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Development of Go-Bima media based on differentiated learning assisted by DIALOPAGU to improve understanding of concepts and motivation to learn mathematics in grade 4 elementary school

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Abstract: Mathematics learning in elementary schools is often considered a process of memorizing discrete facts, thereby hindering conceptual understanding and decreasing students' motivation to learn. Therefore, teachers must use appropriate strategies to present lessons and encourage students to take a more active role in their own learning. This research aims to develop differentiated learning media based on DIALOPAGU (Digital, Loose Parts, and Songs) to enhance fourth-grade students' conceptual understanding and motivation for learning mathematics. The approach includes content, process, and product differentiation, aligned with students' characteristics and needs as outlined by the Merdeka Curriculum. The study employs the 4D development model (Define, Design, Develop, and Disseminate). Data collection techniques include questionnaires, tests, and observations. The developed media is valid, practical, and potentially effective in improving student learning outcomes. The effectiveness of the Go-Bima media, based on differentiated learning assisted by DIALOPAGU, was demonstrated through MANOVA analysis, which revealed a significant difference in students' conceptual understanding and motivation between the experimental and control groups ($p = 0.001 < 0.05$). These findings underscore the importance of innovative learning media that accommodate student diversity.

Keywords: *Differentiated, Learning media, Mathematics learning.*

1. Introduction

Mathematics learning in elementary school is expected to guide students not only to master the knowledge of calculations but also to understand how mathematical concepts can be beneficial for everyday life. As is known, mathematics is one of the subjects that is considered difficult and is not favored by many elementary school students. According to a survey of elementary school students, it was found that 85% of students said that learning mathematics falls into the difficult category, making learning mathematics always feared, partly because students struggle with mathematics learning as they cannot visualize the concepts when studying. Mathematics has so far been viewed as a daunting subject for students because it involves objects such as facts, concepts, and principles that are abstract and therefore difficult to understand [1, 2]. One of the objectives of mathematics learning materials is problem-solving. However, one of the problems that often arises in learning is the students' weak ability in the aspect of mathematical problem-solving, and this is something that must be addressed. Learning mathematics cannot be achieved without motivation to learn, and to make the learning meaningful, it is necessary to connect the material with simple concepts [3, 4]. Therefore, teachers must use the right strategies to present lessons and encourage students to take the largest role in their own learning.

Mastery of topics in mathematics must be emphasized in mathematics education so that when students face problem-solving issues, they can resolve them based on their ability to understand concepts. The mathematics that students must possess is learning that establishes fundamental ideas

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and understands the concept of learning and skill development. Students are expected to instill and understand the concept of topic mastery and the understanding of mathematics concepts themselves. In addition, in Mathematics learning at the elementary school level, it is expected to achieve learning objectives in terms of problem-solving. To achieve these goals, teachers are expected to implement student-centered learning that becomes meaningful for students in their daily lives [5-7]. the low motivation to learn mathematics among students is mainly due to having a misconception about the importance of mathematics in differentiated learning and the difficulty of the material not matching the students' abilities.

SD Negeri 11 in Rantau Selatan District is a school located in Labuhanbatu Regency, specifically in the city of Rantauprapat. From the observations conducted by the author, the students at SD Negeri 11 in Rantau Selatan District stated that the learning process carried out has not maximized the use of innovative models or approaches that make students actively participate directly in the mathematics learning process. Students who consist of different initial abilities, interests, talents, learning styles, and characteristics receive the same treatment in learning, namely through the lecture method [8, 9]. The most fundamental problem that is complained about is that students feel bored with the class process because their activities only involve listening to the teacher's lecture without actively participating in the learning process. In the learning process, the teacher still uses the lecture method, so student activity in mathematics learning is not visible. Students experience difficulties in analyzing and constructing learning concepts, and problem-solving abilities in mathematics learning are hindered because teachers have not yet optimized the use of appropriate learning media, especially digital-based ones [10, 11]. The teacher, as a facilitator in every lesson, therefore, every educator needs to learn how to select and determine learning media that can stimulate students' motivation, interest, enhance understanding, and improve students' learning outcomes. This is intended to improve the learning process as expected by the Merdeka Curriculum, which requires students to be directly active in learning in an active and differentiated manner.

The problems in elementary school mathematics education must receive appropriate and precise solutions, so that they can enhance students' conceptual understanding and learning motivation. The appropriate solution to these problems is to enhance innovative teaching methods, approaches, and strategies in classroom activities, particularly in mathematics education, through differentiated learning with the development of teaching media that align with the needs and characteristics of the students [12, 13]. The presentation of concrete and enjoyable mathematics can be linked to game-based learning with engaging learning media, meaning that learning while playing can provide students with the opportunity to seek and discover new knowledge independently through active learning. Mathematics learning needs to be supported with realistic and relevant mathematics learning media.

The appropriate media must be able to represent children's thought patterns and meet their needs. Simple learning media can be described as anything that facilitates students in obtaining information, knowledge, experience, and skills during the teaching process. The selection of learning media must also be based on a strong foundation for the benefit of the learners, considering several positive aspects of the learners, especially in mathematics education. One of the goals of using media is to enhance students' interest and motivation to learn, which must align with the characteristics of the material and the learning objectives [14-16]. Teaching mathematics with technology using digital resources and game applications will help students learn skills and understand concepts.

Differentiation in the process is a method that involves students acquiring knowledge, understanding concepts, and applying them through various activities to facilitate students' needs. In terms of process differentiation, the author implements diverse learning by developing 3 content pieces through 3 learning media tailored to the characteristics of the students. The author named the three Learning Media "Go-Bima" to attract students' interest in the learning media. The term "Go-Bima" means "Online-offline Game Based on Images and Mathematics Animation." By combining visual, interactive, and enjoyable elements, it allows for the adaptation of materials according to the learning needs of each student. The DIALOPAGU approach, which combines digital elements, Looseparts, and

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songs, offers a holistic learning approach. The digital elements in Go-Bima provide an interactive platform for exploring mathematical concepts. Looseparts can be used to represent concepts concretely and allow learners to perform physical manipulation. Songs can be used to facilitate dialogue, remember concepts, and create an enjoyable learning atmosphere. This Go-Bima game is used in the Division Arithmetic Operations material. Interestingly, the results of the division using that media will bridge the concept of prime numbers.

This Differentiated Learning Media Assisted by DIALOPAGU will be adjusted to differentiated learning with a variety of activities based on diagnostic assessments of initial abilities, interests, talents, learning styles, and the diverse needs of students. Learning while playing to enhance students' understanding and motivation through learning media that can be used by Grade IV students of SD Negeri in Rantau Selatan District. The learning media in question is the Go-Bima Learning Media Assisted by DIALOPAGU (Digital, Loose Parts, and Songs) which is created according to the needs and characteristics of the students. The purpose of this research is to analyze and describe the validity, practicality, and effectiveness of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Loose Parts, and Songs) to improve the understanding of concepts and motivation to learn mathematics among fourth-grade elementary school students.

2. Literature Review

Teachers can use differentiated learning as one of the strategies to meet the needs of each student. Differentiation is a teaching and learning process where children learn the subject matter according to their talents, what they like, and their special needs so that they do not feel disappointed and fail during the learning process. Teachers should prepare lesson materials, activities, daily assignments completed in class and at home, as well as final assessments based on students' readiness to learn the subject matter, their interests or what they enjoy in learning, and the way of delivering lessons that aligns with the learning profiles of the students they teach. Teachers have an influence over four different areas of learning: content, methods, products, and assessment [17].

Learning coordination that emphasizes factors such as students' interest in learning, students' readiness to learn, and learning preferences. Differentiated learning involves five specific objectives, namely helping all students achieve learning goals, increasing student motivation through learning stimuli so that students' understanding of the material concepts improves, fostering harmonious relationships in the learning process to make students more enthusiastic, encouraging students to become independent learners who appreciate diversity, and enhancing teacher satisfaction due to the sense of challenge in the classroom. Differentiated learning design highlights the active role of teachers as implementers of learning who are capable of analyzing the conditions and needs of students in the school. The role of the pedagogical instructor is undeniably significant; as professional teachers, they must be able to meet students' needs through varied learning approaches. Efforts to enhance teacher professionalism and improve the quality of education through the mobilization program Teachers are one of the government's efforts to improve the quality of education in Indonesia. Because as predecessors, students must have a proper education to build society. Because the consequences of excellent education will also impact the growth of the Indonesian nation [18].

Teachers play a role in providing a positive learning environment for students. The differences and uniqueness of each student will require the teacher to educate according to the qualities of the students they face. Teachers can have a positive impact through the preparation of appropriate methods and learning tactics to facilitate students in assimilating content and learning more effectively. The differences in students' learning styles to meet their needs, the teacher applies differentiated instruction during the learning process in the classroom. Differentiation in learning does not mean teaching all students in different ways, nor does it mean grouping smart students with smart students and vice versa. The individuality of students affects learning outcomes and teaching approaches. Students do not learn according to their learning styles, which disrupts the learning process in terms of receiving explanations and affects learning outcomes. Although they are in the same grade level, students' abilities

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to process knowledge are certainly different; there are students who are slow, average, and quick. Learning occurs spontaneously as a result of the process of experience. Teachers must lead and accommodate students to identify learning styles and ensure that learning is successful. Based on the many perspectives mentioned above, it can be concluded that learning styles are a combination of learning activities with the way of processing information and remembering a fact, so that the learning process will have implications [19].

From the published research, there has not yet been an approach in teaching conducted by teachers to implement digital aspects as a learning medium that is inherent to the current pedagogical context. Therefore, the novelty of this research is offering the DIALOPAGU system (Digital, Loose Parts, and Songs) as a learning tool implemented for students in schools.

3. Methodology

Establishment, design, development, and dissemination are the four stages of development research. Students in the classroom consist of preschoolers with differing characteristics, backgrounds, and learning styles. Every child has their own uniqueness, interests, talents, learning styles, characteristics, and needs. The learning conducted by teachers should not standardize the level of students' abilities with the same learning approach, as this creates obstacles in classroom learning. Learning that is less active and enjoyable will impact students' understanding of concepts and their motivation to learn. Elementary school students do not fully understand mathematical concepts. Furthermore, the learning is still monotonous with lecture methods and only focuses on the teacher's explanation. Meanwhile, mathematics learning can be conducted with a variety of enjoyable activities that meet the needs of the students. mathematics learning in elementary school is conducted through differentiated learning with various activities that provide content differentiation in the development of Go-Bima Learning Media Assisted by DIALOPAGU (Digital, Loose Parts, and Songs). In the mathematics lesson on division, this material will bridge the concept of Prime Numbers and is expected to facilitate both teachers and students in applying it. Mathematics learning in this study is conducted for fourth-grade students at SD Negeri 11 Rantau Selatan to enhance students' conceptual understanding and learning motivation by emphasizing differentiated learning with various activities, namely learning through play or playing while learning.

The subjects of the trial to measure this effectiveness are the control group and the experimental group, which come from the fourth-grade elementary school class obtained from the sampling of the fourth-grade student population at SD Negeri 11 Rantau Selatan. In more detail, the subjects of the effectiveness test can be seen below on the table of test subjects for effectiveness.

Table 1.
Table of Test Subjects for Effectiveness.

	Experimental Class	**Control Class**
Student	**Class IV B**	**Class IV C**
Number of Students	30	30
Learning Media	Using Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Loose Parts, and Songs).	Not using Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Loose Parts, and Songs).

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The table of test subjects for effectiveness demonstrates that both groups consisted of the same number of students (n = 30), which is essential for ensuring statistical equivalence in the analysis. This balanced distribution helps minimize potential bias in the calculation of the mean and other statistical measures. As only the experimental group received instruction using the Go-Bima media based on differentiated learning supported by DIALOPAGU (Digital, Loose Parts, and Songs), any observed differences in learning outcomes between the two groups can be reasonably attributed to the intervention.

Research instruments in the development of the Go-Bima media based on differentiated learning assisted by DIALOPAGU (Digital, Loose Parts, and Songs) in elementary schools can be briefly seen below.

Table 2.
Table of Data Collection Techniques.

Number	Data Collected	Data Collection Techniques
1	Validity of Learning Media	Questionnaire
2	The Practicality of Learning Media	Questionnaire
3	Effectiveness of Learning Media (Concept Understanding)	Test
4	Effectiveness of Learning Media (Motivation to Learn Mathematics)	Observation

Overall, the table of data collection techniques shows that the research employed three main data collection techniques—questionnaires, tests, and observations—to measure various aspects of the learning media: validity, practicality, conceptual understanding, and learning motivation. It reflects careful and systematic planning in the data collection process to evaluate the effectiveness of the learning media. There is a balance between theoretical and practical considerations, as well as methodological precision in selecting the instruments. If all instruments are well developed, the study's results will demonstrate high validity and credibility.

This research involves two dependent variables, namely: concept understanding and students' motivation to learn mathematics. Therefore, the statistical analysis for hypothesis testing used is MANOVA.

Table 3.
Analysis Design Matrix Table.

A_1		A_2	
Y_1	Y_2	Y_1	Y_2

Explanation:

A_1 : Go-Bima media based on differentiated learning assisted by DIALOPAGU (Digital, Loose parts, and Songs)

A_2 : Not using the Go-Bima media based on differentiated learning assisted by DIALOPAGU (Digital, Looseparts, and Songs)

Y_1 : Understanding the concept

Y_2 : Motivation to Learn Mathematics

Table analysis design matrix table illustrates the experimental design used to test the impact of Go-Bima media based on DIALOPAGU on two indicators of student learning outcomes: conceptual understanding and motivation to learn mathematics. The design involves a comparison between two treatment groups.

The hypothesis testing used to evaluate the effectiveness of the learning media employs N gain. Gain is the difference between posttest and pretest scores. The N-Gain test is used to determine the improvement in concept understanding and motivation to learn mathematics among elementary school students after learning using the Go-Bima learning media based on differentiated learning assisted by DIALOPAGU (Digital, Looseparts, and Songs) that has been developed. The formula for the

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normalized N-Gain test (GSn) is formulated in the following equation.

$$GSn = \frac{Skor\ \ Posttes - Skor\ \ Pretes}{Skor\ \ Max - Skor\ \ Pretes}$$

Guidelines for decision-making on categorizing N-Gain values in the table below

Table 4.
Table of N-Gain Score Acquisition Criteria.

Number	N-Gain Score	Criteria
1	g > 0.7	Height
2	0.3 ≤ g < 0.7	Middle
3	g < 0.3	Low

Based on the gain score criteria, the educational media product is considered successful in improving elementary school students' conceptual understanding if the N Gain value obtained from the calculation of student test data results in a gain > 0.3 and 0.7. Then the learning is said to be effective because it reaches a moderate or high category.

Hypothesis testing was conducted using the Multivariate Analysis of Variance (MANOVA) technique with the assistance of SPSS version 27, and all tests used a significance level (α) = 0.05. After the F coefficient was found in the MANOVA analysis, the F value was transformed into a t coefficient to test the influence of each variable on the understanding of concepts and the motivation for learning mathematics among elementary school students in the use of the Go-Bima media based on differentiated learning assisted by DIALOPAGU (Digital, Looseparts, and Songs).

4. Result

The results of this research are described as follows. To ensure clear results on instrument validity, the validators' assessments are essential and are summarized in the following Validator Assessment Category Table.

Table 5.
Validator Assessment Category Table.

Average Validity Range	Category
4≤ RTV ≤ 5	Very Valid
3 ≤ RTV ≤ 4	Valid
2 ≤ RTV ≤ 3	Less Valid
1 ≤ RTV ≤ 2	Not Valid

The table Validator assessment category table displays validity assessment categories based on the average value range assigned by the validators to the instrument being developed. It is used to classify the instrument's validity level according to the average validator assessment, thereby facilitating decision-making about whether the instrument is suitable for use or requires further improvement.

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Table 6.
Table of Content Validity for Learning Media.

Number	Expert Validation	Aspect	Number of Items	Expert Score I	Expert Score II	Expert Score III
1	Content and Language	Content Eligibility	9	36	36	36
2		Presentation Eligibility	8	32	31	32
3		Linguistics	8	32	31	32
3	Media	Media Display	3	11	12	12
5		Media Eligibility	4	15	16	16
6		Media Usage	3	11	12	12
7	Media (Final Product)	Media Display	3	9	12	11
8		Media Eligibility	4	12	15	15
9		Media Usage	3	9	12	11
Total Score			45	167	177	177
Average/Expert				3.7	3,9	3,9
Overall Average Score				3.86		

Based on the above, from the tabulation results, an average validity of 3.86 was obtained. Referring to the validity category in the validator assessment category table, the average validity of 3.86 falls into the valid category. The validation results indicate that the content presented in the Go-Bima Learning Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) is suitable for educational use. In addition to qualitative assessments, the experts also provided quantitative evaluations in the form of suggestions and feedback obtained from the product validation results, including: 1) for the Worwall media, an introduction and instructions should be provided on the game portal; 2) creating a Manual Book that contains usage explanations for all developed media to facilitate students and teachers in using it; 3) the inclusion of didactics or pedagogy in the use of the media.

In terms of benefits, the average score for the learning motivation indicator is 3.8. On the interest indicator, it reached an average score of 3.8, and for the understanding indicator, it reached 3.7. This indicates the usefulness of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs), which is developed to be practical and can facilitate students in the learning process. Based on the survey results, there are no major revisions to the developed learning media product because consistently, the learning media has received positive responses from users, with the criterion of being "practical." Therefore, it can be concluded that the developed Media Go-Bima Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) has a very good practicality value and the learning media can be used.

The validity of the learning media is assessed based on expert validation tests. The expert validation test is conducted by media experts and subject matter experts. The results of the assessment by material and language experts reached 3.9 with the criteria of "very valid." The results of the media design expert's assessment reached 3.9 with the criteria of "very valid." The results of the media learning product validation received a score of 3.7 with the criteria "very valid." It can be concluded that the development of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) is suitable for use in student learning.

Nevertheless, there are still inputs provided by the validators, which can be used to improve the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) so that it can be well received by users. The good practicality test results can indicate that the developed product is easy to understand and master by the learners. In addition, it is capable of motivating and providing enjoyable learning in accordance with the characteristics and needs of the learners. Because learning outcomes can be encouraged through the use of innovative learning media. This is in line with the development of various learning media in accordance with the rapid advancement of technology. The dynamics of technology today are reaching an extraordinary acceleration. The developed product must meet valid, practical, and effective quality criteria, thereby

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having a potential effect on users. Thus, it can be concluded that the development product of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) has met the product practicality criteria because it is relevant to needs based on scientific knowledge and consistently receives very good responses from users. This is in line with the function of learning media, which is to enable students to easily understand the information and messages conveyed, thereby achieving the learning objectives.

The response results given to teachers and students in the use of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) indicate the "practical" criterion with an average teacher response score of 3.9 and student responses in small and large groups with scores of 3.8 and 3.7, respectively, can be concluded that the learning media can be used. Thus, it can be said that the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) is well-received by users. The good practicality test results can be seen from the developed product, which is easy for students to understand and master. In addition, it is able to motivate and foster a positive attitude towards the environment. The practicality of a product is the level of trust in a developed product. The product is considered beneficial for users if it can be understood and there is a positive change from the users. The use of interactive learning media is very suitable for application in education.

The developed product must meet the criteria of valid, practical, and effective quality, thereby having a potential effect on users. So it can be concluded that the development product of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) has met the product practicality criteria because it is relevant to needs based on scientific knowledge and consistently receives very good responses from users. The criteria for the effectiveness of the development of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) in this study are based on hypothesis testing, which shows that both collectively and partially there are differences in the understanding of material concepts and students' motivation to learn mathematics between the experimental class and the control class. The results of the hypothesis test using MANOVA that have been conducted show a significance value of less than 0.05 ($0.001 < 0.05$). The results indicate that Ho is rejected. It can be concluded that there are differences in the understanding of material concepts and the motivation to learn mathematics between students in the experimental class and the control class. Based on the above effectiveness results, it can be stated that the development of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) is a proven effective learning media, and thus can be considered as a learning media that can enhance students' understanding of mathematical concepts and motivation to learn mathematics in elementary school mathematics education. The use of appropriate learning media is very important, especially in mathematics lessons.

5. Analysis

The results of the validation indicate that the content presented in the Go-Bima Learning Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) is suitable for use in education. In addition to qualitative assessments, the experts also provided quantitative evaluations in the form of suggestions and feedback obtained from the product validation results, including: 1) for the Worwall media, an introduction and instructions should be provided on the game portal; 2) creating a Manual Book that contains usage explanations for all developed media to facilitate students and teachers in using them; 3) the inclusion of didactics or pedagogy in the use of the media.

In terms of benefits, the average score for the learning motivation indicator is 3.8. On the interest indicator, it reached an average score of 3.8, and for the understanding indicator, it reached 3.7. This indicates the usefulness of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs), which is developed to be practical and can facilitate students in the learning process. Based on the survey results, there are no major revisions to the developed learning media product because consistently, the learning media has received positive

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responses from users, with the criterion of being "practical." Therefore, it can be concluded that the developed Media Go-Bima Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) has a very good practicality value and the learning media can be used.

5.1. The Validity of Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs)

The validity of the learning media is assessed based on expert validation tests. The expert validation test is conducted by media experts and subject matter experts. The results of the assessment by material and language experts reached 3.9 with the criteria of "very valid." The results of the media design expert's assessment reached 3.9 with the criteria of "very valid." The results of the media learning product validation received a score of 3.7 with the criteria "very valid." It can be concluded that the development of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) is suitable for use in student learning.

Nevertheless, there are still inputs provided by the validators, which can be used as material for improvement. The Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) can be well received by users. The good results of the practicality test can indicate that the developed product is easy to understand and master by the learners. In addition, it is able to motivate and provide enjoyable learning in accordance with the characteristics and needs of the learners. Because learning outcomes can be driven by the use of innovative learning media. This is in line with the development of various learning media in accordance with the rapid advancement of technology [20-22]. The dynamics of technology today are reaching an extraordinary acceleration.

The developed product must meet the criteria of valid, practical, and effective quality, thereby having a potential effect for users. Thus, it can be concluded that the development product of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) has met the product practicality criteria because it is relevant to needs based on scientific knowledge and consistently receives very good responses from users [23, 24]. This is in line with the function of learning media, which is to enable students to easily understand the information and messages conveyed, thereby achieving the learning objectives.

5.2. The Practicality of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs)

The response results given to teachers and students in the use of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) indicate the "practical" criterion with an average teacher response score of 3.9 and student responses in small and large groups scoring 3.8 and 3.7, respectively, can be concluded that the learning media can be used. Thus, it can be said that the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) is well-received by users. The good practicality test results can be seen from the developed product, which is easy for students to understand and master. In addition, it is able to motivate and foster a positive attitude towards the environment. The practicality of a product is the level of trust in a developed product [25-27]. The product is considered beneficial for users if it can be understood and there is a positive change from the users. The use of interactive learning media is very suitable for application in education. The developed product must meet the criteria of valid, practical, and effective quality, thus having a potential effect for users. So it can be concluded that the development product Media Go-Bima Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) has met the product practicality criteria because it is relevant to needs based on scientific knowledge and consistently receives very good responses from users.

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5.3. The Effectiveness of Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs)

The criteria for the effectiveness of the development of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (digital, Looseparts, and Songs) in this study are based on hypothesis testing which shows that both collectively and partially there are differences in the understanding of material concepts and students' motivation to learn mathematics between the experimental class and the control class. The results of the hypothesis test using MANOVA that have been conducted show a significance value of less than 0.05 (0.001 < 0.05). The result indicates that Ho is rejected. It can be concluded that there are differences in the understanding of material concepts and students' motivation to learn mathematics between the experimental class and the control class. Based on the above results, it can be stated that the development of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) is an effective learning media, and therefore can be considered as a learning media that can enhance students' understanding of mathematical concepts and motivation to learn mathematics in elementary school mathematics education. The use of appropriate learning media is very important, especially in mathematics lessons. During the research process, the learning activities conducted using learning media were met with great enthusiasm from the students, resulting in a student-centered learning process [28-30]. This means that the learning became active and interactive, and students found it easier to understand the learning material. Therefore, the implementation of learning using the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) was deemed effective because it could enhance students' conceptual understanding and motivation to learn mathematics. It can be concluded based on the research results and discussion that the development of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) has been carried out through a systematic research process and has undergone validation tests, product trials, and effectiveness tests, resulting in a very good evaluation of the product development [31, 32]. This means that the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Looseparts, and Songs) developed is suitable for use in the mathematics learning process in elementary schools.

6. Conclusion

Characteristics Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Loose Parts, and Songs). This is an educational media that contains division operation materials in mathematics for 4th-grade elementary school. The learning media used in differentiated learning based on Digital, Looseparts, and Songs in mathematics subjects. In differentiated learning media based on Digital, the learning media used online is through the Wordwall application and for offline, it uses Microsoft Excel. Digital-based learning media consists of animations and learning games with bright colors. Then, the differentiated learning media based on loose parts consists of a game board and several dice that can be disassembled, moved, and placed on the dice board. This media is made from wooden broti boards that are handcrafted. This media is created according to the characteristics and needs of the learners. Meanwhile, in the differentiated learning media based on songs, it is a song related to the lesson material taken from YouTube, which can enhance students' understanding by singing the song according to the material being studied. The validity of the Go-Bima Learning Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Loose Parts, and Songs) developed is assessed based on expert media validation and material validation tests. The results of the media validation (expert judges) show an average score of 3.86. For material validation (content expert judges), it showed an average score of 3.9. Then, product validation was also conducted by experts, showing an average score of 3.7. The overall average expert validation score was 3.8, which can be concluded that the developed learning media falls into the very good classification and can be used for application in the sample group.

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The results indicate that the developed learning media is valid and suitable for use. The practicality of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Loose Parts, and Songs) is assessed based on the response questionnaire results given to teachers and students. The response questionnaire results given to teachers on the learning media scored 3.9 with the Practical criteria. The results of the use of the developed product show that the product is rated very well, usable, and easily understood. The results of the response questionnaire tested on students in a small group showed a score of 3.8, and for the large group trial, it showed an average score of 3.7 with Practical criteria. It can also provide benefits for users. This can be demonstrated by the development results that have met the practicality standards very well. The effectiveness of the Go-Bima Media Based on Differentiated Learning Assisted by DIALOPAGU (Digital, Loose Parts, and Songs), in this study is shown based on hypothesis testing which indicates a difference in conceptual understanding and motivation to learn mathematics among students in the experimental class and the control class through data processing using MANOVA analysis with a significance level of $0.001 < 0.05$. The results indicate that Ho is rejected and Ha is accepted. Therefore, it can be concluded that the Go-Bima Learning Media based on Differentiated Learning Assisted by DIALOPAGU (Digital, Loose Parts, and Songs) is very effective in improving students' understanding of concepts and motivation to learn mathematics in elementary schools.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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