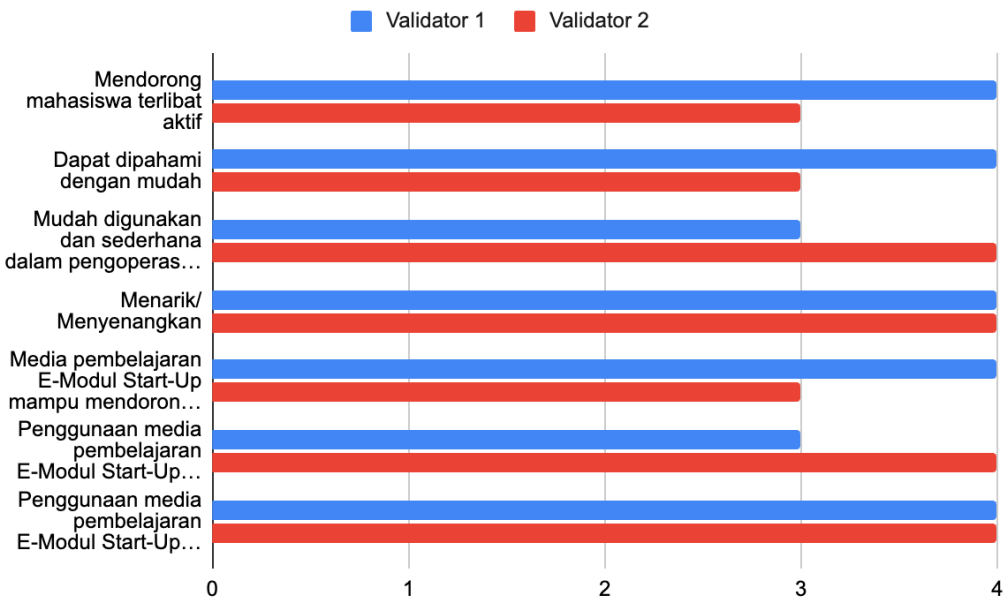

Figure 4.2 Validator Assessment of Benefit Aspects

Based on Figure 4.2 above, it shows the results of media validation based on the benefits aspect, the total score obtained from the first validator was 26 with a percentage of 92.85%, while the second validator obtained a total score of 25 with a percentage of 89.28%, thus the E-Module Start-Up learning media in terms of the benefits of the two validators, it is stated that they are suitable for use.

the E-Module Start-Up learning media was applied to 17 Mechatronics Vocational Education students, Class of 2020. At this stage, students were given material that had been designed in the E-Module Start-Up, then pretest and posttest were given to these students to determine learning outcomes. students before and after using the E-Module Start-Up learning media.

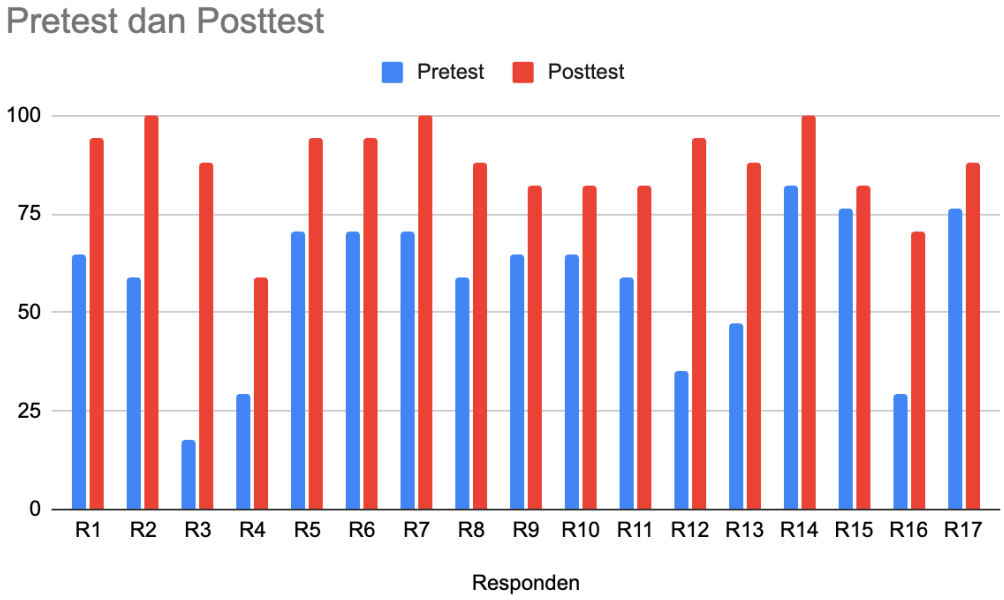

Figure 4.3 pretest - posttest scores for PVM students

Figure 4.3 above shows an overview of student learning outcomes in entrepreneurship courses. Based on this data, it can be seen that the average score of student learning outcomes after using the E-Module Startup learning media is much higher than the average score of student learning outcomes before using the E-Module Startup learning media. From the pretest results, it was found that the learning results of Mechatronics Vocational Education Study Program students before using the Startup E-Module learning media showed that 6 people achieved high scores, 7 people achieved medium scores, and 1 person achieved low scores. Meanwhile, 7 people achieved a very high score in the posttest, 9 people achieved a

high score, and only 1 person achieved a moderate score, while there were none in the low and very low categories (Table 1).

Table 1. Categorization of pretest and posttest scores for PVM student learning outcomes

No	Value Interval	Category	Pretest
1	$x \geq 81\%$	**Very high**	**0**
2	$61\% < x \leq 80\%$	**Tall**	**6**
3	$41\% < x \leq 60\%$	**Currently**	**7**
4	$21\% < x \leq 40\%$	**Low**	**3**
5	$x \leq 20\%$	**Very low**	**1**
Amount			**17**

To determine the significance of increasing student learning outcomes, the N-Gain formula is used. The distribution and average percentage of N-Gain based on the gain index criteria are shown in table 2 below:

Table 2. Distribution and percentage of PVM Student normalized gain

Normalized gain score (g)	**Criteria**	**Frequency**	**Percentage (%)**	**N-gain**
$\langle g \rangle < 0.3$	Low	1	6	0.70
$0.3 \leq g < 0.7$	Currently	6	35	
$\langle g \rangle > 0.7$	Tall	10	59	
Amount		**17**	**100**	

Table 2 shows that 6% of students meet the low criteria, 35% of students meet the medium criteria, and 59% of students meet the high criteria. It can also be seen that Mechatronics Vocational Education Study Program students have a normalized average gain score of 0.8 with criteria in the high category, which means there is a significant change or increase in learning outcomes in entrepreneurship courses.

IV. Discussion of Research Results

In this section, a discussion of the results of research on the learning media that has been created is presented. From the research that has been carried out, 5 learning materials have been produced for the entrepreneurship course in the Mechatronics Vocational Education study program. Start-Up E-Module learning media where users can design or create startup themes according to the needs of each student.

In product testing, the media validation stage is carried out. Media validation was carried out by two validators who are lecturers at the Engineering Faculty, Makassar State University. It can be concluded that the E-Module Start-Up learning media created is suitable for use. The aspects assessed are the appearance aspect and the usefulness aspect of the media itself. The score obtained in the display aspect for validator 1 was a total score of 20 out of a maximum score of 24 with a percentage of 83.33 %, and for validator 2 a total score of 23 out of a maximum score of 24 with a percentage of 95.83%. As for the benefit aspect for validator 1, the total score is 26 out of a maximum score of 28 with a percentage of 92.85% and for validator 2, the total score is 25 out of a maximum score of 28 with a percentage of 89.28%. Therefore, from these two aspects it can be concluded that the media is very suitable for use.

In the validity test of the 30-question instrument which was tested on 30 students, there were 18 valid questions and 12 invalid questions, in this case they were disqualified. For the reliability test, the value obtained is 0.740, which is greater than 0.5, so it can be said that the instrument being tested is reliable.

Based on the results of the pretest on Mechatronics Vocational Education Study Program students, it was found that the learning outcomes of Mechatronics Vocational Education Study Program students before being taught using the Startup E-Module learning media showed that the highest score achieved was 14 correct number questions with a score of 82.35 and the lowest score was 3 about the correct number with a score of 17.64 from the ideal score of 17, while the average score achieved was 9.76. Meanwhile, based on the posttest results for Mechatronics Vocational Education Study Program students after using the Startup E-Module learning media, it shows that the highest score achieved was 17 correct number questions with a score of 100 and the lowest score was 10 correct number questions with a score of 58.82 from the ideal score. 17 were possible, while the average score achieved was 14.88.

Based on the research results, data was obtained on students' learning outcomes in entrepreneurship courses before and after implementing the Startup E-Module learning media there are significant differences, so the Start-Up E-Module

learning media can be used as an alternative learning method that can improve students' learning outcomes in entrepreneurship courses in the cognitive domain. This is in line with the research of RicuSidiq (2020) and S.Nurhasah (2018) . Through this learning media, students can obtain the expected learning outcomes. The result is that learning can be interesting, interactive and the quality of students' learning can be better. Students become more understanding, and students' learning attitudes and attention can be improved.

Based on descriptive statistical analysis, it is clear that there is a significant difference between learning outcomes in entrepreneurship courses before and after using the E-Module Start-Up learning media. This can be seen in the average score obtained during the pretest, namely 57.42 and the average score during the posttest, namely 87.53, while the results obtained with the N-Gain test turned out to be an average increase of 0.7, which is considered high. .

Based on the researchers' findings, it can be concluded that the use of E-Module Start-Up learning media can help students improve student learning outcomes.

So, one of the efforts that can be made to improve learning outcomes in entrepreneurship courses for Mechatronics Vocational Education Study Program students is to use the Start- Up E-Module learning media. in learning entrepreneurship courses it becomes more interesting, interactive and the quality of student learning can improve. Entrepreneurial learning is not only about being a seller or marketer, but also includes being a creator and innovator [21]

V. CONCLUSION

Learning outcomes of entrepreneurship course learning in Mechatronics Vocational Education Study Program students before the application of E-Module Start-Up media amounted to 57.42 in the “medium” category. The Learning Outcomes of entrepreneurship course learning in Mechatronics Vocational Education Study Program students after applying the Start-Up E-Module media amounted to 87.53 in the “High” category. The increase in student learning outcomes in Mechatronics Vocational Education Study Program students is 0.7 and is in the “High” category, and can be said to have increased. This research contributes to the entrepreneurship learning literature in terms of triggering students' entrepreneurial intentions, and attitudes that are prerequisites for new entrepreneurs, and being able to guide students to open new businesses (startups). E-Module Start-Up with technopreneur-ship content can be used as an alternative material and media for learning entrepreneurship in vocational education by continuing to bring up regional local wisdom as a characteristic and linking and utilizing it with technological developments owned by students and lecturers.

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