

The Innovation of Hybrid Learning through Live 24-Hour Streaming Personal in the Learning Process in Higher Education of Vocational in the Era of Industrial Revolution 4.0

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Abstract. The purpose of this research is to reveal and describe the concepts and/or concepts of motorcycle technology courses that are considered difficult, as well as the factors causing the low competency and mindset of students in the subject of motorcycle technology. The design of the research with the mixed method, and centered on the Department of Mechanical Engineering, State University of Malang. The results of the study show that: (1) material that is considered difficult is the principle of engine, engine components, fuel system, filling system starter, exhaust channels, chassis system, and electric system; (2) the main factors causing the low competency and mindset of students are the weak level of ability to analyze calculation questions and the limited availability of learning support media; (3) Live Personal Streaming 24 Hours learning technology proved effective as an alternative to solve the problem of low competency and mindset of students.

Keywords: learning innovation, higher education, vocational education, industrial revolution 4.0.

I. INTRODUCTION

Information Technology development in the era of disruptive technology has encouraged the emergence of various learning model innovations in the field of education [1]–[5]. This fosters the development of IT that is synchronized with the learning process. These innovative learning models emerge as alternative solutions to overcome various obstacles to conventional learning methods [6]–[8]. Information Technology Acceleration in the field of education that continues to advance is the development of hybrid learning. Hybrid learning is a learning model that integrates innovation and technological progress through online learning systems with the interaction and participation of conventional

learning models [9], [10]. Hybrid learning is a combination of face-to-face instructional methods and online learning.

Several problems were identified as a cause of lack of student learning independence in the motorcycle technology course. These problems include: (1) the absence of a learning process that combines face to face and online, (2) students have not been active in the process of creative thinking, because the learning system used is less innovative and less increase student motivation, and (3) student independence in hunting material or learning resources is still relatively low. Based on the results of the analysis of the problem. Also, the development of hybrid learning needs to be facilitated with a live consultation facility that can facilitate students always to be connected to lecture materials and 24 hour lecturers. The technology of live personal streaming 24 hours can be used as an innovative media to always synchronize every student's curiosity towards lecture material [11], [12]. Also, 24 hours of live personal streaming will be able to make students think effectively because they can connect to the lecturers of course [13], [14].

Holding from the results of the analysis above, one of the efforts to improve the quality of learning can be done by integrating IT technology in the learning system and combined with a face-to-face system. Until now, the rapid development of IT has not been optimally utilized in the learning process. Integrating IT is the right step to realize student-centered learning, improve communication, problem-solving skills, and critical and creative thinking skills.

II. METHOD

The research method used is the mixed method, which consists of qualitative methods and quantitative methods. In the qualitative method using data collection techniques in the form of surveys, observations, and in-depth interviews (independent interviews). The data obtained is in the form of: a) concepts and/or concepts of motorcycle technology courses that are considered difficult; and b) factors that cause the low competency and mindset of students in motorcycle technology courses.

The quantitative method used is quasi-experimental. Data obtained from quantitative methods are data understanding of the concept of motorcycle technology. The population in this study are all students of Mechanical Engineering Department 2017/2018 Academic Year who have taken the course of motorcycle technology. Sampling with non-random sampling technique. The sample set consists of two classes, namely one control class totaling 29 students and one experimental class totaling 29 students.

III. FINDINGS

The results of the study describe the research that includes the percentage of student answers on each topic of the material, a description of the factors that cause the low competency and mindset of students in the motorcycle technology course, and the results of the effectiveness of learning tests with Live Personal Streaming 24 Hours technology. As an alternative, the problem is the low competency and mindset of students. Live Technology Personal Streaming 24 Hours developed has a website address, namely otomotortech.com. Screenshot of the online technology is shown in Figure 1 and Figure 2.



Figure 1. Display of technology homepage Live Personal Streaming 24 Hours



Figure 1. Display of technology homepage Live Personal Streaming 24 Hours

In Figure 1. and Figure 2., shows that the Live Personal Streaming 24 Hours technology has content in the form of the main menu, consisting of: Profile, curriculum, E-learning, E-Library, Live Streaming, Quiz Online, and Chat & Ask. Also, the live streaming facility is a student media for conducting 24 hour online learning/clinics to lecturers. Furthermore, the results of

the percentage of student answers in each topic/material are presented in Table 1.

Table 1. Percentage of student answers for each topic/material

No.	Topic/Material	Percentage of Answers	
		True/Yes	False/No
1	Principle of engine	35%	65%
2	Engine components	45%	55%
3	Fuel system	45%	55%
4	Ignition system	80%	20%
5	Filling system starter	40%	60%
6	Exhaust channels	30%	70%
7	Clutch system	65%	35%
8	Chassis system	30%	70%
9	Electric system	45%	55%
10	CVT motorcycles	70%	30%

In Table 1. shows that there are three materials that have a percentage of true answers above 50%. The material includes Ignition systems, Clutch systems, and CVT motorcycles. On the other hand, there are seven materials that have a true answer percentage below 50%. The material includes engine principles, engine components, fuel systems, filling system starters, exhaust channels, chassis systems, and electric systems. Furthermore, a summary of the results of in-depth interviews with students is presented in Table 2.

Table 2. Percentage of interview answers

No.	Question Topic	Percentage of Answers	
		True/Yes	True/Yes
1	Learning media (books, articles, journals) complete	60%	40%
2	Have high motivation to solve problems	55%	45%
3	Able to analyze all count problems	30%	70%
4	The level of habitual work counts	45%	55%
5	Have someone who is an expert in subject matter	55%	45%
6	Able to memorize all important formulas	30%	70%
7	Regular learning intensity	40%	60%
8	Have a special notebook	70%	30%
9	The level of success in working problems is quite high	30%	70%

In table 2 shows that there are four questions that have a percentage value above 50%. The topic questions include complete learning media (books, articles, journals), high motivation to solve motorcycle technology problems, having a motorcycle technology expert, and having a special notebook containing motorcycle technology formulas. On the other hand, there are five topic questions that have values below 50%. The topic of the question includes being able to analyze all the

problems of motorcycle technology calculations, the level of habitual work on count problems, being able to memorize all the important formulas in motorcycle technology, the intensity of regular learning, and the level of success in working on motorcycle technology is quite high. Furthermore, the results of the initial student ability test are presented in Table 3.

Table 3. Summary of students' initial ability analysis

t-test for Equality of Means		
Sig. (2-tailed)	Mean Difference	Std. Error Difference
0,225	2,51	2,26
0,225	2,51	2,26

In Table 3. Shows the results of students' initial ability data. The initial ability test data was obtained from the initial ability score before using the learning technology Live Personal Streaming 24 Hours. This initial ability test data was conducted to determine the pre-test hypothesis test that was by the data to be analyzed. The summary of the results above shows that the significance is 0.224 and can be interpreted that there is no significant difference between the results of the initial ability test of the experimental class and the control class. Furthermore, the summary of the final student ability test results is presented in Table 4.

Table 4. Summary of student final ability test results

t-test for Equality of Means				
t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
2.44	56	0,00	5,23	1,93
2.44	53.46	0,00	5,23	1,93

Table 4. Shows the results of the student's final ability test. The final ability test data is obtained from the final ability score, namely after using the learning technology Live Personal Streaming 24 Hours. The final ability test data is conducted to determine the post-test hypothesis test that is by the data to be analyzed. A summary of the results above shows that tcount is 2.44 with sig. 0.00 and can be interpreted that there is a significant difference between the results of the initial ability test of the experimental class and the control class.

IV. DISCUSSION

The discussion refers to three main things, including: 1) Material motorcycle technology that is considered difficult; 2) Factors causing low competency and mindset of students; and 3) Effectiveness of learning technology Live Personal Streaming 24 Hours as an alternative solution to the problem of low mindset and competence.

1.1. Motorcycle technology material that is considered difficult

The subject matter of motorcycle technology is material that has a high level of immensity, and complexity. That is because each material that is studied

correlates with the previous material. In this study explained that much material on motorcycle technology that students considered difficult to do. The material includes engine principles, engine components, fuel systems, filling system starters, exhaust channels, chassis systems, and electric systems. Every human brain will work harder when working on problems with the type of work analysis (work cycle) [15], [16]. The brain tends to be forced to understand the work analysis problem (work cycle) which has a relatively complicated level. That is because the level of analysis of the brain of each human being is different, so it is often difficult to find a solution to the problem of work analysis (work cycle) that it faces [7]. Like the chassis and electronic system material. The material is material that analyzes the work system in each cycle and changes in the motion of components. Another example is the fuel system material. The material is material with an understanding of the calculation of the mixture of fuel and air. Increasing the power of the brain analysis can be increased one of them by training the brain to often solve problems by leveling conceptualized [17], [18].

1.2. Factors that cause low competency and mindset of students

4.2. Weak level of ability to analyze work systems

The weak ability to analyze the problem of analyzing the work system is a real serious problem. This is an obstacle in developing the ability to achieve the competence of motorcycle technology courses. The work system analysis questions on motorcycle technology materials are generally indirect analysis questions. Students must be able to find a way to resolve and be able to use the understanding of the process appropriately. The brain will not have the ability to solve a good problem if it is not often trained[19]–[21].

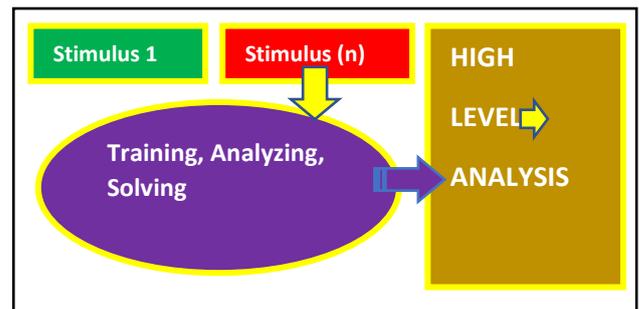


Figure 2. Process of increasing brain capacity

Most of the training questions on motorcycle technology material are work analysis questions. Sometimes, someone will experience a level of boredom when unable to find a solution to each problem that is done. Saturation is caused by the weak memory of the brain in storing every formula and material that is read [22]. Every brain has a different memory. Therefore, the increase in memory in the brain needs to be improved by reading a lot and working on calculation questions (numbers).

V. CONCLUSION

4.2.2. Limited availability of learning support media

The availability of learning support media greatly influences the development of a person's level of competence [9], [23]. Learning support media such as books, journals, articles, or magazines play an important role in the process of updating information on the brain. Also, learning support media will help someone to improve the competence of a field. Limited media and learning facilities can reduce learning motivation [24]. This happens because when a person is at a high level of saturation due to not being able to solve the work cycle analysis problem, he will directly look for reference material to help him.

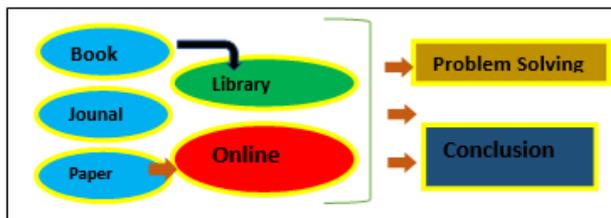


Figure 3. Relationship between the availability of learning media and problem solving

Supporting media such as books and journals are the main learning media that can open a person's mindset. The level of accuracy of learning media such as books and journals has high relevance compared to other learning media [25], [26]. If the learning media is not available, the brain will be more difficult to develop towards a higher level of thinking. Also, someone will be easier to understand everything they read and do [27]. This happens because the motorcycle technology material which is mostly related to the calculation of complex and comprehensive numbers.

4.3.3. The effectiveness of learning technology Live Personal Streaming 24 Hours as an alternative solution to the problem of low mindset and competence

Calculation of data through t-test with the help of SPSS 21.0 for Windows shows significant differences in the control class and the experimental class. In the experimental class, the analysis with mean techniques obtained results that the average value of the final ability to the experimental group that got the education was 85.20. While the average control class is 76.67. The results show that the results of the H_0 effectiveness test are rejected so that it is concluded that there is a significant difference between the test results and the final ability of the experimental and control classes. From the description above, it can be known that the learning outcomes of class students with learning technology Live Personal Streaming 24 Hours differ significantly with the control class that does not use Live Personal learning technology Streaming 24 Hours.

Based on the results and discussion, conclusions can be drawn as follows. Based on the findings and discussion, the following conclusions can be drawn. First, there are six materials on the motorcycle technology of techniques that students find difficult to work on. The material includes the engine principles, engine components, fuel systems, filling system starters, exhaust channels, chassis systems, and electric systems. Second, the main factor causing the low competency and mindset of students includes the weak level of ability to analyze calculation questions and the Limited Availability of learning support media. Third, that is very effective learning technology Live Personal Streaming 24 Hours as an alternative to solve the problem of low competency and mindset of students. The results of data calculations show significant differences in learning control class and experimental class. In the experimental class, the analysis with the mean technique obtained results that the mean value of the final ability to the experimental group that received education was 89.40. While the average control class is 74.22.

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