



# E-Learning Technology: Kahoot Application as a Learning Evaluation Tool

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# E-Learning Technology: Kahoot Application as a Learning Evaluation Tool

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**Abstract**— This research was carried out with the aim of knowing the development of daily evaluation instruments by utilizing the Kahoot application and knowing student responses to the use of daily evaluation instruments using the Kahoot application in learning calluses at the Department of Mathematics, Medan State University. The research method used is the Research and Development (R&D) method using a test instrument development research model. The research instrument used was in the form of tests and questionnaires. The data collection method obtained from the results of instrument validation, questionnaire method, documentation method. The research instruments used were validation sheets and questionnaires. The subjects of this study were students who took the calculus course in the odd semester of the 2020/2021 school year. The data analysis techniques used were qualitative and quantitative. The results showed that the daily evaluation tool with the Kahoot application was very feasible to use. This is based on the results of validation to media experts and material experts who respectively obtained a percentage of 83% and 82%. It obtained student responses with a percentage of 81% with the criteria "very interesting". With these results, a novelty was created in this study, namely the use of the Kahoot application in the Calculus course.

**Keywords**- KAHOOT Application, daily evaluation tool.

## I. INTRODUCTION

Human resources really need to pay attention to the level of ability or quality. For that, we need an effort to make it happen. One of the efforts that can be done is through education. In line with what Dewi (2018) stated: "Education is one of the most important factors to improve one's quality and abilities. The role of education is to grow and develop the existing potential in human resources through teaching and learning activities."

By providing education as an effort to improve human resource capabilities, it is hoped that creative, disciplined and responsible attitudes, and behaviors can grow. According to the Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System: "Education is a conscious and planned effort to create an atmosphere of learning and the learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation and state".

This education itself is a process where there will be changes related to the human mindset and can bring out the potential that exists in every human being. Therefore, it is very necessary to carry out this educational process in order to improve the quality of human resources.

With regard to education and human resources, higher education institutions are an important component in creating a quality education process. Higher education is a place to forge human resources, in this case students. Where, after graduating from tertiary education, students will go directly to the real work field. The role of higher education also greatly determines the success of education. The learning process

that students undergo in higher education will affect the success or failure of a person in the world of work. Therefore, all tertiary institutions must try to provide the best for the students.

One of the subjects studied in Higher Education, precisely at the Faculty of Mathematics and Natural Sciences, is Calculus. Not only Mathematics Department students study Calculus, but because calculus is a basic Mathematics and Natural Sciences subject, students in the Department of Chemistry, Biology and Physics also study it. Calculus is a branch of mathematics that includes limits, derivatives, integrals and infinite series. Calculus is a gateway to other higher mathematics courses, which specifically study functions and limits. Calculus has wide applications in the fields of science, economics and engineering (Wikipedia.org).

Even though it has a "Mathematical" background, calculus is also very useful for other sciences such as Biology, Chemistry and Physics. This is inversely proportional to the situation in the field. The many benefits of studying calculus are not accompanied by the desire of students to learn it. In general, students feel "afraid" of Calculus, especially students who come outside the Mathematics Department. The reason is Calculus is difficult, many students avoid entering the Mathematics Department because they lack interest in it and tend to avoid it. However, it turns out that not only Mathematics Department students study Calculus, because calculus is a basic Mathematics and Natural Sciences subject, students in the Department of Chemistry, Biology and Physics also learn it. Not half-heartedly, this calculus course has a weight of 3 credits but in its implementation it weighs 4 credits which consists of 2 credits for theory and 2 credits for response. What is meant by responsiveness here are additional activities to practice solving technical problems and problems that have not been mastered by students. The lecturer will discuss a series of problems in his lecture and provide weekly worksheets. This activity is also intended to evaluate students' abilities at each meeting. The purpose of holding this response is to facilitate the development of ability to solve problems regarding matters relating to lectures, assist in the assimilation of course materials and provide valuable experiences that will help in facing exams.

However, based on the experience of researchers in the field, many students are less interested in participating in this response. This is due to feeling boredom, afraid, feeling inadequate and reluctant to follow it. The reason is that students feel tired at the beginning of learning when understanding the material. Coupled with the low fighting power of students in studying calculus.

Giving practice questions seems to add a lot to the burden on students participating in this calculus course, especially students outside the Mathematics Department. Many students find completing calculus problems very burdensome and difficult. It is not uncommon for students to be lazy in completing it. Only a few students actually completed and discussed the response questions. The rest is just waiting for an answer from a friend who can solve it.

Of course this is very unfortunate given the importance of taking the response seriously. Because responsiveness will greatly assist students in understanding calculus material more deeply. And it will be very helpful for students in solving the problems faced during the midterm and final semester exams in calculus courses.

Therefore, the researcher wants to change students' perceptions about this response. Researchers want to make students happy and look forward to response activities every week. Of course, by having more responsive activities that are fun for students. One way that can be done is to respond with the help of the KAHOOT application media.

Kahoot is an online application where you can create quizzes in the form of test questions that can be developed and presented in a "game" format. Points will be awarded to those who answer correctly and students who are involved in the game will have their names listed in the player list. The Kahoot application can make it easier for lecturers to evaluate. It cannot be denied that the existence of technology can be an attractive learning medium and by utilizing learning applications it can make it easier for lecturers to manage and convey messages to students.

In 2017 the researchers conducted a KDBK study regarding the design of learning devices based on KKN starting from the RPS to the teaching materials used in the learning process in the classroom, based on the reflection carried out by the research, which is continued with the next tahun, namely 2018 in the same scheme (KDBK) by developing POWTOON-based learning media as well as making teaching



materials with ISBNs. In 2019, researchers are still researching with the same scheme (KDBK) developing Moodle-based e-learning. All learning tools, teaching materials and media that have been developed are used in Moodle-based e-learning.

In 2020, researchers still want to develop previous research while responding to the current pandemic condition, which is not able to meet face to face in one minute. This year the researcher wants to develop an online daily evaluation tool. Where the evaluation tools have not been developed optimally in previous years. So, every time a calculus course meets, students will be given a question as an evaluation material to see the achievement of learning goals online each week. This supports learning activities from their other's homes.

Based on the above background, the researcher conducted a study entitled "Development of a Daily Evaluation Tool Using the KAHOOT Application in calculus learning at the Department of Mathematics, Medan State University."

## II. RESEARCH METHODS

This type of research used in this research is research and development (Research and Development). Research and Development is a research method used to produce certain products and test the effectiveness of these products.

The research was conducted at the Mathematics Department, Medan State University. The subjects in this study were students taking the Calculus course, developing evaluation tools with the kahoot application in the Calculus course in the odd semester of the 2020/2021 school year.

### Research procedure

The steps of the test development process are shown on the chart following:

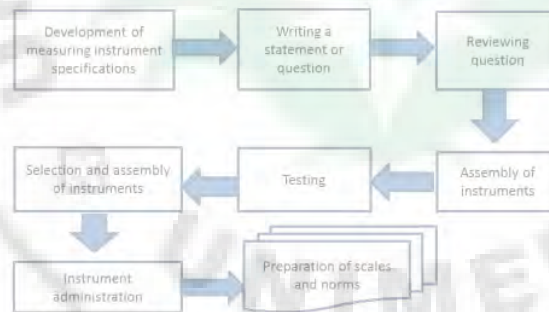


Figure 1. Research steps for the development of a test instrument

Data collection techniques used in this study were validation sheets, questionnaire responses and documentation. This data analysis technique uses quantitative and qualitative analysis techniques. Qualitative data were obtained from validator input at the validation stage, input from material experts, and media experts. Meanwhile, quantitative data is describing the results of product development made in the form of an evaluation tool using the Kahoot application. The data used is using statistical testing.

## III. RESULTS

Research and development results are based on the steps in the development of a test evaluation tool online are as follows:

### 1. Development of Measurement Specifications

This research was conducted in the Department of Mathematics, Medan State University. In this research location, computer facilities and Wi-Fi networks have been selected, but they have not been fully utilized in the evaluation. In evaluating, still using the conventional method, namely using a paper test (using paper). This product development aims to make it easier for lecturers to evaluate and students to be enthusiastic about learning, especially in a pandemic like today. The product developed is a daily evaluation tool using

the KAHOOT application in the Calculus Course. Analysis of data needs at this stage is by providing a questionnaire student assessment of the evaluation tool.

## 2. Collecting Questions

Writing this statement or question is a related question with Calculus material. In the product development process, researchers developed a daily evaluation tool using the KAHOOT application. The questions used were taken from several sources, then developed. The questions presented in the quiz were obtained from the book Calculus by Purcell, and other Calculus books.

## 3. Study Statements or Questions

The purpose of this study is to identify the question instrument grid to the relevance of each item theoretically and construct. So that can be ascertained for each item formed in the based evaluation online according to indicators and can be fulfilled properly and can be continued at the development stage. The curriculum applied at Medan State University is used as the basis for product design indicators for the development of evaluation tools using the KAHOOT application which can be accessed via the website. The development of this evaluation tool is designed according to development needs to achieve predetermined indicators in accordance with the syllabus and curriculum used by the Mathematics Department, Medan State University.

## 4. Instrument Assembly

### a. Sums Design

The assembly of evaluation tools in the form of online tests includes grouping questions according to the categories presented in the application. After reviewing the questions and assembling the initial design questions on the test display according to the online-based test category using the KAHOOT application. This study uses an objective test. In the KAHOOT application, there are 4 question categories, namely quiz, survey, jumble, and discussion. However, in this study, researchers used the quiz category.

### b. Sums Validation

Question validation to test the validity of the evaluation tool in the form of an online test conducted by several experts. Validators who were made material experts were Arnah Ritonga, S.Si, M.Si, Andrea Arifyah, S.Pd., M.Sc and Elfitra, SPd., M.Sc. The selection of these three validators is based on their expertise in the field of study they are engaged in, namely Calculus. Validation of this question was carried out using a checklist in the form of a questionnaire.

Based on the results of data processing from the material expert validation questionnaire stage I, an average score of 76% was obtained, this score included the interval interpretation criteria with the "Eligible" category. After the questions are corrected, the questions are validated again with the same validator. Sadly, in stage II, a score of 82% was obtained which was included in the interpretation criteria with an interval in the category of "Very Appropriate".

Validation of media experts was carried out by several validators, namely Ade Andriani, S.Pd., M.Pd, Sri Lestari Manurung, S.Pd., M.Pd and Badzlan Darari, S.Pd., M.Pd. The validation results were obtained from a questionnaire. The selection of validators is based on educational background and validator skills in using various learning media. The results obtained from the processing of the media expert questionnaire obtained an average score of 73% with interpretation criteria at intervals with the category "Feasible". After revising the input from several experts, it is then validated again with the same validator. Whereas in stage II an average score of 83% was obtained with the criteria of interpretation with intervals in the category of "Very Appropriate".

## 5. Testing

The trial phase is carried out after completing the expert validation stage. Products are tested to determine the extent of product effectiveness which has been developed. At the trial stage, it is carried out in the Mathematics Department in the Calculus class. The trial was carried out in two stages, namely the first stage carried out by 10 students and the second stage carried out by 30 students.



Before conducting the trial the researcher explained to the students several steps to start the online test. After students understand what is explained by the researcher, then the students started the 1st daily evaluation online test followed by 10 students and operated by a research team.

When students finish taking the online test, then the researcher distributing response questionnaires to students to provide some input on the daily evaluation tool with this KAHOOT application. After filling out the questionnaire there was input from students so that the product underwent several revisions. After the product was revised then it was tried out for the second stage, which was attended by 30 students. students do the daily evaluation online test 2 to the maximum extent possible. After completing the student online test, response questionnaires are distributed to find out the effectiveness of the products that have been developed.

After everything is done, the online test results by students are processed to find validation, reliability, difficulty level, and different power tests to find out which questions are best used in the finished product. The results obtained can be seen in the following table.

Table 1. Statistic Results

No	Question Item Analysis	Evaluation I	Evaluation II
1	Validation	9 questions are valid, 6 questions are not valid	10 questions are valid, 5 questions are not valid
2	Reliability	15 reliable questions	15 reliable questions
3	Difficulty Level Test	14 easy questions, 1 difficult question	11 easy questions, 3 medium questions, 1 difficult question
4	Difference Power Test	8 good questions, 3 enough questions, 3 bad questions, 1 bad question	10 good questions, 2 enough questions, 2 bad questions, 1 very bad question

Based on the table above, you can see the results of the item analysis. In the validity test evaluated 9 questions in the valid category and 6 questions were not valid. In the second evaluation, you get 10 questions in the valid category and 5 questions in the invalid category. An invalid question means that the question is not used.

The reliability of the questions was obtained in evaluation I and evaluation II get all the questions in a reliable state. In the difficulty level test, evaluation I got 14 questions in the easy category, and 1 question in the medium category, and on the second evaluation got 11 questions in the easy category, 3 questions in the medium category, and 1 question in the difficult category. Finally, in the difference test, evaluated I got 8 questions in good category, 3 questions in enough category, 1 question in bad category, and 1 question in very bad category, while in evaluation II got 10 questions in good category, 2 questions in enough category, 2 questions in the bad category and 1 question in the very bad category.

## 6. Instrument Selection and Assembly

After the product has been validated and tested then it gets input from validator so that the product can be better presented to students in helping the evaluation process and can be applied in other universities as a whole. The results obtained are as follows:

### a. Material Expert Revision

Here are some input from material experts, as follows.

**Table 2. Material Expert Revision**

No	Suggestion	Repair
1	Subtract questions of the same type	The problem has been reduced, from 15 quiz questions to 10 quiz questions
2	Long questions should be separated to save time	The long problem has been divided into two questions
3	Add about the type of discussion	The type of discussion has been added in accordance with the discussion chapter

### a. Revised Media Expert

Following are some input from media experts, as follows.

**Table 3. Revised Media Expert**

No	Suggestion	Repair
1	The questions should be in the order of the material	The questions have been adjusted according to the order of the material
2	Change view to quiz category	The display has been replaced by a quiz category
3	Random questions when presented	The questions have been presented randomly
4	Match the test title with the material	The test title has been adjusted according to the material

## 7. Instrument Administration 123

Kahoot's daily evaluation tool is made in the form of an online test. During the trial, this test received a good response from students. Students are very happy and enthusiastic in carrying out daily evaluations.

The following is a recapitulation of student response assessments to daily evaluations using the Kahoot application.

**Table 4. First and Last Evaluation**

No	Assessment Indicators	First Evaluation (%)		Last Evaluation (%)	
		Score	Criteria	Score	Criteria
1	Attractiveness	73	Interesting	81	Very interesting
2	Quality	80	Very interesting	80	Very interesting
3	Language	78,6	Interesting	85	Very interesting
4	Convenience	76	Interesting	80	Very interesting
<b>Percentage</b>		<b>77</b>	<b>Interesting</b>	<b>82</b>	<b>Very interesting</b>

Based on the table above, students' initial assessment of the evaluation with the KAHOOT application was obtained the results on the assessment indicator are attractiveness getting a score of 73%, content quality gets a score of 80%, language gets a score of 78.6%, and convenience of getting a score of 76%. From the percentage results obtained from each assessment indicator got an average score of 77% with "Attractive" criteria. Furthermore, in the final assessment of students on the evaluation of the KAHOOT application, it was obtained the results on the assessment indicator are attractiveness getting a score of 81%, content quality gets a score of 80%, language gets a score of 85%, and the convenience of getting a score of 80%. From the percentage results obtained from each assessment indicator gets an average score of 81% with "Very Interesting" criteria.

#### IV. DISCUSSION

This research was conducted by following the research and test development procedures described previously. The result is information about the validity and questions used in daily evaluations using the Kahoot application. In addition, students involved in carrying out evaluations using the Kahoot application feel happy and excited in completing each point of the problem.

In the development process, many questions have been changed and even discarded or not used according to the direction of the material validator team. The average percentage in stage I was 76% with the criteria "Eligible" and at stage II was 82% with the criteria "Very Feasible". It can be seen that there is an increase in stage I to stage II by 6%. This increase occurred due to improvements in suggestions from the validator, namely improving the reduction of quiz questions, adding questions to the discussion category and dividing the questions into 21 parts. So it can be interpreted that the development of an evaluation tool using the KAHOOT application is suitable for use as a support for learning mathematics.

As well as Kahoot's appearance on this evaluation, much more was adapted to the advice of media experts. It obtained an average percentage at stage I 73% with the criteria "Eligible" and in stage II 83% with the criteria "Very Eligible". It is seen that there is an increase from stage I to stage II by 10%. This increase occurred because of the improvement suggestions from validator, namely correcting questions according to the order of the material, questions at random, and changing the appearance of the quiz category. So it can be interpreted that the development of an evaluation tool using the KAHOOT application is suitable for use as a support for learning mathematics.

Student assessment responses can be seen from 4 assessment indicators, namely attractiveness, quality of content, language, and convenience. In the assessment of attractiveness indicators, the initial response was 74% and the final response was 81%. In the content quality assessment indicator, the initial response was 80% and the final response was 80%. In the linguistic assessment indicators, the initial response was 79% and the final response was 85%. In the assessment indicator of attractiveness, the initial



response was 76% and the final response was 80%. So that based on the criteria by calculating the assessment of students obtained an initial response of 77% with the criteria "Interesting" and the final response 81% with the criteria "Very Attractive".

From the explanation above, it can be seen that good validation results and student responses to Kahoot's evaluation are also good, so it can be concluded that daily evaluations using the Kahoot application can be used effectively and efficiently and can attract student interest in completing the evaluations given each week.

### V. CONCLUSION AND SUGGESTION

Based on the previous explanation, it can be concluded that the daily evaluation tool using the Kahoot application is very feasible to use. The final assessment response from students also shows a percentage of 81% with the criteria "very interesting."

Suggestions submitted to researchers and other developers or teachers, this Kahoot application can be used as a reference in creating or developing tests or evaluations in learning.

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