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Learning Design Based on Local Wisdom *Maddawa-dawa, Mammanu-manu* and *Mappettuada*

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ABSTRACT

Local traditions of *Maddawa-dawa, Mammanu-manu, Mapppettuada* as a form of local wisdom that elaborated entry into learning, especially mathematics. In its application the local traditions of *Maddawa-dawa, Mammanu-manu, Mapppettuada* integrated with an android application, namely the application of *group maker* is used on the phase *Maddawa-dawa*, application *lucky wheel* and *mind mapping* is used on the phase *Mammanu-manu* and application *pro & cons* used on the phase *Mappettuada*. This research emphasizes the design process with a focus on the literature review in finding the proper integration between local traditions of *Maddawa-dawa, Mammanu-manu, Mapppettuada* with android apps that are focused student-centered in learning. The results of this design are expected to provide an alternative solution in improving the ability of extrapolation of the students especially in the learning of mathematics through the approach of local traditions in the learning process.

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A. INTRODUCTION

Mathematics is one of the subjects that are the main concern and has a major influence in everyday life (Nuraini, 2018). However, many students fear mathematics because it is considered complicated to understand and understand (Asfar, Asfar, Aspikal & Nurwijaya, 2019). In fact, learning mathematics can train students to understand a concept through thinking and reasoning to conclude, develop student creativity, make predictions or guesses, develop problem-solving skills and convey information and communicate ideas (Nugraha & Octavianah, 2020).

The importance of learning mathematics above is not accompanied by the mathematical abilities of the students. Several facts in the field show that the mathematical ability of Indonesian students is still very low, seen from the results of the survey results *Program for International Student Assessment* (PISA) 2018 (OECD, 2019) that the mathematics learning achievement of Indonesian students reaches an average score of 379 which is ranked 67 out of 73 countries. This is in line with the results survey *Trends International Mathematics and Science Study* (TIMSS) of 2015, where Indonesia was ranked 44th out of 49 countries with an average score of 397 (IEA, 2016). In addition, the results of the 2017 Indonesian Student

Competency Assessment (ISCA) showed that the lowest score in mathematics was 0.93 and the highest score was only 67.39 with a mean score of 27.51 (Kemdikbud, 2019a). Likewise, the results of the 2019 National Examination (NE) for Indonesian students for junior high school level obtained an average math score of 46.56 (Kemdikbud, 2019b). It is feared that the low mathematical ability of Indonesian students will have an impact on the competitiveness of students in the era of the Industrial Revolution 4.0.

One of the factors that causes the low mathematical ability of Indonesian students is the lack of understanding of students' mathematical concepts, especially the extrapolation level, where mathematics is concerned with abstract and hierarchical concepts, so that in learning mathematics no conceptual stages should be missed (Asfar, Asfar, Darnawati & Darmawan, 2019). A hierarchical mathematical concept requires students to be able to predict the tendency (extrapolation) of a mathematical problem (Rohaeti & Bernard, 2018). However, Effendi (2018) research results show that most students still find it difficult to extrapolate from solving mathematical problems at hand.

The ability to extrapolate *(extrapolation)* is to apply concepts in mathematical calculations (Rahayu & Pujiastuti, 2018) to see the trend or direction of the continuation of a finding (Syarifah, 2017). Students are expected to be able to see behind what is written, make predictions about consequences, and expand perceptions in terms of time, dimensions, cases, or problems through extrapolation abilities (Suhardi, 2018). The low ability of students to extrapolate can be influenced by the lack of giving questions that stimulate students' thinking processes, not linking concepts to real-life (Sutisna, Maulana & Subarjah, 2016), and only providing practice questions by utilizing existing LKS (Aryani, Marzuki & Suryani, 2019). Besides, the mathematics learning process in schools still tends to be teacher centered, where students just listen, pay attention, take notes, then work on practice questions and seem passive (Asfar, Asfar & Sartina, 2018; Azis *et al*., 2019). Learning like this does not provide opportunities for students to be directly involved in suggesting ideas and that will lead to the formation of their mathematical knowledge (Asfar, Nur & Asfar, 2019; Nur, Asfar, Ruhni & Nurliah, 2019).

The problem above is in line with the information obtained during the implementation of apprenticeship 2 in class VIII SMP Negeri 1 Kahu, Kahu District, Bone Regency, South Sulawesi, that the extrapolation ability of students in mathematics is still low. Students seem to be less able to apply concepts in mathematical calculations, marked by the inability of students to solve math problems with a different form of questions than before. Besides, students also experience difficulties in predicting trends that will occur, interpreting the meaning of mathematical concepts, and concluding solutions to problems given. As a result, students are unable to solve math problems at a higher level because it is difficult to understand the previous material even though the teacher has made perceptions.

One of the efforts that can be made to overcome the above problems while improving students' extrapolation abilities is by involving socio-cultural factors that have positive values for educational practice in learning (Majid 2019). *Maddawa-dawa, Mammanu-manu '* and *Mappettuada* are traditions of the Bugis-Makassar tribe *student-centered* so they can be used as methods in the learning process. In addition, the use of android in the learning process can overcome student boredom, so that learning can take place effectively and increase students' interest in learning mathematics (Zakiy, Syazali & Farida, 2018). Some android applications that can be applied to the traditions of the Bugis-Makassar *Maddawa-dawa, Mammanu-manu, Mappettuada* are applications *group maker* at the *Maddawa-dawa* phase, *lucky wheel* and *mind mapping* at the *Mammanu-manu* phase as well as applications *pro & cons* at the *Mappettuada* phase. Therefore, this study discusses a technology-integrated local wisdom-based learning design for students' extrapolation abilities.

B. METHODS

The research method used is a qualitative paradigm with descriptive methods, namely the form of exposure based on literature review and the results of other supporting sources. The purpose of this study is to design a technology-integrated local wisdom-based learning process, in this case the use of an android application in order to design learning in the form of ethnopedagogy that is focused on extrapolated abilities. The design procedure used is data collection from various literatures in the form of articles, books and journals that touch on actual pedagogical issues in relation to research studies as a theoretical basis in making systematic syntax of learning. In measuring the success of the learning method, it refers to the extrapolation ability indicator with the scoring rubric in Table 1.

Table 1. Extrapolation Ability Scoring Rubric

Indicator	Question Number	Score Assessment Criteria	Score
Predicting trends that will occur	1, 2, 3, 4, 5	1. Predict the overall trend correctly and completely	4
		2. Predicts a trend that will occur correctly but incompletely	3
		3. Predicts an impending trend complete but wrong answers	2
		4. Predicts the likely trend with wrong and incomplete answers	1
		5. Wrong answer or no answer	0
Interpreting the meaning of mathematical concepts	1, 2, 3, 4, 5	1. Interpreting the meaning of a mathematical concept as a whole correctly and completely	4
		2. Correctly interpret the meaning of mathematical concepts but the answers given are incomplete	3
		3. Correctly interpret the meaning of a mathematical concept but the answer is wrong	2
		4. Interpreting the meaning is not a mathematical concept	1
		5. Wrong answer or no answer	0
Summing up the solutions to the problems given	1, 2, 3, 4, 5	1. Summing up the overall solution to the problem given correctly and completely	4
		2. Conclude the solution to the problem given correctly but the answer is incomplete	3
		3. Summing up the solution to the problem given correctly but the answer is wrong	2
		4. Summarize the solutions to the problems given without being based on relevant mathematical concepts	1
		5. Wrong answer or no answer	0

In this study, the design concept used in designing learning consists of two main stages, namely the exploration and design stages, with the following Figure 1.

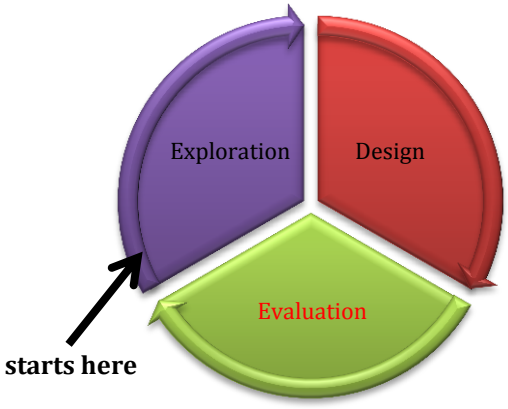

Figure 1. Learning Design Process

1. The first stage is exploration where the main activity is to identify and examine information related to learning conditions, including students (Diningrat, 2019). In other words, researchers have the main task of collecting and identifying information related to student characteristics, environment, material and learning objectives, which in turn will lead researchers to choose methods that suit student needs.
2. The second stage is designing where the main activity is mapping the information obtained in the exploration stage about the objectives, processes, learning materials using existing pedagogical models and also considering the pedagogical model to be chosen, so that it can be used as consideration in determining the learning method according to student needs (Diningrat, 2019). In other words, this stage requires researchers to produce effective learning methods through the analysis of the results of exploration of pedagogic models or learning theories that can produce specific learning methods and be taken into consideration in choosing learning technologies that can be evaluated at a later stage.
3. The following stage which will be done as a research sustainability, that is the evaluation stage. Evaluation where the main activity is to determine the objectives, expected results and how to evaluate the design of learning methods, combining formative evaluation with a revision cycle that results in the effectiveness of the results of applying learning (Diningrat, 2019). In other words, researchers must be able to apply good decision-making skills by considering factors related to the learning context.

C. RESULT AND DISCUSSIONS

Based on some literature that was collected and analyzed the data, results, and discussions were obtained related to the technology-integrated local wisdom-based learning design on extrapolation abilities, namely as follows.

1. Extrapolation Ability

Extrapolation ability is the ability to predict or provide an overview of things based on *trends* that appear in data in the form of consequences, implications, and consequences based on motives and patterns in the data (Suhaesa *et al*., 2018). The ability to extrapolate according to Harti, Suprapta & Ikbal (2018) is a person's ability to conclude and state more explicitly a form of graphs, data, predict the consequences of actions depicted from a communication, sensitive or sensitive to factors that might make predictions accurate. Operational verbs that can be used to measure this ability are calculating, guessing, concluding, predicting, differentiating, determining, and filling (Yanti, Nahwiyah & Mailani, 2018). Extrapolation ability is the highest level of understanding of mathematical concepts, including estimates and predictions based on in a thought, a description of the condition of information, and includes making conclusions with consequences that are in accordance with the third cognitive level of information, namely the *application* that uses or applies a material that has been studied into a new situation in the form of ideas, theories or technical instructions (Jelatu, Sariyasa & Ardana, 2018).

Based on some of the opinions above, it can be concluded that extrapolation ability is the ability to predict a trend through mathematical calculations, to be able to apply a concept that has been learned to a new situation in the form of an idea. The extrapolation ability indicators that will be used in this study include the ability to predict trends that will occur, interpret the meaning of mathematical concepts, and conclude solutions to the problems given. The following is a scoring rubric table used for each indicator of extrapolation ability.

2. Technology Integrated Local Wisdom

a. Maddawa-dawa

Maddawa-dawa is a form of friendship between people to strengthen familiarity with family and society. In practice, this maddawa-dawa must be done collectively or collectively in society. Because its implementation collectively can be meaningful as a medium of communication between family and relatives or a medium to stay in touch and increase integration between people (Rusli, 2015). *Maddawa-dawa* in the learning process can be interpreted as the apperception stage, namely the teacher's activities to connect the previous learning material with the material to be taught to provide instructions to students what material to learn at that time.

The android application that can be used at the *Maddawa-dawa* phase is application *group maker.* This application will assist the teacher in dividing students into groups randomly, namely by simply entering the name of the student (small scale) or student absent number (large scale). The following is an overview of the application *group maker.*

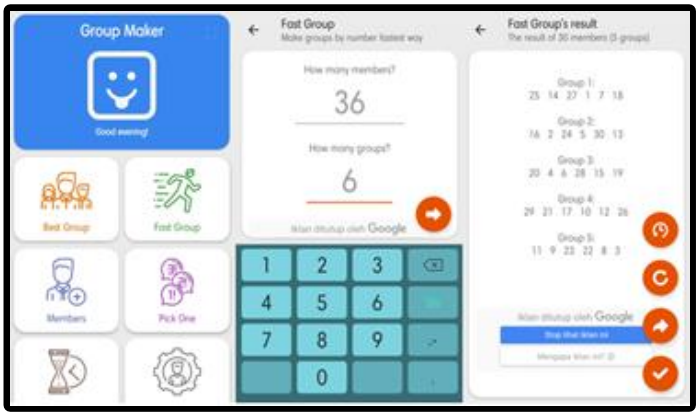

Figure 2. *Group Maker* Application

b. Mammanu-manu

Mammanu-manu is the process of seeking further information about the prospective bride, especially about her status, whether someone has proposed or not, or whether the person has been arranged a marriage with another (Tang, 2017). *Mammanu-manu* in the learning process can be interpreted as the investigative stage, namely learning activities that give students the possibility to develop their understanding through various activities and correct results according to the development they are going through.

Android applications that can be used at the *Mammanu-manu* phase are applications *lucky wheel* and *mind mapping.* The application is a *lucky wheel* used in determining students who will investigate other groups, then the results of the investigation will be entered into the application *mind mapping* which will make it easier for students to determine the right solution based on some data. The following is an overview of the application *lucky wheel* and *mind mapping.*

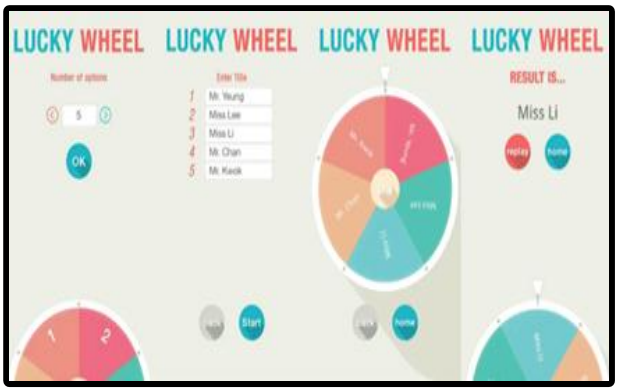

Figure 3. *Lucky Wheel* Application

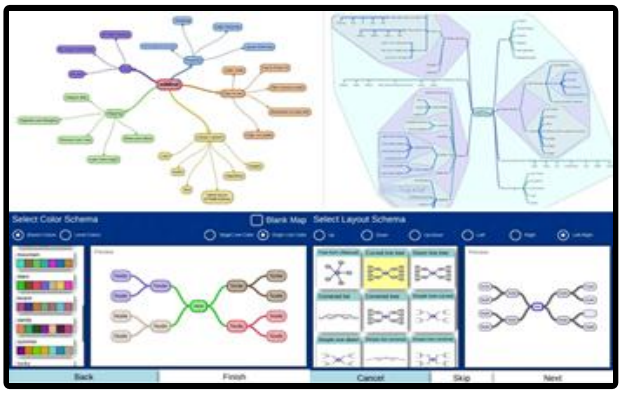

Figure 4. *Mind Mapping* Application

c. Mappettuada

Mappettuada is the process of making the final agreement from several previous activities (Zulkhaeriyah, 2018). In the tradition *Mappettuada,* several performances appear through verbal and non-verbal communication between communities. Verbal communication is a communication process used by language and the spoken words. Nonverbal communication is the delivery of messages without words and is reflected in body language, symbols, and verbal intonation. In the mappetuada tradition, this communication will appear to complement the formality of this tradition (Ansar, 2016). *Mappettuada* in the learning process can be used as a decision-making stage, namely the process of systematically selecting the best alternative from several alternatives to be used as a way of solving problems.

To make it easier for students to make decisions from several options, the application is used *pro & cons.* This application will display several choices and the final agreement from students so that the decision-making process can be easily carried out without taking a lot of time. An overview of the application can be seen as follows.

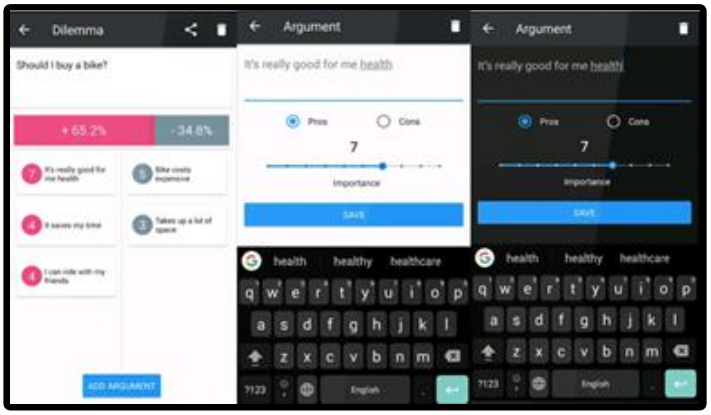

Figure 5. *Pro & Cons* Application

3. Learning Design

The learning process based on local wisdom integrated technology emphasizes the traditions of the Bugis-Makassar *Maddawa-dawa, Mammanu-manu, Mappettuada tribes*. The application of the Bugis-Makassar *Maddawa-dawa, Mammanu-manu, Mappettuada tribal traditions* in the learning process shows the stages of the learning process from beginning to end, namely starting with the *Maddawa-dawa* stage to the stage *Mappettuada.* The learning process by integrating the tradition *Maddawa-dawa* can make it easier for students to learn mathematics, where the material taught will be connected to real-world concepts that are

easily understood by students so that students' ability to predict future trends can be improved. Through the integration of the tradition *Mammanu-manu*, the learning process will not seem passive, where each student is actively seeking to know the truth of the problem given. This can help students interpret (interpret) the meaning of mathematical concepts easily. The stage *Mappettuada* can train students in concluding the right solution to the given problem.

The following is a technology-integrated local wisdom-based learning design for extrapolation abilities.

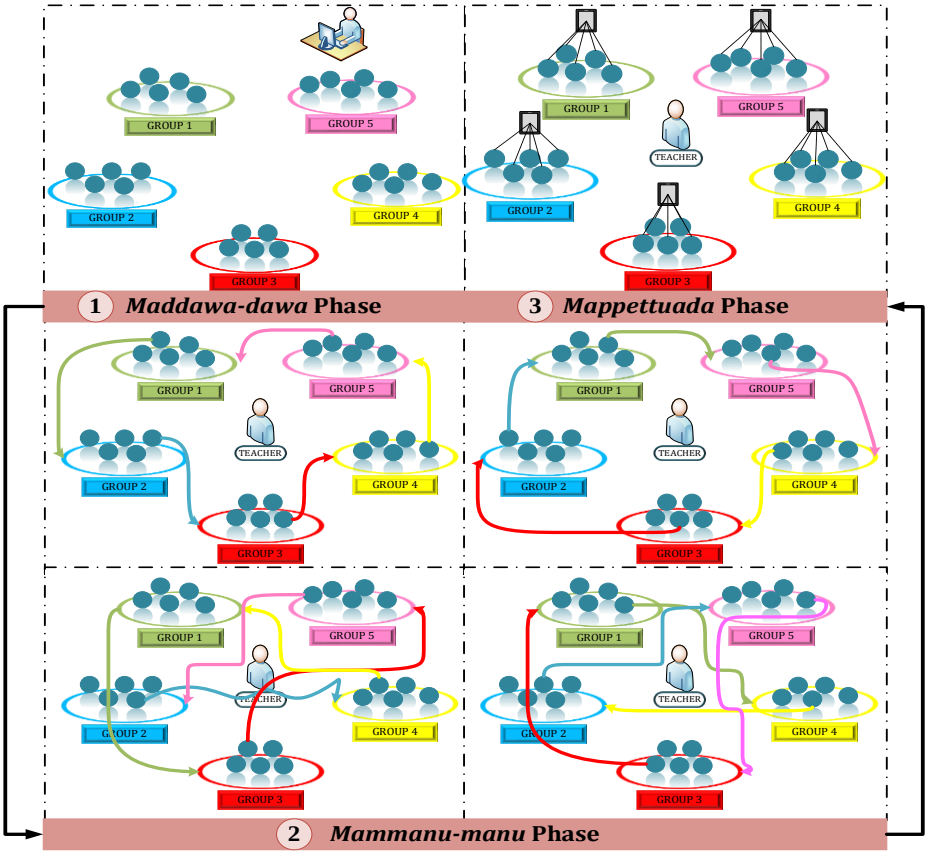

Figure 6. Learning Stages

Based on the Figure 6 above, it appears that the teacher in this case acts as a facilitator and the students play an active role in solving the problems given. The teacher and student activities can be seen in the reaction principle Table 2 below.

Table 2. Reaction Principle

Step	Teacher Reaction	Student Reaction
Maddawa-dawa	1. The teacher divides students into several groups heterogeneously using the *group maker* application 2. The teacher provides materials to students to be presented more broadly by connecting real-world concepts	1. Students join their group friends and have discussions 2. Students listen to the material presented by the teacher and gather various information
Mammanu-manu'	1. The teacher divides the assignments of each student using the *lucky wheel* application 2. The teacher directs students to	1. Students are responsible for each assignment given 2. Students who are group representatives conduct

Step	Teacher Reaction	Student Reaction
	investigate other groups 3. The teacher guides students in presenting the results of the investigation into a *mind mapping* application	investigations into other groups 3. Students present the results of the investigation into a *mind mapping* application
Mappettuada	1. The teacher instructs the group representatives to return to their respective groups 2. The teacher guides students in making decisions based on the results of investigations using the *pro & cons* application 3. The teacher invites group representatives to present the results of the discussion 4. The teacher gives awards to the group that gets the highest results and is active during the discussion	1. Students who carry out the investigation return to their respective groups 2. Each group determines a solution to the problem by making decisions based on the results of the investigation 3. Students who represent their groups present the results of the discussion accompanied by strong arguments 4. Students from the group who get the highest results and are active during the discussion will get the teacher's appreciation

D. CONCLUSION AND SUGGESTIONS

The learning process based on local wisdom of *Maddawa-dawa* can make it easier for students to learn mathematics, where the material taught will be connected to real-world concepts that are easily understood by students, so that students' ability to predict future trends can be improved. The application of the *Maddawa-dawa* phase can be integrated with the *group maker* application in the group division process. In the *Mammanu-manu* phase, the learning process will no longer seem passive, where each student is active in finding out the truth of the problem given. This phase can help students interpret (interpretation) the meaning of mathematical concepts by integrating *lucky wheel* and *mind mapping* applications. The *Mappettuada* phase can train students in concluding the right solution of the problems given with the help of *pro & cons* applications. This learning design is expected to provide alternative solutions in increasing students' extrapolation abilities, especially in mathematics through a local traditional approach in the learning process.

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