Optimizing Synchronous Hybrid Media For Project Based Learning: Prospects Of Learning Policy For Vocational Education

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ABSTRACT

The application of media in online learning is independent and has high interactivity to improve the learning experience because the information conveyed can be more easily understood and learned. The Project Based Learning (PjBL) model is a model that activates students in groups to complete projects and trains them to collaborate. This study aims to determine the effectiveness of project-based hybrid synchronous media in online learning in SMK. The type of research used is pre-experimental research. The research population was 143 students of Computer and Network Engineering (TKJ) who chose Basic Programming subjects, at SMKN 2 Makassar. Determination of the sample using cluster random sampling technique. Collecting data using test instruments, observations and questionnaires. Based on the results of the study, it was concluded that project-based hybrid synchronous media, in online learning, was effective for increasing learning activities and learning outcomes during the Covid-19 Pandemic.

Keywords: Media Hybrid Synchronous, Effective, Activities, Online learning.

1. INTRODUCTION

The Government policy decisions that limit face-to-face meetings have confused many parties, due to the unpreparedness of the educators, students, and parents for online learning activities.

Along with the development of technology, there are three types of interaction in online learning activities, namely: learner to content interaction; learner to learner interaction; learner to instructor interaction (Watts, 2010). These three types of interactions can be hybridized through synchronous media communication withtaking into account collaboration in the sharing of information between teachers and students, students and students.

Online learning is an activitylearning through the platformavailable, assisted by several applications, such as Google Classroom, Google Meet, Zoom, Whatsapp, etc. Based on the synchronous communication function, the learning process can be carried out simultaneously at the same time with computer media, smartphones or similar tools.

According to Wang (2019), synchronous learning islearning where students and teachers meet at the same timetogether, face-to-face, online and in person. In accordance with the communication function, online learning is a program of pedagogy, technology and learning system design, which if integrated in the delivery of subject matter through synchronous communication can be effective.

Furthermore, Lin, M. H., Chen, H. C., & Liu, K. S. (2017), that for the current teaching trends, combine and utilize the advantages of digital learning to develop practical teaching strategies for teaching. Learning consists of several components that interact with each other, namely: teachers, students, materials, media, methods, models and evaluations. To achieve the effectiveness of online learning, it is very dependent on the ability of educators to choose learning models, to innovate to achieve learning goals through the use of information technology.

Eggan and Kauchak (2012) suggest that effective learning occurs when students actively involved in organizing and finding the relationships of the information provided. This

means that students do not just passively accept the knowledge conveyed by the teacher, but in the learning activities students respond actively.

The application of online learning in Vocational High Schools (SMK), has challenges, especially on the sustainability of the productive learning process, which is oriented towards the achievement of competence. Some research results in SMK; (Nabila Febrianti, 2021), which was conducted at SMKN 1 Luwu Timur, showed a positive influence on learning outcomes using the LMS Google Classroom. And (Fatmawati, 2021), conducted at SMKN 3 Makassar, showed a positive tendency for independent learning to use the internet as a learning resource.

Referring to the results of the research above, the opportunity to use online learning in SMK is very possible for productive learning. According to Smaldino, Lowther, & Mims (2018), synchronous learning consists of face-to-face learning in class and online learning. Face-to-face in class acitivities, for example; presentations and group discussions, while online synchronous learningactivities include audio conferencing orvideo, chat, live streaming, instant messaging (instant messaging), etc.

WhatsAppis a means of communicationby exchanging information both text messages, pictures, videos, and even telephones, (Lambuan, H. 2019). The use of these two synchronous media is regulated according to the PjBL syntaxinstages of the Online Learning Program Plan (RPP). Based on some of the descriptions of the problems above, the purpose of this study is todetermine the effectiveness of the implementation of project-based hybrid synchronous media in online learning in SMK.

2. METHODS

This research is a pre-experimental type, using an experimental group that aims to determine the effectiveness of online learning in Basic Programming subjects using Google Classroom and WhatsApp hybrid media. Research design using One Group Pretest-Posttest Design. The research population was 143 students from the Department of Computer and Network Engineering (TKJ) at SMKN 2 Makassar. The sample selection used the Cluster Random Sampling techniqueand 72 students were selected tobecomesthe research subjects.

Collecting data using test instruments, observations and questionnaires that have been validated with the help of software SPSS Statistic Cronbach Alpha (α) $\geq$ 0.70. The test results of the test instrument were declared reliable with a value (α) of 0.868 > 0.70. And the questionnaire instrument is declared reliable with a value (α) of 0.878 > 0.70.

The test was conducted to determine the success of learning in using Google Classroom and WhatsApp hybrid media. Observation sheets were used to observe the activities of students and teachers during the teaching and learning process, and instruments were used to collect data on student and teacher responses to the use of Google Classroom hybrid media and WhatsApp groups. Online RPP validity with quantitative experts's agreement. Furthermore, the data analysis technique used a descriptive quantitative approach, as follows;

a. Techniques for analyzing learning outcomes data

Analysis of student learning outcomes is directed at individual and classical achievements. Students are said to pass if they reach a value of 70 in accordance with the minimum completeness criteria (KKM). While classical completeness is achieved if 75% of students in the class gets a score of at least 70.

b. Techniques for analyzing student and teacher response activities data

Activities data analysis was carried out through observations by determining the frequency and percentage of student and teacher activities during PjBL learning using Google Classroom and WhatsApp hybrid media.

c. Techniques for analyzing student and teacher response data

Descriptive analysis of response questionnaire data is used to determine the results of the students and teachersassessment presentationby determining each statement item in the respondent's questionnaire to be answered, using the Likert scalewhich has a minimum score of 1 and a maximum score of 4, with the meaning of the score: (4) = very good; (3) = good;(2) = not good;(1) = bad (Moleong, 2017).

3. FINDINGS AND DISCUSSION

Findings

The findings and discussion comprehensively include the results according to the research objectives, namely to determine the effectiveness of project-based online learning in Basic Programming subjects using Google Classroom and WhatsApp hybrid media, according to the stages in the Online RPP.

The results of the agreement that expert validators have assessed online RPP, on eight aspects with an average value of 94.79%, which is included in the very feasible category. The eight aspects are; Basic Competencies, Learning Objectives, Content, Interactivity Level, Activity Stages, Presentation, Communication Learning Assessment Time. Furthermore, after the lesson plans are validated and suitable for use, the learning process is carried out using hybrid media Google classroom and WhatsApp.

a. Description of Data on Learning Outcomes Improvement

Referring to the minimum completeness criteria (KKM) of SMKN 2, the assessment shows that student learning outcomes using Google Classroom and WhatsApp hybrid media have achieved learning completeness both

individually and classical completeness because 75% of students in the class have achieved grades ≥ 70.

Based on pre-test (initial test) result data, it shows mastery of the material in making algorithmic program flow, is classified as Moderate with an average score of 62.5, the lowest score is 50.00 and the highest score is 75.00 out of 72 students. Furthermore, the post test results after using Google Classroom and WhatsApp hybrid media, showed an increase on themastery of the material in making algorithmic program flow, indicated by the algorithm image product, which was classified as High with an average value of 79.5, the lowest score was 61 and the highest score was 98, out of 72 students.

According to Corcoran Edward (2005), the N-Gain testusedto measure how much increase in thestudent's learning outcomes after the learning implementation. Based on the calculation of learning outcomes after using Google Classroom and WhatsApp hybrid media, there was an increase in student learning outcomes of 0.71 which was obtained from the difference between pretest and posttest results, then converted into a normalized gain formula (Hake, 1999).

Table 1. N-Gain Measurement Distribution

No	N-Gain	Category	Frequency	Percentage (%)
1	$g \leq 0.30$	Low	5	6.94
2	$0.30 < g \leq 0.70$	Medium	30	41.67
3	$g > 0.70$	High	37	51.39
		Total	72	100

Furthermore, summary of the calculation of the N-Gain value can be seen in Table 1, there are 5 students in the Low category, 30 students in the Medium category and 37 students are in the High category. The increase in learning outcomes shows the N-gain is in the High category.

b. Description of Analysis Resultof Student and Teacher Activities Data

The data from the analysis of observations to measure the activity of 72 students were carried out for 6 meetings. Observations include several indicators, namely; discipline, motivation, honesty, responsibility, student feedback, enthusiastic, work assignments, students attentionand, tolerance. The summary of the resultof observations during learning are shown in Table 2 following;

Table 2. Descriptive Analysis of Student Activity Observation

No	Activity	Meetings Google Classroom Hybrid WhatsApp Group							
		Theory Meeting				Practical Meeting			
		1	2	3	Average (%)	4	5	6	Average (%)
1	Discipline	90.3	97.2	97.2	94.90	90.3	94.4	97.2	90.3

2	Motivation	87.5	97.2	97.2	93.97	90.3	97.2	97.2	87.5
3	Honesty	80.6	98.6	100	93.07	82.5	95.8	97.2	80.6
4	Responsibility	73.6	97.2	98.6	89.80	70.8	76.7	82.2	73.6
5	Student feedback	69.1	78.6	87.8	78.50	80.6	97.2	98.6	69.1
6	Enthusiastic	72.5	95.8	97.2	88.50	75.3	95.8	97.2	72.5
7	Work Assignment	77.8	97.2	98.6	91.20	76.1	82.6	88.6	77.8
8	Student attention	79.7	97.2	100	92.30	87.5	98.6	100	79.7
9	Tolerance	76.4	100	98.6	91.67	94.4	97.2	98.6	76.4
Average (%)					90.43				78.61

Table 2 shows student activities learning through 3 theoretical meetings, an average of 90.43%, and 78.61% through 3 practical meetings on discipline activities, motivated, honesty, responsibility, student feedback, enthusiastic, happy working, attention students and tolerance. Furthermore, observations of teacher activities were carried out in 6 meetings to measure teacher activity in the implementation of online learning using Google Classroom and WhatsApp Group.

Tabel 3 Summary of Teacher Activity Observation

No	Observation	Meetings Google Classroom Hybrid WhatsApp Group					
		1	2	3	4	5	6
1	Observer 1	80.00	87.50	89.29	92.86	96.88	100
2	Observer 2	83.33	83.33	82.14	83.33	90.63	93.75
	Average (%)	81.67	85.42	85.71	88.10	93.75	96.88

Table 3 shows a summary of observations made by 2 people on teacher activities in the online teaching and learning process according to the Basic Programming RPP with PjBL syntax. Observation of teacher activities in 3 meetings explained the theory and the next 3 meetings explained the practice of giving assignments. The results showed that each meeting, the teacher's activity increased.
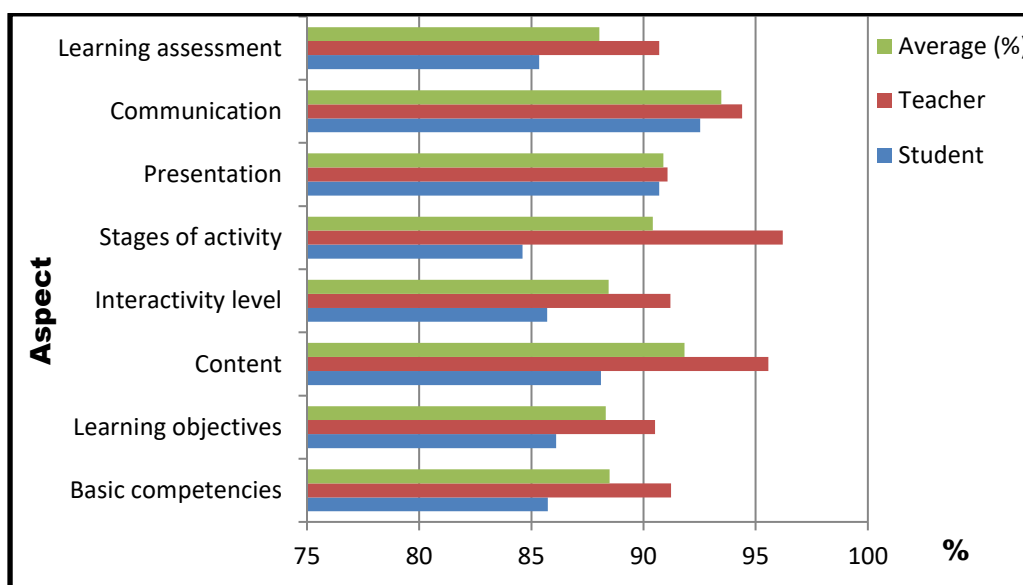
c. Descriptionof Analysis Result of Student and Teacher ResponsesData
The student and teacher responses to online learning of Basic Programming subjects using WhatsApp and Google Classroom hybrid media were obtained through a questionnaire with Liker scale (4, 3 ,2 ,1). The summary of the result data analysis is shown in Table 4 below:

Table 4. Summary of Student and Teacher Responses

No	Aspect	Student	Teacher	Average (%)
1	Basic competencies	85.74	91.23	88.49
2	Learning objectives	86.11	90.52	88.32
3	Content	88.1	95.56	91.83
4	Interactivity level	85.7	91.2	88.45
5	Stages of activity	84.6	96.21	90.41
6	Presentation	90.7	91.07	90.89

7	Communication	92.53	94.4	93.47
8	Learning assessment	85.35	90.7	88.03
	Average (%)	87	93	90

Discussion

Based on the results of the N-gain analysis which is in the High category, it shows that there is an increase in learning outcomes, according to the difference between pretest learning outcomes and posttest learning outcomes after working on project assignments to design algorithmic program flow individually. PjBL model enables students to think and learn independentlyevencan be optimized through a systematic group work process, so that students can empower, hone, test anddevelop their thinking skills continuously. Supported by Choi, Lindquist, & Song, (2014), PjBL helps students develop critical thinking to solve problems in their clinical settings and bridges the gap between theory and practice.

In the online RPP Basic Programming the use of the PjBL syntax at each stage, makes it easier for students to discuss clarifying project material with teacher explanations through the mediaGoogle Classroom. The material content for making the algorithm program flow is discussed in groups, then followed by project completion in the form of images sent via WhatsApp groups as a solution for individual project completion. Because the assessment of student learning outcomes is individual, its thusencourage students to be more independent and actively creative in finding solutions to makealgorithmic program flows and completing assignments to be assessed.

Markova, T., Glazkova, I., & Zaborova, E. (2017) research results that although students respond positively to their distance learning experience; however they evaluate some of the challenges facing learning especially in terms of effective teaching practices and communication patterns, in order to maximize the potential of ICT in distance learning.

Furthermore, on the results of student and teacher activities through Google Classroom mediaand WhatsApp in the implementation stage of Basic Programming online lesson plans with PjBL syntax at each learning stage explaining project materials and tasks designing algorithmic program flow according to events. The results show that student activity in using Google Classroom media is higher than use via WhatsApp.

Student activities when meeting face-to-face with teachers and colleagues through Google Classroom media are very high, because they are driven by the desire to engage in activities that lead to the process of doing tasks to complete the product. According to Nurmala Ayu et al. (2014) student learning activities during the learning process is one indicator of the student's desire to learn. Supported by Theobald & Ramsbotham (2019), students must be active independently in finding and

solving problems/assignments given by the teacher.

In contrast to the results of teacher activities, which show teacher activities through WhatsApp media is higher, this is because WhatsApp media is used by the teachers as mentoring and monitoring. ThroughWhatsAppgroup, teachercan ensure students can follow learning in a timely mannertogether even though they are in different places. Supported by Suryadi (2018), WhatsApp is a means of communicatingby exchanging information both text messages, pictures, videos, and even telephones.

Application of project-based synchronous hybrid media in Basic Computer Programming subjectsreceived a very good response from students and teachers, its was atthe average percentage of 90%. The results of the analysis of student responses on 8 aspects experienced in the first meeting until the sixth meeting were able to respond to the project task of designing the flow of events explained by the teacher using hybrid synchronous media. There was very good communication through the Google Classroom and WhatsApp media, students' responses were obtained with an average percentage of 87%, and teacher responses with an average percentage of 93%. WhatsAppcan provide effectiveness in communication, interaction, easily and quickly, especially in the delivery of informationforlearning. Supported by Jumiatmoko (2016), WhatsAppis an Instant Messagingtechnologysuch as SMS, but with the help ofinternet data has more attractive supporting features and is the most popular social mediawhich can be used as a medium of communication.

Referring to the results of the responses and activities experienced by students and teachers, there is an increase in student learning outcomes. Learning activities can run well and effectively in accordance with the creativity of the teacher in providing material and practice questions to students, Dewi Wahyu Aji Fatma (2020). The use of project-based hybrid media, based on the analysis results of the KKM value, has achieved learning completeness both individually and classically, because 75% of the students in the class have achieved score ≥75. The increase in learning outcomes achieved by SMKN 2 students in online learning shows that the use of project-based Google Classroom and WhatsApp hybrid media is effectively used in online learning in SMK. Effectiveness is a measure of how muchthe target has been achieved, or the higher the valuethe target is achieved, the higher the effectiveness, Kenneth D. (2015). According to Ramadhani (2018), the reference to vocational education according to Charles Prosser's 16 Theorems are on 2 theories, namely: (1) The 3rd theory, vocational education will be effective if it trains a person in the habits of thinking and working as required in the job itself and (2) The 7th theory, is effective if the teacher has successful experience in the application of competence in operations and work processes that have been carried out.

4.CONCLUSION
The conclusion from the results of this study became a new paradigm experienced by both teachers and students. Through hybrid media, online learning is able to increase activity, which can be a reference in the prospect of productive learning in SMK. Supported by Palvia et al., (2018), online learning in SMK has now got its place, not just an additional activity but is predicted to be a mainstream platform.

Planning RPP referring to the PjBL model syntax really helps the learning process in increasing online learning activities through Google Classroom and WhatsApp groups media. The preliminary stage uses WhatsApp groups, followed by face-to-face through Google Classroom for discussion, deepening of material etc., and closing using WhatsApp groups for mentoring and monitoring the independent learning process.

According to Pujilestasi (2020), the inability to use technology will cause many obstacles or problems that hinder the implementation of learning effectiveness.

5.AKNOWLEDGEMENTS

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