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## Digital Technology's Implementation in Hybrid Learning at Higher Educational Level

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### Abstract

The majority of sectors are currently influenced by digital technology, including the education sector. Through the development of digital technology, a new learning model can be designed, namely hybrid learning. Hybrid learning can help the learning process, such as providing variations in learning, minimizing space and time limitations, and improving digital skills. Hybrid learning is a solution in higher education that has limited learning space but has facilities for implementing digital technology in hybrid learning. The research subjects were 36 students of educational informatics engineering department. The research method used was research and development, with ADDIE model (Analysis, Design, Develop, Implementation, and Evaluation). At the implementation stage, an effectiveness test was carried out to see the extent to which the application of digital technology in hybrid learning had an effect on the learning process. The research's results were the implementation of digital hybrid learning technology which consists of combination face-to-face classes with e-learning moodle. Another result from this research was the value of effectiveness was obtained, which is 86.44% conducted from 36 subjects and was categorized as very effective for implementation in higher educational level.

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## A. Introduction

Digital technology affects almost all sectors in the current revolutionary era, such as the economic, social, tourism and education sectors. The development of digital technology has had many impacts on its application, both positive and negative impacts [1]. To minimize the negative impact of digital technology, it is necessary to emphasize the application of technology in several sectors so that it can be utilized to the fullest. The development of digital technology in the field of education has a significant influence, especially at the higher education level. The existence of digital technology allows learning from two directions through feedback responses between educators and students [2]. An example of digital technology that has been implemented in education is the use of computers, infocus, printers, cameras, video recorders, voice recorders [3]. After the pandemic, the digital technology used is growing, for example the use of web cameras to conduct video conferencing for educational discussion forums, the use of video streaming to share material, and the like [4]. In addition to these devices, there is also the use of smart phone in learning process, this certainly provides an efficient and effective increase of learning process which is limited in space and time [5].

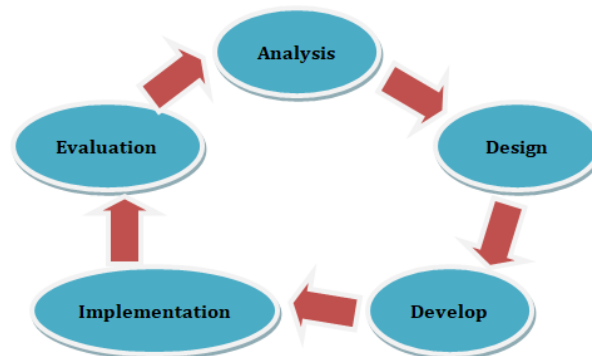
The application of this technology is not limited to digital devices, but can be combined with internet technology. This combination of digital technology and internet technology provides opportunities for the implementation of hybrid learning or known as hybrid learning [6]. One of the uses of digital technology in hybrid learning is the use of virtual rooms to deliver material at the higher education level. In the virtual room several technologies are used, such as a set of computers or laptops along with digital cameras and microphones, internet applications such as zoom and the like. The explanation of hybrid learning is a learning model that uses two or more models, and utilizes existing digital technology or internet technology and is carried out simultaneously [7]. One of the advantages of hybrid learning is that educators and students can develop their own digital skills, so that they can adapt more precisely to digital technologies that are increasingly developing [8]. In general, hybrid learning also has drawbacks, namely the stability of the device used by all users [8]. In hybrid learning there are five things that must be applied to the learning process, namely (1) Live-Event, (2) Self-Paced Learning, (3) Collaboration, (4) Assessment, and (5) Performance Support Material [9]. The five keys explain that in hybrid learning must be carried out in different places, carried out independently and there must be collaboration between educators and students. With the existence of hybrid learning it is assumed to be able to minimize learning constraints such as the limited number of face-to-face meetings or the number of classes available, and can also provide variations in the learning process.

The application of hybrid learning has been widely applied, including at the higher education level. One example of higher education that applies hybrid learning is Universitas Putra Indonesia YPTK Padang, especially the informatics engineering education study program. In this study, the objects of research were lecturers and students in the informatics engineering education study program. The results of the initial observation of the study showed that the application of face-to-face hybrid learning combined with e-learning moodle showed an increase in the digital abilities of students and lecturers. This can be seen from the use of digital technology devices which have increased significantly by lecturers and students. Therefore it is

necessary to examine how the influence of the application of digital technology on the learning effectiveness of the hybrid learning model. Based on this background explanation, the aim of the research is to implement digital technology in hybrid learning, and how effective digital technology is in hybrid learning in higher education.

## B. Research Method

The research carried out was categorized into types of research and development, using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). In theory, research and development means that research is carried out based on existing products or models, then a new product model is developed or designed that has innovation value [10]. The ADDIE model is assumed to be in accordance with the needs of the research carried out because the purpose of the research is to determine the effectiveness of applying digital technology to hybrid learning models. The procedure of the ADDIE research model is as follows:



**Figure 1.** ADDIE's Model Procedure

Based on the figure, the following procedure steps can be explained [10]:

1. Analysis: analyzing the needs of educators and students, analyzing instructional needs, and analyzing instructional outcomes.
2. Design: designing instructional objectives, task analysis, and assessment criteria.
3. Develop: developing instructional materials.
4. Implementation: the learner conveys and directs, the learner receives and gets the material, focuses on achieving objectively
5. Evaluation: know what and how the results of the research.

In the procedures of implementation stage it is necessary to carry out a field test, where in this field test process a test is carried out to test the effectiveness of the application of digital technology in the hybrid learning learning model.

The effectiveness test is carried out through questionnaires distributed to students and lecturers to find out how effective the application of digital technology is in hybrid learning. The following questions are asked through a questionnaire:

**Table 1.** Effectiveness's Questionnaire

No	Indicator	Statements
1.	Pleasure	I really like learning with digital technology in a hybrid learning model because there are variations in learning

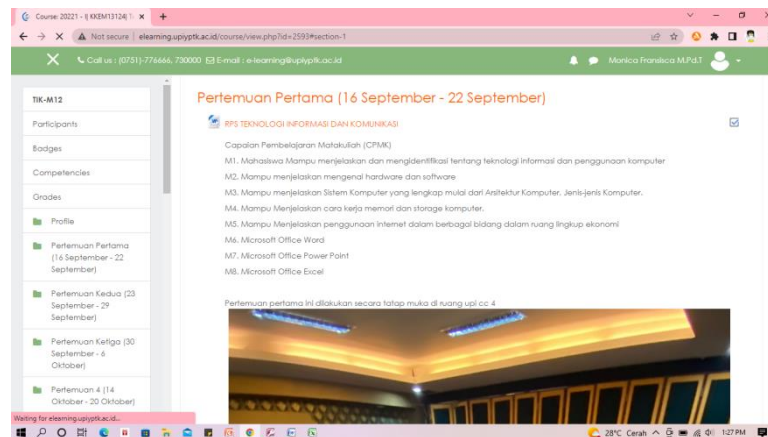
	I feel relaxed learning with digital technology in a hybrid learning model
	I like learning digital technology in a hybrid learning model because it can ease the learning process
	I like learning accompanied by digital technology in a hybrid learning model
	I can learn by myself using digital technology in a hybrid learning model because it has complete features
2. Attractiveness	I want digital technology in the hybrid learning model of self-study materials
	I want digital technology in the hybrid learning model as an interesting companion learning resource
	I cannot learn if there is no digital technology in the hybrid learning model
	I feel that with digital technology in the hybrid learning model, learning becomes more interesting and easier
	I like it when lecturers use digital technology in the hybrid learning model in all courses

For the assessment of each questionnaire using Likert Scale which consist of a scale 1-5 with the categories Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, and Strongly Disagree. After completing the questionnaire, the percentage of each indicator was calculated and concluded in the percentage of class intervals.

### C. Result and Discussion

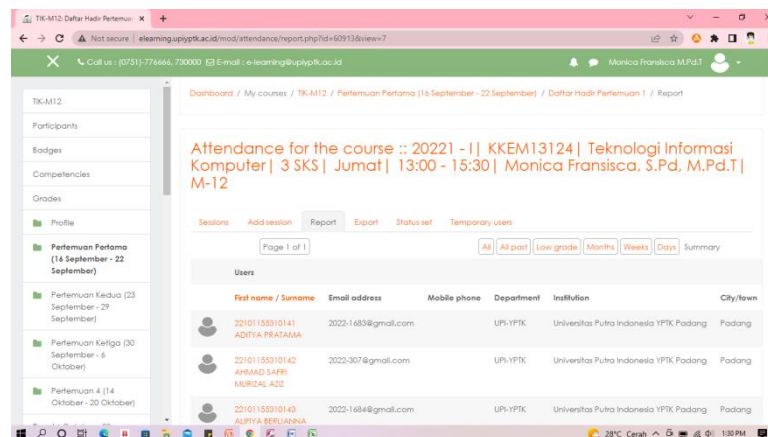
The application of digital technology in hybrid learning in the informatics engineering education study program, Universitas Putra IndonesiaYPTK Padang is in the form of a combination of face-to-face classes and the use of e-learning moodle. In the face-to-face learning process, Moodle is still used as an intermediary medium for presenting material. The percentage of moodle usage is limited and the courses that must exist are determined, as is the case with face-to-face meeting restrictions. This is necessary to vary the learning model, as well as help the shortage of available classes due to the increasing number of students. The subject was 36 students of the informatics engineering study program class of 2020.

Based on the needs analysis, the results show that the use of digital technology in hybrid learning is needed to meet learning needs. Referring to the results of this analysis, a new learning model was designed, namely hybrid learning where 30% of face-to-face meetings were carried out and 70% of Moodle was used. In the development process, the percentage of detailed usage of Moodle is determined, namely 40% delivery of material, 20% independent assignments, and 10% evaluation. After passing through the develop stage, the implementation stage is carried out, namely the application of the two learning models, to then be evaluated for their level of effectiveness. For the use of moodle can be seen in the following image.



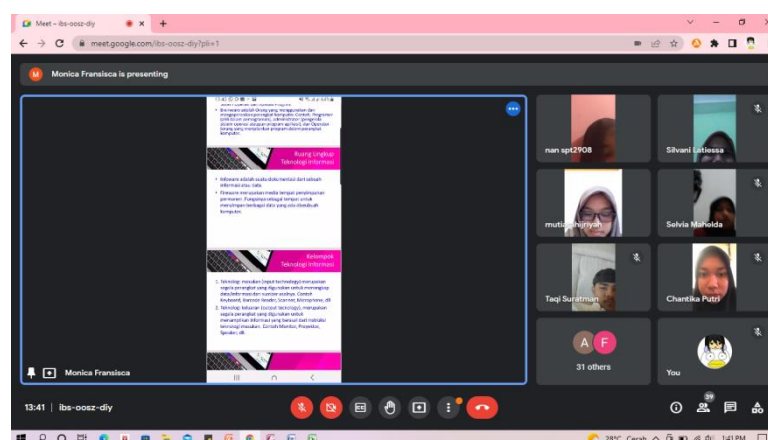
**Figure 2. Courses Details on Moodle**

In Figure 2 there are details of the material that will always be updated at every meeting, both face-to-face and online. If there is a face-to-face meeting, proof of the face-to-face meeting will be attached at the meeting by uploading photos of activities in class.



**Figure 3. Attendances' Page on Moodle**

Figure 3 is an attendance display that is separated at each meeting, through this page you can also check whether students are active or not during class hours.



**Figure 4. Video Conference's Page**

Figure 4 shows the learning video conference process, this is one of the indicators that must be implemented during hybrid learning activities. Video conferencing is

carried out using zoom and google meet, so it requires digital devices such as video cameras and microphones.

After completing the implementation phase, testing the effectiveness of the application of technology in hybrid learning is carried out. The effectiveness test was carried out through a questionnaire filled out by students and lecturers, the results of the test can be seen in the following table.

**Table 2.** Effectiveness's Results of Digital Technology in Hybrid Learning

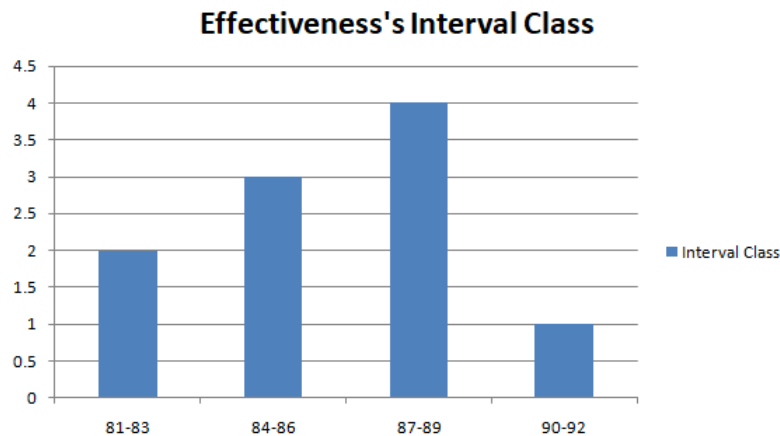
No	Statement	SA	A	LD	D	SD	Aspect					Value	Total	Criteria
							5	4	3	2	1			
Pleasure														
1	I really like learning with digital technology in a hybrid learning model because there are variations in learning I feel relaxed learning with digital technology in a hybrid learning model	10	23	3	0	0	50	92	9	0	0	151	83.89	Very Effective
2	I like learning digital technology in a hybrid learning model because it can ease the learning process	11	19	4	1	1	55	76	12	2	1	146	81.11	Effective
3	I like learning accompanied by digital technology in a hybrid learning model	17	12	6	1	0	85	48	18	2	0	153	85.00	Very Effective
4	I can learn by myself using digital technology in a hybrid learning model	12	20	4	0	0	60	80	12	0	0	152	84.44	Very Effective
5	I really like learning with digital technology in a hybrid learning model because there are variations in learning I feel relaxed learning with digital technology in a hybrid learning model	17	18	1	0	0	85	72	3	0	0	160	88.89	Very Effective

	because it has complete features														
Attractiveness															
1	I want digital technology in the hybrid learning model of self-study materials	21	10	5	0	0	105	40	15	0	0	160	88.89	Very Effective	
2	I want digital technology in the hybrid learning model as an interesting companion learning resource	19	15	1	1	0	95	60	3	2	0	160	88.89	Very Effective	
3	I cannot learn if there is no digital technology in the hybrid learning model	17	16	2	1	0	85	64	6	2	0	157	87.22	Very Effective	
4	I feel that with digital technology in the hybrid learning model, learning becomes more interesting and easier	20	15	1	0	0	100	60	3	0	0	163	90.56	Very Effective	
5	I like it when lecturers use digital technology in the hybrid learning model in all courses	15	17	3	1	0	75	68	9	2	0	154	85.56	Very Effective	
Effectiveness's Average													86.44	Very Effective	

Based on the results of the questionnaire obtained from 36 subjects, the percentage for the fun and attractiveness indicator was 86.44% and was included in the very effective category. This is in accordance with several relevant research results which state that learning by utilizing digital technology is classified as effective to apply [11]. The application of digital technology becomes more effective when combined with a hybrid learning model [12]. This is because hybrid learning prioritizes the use of digital technology. Questionnaire results were also dominated by very

effective results in almost every category, meaning that the subjects in this case were students and lecturers who were very skilled in using digital technology in hybrid learning, according to the statement [13].

For a more concise explanation, class interval values are calculated from the results of the effectiveness test which are presented in the following chart form. Interval class was obtained from the range of effectiveness which are formed in groups of scores from the lowest to the highest.



**Figure 5.** Effectiveness's Interval Class

The interval class picture shows that most of the effectiveness test values are in the assessment in the range of values 87-89, so from the chart it can be concluded that the application of digital technology in hybrid learning is very effective for use on research subjects. In addition to research subjects, it is assumed that this application can also be implemented in other higher education subjects.

#### **D. Conclusion**

Improvements or advances in digital technology make the learning process easier. The application of digital technology is also considered very appropriate in the hybrid learning learning model, seen from the results of initial observations where each subject is skilled in using digital technology. The research results obtained are in accordance with the initial assumption that the application of digital technology in hybrid learning is categorized as effective for applying to higher education. This is supported by the results of research on testing the effectiveness of digital technology in hybrid learning, namely at an average percentage of 86.44% obtained from 36 subjects which were students of the informatics engineering study program class of 2020, concluded as very effective category. So it can be concluded that the application of digital technology in hybrid learning is very effective for high-level learning processes.

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