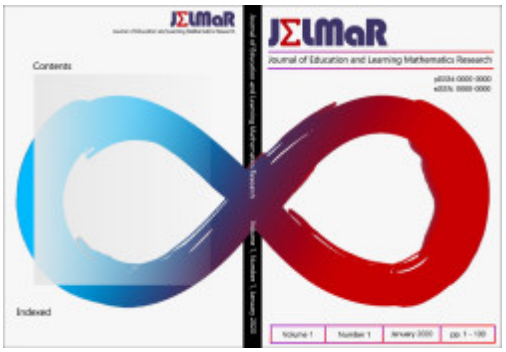

Journal of Education and Learning Mathematics Research (JELMaR)

Online ISSN : 2715-9787
Print ISSN : 2715-8535
Journal Homepage : http://jelmar.wisnuwardhana.ac.id/index.php/jelmar/index

Development of Doratoon Video Learning Media Based on Local Wisdom for Students' Understanding of Fraction Concepts in Grade IV

Nurhasanah Dwi Khodijah, Putri Juwita, Sukmawarti

To cite this article Khodijah, N., Juwita, P., & Sukmawarti, S. (2025). Development of Doratoon Video Learning Media Based on Local Wisdom for Students' Understanding of Fraction Concepts in Grade IV. *Journal of Education and Learning Mathematics Research (JELMaR)*, *6*(2), 152-159. https://doi.org/10.37303/jelmar.v6i2.3846

To link this article: https://doi.org/10.37303/jelmar.v6i2.3846

Publisher
Department of Mathematics Education,
Faculty of Teacher Training and Education,
Universitas Wisnuwardhana Malang

Journal of Education and Learning Mathematics Research (JELMaR)
Volume: 6, Number: 2, November 2025, pp. 152-159
p-ISSN: 2715-8535, e-ISSN: 2715-9787

Received: October 2025 *Revised: October 2025* *Accepted: October 2025* *Published: 3 November 2025*

Development of Doratoon Video Learning Media Based on Local Wisdom for Students' Understanding of Fraction Concepts in Grade IV

[1*]Nurhasanah Dwi Khodijah, [2]Putri Juwita, [3]Sukmawarti
Elementary School Teacher Education Study Program, Faculty of Teacher Training and Education Faculty, Universitas Muslim Nusantara Al Washliyah, Indonesia
[*]Email: nurhasanahdwikhodijah@umnaw.ac.id

Abstract: *This study aims to develop local wisdom-based video doratoon learning media for understanding the concept of fractions of grade IV students and determine the validity, practicality, and effectiveness of the learning media developed. The type of method used in this research is development (Research and Development) using the 4D development procedure model which consists of 4 stages namely Define (definition), Design (plaħning). Development (development), Dissemination (dissemination). This research uses instruments, namely validation sheets in the form of questionnaires or questionnaires given to validators of material experts, media experts, teacher responses, student responses, and tests of understanding of local wisdom-based fraction concepts given to students. The subjects in this study were media expert validators, material experts, teachers, and grade IV students totaling 20 people. Based on the trials conducted, the results of the validity of the learning media development were 97.22% with very valid criteria, and the validity of the learning material was 95% with very valid criteria. The results of the practicality level were 83% student response, and 92% teacher response with very practical criteria. For the level of effectiveness obtained by 89% very effective criteria, and on the n gain score of 74% with high criteria. So it can be concluded that the doratoon video learning media based on local wisdom for understanding the concept of fractions of fourth grade students.*

Keywords*: Video doratoon, Local Wisdom, Concept Understanding*

INTRODUCTION

Change is something that is certain to happen in life, as well as in the world of education such as curriculum. The curriculum in Indonesia has changed very rapidly over time. The national education curriculum has undergone 11 changes, namely the 1947 Lesson Plan, the 1952 Lesson Plan, the 1964 Education Plan, the Old Order 1968, 1975 with a centralistic nature, 1984, 1994, KBK 2004, KTSP 2006, K2013, Merdeka 2022. Nila Lestari & Nurmairina (2023) stated "in the course of curriculum development, whatever the characteristics of the curriculum, everything is the result of a national agreement that is adjusted to the goals, aspirations and adjusted to the development of the times". The curriculum is the most important part of education, because without a curriculum, educational goals will be unfocused in achieving quality education. Meanwhile, quality education depends on the competence and understanding of teachers regarding the content and technical implementation of the curriculum.

The low quality of education at the formal level is caused by a reduction in human resources, low effectiveness, efficiency, standardization, low teacher welfare, low opportunities for equal distribution of education, low training opportunities, self-development to improve pedagogical competence in teachers, inadequate infrastructure (Agustang et al., 2021). The curriculum that is always changing so quickly to follow the times is also a reason for the weak quality of education, even though according to educational policy makers the latest curriculum is better, but, if the implementers and the community do not yet understand the objectives and technical rules for implementing the curriculum evenly, what will happen is a misconception between policy makers and implementers, so that the benefits of the curriculum cannot be felt by either students or teachers in the administration and teaching and learning processes. Education is an activity

carried out consciously and directed by someone who is passed down from one generation to the next to develop the potential that exists in a person through training and teaching.

Education plays a vital role in fostering a better human life. Therefore, an appropriate education system is crucial. It will produce intellectuals who are strong in spirituality, religion, thought, feeling, and behavior, capable of contributing to building a brilliant civilization. Education plays a crucial role in improving individual quality. Therefore, for educational goals to be successful and achieved in the learning process, qualified teachers are also needed. Learning resources are not only human beings, but also objects. Advanced technology in the form of videos combined with local wisdom from the surrounding area can also be used as learning resources to provide an overview of the values, characteristics, and traditions of a region's culture. Thus, through the presentation of learning videos, students can become more familiar with their local wisdom, which is relevant to real life, and helps them develop a deeper appreciation (Asfiana, 2023).

Therefore, good learning resources are those that are more tailored to students' needs, the realities of life, and developments in the era of globalization. The increasingly advanced development of science and technology is inseparable from the role of education in everyday life. Mathematics is a science that plays a major role in the development of science and technology. Mathematics is a subject that is always present in education levels from elementary school, junior high school, high school, to college. Science that is always related to everyday life that can sharpen human thinking skills, making its existence very important to learn and understand. In Article 37 of Law No. 20 of 2003 or the National Education System Law (UUSPN) it is emphasized that mathematics is a subject that is mandatory for students from elementary school to college.

Mathematics learning emphasizes not only problem-solving procedures but also conceptual understanding. This is because conceptual understanding allows students to assess and determine their achievement in solving problems using their mathematical concepts. Conceptual understanding is a student's ability to master specific subject matter by rephrasing it in a different, easily understood form and applying the concept based on their existing knowledge (Gee & Harefa, 2021).

In its use, media is divided into several parts, namely audio, visual, and audiovisual. There are some abstract mathematical materials, which can be simplified to be more concrete by using audiovisual learning media, namely animated videos. Therefore, it is a necessity for teachers to be more creative in creating interesting, active, and effective mathematics learning by instilling the concept of fractions that link local wisdom through learning media so that students can better know, understand, remember, analyze information from the material studied over a long period of time, and there are no misconceptions about the material being taught.

Based on the results of observations conducted by researchers, through observations of the learning process and interviews with the fourth grade teacher, Mrs. Nur Mauliddina Suji, S.Pd, it was obtained information that in carrying out the teaching and learning process, teachers have used TPACK (Technological Pedagogical Content Knowledge) based learning media, in connection with schools that have provided adequate facilities, such as the availability of LCD projectors, speakers, which can help teachers in displaying broader material in the teaching and learning process. However, the technology-based media used by teachers has not been varied. Such as still using power points which were assisted by Doratoon in their creation. Fourth grade teacher Mrs. Nur Mauliddina Suji, S.Pd said that the learning media used in the teaching and learning process on fraction material is also not based on local wisdom of the surrounding environment and still does not cover several indicators of conceptual understanding, especially fraction material. Moreover, the students' perspectives assume that mathematics is a difficult subject, so this initial assumption ultimately has an impact on the lack of interest and focus of students in learning

to understand mathematics material. As a result, several students are born who lack the ability to understand the concepts of mathematics learning being taught.

Therefore, the researcher proposes a solution: teachers must be highly creative in creating and developing more engaging learning media. One way to achieve this is by developing Doraemon video learning media based on local wisdom for students predominantly of Javanese ethnicity. The advantage of Doraemon videos is that they can visualize material in a more engaging, clear, and enjoyable way. Therefore, the researcher hopes that using Doraemon video learning media based on local wisdom can help students understand the mathematical concept of fractions. Through local wisdom, students can better recognize the characteristics and potential of each region and develop an appreciation for them. Therefore, the researcher is interested in conducting a study entitled "Development of Doraemon Video Learning Media Based on Local Wisdom for Fourth Grade Students' Understanding of Fraction Concepts."

METHOD

This research method is Research and Development (R&D). The R&D design model used is the 4D model proposed by Thiagarajan (1974), which is an extension of Define, Design, Development, and Dissemination (Sugiyono, 2022). This can be illustrated as follows:

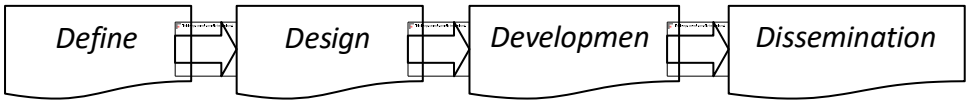

Figure 1. Desain Model 4D

a. Data Analysis Techniques

Data analysis techniques are used to answer the existing problem formulation. Data analysis is an activity that transforms research data into information from which conclusions can be drawn. In this study, data analysis techniques are divided into media validity analysis and product effectiveness analysis.

1. Validation

Data analysis is used to analyze the level of validity of the product data being developed. This study includes qualitative and quantitative data in the form of suggestions and criticisms from media experts and material experts, which are used to improve the product. Quantitative data is collected using questionnaire assessment scores obtained from media experts, material experts, and students. The formula for calculating validity based on the media expert validation results is as follows:

$$P = \frac{X}{\sum \text{Xi}}\ x\ 100\%$$

Description:

P = The score being calculated

X = The total number of respondents' answers across all points

$\sum x$i = The total ideal value at 100% = Constant number

2. Practicality Analysis Technique

Practicality analysis can be seen from student and teacher responses. To assess student responses to the animated video learning media, there are four answer options, each with a different score. Each answer provides meaning based on the product's level of appeal. The steps for practicality analysis are as follows:

1) Summarize student responses in the form of a questionnaire regarding the animated video learning media on the topic of tangents to circles.
2) Practicality analysis is conducted by analyzing student questionnaire responses based on the scores in the following table:
Calculate the practicality of the media developed using the following formula:

$$P = \frac{Number\ of\ responses\ that\ meet\ the\ desired\ criteria}{Total\ number\ of\ responses}\ x\ 100\%$$

Description:
P = The practicality of the developed media

With criteria based on the following table.

Table 1. Practicality Score Criteria

Score	Criteria
$80\% \leq P \leq 100\%$	Very practical
$60\% \leq P \leq 80\%$	Practical
$40\% \leq P \leq 60\%$	Fairly practical
$20\% \leq P \leq 40\%$	Less practical
$P \leq 20\%$	Not practical

(M. H. Harahap, 2019)

In the practicality analysis technique, the researcher hopes that in this research and development, the animated video learning media developed will have a minimum value of $60\% \leq P \leq 80\%$ to produce a practical product.

3. Effectiveness
Effectiveness is measured using a pretest-posttest. The pretest-posttest results were measured using the standardized gain formula, which is as follows:

$$Gain\ (g) = rerata\ skor\ postest - rerata\ skor\ pretest$$
$$skor\ maksimal - skor\ pretest$$

(Daryanto, 2020)
The decision-making criteria in line with the gain formula are:
1. $Ho : Hg <$ 0.3, then Ho is accepted if the increase in learning outcomes is less than 0.3 (moderate category)
2. $H1 : Hg \geq$ then H1 is accepted if the improvement in learning outcomes is greater than 1 or equal to 0.3 (medium category)

RESULTS AND DISCUSSION

A. Development Stage

At this stage, the learning media that has been designed will then be tested for validity and effectiveness. The purpose of this validity test is to assess the feasibility and suitability of the designed media for the established learning objectives. Meanwhile, the effectiveness test aims to determine the effectiveness of the developed media on students' understanding of fraction concepts. The validation test in this study used a questionnaire-based validation sheet, and the effectiveness test was conducted by two validators: Ms. Ramadhani, S.Pd., M.Pd., who validated the material and media, and Ms. Darmina Eka Sari Rangkuti, M.Pd., who validated the questionnaire and questions.

1. Questionnaire Validation

The development stage begins with validating each questionnaire instrument by experts. Questionnaire validation involves testing the validity of the questionnaire's material, media, student responses, and teacher responses. The purpose of questionnaire validation is to determine whether the questionnaire, including the material, media, student responses, and teacher responses, is appropriate and valid for use. A questionnaire will be deemed valid if no revisions are made. Conversely, if it is deemed invalid, it requires revision. Based on the score calculations completed by the validator or questionnaire instrument expert, Ms. Darmina Eka Sari Rangkuti, S.Pd., M.Pd., the summary of the questionnaire instrument validation data is as follows: Based on the results, the validity score was 97.5%, categorized as very valid and requiring no revision. Therefore, the researcher did not need to make any revisions because the questionnaire instrument was ready for distribution and use.

2. Media Expert Validation

Media expert validation aims to test the validity of the developed media to determine whether it is valid for use in the learning process. The media expert validator is Ms. Ramadhani, S.Pd., M.Pd., a mathematics lecturer. The aspects assessed in media validation are: media efficiency, technical quality, language, suitability, and the quality of the results obtained from the media. Based on the results, the validity of the animated video learning media developed for mathematics learning before revision was demonstrated: 59.72% scored less than valid, 75% after the first revision scored valid but required minor revision, and 97.22% scored very valid and required no revision. Therefore, the researcher did not need to revise the second revision because the media was already ready for distribution and use.

3. Material Validation

Material expert validation aims to test the validity of the developed material to determine whether it aligns with the learning indicators and objectives. The material expert validator was Ms. Darmina Eka Sari Rangkuti, S.Pd, M.Pd, a mathematics lecturer. The aspects assessed in material validation were suitability for the learning, accuracy, creativity, presentation, and coherence. Based on the proven results, the validity of the animated video learning media developed for mathematics learning achieved a score of 70% before the revision, categorizing it as less valid. After the revision, it reached 95%, categorizing it as highly valid and requiring no revision. Therefore, the researcher did not need to revise the material, as it was ready for distribution and use.

B. Dissemination Stage

The final stage was the dissemination of the learning media to students and teachers. This stage aimed to introduce the developed product and ensure its acceptance by users through a trial. This stage was conducted by distributing the product to Taman Siswa Bangun Sari Elementary School in Tanjung Morawa. The researcher then implemented the Doraemon animated video in fractions learning in fourth grade and assessed the media through student and teacher responses. The questionnaire and test were used to measure the effectiveness of the learning media in improving the fourth grade students' understanding of fraction concepts.

1. Practical Use

The practical use was carried out by distributing questionnaires to students and teachers to obtain data. The summary of the material results data is as follows:

Based on the proven results, student responses before using the animated video learning media developed for mathematics learning were at 65%, categorized as practical. After

implementing the learning media, student responses were at 83%, categorized as very practical. Meanwhile, the responses from class teachers were at 92%.

2. Results of Effectiveness Analysis

The effectiveness analysis was conducted to determine the effectiveness of using animated video learning media to support students' understanding of mathematical concepts in fractions. The effectiveness analysis of the developed learning media was based on student achievement in completing the mathematical concept understanding test. The effectiveness analysis steps were as follows:

a) Assigning a score to each student's answer.
b) Calculating the score obtained by each student.
c) Categorizing student learning outcomes based on the Minimum Competency (KKM) set by the school, which is 75.
d) Tabulating student test results, as follows:

According to the results, almost all students achieved scores above the Minimum Competency (KKM). Therefore, the average student test score after using the Doraemon video learning media was 89%, which is considered very effective for students' understanding of fraction concepts.

3. Normalized Gain Test (N-Gain)

The N-Gain test aims to determine the improvement in students' mathematical representation ability test results after using the Doraemon video learning media. The normalized gain test is conducted using the following steps:

a) Score each student's pretest (test before using the media) and posttest (test after using the media).
b) Calculate the scores obtained by each student.
c) Tabulate the student test results, as follows.

Based on the N-Gain score criteria table above, an N-Gain score of 74% is considered high. This indicates an increase in students' mathematical representation ability after using the animated video learning media, with 74% achieving high criteria.

C. Discussion

The development of the Doraemon video learning media in mathematics learning on fractions in fourth grade at Taman Siswa Bangun Sari Elementary School. The researchers used the 4D model proposed by Thiagarajan (1974), which consists of four stages: define, design, development, and disseminate. The video development results were a fraction animation based on local wisdom using the Doraton website. The data were obtained from the validation of the questionnaire, media, and materials. After the validation data was obtained, the researchers revised the video based on the criticism and suggestions provided by the media and materials expert validators. After the revisions, the content expert achieved a validity score of 95%, categorizing it as highly valid. The media expert achieved a validity score of 97.22%, categorizing it as highly valid. This is in line with research (Sinindya et al., 2024), which found that the validity of animated learning videos using.

Doraton in mathematics learning reached 0.84 using Aiken's V formula, categorizing it as valid. To determine the effectiveness of the Doraemon video learning media in mathematics, fractions, in fourth grade at Taman Siswa Bangun Sari Elementary School, researchers obtained 65% of student responses before using the animated video product, with practical criteria. Data analysis of student responses after using the Doraemon video learning media product showed a percentage of 83%, with very practical criteria. Teacher responses also showed a score of 92%, with very practical criteria. This indicates that the learning media is very effective and practical, making it easy to use to

attract students' attention in mathematics. This is in line with research (Sinindya et al., 2024), which states that the score obtained by practitioners was 0.96 with a range of 0.91-1.00, in the very high category. Furthermore, researchers also obtained a percentage of effectiveness from the pretest of 63%, with less effective criteria, and the posttest of 89%, with very effective criteria. Furthermore, the N-Gain score obtained was 74%, with high criteria. In line with (Sinindya et al.,) who stated that based on the analysis, the product the researcher designed is highly effective because the N-Gain value obtained is 0.96, within the range (g) > 0.7.

Thus, it can be seen that the Doraemon video learning media can facilitate students in understanding the mathematics learning concept of fractions, which is more focused on ordinary fractions, equivalents, simplifying and comparing fractions. Because the Doraemon video learning media in fourth-grade mathematics has been designed with various animations and images that can attract students' attention and curiosity, which then makes students more focused, so that students can better understand the learning. From the data above, it can be concluded that the use of Doraemon video learning media is very practical and effective in attracting attention and understanding mathematics concepts in fourth-grade students on fractions. Validation data was obtained by researchers from the questionnaire, media, and material validation instruments. After the validation data was obtained, researchers revised the product based on the criticism and suggestions provided by the media and material expert validators. After the revisions, the media expert obtained a validity score of 97.22%, categorized as very valid, and the material expert obtained a validity score of 95%, categorized as very valid.

To determine the effectiveness of the Doraemon video learning media in the mathematics subject of fourth-grade fractions at Taman Siswa Bangun Sari Elementary School, researchers obtained 65% of student responses before using the animated video product, categorized as practical. Data analysis of student responses after using the Doraemon video learning media product showed a percentage of 83%, categorized as very practical. Teacher responses also showed a percentage of 92%, categorized as very practical. This indicates that the learning media is very effective and practical and can be easily used to attract students' attention in mathematics. Furthermore, the researcher also obtained a pre-test effectiveness score of 63%, categorized as less effective, and a post-test score of 89%, categorized as highly effective. The N-Gain score was 74%, categorized as high.

This demonstrates that the Doraemon video learning media can facilitate students' understanding of mathematics concepts in fractions, focusing on common fractions, equivalent fractions, simplifying, and comparing fractions. This is because the Doraemon video learning media in the fourth-grade Mathematics subject is designed with various animations and images that capture students' attention and curiosity, which then enhances their focus and allows them to better understand the lesson. From the above data, it can be concluded that the use of the Doraemon video learning media is highly effective in capturing students' attention and fostering their understanding of mathematics concepts in fractions.

CONCLUSION

After conducting research and development of animated video learning media and obtaining the results of the research, it was concluded that the validity results of the development of animated video learning media for students' understanding of mathematical fraction concepts were 97.22% on a scale of 85.01 - 100.00 with very valid criteria. The validity results of animated video learning materials for students' understanding of mathematical fraction concepts were 95% on a scale of 85.01 - 100.00 with very valid criteria. The results of the percentage of student response practitioners were 83% with very practical criteria, and teacher responses were 92% with very practical criteria. The results of the effectiveness of the development of animated video learning media for

students' understanding of mathematical fraction concepts were 89% with very effective criteria at a score of 74% with high and effective criteria for use in the learning process.

ACKNOWLEDGMENTS

The researcher would like to express his gratitude to those who helped the researcher, including the principal and teachers of Taman Siswa private elementary school.

REFERENCES

Andi Agustang, I. A., & Asrifan, A. (2021, January 10). Educational Problems in Indonesia. Retrieved May 9, 2023, from Wordpress.Com: https://osf.io/preprints/osf/9xs4h

Andrew Billy Yonathan, J. S. (2023). Realistic Mathematics Education to Optimize Students' Understanding of Mathematical Concepts. Journal of Holistic Mathematics Education, 7(2), 143-155.

Ani Daniyati, I. B., & Ricken Wijaya, S. A. (2023). Basic Concepts of Learning Media. Journal of Student Research, 1(1), 282-294.

Azhar Umar, I. H., & Hutagalung, T. (2023). Machine Translated By Google Effectiveness of Using Doratoon Animation Maker as Learning Media in Indonesian Language Semantics Course Machine Translated By Google. Jurnal Morfai, 2(3), 497-502.

Cecep Kustandi, D. D. (2022). Development of Learning Media. Jakarta: Kencana.

Een Unaenah, M. S. (2019). Analysis of Fifth-Grade Elementary School Students' Mathematical Concept Understanding on Fractions. Basicedu Journal, 3(1), 106-111.

Efrata Gee, D. H. (2021). Analysis of Students' Mathematical Connection Ability and Mathematical Concept Understanding. Musamus Journal of Primary Education, 4(1), 1-11.

Erna Setyowati, I. S., & Hermawan, T. (2020). The Effect of Using Interactive Multimedia on Concept Understanding in Mathematics Learning at Mts Darul Ulum Muhammadiyah Galur. Insections Journal, 5(2), 27-37.

Gingga Prananda, A. W. (2020). Development of Learning Video Media for Theme 6, Subtheme 2 for Grade 1 Students of SD Negeri 17 Pasar Masurai 1. Dharma PGSD Journal, 1(1), 38-45.

Handayani, D. (2020). Utilizing YouTube During the Covid-19 Pandemic as an English Language Learning Medium to Improve Student Vocabulary and Comprehension. Journal of Education, 4(2), 12-18.

Nila Lestari, M. Y., & Nurmairina, D. N. (2023). Learning Problems in 21st-Century Elementary Schools. Medan: LPPM UMNAW.

Novita Fatmiyati, J. S., & Mursidah, I. S. (2023). Utilizing Videos and Crossword Puzzle Quizzes in Mathematics Learning. Dimasejati Journal, 5(3), 65-73.

Sugiyono, (2022). Research and Development Methods. Bandung: Alfabeta.