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Distance Learning Strategy Based On Interactive Online Test Game To Improve Student Learning Outcomes In The Pandemic Covid-19

Muh Fauzi
Jakarta State University
Doctoral Student
muh.fauzi_7117158074@mhs.unj.ac.id
ORCID: 0000-0003-0507-5047

Martini Jamaris
Jakarta State University
Faculty Member
martinijamaris@unj.ac.id

Khaerudin
Jakarta State University
Faculty Member
khaerudin_tp@yahoo.co.id

Abstract

The purpose of this study was to design a distance learning strategy based on interactive online test media on discrete mathematics material to improve student motivation and learning outcomes during the Covid-19 pandemic. The low motivation of students to learn mathematics is caused by the paradigm of mathematics which is not a core subject in the informatics department which requires mathematics teaching staff to use new strategies and media to increase student learning motivation. The research method used is the mix method which begins with developing a distance learning strategy based on an interactive online game test and then ends with a test of effectiveness with the experimental method. The results of strategy development include methods, media, and time management. The resulting method is Synchronous in the form of face-to-face virtual discussions and Asynchronous in the form of material arranged in a Learning Management System (LMS), while the media developed is LMS. From the experimental results, it was found that the significant value of paired samples test was 0.00 <0.05, which means that there were differences in student learning outcomes in the experimental class and the control class. The average value of the experimental class is 84.04 and the control class is 66.35, which means that the learning outcomes of students who use distance learning based on interactive online test media of discrete mathematics are better than conventional methods. Then from the results of observations and student responses to distance learning strategies based on interactive online test media were declared valid and effective.

Keywords: Development, strategy, test, game.

Introduction

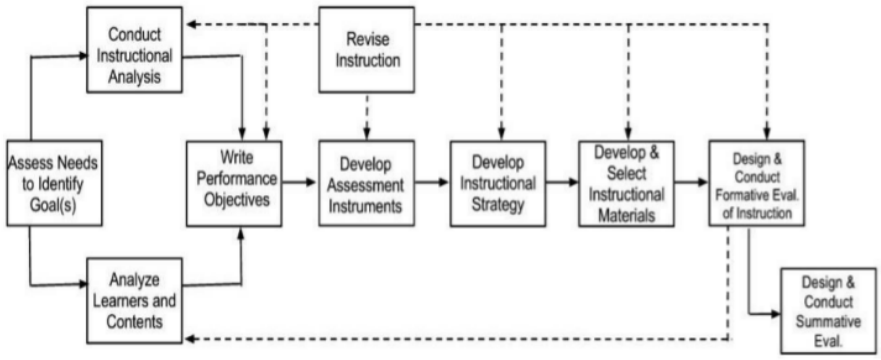
Joint Decree of the Minister of Education and Culture, Minister of Religion, Minister of Health, and Minister of Home Affairs of the Republic of Indonesia Number 01 / Kb / 2020 Number 516 of 2020 Number Hk.03.01 / Menkes / 363/2020 Number 440-882 of 2020, concerning guidelines for implementing learning in the 2020/2021 academic year and 2020/2021 academic year during the 2019 coronavirus disease pandemic (COVID-19) that face-to-face learning in educational units in the 2020/2021 academic year and 2020/2021 academic year as referred to in the KESATU Dictum was not carried out simultaneously throughout Indonesia. This condition certainly requires alternatives that are relevant and workable so that the education system and the learning process do not stop.

One of the most likely alternatives to overcome this condition is by utilizing technology. Basically, technology has been used by the education environment before the Covid-19 pandemic broke out, but the implementation in the region is still not optimal. Technologies such as smartphones, tablets, and computers are still widely used for social media activities only. This is what makes the use of technology in the teaching and learning process still not focused on being utilized.

The existence of the condition of Covid-19 resulted in the condition of education that could not be carried out with the usual method so that different strategies and techniques were needed from the usual. Each educator has his own way and technique in determining the sequence or steps of learning to be carried out (Suparman, 2014) but in this condition, the only relevant teaching strategy and method is by implementing distance education. Thus presenting strategies and ways of learning that are fun in a new atmosphere, new learning models are important to show.

Research Methods

This study uses the Research and Development (R & D) method which aims to design a distance learning strategy based on interactive online test media on discrete mathematics material to increase student motivation and learning outcomes during the Covid-19 pandemic. The development method used is the steps of system approach model of education reasech developed by Dick and Carey which includes the steps (1) Identifying goals, (2) Conducting instructional analysis, (3) Identifying entry behaviors and learner characteristics (4) Writing performance objectives, (5) Developing criterion-referenced test items, (6) Developing instructional strategy, (7) Developing and selecting instructional materials, (8) Designing and conducting the formative evaluation of instruction, (9) Revising instruction (10) Conducting summative evaluation (Gall at al., 2007)



Picture 1. steps of system approach model of education reasech

In general, the steps of system approach model of education reasech is an approach to develop a learning model as a whole in one lesson. However, in this study the focus will be used to develop interactive online test-based learning strategies. Thus, not all steps of the system approach model of education reasech are implemented. After the appropriate strategy in the research case is defined and designed, then trials are carried out in the experimental class to determine the level of student response to the strategies developed.

Results and Discussion

In the strategy development process, several facts related to basic needs and problems faced in the distance learning process were obtained from the analysis of the learning process needs during the Covid-19 period, including:

a) Learning objectives must be adjusted to a realistic level of achievement
b) The learning process tends to be boring if you only see the teacher explaining the theory on the computer layer (video conference)
c) Conference activities are considered too long if they follow the lessons that are usually used in the offline learning process.
d) Excessive assignments make students not enthusiastic about understanding the material but tend to exchange answers.
e) The absence of active control in the learning process using video conferencing results in students not seriously participating in learning activities.
f) Learning materials that are conceptual and in-depth cannot be presented only in the form of reading material only.

The learning strategy that is developed is then formulated and compiled to be able to solve some of these problems. The phenomenon that has been described will certainly be resolved by designing a special strategy to deliver material during the Covid-19 pandemic.

1. Identifying goals,

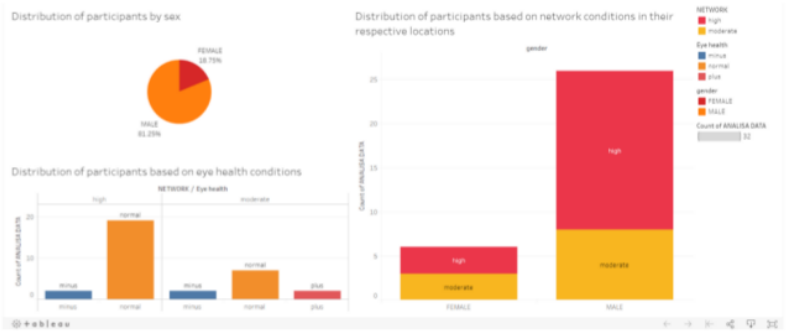
Learning objectives are formulated to be simpler in conceptual understanding. Mathematics in the field of informatics engineering is a Wajip subject and is the basis of science that can support students in learning basic concepts in computer science. Thus the learning objectives are directed to focus more on understanding the concept of the material provided.

2. Conducting instructional analysis

To achieve the goal of conceptual understanding, some specific objectives are formulated which can then be implemented in the learning process so that it can achieve the general learning objectives that have been set. The learning arrangement strategy is carried out by looking at the supporting objectives for the material being taught. Mathematics is learning with content characteristics that are interrelated with one another. The search for content related to material that can achieve the general goal of learning is carried out by reviewing and analyzing content with experts.

3. Identifying entry behaviors and learner characteristics

In the distance learning process, of course, there are different student specifications from ordinary learning in the classroom. The obstacles that will be faced, and the character of the students, certainly need to be analyzed as a basis for determining a good strategy. General constraints for educators who use the concept of distance learning are related to control of learning both from class control, student learning, control evaluation of learning outcomes and control of the learning process through virtual face-to-face. The strategy that is developed should be able to help the teaching staff to control each learning process that is carried out. Some of the basic skills that are required for the continuity of distance learning are generally identified, namely computer literacy and basic math skills. The characteristics of the participants based on the conditions required are as follows:



Picture 2. Learner Characteristics

Some of the obstacles obtained from this analysis are the lack of motivation to learn, learning that does not meet face to face is not taken seriously, neglect of online assignments and materials provided, students are not serious about taking video conferences, reasons for data packages are frequent reasons for not being able to participate learning activities directly in a virtual network.

4. Writing performance objective

To ensure that the general objectives can be achieved, the preparation of specific learning objectives is carried out, which are derived from general learning objectives. The preparation strategy is carried out by formulating learning objectives using the ABCD concept. Audience (A) is a participant who will learn, Behavior (B) competencies that will be given to each formulated goal, Condition (C) as an atmosphere that will be displayed to be able to achieve the expected competence, Degree (D) Limit or level of achievement to be achieved.

5. Developing criterion-referenced test items

   The preparation of the test is certainly based on the objectives to be achieved and has been formulated in the previous step. Thus, the focus of this step is the form of questions that can be made into flexible test items for use in various digital platforms. In this case the exam questions are made in html format and txt format that can be read by existing programs in the online system.

6. Developing instructional strategy

The distance learning strategy that is formulated will follow the form of a document that has been compiled and at this stage a learning strategy is described based on the initial conditions

of students and distance learning needs as follows:

source	material form	METHOD OF ACCESS			
		access	learn	identification	
Learning Materials	PowrPoin	open	answer questions on several slides	finish to the end of the slide	Asynchronous
	PDF	open	rad	make a conclusion	
	VIDEO	open	watch	make a conclusion	
	VIDEO COMPREN	open	discussion	game based exam	Synchronous
Teacers					
		Student			

Some of the strategies shown in the table above are to avoid several things related to the obstacles to distance learning that have been described previously, namely related to the seriousness of students in learning the material, identifying participants who follow each instruction well, controlling participants in accessing the material, ensuring that participants understand the concept of the material which is studied and evaluates each virtual activity automatically and completely identified.

41

7. Developing and selecting instructional materials

The selection of materials and learning tools, in this case, is based on the characteristics of students and the material to be presented. Students in general are still not used to learning using online concepts, but students are already accustomed to using technology in their daily lives. Technology as a means of communication and social nature for students in this era, even digital world activities are more than real activities. Thus using a platform that is designed and designed to follow their digital lifestyle will be a very helpful strategy. Some of the media used to deliver material to students include

8. Learning resources

Ispring, articulate storyline: as a medium for developing learning resources that are interactive, controlled, and measurable.

Camtasia, Filmora: as a medium used to develop interactive videos and animations that can put students' conceptual understanding of the expected material concepts.

Quizizz, Kahoot, ProProfs: used as an online game-based test media used in the ongoing learning process and also used as a cognitive evaluation tool at the end of learning.

LMS: used as a distance learning system that can be accessed by

9. Hasil uji implementasi

After the development process is carried out, the actual classroom strategy is tested.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PoEx	84.0385	26	6.93098	1.35928
	PoKo	66.3462	26	11.09574	2.17605
Pair 2	PrEx	55.9615	26	6.93098	1.35928
	PrKo	44.0385	26	7.61830	1.49407

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	PoEx - PoKo	17.69231	12.82426	2.51504	12.51248	22.87214	7.035	25	.000
Pair 2	PrEx - PrKo	11.92308	12.33507	2.41911	6.94084	16.90532	4.929	25	.000

From the experimental results, it was found that the significant value of the paired samples test was 0.00 <0.05, which means that there were differences in student learning outcomes in the experimental class and the control class. The average value of the experimental class is 84.04 and the control class is 66.35, which means that the learning outcomes of students who use distance learning based on interactive online test media of discrete mathematics are better than conventional methods. Then from the results of observations and student responses to distance learning strategies based on interactive online test media were declared valid and effective.

Conclusion

Effective learning strategies to support distance learning must be embedded in each module content or material and learning process, such as material access strategies, evaluation and participant control. Embedding activities in each material to control students can ensure that

all material is read and learned by students. A technology-based distance learning strategy must have adequate control of the material and participants. Online media test can be used to ensure every learning process is passed by students. The results of testing online test-based learning strategies can improve student learning outcomes.

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