Analysis of Module Needs and Blended Learning-Based Videos to Enhance Students' Creative Thinking Skills

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ABSTRACT

To realize 21st-century skills, particularly students' creative thinking skills in the mathematics education statistics program at the University of Muhammadiyah Makassar, Faculty of Teacher Training and Education. Creative efforts from lecturers are also required, one of which is developing learning modules and videos to support the student learning process by utilizing synchronous and asynchronous learning spaces. Therefore, it is first essential to research the needs of lecturers and students towards blended learning-based learning modules and videos. Researchers used a mix of methods to answer the problem of these needs through data collection using questionnaires and interviews, then analyzed them using simple statistics and descriptive analysis. The study results showed that 1) teaching materials used by lecturers in the classroom had not been fully attractive for students to re-learn independently. 2) The lecturer's task has motivated students to complete it. 3) Guiding students in solving problems. However, the problem was that the methods used by lecturers had not been so varied. 4) The material presented in the classroom was quite understandable because some of the material was still abstract. 5) Only a small percentage of students could answer the statistics-based questions quickly and correctly. 6) many students already had good basic math skills. However, only a few of them used statistical formulas correctly, and 7) there were enough students who could describe distribution curves and graphs correctly and easily.

Keywords: Needs analysis, modules, learning videos, blended learning, creative thinking skills.

1. INTRODUCTION

The era of the industrial revolution 4.0 in the 21st century is characterized by artificial intelligence, supercomputers, genetic engineering, nanotechnology, automated cars, and innovation [1]. Such changes occur at an exponential rate, affecting a variety of domains like economics, industry, government, and so on. Human existence is now based on information technology [2]. To prepare for the Industrial Revolution 4.0, education must create a creative, inventive, and competitive [3]. It may be accomplished through optimizing the use of technology as educational supports, which are anticipated to provide outputs that can either follow or change the times for the better.

1.1. 21st Century Skills

Critical thinking, communication skills, creative thinking, and collaboration are necessary for the Industrial Revolution 4.0 era [4]. The 4C, required in the 21st century, maybe learned at educational institutions, notably higher education institutions. Critical thinking

may be taught to students through a learning technique that teaches them how to solve problems. Problem-based learning, project-based learning, cooperative, group investigation, inquiry learning, and other strategies are employed [5]. Collaboration can be trained through cooperative learning strategies [6]. In cooperative strategy, there is a moral value of appreciation for groups, individual and group responsibilities, opportunities to succeed together, fun learning, working in pairs, and group work. In addition, other learning strategies can be used to practice collaboration skills by staying in group work and bringing out the moral values in cooperative learning. Communication skills can be trained by compiling reports of the results of activities, the presentation of project tasks, group/class discussions, and other activities that cause interaction between learners and other learners, lecturers, and other academic community members [7]. Creativity can be trained with problem-based learning, project-based learning, cooperative group investigation, and inquiry learning [8]. They solved problems differently by looking at the problem from multiple points of view while implementing the strategy.

In Indonesian education, students must build creative thought processes, including developing creative and innovative thinking skills. Creativity and innovation are critical to guaranteeing Indonesia's long-term growth [9] . College students should be prepared to be real learners who are skillful, adaptable, and resilient (agile learners) [10]. Merdeka Belajar Kampus Merdeka Policy, introduced by the Minister of Education and Culture, is a framework for preparing students to become resilient scholars who are relevant to the requirements of the times and ready to lead with a strong sense of national spirit. [11].

1.2. Student Learning Outcomes

Researchers have carried out preliminary exploration to obtain the factual conditions of teaching materials and learning media used and the condition of teaching materials and learning media expected in Statistics courses. The collection of information was carried out using Google Form. As many as 72 students participated in the exploration. The results showed that 51.38% of lecturers used reference books to teach, 16.67% used modules made by lecturers, and the remaining 31.95% used power points, social media, and others. The score of student learning outcomes in statistics courses showed that of the 33 students who took the statistics course, the average grade obtained was 71.2, or the grade at the predicate C at intervals of 70–74 [12]. The above data shows that overall or average student learning outcomes in statistical subjects were still not maximal. Students need stimulation so that their learning outcomes can be more maximal, characterized by an average of at least 80 or at least B with intervals of 80-85.

1.3. Utilization of Study Space

Researchers utilized four study rooms from the research related to blended learning. These were learning rooms that were directly known as synchronic spaces, such as face-to-face direct (in room 1) and virtual face-to-face (in room 2) [13]. Virtual face-to-face was already possible with the many applications now (Google meet, Google Classroom, Zoom, etc.) [14]. With the development of technology, learning can be managed with an asynchronous form of indirect learning where students can learn material offline (in room 3). Furthermore, students can make questions, do tasks individually or in groups, and participate in discussion forums, all of which support the creation of a collaboration space (in room 4). The four learning spaces will maximize their use in developing blended learning-based learning modules and videos.

Nevertheless, before the development process is carried out, first through this research, it is known how to describe the learning process of statistics courses to measure the level of needs of lecturers and students for blended learning-based learning modules and videos.

2. METHOD

The type of research used to look at the level of lecturers and students' needs towards blended learning-based learning modules and videos to improve students' creative thinking skills, especially in the statistics course, is mixed methods (quantitative and qualitative).

2.1. Quantitative Method

Quantitative data were collected through questionnaires so that the data results were in the form of numbers which were then analyzed using simple statistics. As a result, the average percentage of the aspects studied related to the learning needs of statistics courses in the mathematics education study program at the Muhammadiyah University of Makassar will be known.

2.2. Qualitative Method

Qualitative data were collected through interviews with lecturers and students to deepen the average results of the data that had been collected through the previous quantitative method so that the results to be presented from this qualitative research method would later be in the form of a description or explanation of the conclusions drawn by the researcher from the process the interview.

3. RESULT AND DISCUSSION

3.1. Results

As in the ADDIE development model concept, the first step in development is analysis [15]. Related to the researcher's problems, in analyzing the needs of learning modules and videos, the aspects analyzed are 1). Analysis of teaching materials used, 2). Analysis of assignments, 3). Analysis of lecture materials, 4). Analysis of lecture implementation, 5). Analysis of Student Characteristics [16]. The results of the analysis that has been done show that:

3.1.1. Analysis of teaching materials used

The analysis of teaching materials used by lecturers in the classroom showed that they were not fully attractive for students to learn independently. It is seen from the percentage obtained by 51.38% of teaching materials used in reference books for teaching, 16.67% using modules made by lecturers. The remaining 31.95% used power points, social media, and others in teaching statistics courses in the Mathematics Education Study Program of FKIP, University of Muhammadiyah Makassar.

3.1.2. Analysis of assignments

The results of the analysis of the tasks given by lecturers showed that 78.8% of students stated that the task given by the lecturer had motivated them to complete it. Then the task was discussed again by the lecturers and students in the classroom. The task could help students understand the lecture material. Tasks were given in structured tasks and have been given regularly to students.

3.1.3. Analysis of lecture materials

The analysis results of the lecture material showed that the material delivered by lecturers was following the target in RPS with a percentage of 95% and was presented directly from simple to complex. But the material presented in the lecture was still within the category of quite understandable by students, with a percentage of 73.5%, because some materials were still abstract.

3.1.4. Analysis of lecture implementation

The results of the analysis of the implementation of lectures showed that lecturers had optimally guided students in solving problems. Lecturers have also recommended using various reference books in the completion of the practice. However, the problem is that lecturers who had not been such varied use the method. It is because teaching materials in lectures have not been optimal.

3.1.5. Analysis of student characteristics

Analysis of student characteristics was carried out to get an idea of the potential and obstacles faced by students during the class. The analysis of the characteristics of students who follow the statistics course showed three groups of analysis results. The first analysis results showed that 78.79% were able to do the task if given an example of a problem by a lecturer. 75.76% of students enjoy studying statistics courses. 90.91% of students were happy if they could solve the problem given. 51.52% of students actively asked if there was material that was not yet understood. 63.64% of students had ideas or ideas for solving the given problem, so it impacted providing examples of problems relevant to the lecture material, which was quite optimal. 21.21% of students could answer statistical questions quickly and correctly. It has the impact of making students feel anxious in the face of statistics course exams.

Table 1. Results of Student Characteristic Analysis

No	Statements	Response (%)
1	Learning resources used are reference books, power points, and other social media.	83.33
2	Able to re-explain the material	60.61
3	Which has been learned	57.58
4	Study Statistics courses at home when going to exams only	51.52
5	Study statistics courses only from the explanation of lecturers	78.79
6	Able to do the task when	75.76
7	A lecturer has given me an example.	84.85
8	Actively ask if there is the material that is not yet understood	51.52
9	Able to correct answers that friends in front of the class have written	57.58
10	Have an idea in Solve a given problem	63.64
11	Able to make temporary answers to the problems given	81.82
12	Able to provide examples of problems relevant to the material taught	63.64
13	I feel good when I can solve the problem given	90.91
14	Answer statistical questions quickly and correctly	21.21
15	Feeling anxious in the face of the Statistics exam	72.73
16	Have good basic math skills when taking classes	69.70
17	Frequently making mistakes in understanding symbols	60.61
18	Difficulty remembering the statistical formulas to be used	81.82
19	Frequently making mistakes in using statistical formulas	75.76
20	Understand statistical formulas well	51.52
21	Use the appropriate statistical formula to solve the problem	69.70
22	Perform an analysis of statistical problems to determine parameters/statistics	84.85
23	Able to use statistical tables easily and correctly	72.73
24	Able to describe distribution curves and charts easily	54.55
25	Able to formulate hypotheses	78.79
26	Able to make decisions in hypothesis testing easily	72.73
27	Able to conclude data analysis	84.85

The second analysis results showed that more than 60.61% of students made mistakes in understanding the symbols, resulting in students' difficulty in understanding statistical formulas. 75.76% of students often made mistakes in using statistical formulas, which has the impact that only 51.52% of students can understand statistical formulas well. However, 69.70% of students already had good basic math skills.

The results of the third analysis showed that 72.73% of students could use statistical tables easily and correctly. However, only 54.55% of students could correctly and easily describe distribution curves and charts. It impacted students' ability to make decisions in hypothesis testing, which is not optimal. However,

84.85% of students have been able to conclude from the results of data analysis that has been done.

3.2. Discussion

The study results described the analysis of the needs of modules and learning videos with indicators: 1). Curriculum analysis contained an analysis of teaching materials, assignments, and the implementation of lectures; 2). Analysis of concepts related to the analysis of lecture materials. 3) Analysis of student characteristics. A needs analysis was very important before designing lecture teaching materials. Curriculum analysis gives an overview of the results of several indicators. Teaching materials used by lecturers in lectures had not been fully attractive for students to re-learn independently. The teaching materials available were only in reference books and PowerPoint. So, it is necessary to develop modules and videos of blended learning that follow the learning outcomes in RPS. In addition, the task analysis showed that the task given by the lecturer had been able to motivate students to complete it. Then, the task was discussed again in class; it was quite clear and followed the student's thinking ability. Assignments in the form of structured tasks have been given regularly to students. Therefore, tasks that have motivated students should be combined with learning modules and videos developed.

An analysis of the implementation of lectures as part of the curriculum analysis gives students an idea of resolving problems. However, the problem is that the methods used by lecturers have not been so varied. That is because teaching materials in lectures have not been optimal. For the methods used by lecturers to vary, it is necessary to use learning modules and videos that follow student activities. Analysis of concepts related to statistics lecture material, where the results showed that the material presented in the lecture was quite understandable by students because some of the material was still abstract. To overcome the problem of materials that are still abstract, it is necessary to present real problems in the field of education in class and teaching materials. An analysis of student characteristics provided three indicators. First, only a small percentage of students could answer statistical questions quickly and correctly. As a result, students felt anxious about answering questions on statistical examinations. Second, students who already had good basic math skills were quite a lot, but only some used statistical formulas. Third, students who could describe distribution curves and charts correctly and easily were enough. It impacts students' ability to make decisions on problems that are not optimal. As part of mathematics, statistics are used to solve problems in everyday life. It is in line with Taplin's [17] opinion, which states that mathematics is a "tool" to increase statistical knowledge and help understand everyday problems. So, it is necessary to apply creative thinking skills in lectures, modules, and learning videos. According to Polya [18], the problem-solving model has the following advantages: 1) it can make learners more

familiar with daily life; 2) it can train and familiarize learners to face and solve problems skilfully; 3) it can develop learners' creative thinking skills; 4) students have begun to be trained to solve their problems.

4. CONCLUSION

Based on the results of research and discussions that have been done, several conclusions were obtained; 1) teaching materials used by lecturers in the classroom had not been fully attractive for students to re-learn independently. 2) The lecturer's task has motivated students to complete it. 3) Guiding students in solving problems. Nevertheless, the problem was that the methods used by lecturers had not been so varied. 4) The material presented in the classroom was quite understandable because some of the material was still abstract. 5) Only a small percentage of students could answer the statistics-based questions quickly and correctly. 6) many students already had good basic math skills, but only a few of them used statistical formulas correctly, and 7) there were enough students who could describe distribution curves and graphs correctly and easily.

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