The use of Mixed Apps as accommodation of mathematical student creativity

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Abstract. Mixed Apps is a mixture of 3 information and communication technology applications, Web applications, Google classroom applications, and hang out applications. The web application was a place for lecturers and students to share learning material; the google classroom application was for task collection while the hangout was for video conferences. In general, this research was conducted to improve the quality of the process and learning outcomes further, especially in mathematics teaching and learning strategy courses. The specific purpose of this study is to describe the effect of using Mixed Apps on the creativity of Mathematics Education students. This research method is mixed research, a mixture of qualitative methods, and quantitative methods. This research is at a university in Medan city with 30 students. The research instruments were interview items, student creativity products, creativity product assessment sheets and student questionnaire responses. As for learning by utilizing Mixed apps, some students have high creativity scores of 20 students, five students who are of moderate value, and five who fall into the low category. But overall, 87% of students have a positive (happy) response to learning by using Mixed Apps.

1. Introduction
Mathematics teaching and learning strategies are compulsory subjects for mathematics education students. They have the knowledge, experience, and skills to implement mathematical learning efficiency and effectively from this lecturer. This lecture material covers the Nature of Mathematics, School Mathematics, Psychology of Mathematics Learning, Approaches-Models-Mathematics Learning Techniques, Basic Teaching Skills. So that the output of mathematics education will be of quality in teaching, starting with lecturing mathematics teaching and learning strategies that are also of high quality. [1]

The quality of learning now faces a new challenge, namely how learning in the era of the industrial revolution 4.0 teaching and learning process must develop in line with the rapid development of technology, this change automatically drives changes in educational or learning projections by maximizing technological literacy [2]. Mary. Technology literacy is the ability to use, understand, manage, and assess an innovation that involves processes and knowledge to solve problems and expand one's abilities. Technology literacy is the ability that consists of aspects of science, critical thinking skills, and decision making to use technology/innovations of - social work effectively, especially in education. Technology literacy can produce quality learning processes [3].

Apart from the process of learning, the quality of learning can from the results of the learning itself. One expected outcome of the learning process is the of student creativity. Creative separated from creativity. Creativity is the result of learning in cognitive skills, so to be creative can be learned through the teaching and learning process [4]. Creativity divided into four forms; person, process,
product, and press. Called it "the four creativity." Besides, the definition of creativity also divided into consensual and conceptual definitions.[5]

The consensual definition emphasizes the aspect of a creative product that is assessed for the degree of creativity by an expert observer. Argues that a product or a person's response is said to be creative if, according to the judgment of an expert or observer, who has authority in that field that it is creative. Thus, creativity is the quality of a product or response that is considered creative by an expert observer [6][7][8]. The consensual definition based on creative products or observable responses are manifestations of the peak of creativity. Creativity is something that can be recognized by outside observers, and they can agree that something is a creative product, creativity differs in degree. Observers can come to an agreement that one product is more creative than another. Conceptual definitions depart from certain concepts of creativity, which translated into criteria about what is called creative. Product considered creative if a) the product is new, unique, useful, correct, or valuable in terms of particular needs, b) more heuristic, that is, displaying a method that has never been or rarely done by others before. The definition of creativity that represents the consensual definition and conceptual definition is "The creative work is a novel work that is accepted as tenable or useful or satisfying by a group at some point in time" [9]. In this research, the creativity that assessed is from the products produced by students, namely technology-based learning media, and will be assessed consensually and conceptually.

However, learning carried out so far has not been maximized in utilizing technology, also learning that oriented in the development of student creativity. For example, most still use computer technology but not internet-based, namely using LCD in learning. In lectures, mathematics learning strategies so far have not maximized the use of technology, especially information and communication technology in the learning process; some are even conventional. Students only sat quietly, listening to the lecturer's material presentation. The lecturers are examples that can directly see in the teaching and learning process. Moreover, the subject is a teaching and learning strategy. Likewise, the learning process based on student creativity did not see yet.

One strategy used in utilizing technology is the use of mixed apps. In learning, Mixed apps are a mix of three applications, Web, google classroom, and hang out applications. The researcher divided the three roles of each application in the learning process: the web application was a place for lecturers and students to share learning material, the google classroom application was for task collection while the hangout was for direct online learning.

Word Wide Web (www), also called the web, site, website or site, is an internet application and service that includes multimedia resources [10]. The physical web is a collection of personal computers, web browsers, connections to ISPs, server computers, routers and switches that are used to link information and become the first vehicle for sharing related parties[11]. The web is a word that is short of the word website, which means it is a collection of pages on a domain on the internet that is created with a specific purpose and is interconnected and can be accessed widely through the front page (homepage) using a browser. The website was first created at CERN by the Berners-Lee team, and online in 1991, the purpose of this making was to make it easier for researchers in their workplaces when they would exchange or make changes to information. This first website can be used free on April 30, 1993.

Furthermore, Google Classroom is a Google product that connected to Gmail, drive, hangouts, YouTube, and calendar. Google is working with educators across the country to create this classroom. Google Classroom has features that are efficient, easy to use. It can help teachers manage assignments, with classroom teachers being able to create classes, distribute assignments, assign grades, send feedback and see everything in one place. This application is a learning management system that can be used to provide teaching materials, tests that are integrated with an assessment so that using this feature effectively and efficiently occurs in learning.

The many facilities provided by google classroom make it easy for teachers to carry out learning activities. The intended learning is not only in the classroom but also outside the classroom. The participants in the student can do learning anywhere and anytime by accessing Google online. The learning objectives easily realized and full of meaningfulness through this application. The use of google classroom makes it easy for teachers to manage to learn and convey information accurately and
accurately to students. While Hangouts is a communication platform developed by Google that includes instant messaging, video conversations, SMS and VOIP features, this application places three messaging products whose services have also been developed by Google. Google states that Hangouts is designed for the "future" of remote communication products.

2. Methodology
This research is mixed-method research, which is a mixture of qualitative and quantitative methods [12]. Qualitative data are in the form of interviews with lecturers and students, while quantitative data are data on student creativity and response questionnaires. Student responses are said to be positive if 80% or more responses in the positive category. Student's response data used to calculate the number of students who gave positive responses. The formula is as follows:

\[ \text{Percentage} = \frac{A}{B} \times 100\% \]

\( A \) : The proportion of students who choose
\( B \) : Number of students (respondents)

The assessment of student creativity is media products produced by students. Then it will be assessed by three experts. Experts, in this case, are three lecturers who are taking mathematics teaching and learning strategies. Each expert will a creativity assessment sheet. This creativity assessment sheet is a questionnaire sheet that has a scale from 1 to 5.

\[ \text{Rumus Index } \% = \frac{\text{Score Total}}{\text{Maximum}} \times 100 \]

The following criteria for interpretation of scores based on intervals:

| Interval       | Category                |
|----------------|-------------------------|
| 0% - 19.99%    | Very Low Creativity (VL) |
| 20% - 39.99%   | Low Creativity (L)      |
| 40% - 59.99%   | Moderate Creativity (M) |
| 60% - 79.99%   | High Creativity (H)     |
| 80% - 100%     | Very High Creativity (VH)|

3. Results and Discussion
The following are the results of a consensual and conceptual assessment of creativity from 3 experts on student creativity products

| Learning Media Expert | Total Value of Creativity (people) |
|-----------------------|-----------------------------------|
|                       | High     | Medium | Low    |
| Expert 1              | 20       | 5      | 5      |
| Expert 2              | 21       | 5      | 4      |
| Expert 3              | 19       | 6      | 5      |

| Value of Creativity  |
|----------------------|
| 0-19 (VL)            |
| 20-39 (L)            |
| 40-59 (M)            |
| 60-79 (H)            |
| 80-99 (VH)           |

Total (Students) 2 3 6 10 9
From table 2, it can see that expert one states 20 student products have high creativity values, five medium students and five students low creativity. Likewise, things that are not much different from expert two and expert 3 in providing an assessment of student creativity. From table 3. It can see that the number of students categorized as high creativity is 19 students, Six are categorized while the remaining five students categorized as low creativity. The assessment of creativity with consensual and conceptual gives the number of students who are not much different from each other [12].

Then from the data tables 2 and 3. The researchers conducted interviews with representatives of each category of value of creativity. The interview results found that students who have high creativity because they have high intensity in utilizing technology, such as mixed apps during learning. The medium category, while students who have low creativity scores have low intensity in utilizing technology. The interview results concluded that students could have high creativity can be developed through a learning process, moreover learning that is carried out integrated with technology, technology is created from creativity, of course in using it, creativity is needed. So that in developing creativity, there is a need for regular or continuous guidance or learning [13][14].

The use of Mixed apps in the learning process is one way to develop student creativity. When students read material on the web, they are also given the task to be able to upload material on the web that they make. Of course, students are designing the web as exciting as possible, so they are interested in reading. This design is a learning process that fosters students to be creative [15]. Likewise, when they are instructed to collect tasks in google classroom. They are accustomed to creating soft copy saved tasks to be uploaded to google classroom, plus they use google hangout when they present online, their creativity is needed to make an attractive appearance during a presentation the online [16][17].

Interview results also illustrate that on average, students who have high or low creativity live in an environment that supports the development of creativity. Parents who intensively help children to think Utami Munandar creatively in his book Developing Gifted Child Creativity (1999) suggests several attitudes of parents that support the development of children's creativity. The parents attitude such as, respecting children's opinions and encouraging them to express them, giving time to the child to think, reflect and fantasize, let the child make his own decisions, encourage the accuracy of the child, to explore and question many things, convince the child that parents respect what they want to try and what the results are, support and encourage children's activities, enjoy being with children, give serious praise to children, encourage children's independence at work, and practice good cooperative relationships with children. A supportive environment by providing opportunities, positive examples, practical guidance can develop and direct creative children into productive children.

| Average | Positive | Percentage | Negative | Percentage |
|---------|----------|------------|----------|------------|
| 19.3    | 83.91    | 3.7        | 16.1     |

Table 4 is a representation of students' responses to the use of mixed apps in the learning process. On average, students gave positive responses to a percentage of 83.91. From the results of the interview, students enjoy learning by using technology. Moreover, this technology can be applied to their Android, so that wherever they are, they can do the learning process. Thus wherever students can do creativity. Thus their positive sense of learning using mixed apps finally gives a positive value to their creativity, seen with up to 20 students who have products that have high creativity value.

The following are examples of pictures contained in videos created by students as learning media in mathematics teaching and learning strategies.
Figure 1. Preview of Student Presentations

Figure 1 is one of the pictures that appear in the learning videos made by students, and they upload these videos on the web that they make themselves. Based on the views of learning media experts, this video is one of the main results of the categories of students who have high creativity.

Figure 2. Preview of Student Presentations

Figure 2 is also a picture that appears when students present the learning approach material, one of which is the Inductive approach. This picture is an illustration that explains a group of people who are learning in the form of human animation. Different from picture 3. Students give a direct picture of Individual objects while doing the learning process. Learning media experts give the value that picture 2 is more creative than picture 3. By reason, the element of modification included in creativity.

Figure 3. Preview of Student Presentations

4. Conclusion
The utilization of mixed apps is an effective way of developing student creativity. Creativity is born with the habituation experienced; this habituation is learning. Good learning can give the students' creative spirits. The use of various media. Including technology is one way to increase student creativity. The technology that exists to help humans is the result of human creativity itself. Utilizing it in learning contains an element of creativity in it. Creativity products are born from creative students.

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