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DEVELOPMENT OF VIDEO-AIDED STORYBOOKS TO IMPROVE UNDERSTANDING OF MATHEMATICAL CONCEPTS IN ELEMENTARY SCHOOL

Abstract. This study aims to develop a video-assisted picture storybook to improve the understanding of mathematics concepts for fourth-grade elementary school students. The type of research conducted is research and development (R&D). Data collection techniques are used in the form of tests, observations, interviews, and documentation. The data sources or subjects in this study were 76 fourth grade students of Primary School Number Gugus Yos Sudarso, Pulokulon District, Grobogan Regency consisting of 25 fourth grade students of Public Primary School Number 1 Pulokulon as the control class, and 24 fourth grade students of Public Primary School Number 2 Pulokulon, and 27 class students. Public Primary School Number 3 Pulokulon IV as the experimental class. The types of data obtained are quantitative and qualitative data. The data analysis used is descriptive quantitative. The results of this study are video-assisted picture storybooks according to the needs of teachers and students in questionnaire recapitulation that the level of need for video-assisted picture storybooks is high with a student answer score of 84.67%, and a teacher's response of 86.67%. The developed book was tested for feasibility with the results of expert validation being in the appropriate category with details of the average score of linguists of 3.07, material experts of 2.94, and media experts of 3.17. The results of the effectiveness test were tested by an independent t-test in the experimental class and the control class showed a significance of <0.05, i.e. 0.000, thus Ha was accepted and H0 was rejected, meaning that there were differences in understanding the concept of fractions between students who took part in learning using picture storybooks. video-assisted and students who are not. Based on the results of the study, it was concluded that video-assisted picture books were effectively used to improve the understanding of fractions concepts for fourth-grade elementary school students.

Keywords: picture, storybook, concept, understanding, fractions.

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Бастауыш мектепте математикалық ұғымдарды түсінуді жақсарту үшін видео-кітаптар құрастыру

Аңдатпа. Бұл зерттеу төртінші сынып оқушыларының математикалық ұғымдарды түсінуін жақсарту үшін видео-кітаптар әзірлеуге бағытталған. Жүргізілетін зерттеу түрі – ғылыми-зерттеу және тәжірибелік-конструкторлық жұмыстар. Деректерді жинау әдістері тестілер, бақылаулар, сұхбаттар және құжаттамалау түрінде қолданылады. Бұл зерттеудегі дереккөздер немесе субъектілер Гробоган Редженси, Пулокулон ауданы, Гугус Йос Сударсо бастауыш мектебінің 76 төртінші сынып оқушысы болды, соның ішінде бақылау сыныбы ретінде №1 Пулокулон мемлекеттік бастауыш мектебінің 25 төртінші сынып оқушысы және №2 Пулокулон Қоғамдық орта мектебінің 24 төртінші сынып оқушысы алынды. №3 Пулокулон IV мемлекеттік бастауыш мектебі эксперименттік топ ретінде қатысты. Алынған мәліметтердің түрлері сандық және сапалық мәліметтер болып табылады. Қолданылатын деректерді талдау сипаттамалық сандық болып табылады. Бұл зерттеудің нәтижелері мұғалімдер мен студенттердің сұраныстарына сәйкес видеолық суретті әңгіме кітаптары болып табылады, қайта жүргізілген сауалнаманы талдауда видеолық суретті әңгіме кітаптарына қажеттілік деңгейі жоғары, студенттердің жауабы 84,67% және мұғалімдердің жауабы 86,67% болды. Әзірленген кітап мақсатқа сәйкестігі бойынша сараптамадан өткізілді, сараптамалық тексеру нәтижелері лингвистердің орташа ұпайы – 3,07, материалтанушылардікі – 2,94 және медиа сарапшылардікі – 3,17 болып, орташа ұпайлары көрсетілген тиісті санатқа жатқызылды. Тиімділік сынағының нәтижелері эксперименттік сыныпта тәуелсіз t-тестімен тексерілді және бақылау сыныбы <0,05, яғни 0,000 мәнділігін көрсетті, осылайша Ha қабылданды және H0 қабылданбады, яғни тұжырымдаманы түсінуде айырмашылықтар болды. Зерттеу нәтижелері бойынша бастауыш төртінші сынып оқушыларының бөлшек ұғымын түсінуін жақсарту үшін видеолық суретті кітаптарды пайдалану тиімді деген қорытынды алынды.

Кілт сөздер: сурет, әңгімелер жинағы, ұғым, түсіну, бөлшектер.

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Разработка видео-книг для улучшения понимания математических понятий в начальной школе

Аннотация. Это исследование направлено на разработку сборника рассказов с видео с картинками, чтобы улучшить понимание математических концепций для учащихся

четвертого класса начальной школы. Тип проводимых исследований – научные исследования и опытно-конструкторские разработки. Методы сбора данных используются в виде тестов, наблюдений, интервью и документирования. Источниками данных или субъектами в этом исследовании были 76 учеников четвертого класса начальной школы Гугус Йос Сударсо, район Пулокулон, Регентство Гробоган, в том числе 25 учеников четвертого класса государственной начальной школы №1 Пулокулон и 24 ученика четвертого класса государственной школы №2 Пулокулон участвовали в качестве контрольного класса. Государственная начальная школа №3 Пулокулон IV выступила в качестве экспериментального класса. Типы полученных данных являются количественными и качественными данными. Используемый анализ данных является описательным количественным. Результаты этого исследования представляют собой сборники рассказов с видео с картинками в соответствии с потребностями учителей и учащихся, в повторном опросе выявлено, что уровень потребности в сборниках рассказов с видео с картинками высок: оценка ответов учащихся составляет 84,67%, а ответ учителей – 86,67%. Разработанная книга была проверена на целесообразность, и результаты экспертной проверки были отнесены к соответствующей категории с подробным описанием среднего балла лингвистов 3,07, материаловедов 2,94 и медиа-экспертов 3,17. Результаты теста эффективности были проверены с помощью независимого t-критерия в экспериментальном классе, а контрольный класс показал значимость <0,05, т.е. 0,000, таким образом, На была принята, а H0 отклонена, что означает наличие различия в понимании концепции дробей между учащимися, которые принимали участие в обучении с использованием иллюстрированных сборников рассказов, видео-книг и студентами, которые не принимали в этом участие. По результатам исследования был сделан вывод, что использование видеокниг с картинками эффективно влияет улучшению понимания понятий дробей у учащихся четвертого класса начальной школы.

Ключевые слова: картинки, сборник рассказов, концепция, понимание, дроби.

Introduction

Understanding the concept is very important for students because it is a cognitive part that affects student learning outcomes at school. Concept understanding is also the basis for developing students' thinking skills to a higher level or High Order Thinking Skill (HOTS). Arend & Kilcher [1] states that conceptual understanding can be developed through experience and thought. On the other hand, Mansor et al. [2] emphasized that to provide facilities to students in understanding concepts, teachers can develop the learning process. Based on this opinion, it can be concluded that a good learning process will provide a good learning experience, and will make students able to understand the concept well.

Mathematics is a subject that requires an understanding of concepts. According to Brunner in Pitadjeng [3] and Harun et al. [4], learning mathematics is an activity to study the concepts and structures of mathematics that exist in the material being studied and seek and find the relationship between the concepts and the mathematical structure.

The problem that often occurs in the field is that most students think that mathematics is a scary and difficult subject. According to Schaeffer et al. [5] Many factors influence children's math learning, including the math content students are taught in school, the quality of their instruction, and the math attitudes of students' teachers. Furthermore, the research results of Ciosek & Samborska [6] also concluded that fractions are a difficult material, where many student errors indicate a lack of conceptual understanding of the material. shows that fractions are very difficult for students to understand.

This problem was also found in elementary schools in the Yos Sudarso Cluster, Pulokulon District, Grobogan Regency based on the results of researcher interviews. The fourth-grade teacher

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at Public Primary School Number 2 Pulokulon in an interview with the researcher said that most of the students had difficulty developing the concept of fractions they had learned when asked to answer questions in the form of story questions. This was also found in previous research where Suartama in Pujiati, Kanzunnudin & Wanabuliandari [7] stated that there are still many students who have difficulty solving math problems in the form of stories. The low understanding of the concept of fractions based on the results of research by Siegler & Pyke [8] is caused by students only memorizing the rules of the procedure, but not understanding the concepts that correspond to fractions.

Based on this description, the researchers tried to help teachers and elementary school students in the Yos Sudarso Cluster, Pulokulon District, Grobogan Regency by conducting research and development of learning media in the form of video-assisted picture storybooks that were effectively used to improve understanding of fraction concepts for fourth-grade elementary school students.

The study was conducted based on the results of research from Cahyady et al. [9] who concluded that making fractions learning media was able to improve understanding of the concept of fractions. In addition, there are also research results from Nuhidayah & Wangid [10] which conclude that the development of teaching materials for fairy tales is effectively used to help improve understanding of the concepts of mathematics subject matter.

Widyastuti & Pujiastuti [11] argue that conceptual understanding is the ability of students to master the material. This means that every student must have an understanding of concepts that are part of the cognitive domain. Meanwhile, Monfort, Brown & Pullen [12] stated that understanding the concept is very important in learning something. This can be interpreted that understanding the concept must be mastered by students, especially elementary school students because elementary school-age students are at a stage of self-formation to understand the meaning of the message well so that they can construct knowledge perfectly.

Nelson, Burton, & Bennett [13] stated that the fraction comes from the Latin fraction from the form frangere which means pause. Novak & Renzo [14] argue that a fraction is a quotient or a representation of a part of a number. While Musser, Burger, & Peterson [15] stated that: (1) fractions as numbers that show part of the whole, (2) fractions as comparisons.

Based on the description above, it can be concluded that understanding the concept of fractions is the process of understanding and constructing ideas or facts related to symbols or objects that are quotient, part of a whole, or comparison. This study aims to design an effective video-assisted picture storybook to improve understanding of fractions concepts for fourth-grade elementary school students, as well as analyze the effectiveness of video-assisted storybooks in improving understanding of fractions concepts for fourth-grade elementary school students.

Research methods

The type of research conducted is research and development. The development model used in the study was adapted from the Borg & Gall development model covering the stages of gathering information and solving problems, collecting data, designing products, validating designs, revising designs, testing products, revising products, and testing usage. The data sources or subjects in this study were 76 fourth grade students of Primary School Gugus Yos Sudarso, Pulokulon District, Grobogan Regency consisting of 25 fourth grade students of Public Primary School Number 1 Pulokulon as the control class, and 24 fourth grade students of Public Primary School Number 2 Pulokulon, and 27 class students. Public Primary School Number 3 Pulokulon IV as the experimental class.

The types of data obtained are quantitative and qualitative data. Data collection techniques used are tests, observations, interviews, and questioner. The instrument used to collect data is a test of understanding the concept of fractions. The instrument has met the validity through the validity test with Pearson's Product Moment where 10 items showed the results of t-count > t-table and were

declared valid, and the reliability test with Cronbach's Alpha which showed a result of 0.700, namely 0.936 and declared reliable. In addition, the instruments used are observation sheets, interview instruments, and questionnaires.

The data analysis technique in this study uses quantitative analysis with the following details.

The data from the needs questionnaire was processed into percentages and analyzed by quantitative descriptive techniques. The feasibility of the product was obtained from the results of expert validation consisting of linguists, materials, and media experts, as well as the results of teacher and student response questionnaires. The product feasibility classification can be seen in the following Table 1.

Table 1 – Product Eligibility Score

No	Average Score	Criteria	
		Expert Validation Results	**Response Questionnaire Results**
1	>3.25 to 4.00	Very Worthy	Very good
2	>2.50 to 3.25	Worthy	Well
3	>1.75 to 2.50	Not worth it	Not good
4	1.00 to 1.75	Not feasible	Not good

The prerequisite test used before conducting the data analysis was the normality test using the Saphiro Wilk technique, and the homogeneity test using the Lavene's Test. To test the effectiveness of the product developed, the data analysis used was paired t-test and independent t-test.

Results. Based on the needs analysis and literature review, it was found that there is a need for the development of teaching materials that can be used by teachers following the challenges of the 21st century, especially for understanding the concept of mathematical content [16]. In addition, it is necessary to use technology in learning. So, it is necessary to develop a video-assisted picture storybook to improve the understanding of the concept of fractions for fourth graders at Gugus Yos Sudarso Elementary School, Pulokulon Regency. This can be seen from the results of the questionnaire recapitulation that the level of need for video-assisted picture storybooks is considered high with a student answer score of 84.67%, and a teacher's response of 86.67%.

The research carried out has three stages, namely planning, book preparation, and evaluation. The planning stage consists of formulating goals, analyzing student characteristics, analyzing curriculum, analyzing the content of character education, collecting material resources. The process consists of compiling the components of the book's content, the intrinsic elements of the story, and the anatomy of the book. The evaluation stage contains a test of understanding the concept of fractions.

Planning is carried out in several steps as follows. 1.) Formulate the purpose of writing this book to improve understanding of concepts and learning outcomes of fractional mathematics. 2) Analysis of student characteristics, namely the analysis of student characteristics is intended to find out what student characters need to be improved. 3) Curriculum analysis. At this stage, the researcher analyzes the curriculum which includes Graduate Competency Standards (SKL), Content Standards, and Process Standards. 4) Analysis of the content of character education, the researcher analyzes the content of character education which aims to determine the direction of developing video-assisted picture storybooks that can facilitate these characters. 5) The collection of material sources is carried out by discussing with class IV teachers, supervisors, illustrators, and colleagues separately and gradually. It is intended that the products developed are following the curriculum and student characteristics. Video-assisted picture storybooks contain material that is packaged in the form of picture stories as reading material for students in literacy activities at school as well as barcode video learning that can be accessed using mobile phones.

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The book preparation process consists of 1) The process of compiling the components of the book content which generally consists of 3 components, namely introduction, content, and closing which includes the title page, copyright page, foreword, table of contents, main instructions, character introduction page, story content, message, stories, practice questions, QR code learning videos, math games, and author profiles; 2) Preparation of the intrinsic elements of the story consisting of the theme, title, characters and characterizations, plot, setting, point of view, mandate, and description of the content of the story; 3) Preparation of book anatomy consists of preparation of book covers, book text design, book visual design.

The last stage of designing the development of this video-assisted picture story book is evaluation, namely learning evaluation to determine understanding of the concept of fractions with tests.

The design of developing a video-assisted picture story book in this research and development can be seen in more detail in the following Figure 1.

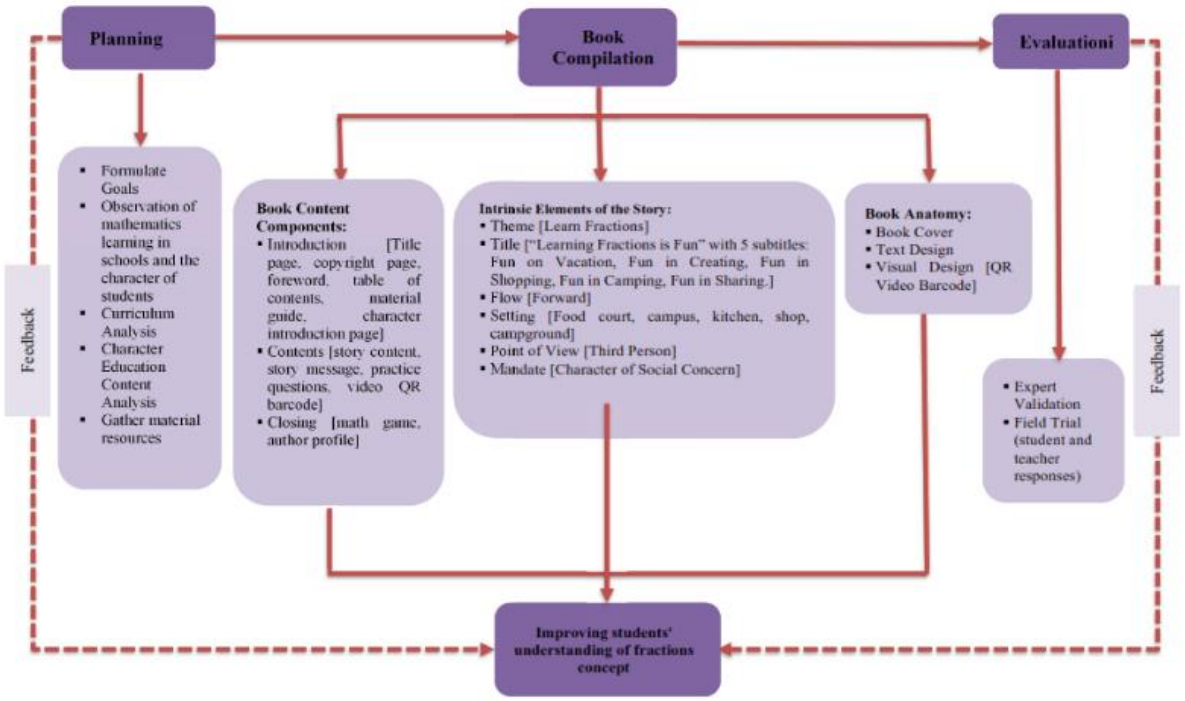

Figure 1 – Design of Video-Assisted Picture Storybook Development

The product that has been developed is then tested for feasibility by asking for validation from expert judgment, namely media experts, linguists, material experts. The results of each assessment from expert judgment can be seen in the following Table 2.

Table 2 – Expert Validation Score Results

Validator Type	Overall Average Score	Criteria
Linguist Validator	3.07	Worthy
Material Expert Validator	2.94	Worthy
Media Expert Validator	3.17	Worthy

Based on the results of the average expert validation in the table above, it can be concluded that the developed book is feasible to be used as teaching material for students with an average score of 3.07 for linguists, 2.94 for material experts, and 3.17 for media experts. After expert

validation has been carried out, product revisions are carried out according to suggestions and input from experts. The results of the revision were then tested to see if the book developed was effective in increasing the understanding of concepts in fractional material.

The Effectiveness of Video-Assisted Picture Storybooks. Data on the effectiveness of the video-assisted picture book developed to improve the understanding of the concept of fractions for fourth-grade students of Primary School Gugus Yos Sudarso, Pulokulon District, were obtained from the results of field tests. The field test was conducted using a quasi-experimental research method. The experimental class selected was class IV at Public Primary School Number 2 Pulokulon with 24 students and class IV at Public Primary School Number 3 Pulokulon with 27 students, while the control class used was class IV at Public Primary School Number 1 Pulokulon with 25 students. The data used to measure the effectiveness of the video-assisted picture book in this study were the pretest and posttest scores of the fraction concept understanding test.

In the experimental class, learning is done by using storybooks with videos. The results of the pretest and posttest in the experimental class can be seen in the appendix. The results of the average pretest and posttest understanding of the concept of fractions in the experimental class can be seen in the following Table 3.

Table 3 – The Average Value of the Experimental Class Fraction Concept Understanding Test

Class	Average score	
	Pre-test	Posttest
Class IV Public Primary School Number 2 Pulokulon	52.88	87.54
Class IV Public Primary School Number 3 Pulokulon	56.33	86.44

In the control class, learning was carried out only by using books provided by the school and not using video-assisted picture storybooks. The summary of the results of the assessment of understanding the concept of fractions in the control class can be seen in the following Table 4.

Table 4 – Summary of Assessment Results In The Control Class

Data Collection Aspect	Average score	
	Before Study	After study
Understand the concept of fractions	55.08	65.24

Prerequisite tests were carried out before analyzing the data, namely normality test and homogeneity test. This test aims to see whether the data is normally distributed and homogeneous or not. The normality test used is the Saphiro Wilk technique with data processing using the Statistical Product and Service Solutions (SPSS 16.0) program with a significance of 0.05. The results of the normality test for understanding the concept of fractions can be seen in the following Table 5.

Table 5 – The Results of the Normality Test for Understanding the Concept of Fractions in The Pretest Data

	Class Type	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistics	df	Signature.	Statistics	df	Signature.
Pretest Results	Experiment Class A	.179	24	.055	.949	24	.260
	Class B. Experiment	.091	27	.200*	.985	27	.951
	Control Class	.136	25	.200*	.945	25	.193

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Based on the results above, it can be seen that the results of the normality test for understanding the concept of fractions using the Saphiro Wilk technique showed significance values > 0.05, namely 0.260, 0.951, and 0.193. The decision taken is that Ha is accepted and H0 is rejected, meaning that the data is normally distributed.

The results of the normality test show that the data is normally distributed, then the data is then tested with parametric statistics. This is following the opinion of Kobylin et al. [17] which states that one of the conditions and assumptions of parametric statistics is data obtained from a population that has a normal distribution pattern.

The homogeneity test used was the Lavene's Test technique with data processing using the Statistical Product and Service Solutions (SPSS 16.0) program with a significance of 0.05. The results of the homogeneity test of understanding the concept of fractions can be seen in the following Table 6.

Table 6. Homogeneity Test Results of Pretest Data Understanding the Concept of Fractions Variance Homogeneity Test

Levene Stats	df1	df2	Signature.
.002	2	73	0.998

The results of the homogeneity test of understanding the concept of fractions using Lavene's Test technique showed a significance value of > 0.05, which was 0.998. Thus it can be decided that Ha is accepted and H0 is rejected, meaning that the data comes from a homogeneous population.

After the prerequisite test was carried out, a statistical test was carried out to measure the effectiveness of the video-assisted picture storybook which was developed to improve the understanding of the concept of fractions for fourth graders of Primary School Gugus Yos Sudarso, Pulokulon District. Based on the results of the normality test which shows that the data is normally distributed, the statistical test used is a parametric statistical test, namely paired-sample t-test, and independent t-test.

Paired t-test was conducted on the students' understanding of the experimental class students' understanding of fractions before and after learning by using a video-assisted picture storybook. The results of hypothesis testing conducted using the paired sample t-test on the results of the experimental class understanding of the fractional concept test are as follows (Table 7).

Table 7 – Hypothesis Test Results Data for Understanding the Concept of Fractions in the Experimental Class

		Pair Difference					T	df	Signature. (2-tail)
		Means	Std. Deviation	Std. Mistakes Mean	95% Confidence Interval of Difference				
					Lower	On			
Couple 1	Class A Pretest - Class A Posttest	-3.46667E1	8.12225	1.65795	-38.09639	-31.23694	-20.909	23	.000
Couple 2	Class B Pretest - Class B Posttest	-3.01111E1	3.43437	.66094	-31.46970	-28.75252	-45.558	26	.000

The results of the paired t-test data on understanding the concept of fractions in the experimental class showed results <0.05, namely 0.000. Thus, it can be decided that Ha is accepted and H0 is rejected, meaning that there are differences in students' understanding of the concept of fractions before and after participating in learning using video-assisted storybooks.

An independent t-test (Independent Sample T-Test) understanding the concept of fractions was also carried out with the help of the SPSS 16.0 program, and the following results were obtained (Table 8).

Table 8 – Independent t-test results for understanding the concept of fractions

Independent Sample Test										
		Levene test for Equation of Variance		t-test for Equality of Means						
		F	Signature.	T	df	Signature. (2-tail)	Difference Means	Std. Error Difference	95% Confidence Interval of Difference	
									Lower	On
Test results	The same variance is assumed	7,895	.007	12.046	47	.000	22,302	1,851	18,577	26,026
	Equal variance is not assumed			12,151	41,164	.000	22,302	1,835	18,595	26.008
Test results	The same variance is assumed	.278	.601	9.365	50	.000	21,204	2.264	16,657	25,752
	Equal variance is not assumed			9,406	49,944	.000	21,204	2.254	16,676	25,732

Based on these results, it can be seen that the significance value of the independent t-test for understanding the concept of fractions is <0.05, which is 0.000. Thus, it can be concluded that Ha is accepted and H0 is rejected, meaning that there are differences in understanding of the concepts of middle-level students who do not use Picture and Picture Video Books with Picture Pictures.

Discussion

This study aims to develop a video-assisted picture storybook to improve understanding of mathematical concepts infractions. The development carried out is based on the results of the analysis of the needs of teachers and students [18]. The results of the needs analysis found that it was necessary to develop a video-assisted picture storybook to improve understanding of the concept of fractions for fourth graders at Gugus Yos Sudarso Elementary School, Pulokulon Regency. 67% and the teacher's response was 86.67%.

Then the illustrated storybook that has been developed is then tested for feasibility with the results of expert validation. The average expert validation results are in the appropriate category with details of the average score of linguists of 3.07, material experts of 2.94, and media experts of 3.17. This is following the principle that in developing learning resources, it is necessary to pay attention to several things, especially by utilizing videos, technology, and so on, which must be adjusted to the level of student needs, student characteristics, and the usefulness of the teaching materials developed. This is following the opinion of Miosga [19]. The thing that a teacher needs to reach is to be able to develop teaching media or teaching materials that are following the level of student development.

After expert validation has been carried out, product revisions are carried out according to suggestions and input from experts. The results of the revision were then tested to see if the book

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developed was effective in increasing the understanding of concepts in fractional material. The effectiveness of the product was tested by paired t-test on the pretest and posttest data for understanding the concept of fractions of experimental class students showing a significance of <0.05, which is 0.000. According to Santoso [20] if the value of sig. (2 tailed) < 0.05 then H0 is rejected and Ha is accepted, otherwise if the value of sig. (2 tailed) > 0.05 then H0 is accepted and Ha is rejected. Based on the results of the pretest and posttest above, it can be concluded that H0 is rejected and Ha is accepted, meaning that there are differences in understanding the concept of fractions and the caring character of students before and after participating in learning using video-assisted picture storybooks.

The results of the t-test for understanding the initial concept of independent data with the SPSS 16.00 program showed a significance of <0.05, which is 0.000. The decision was taken in the opinion of Wiratna [21] which stated that if the value of sig. (2 tailed) > 0.05 H0 is accepted and Ha is rejected, whereas if the value of sig. sign. (2 tailed) < 0.05 H0 is rejected and Ha is accepted. Based on this opinion, the decision taken is that H0 is rejected and Ha is accepted, meaning that there are differences in understanding of the concepts of students who take lessons using video-assisted storybooks with students who have video-assisted storybooks. story. This also proves that the use of picture storybooks is to improve the understanding of the concepts of fourth-grade elementary school students in the Yos Sudarso Group.

Based on the description above, it can be concluded that video-assisted picture storybooks are effectively used to improve understanding of the concept of fractions in fourth grade students of Primary School Gugus Yos Sudarso, Pulokulon District. This is contrary to the results of previous studies that prove the effectiveness of picture story books, including 1) picture story books are effectively used in learning for fourth grade students of Primary School [22]; 2) illustrated story books are effectively used in language learning [23]; 3) Picture story-based teaching materials are effectively used in learning mathematics [24].

These results are also supported by research conducted by Mei et al. [25] where the use of story books for children is one of the effective methods that can be used for children in learning this because students become more interested so students will become more aware of the material.

Further according to Nisak et al. [26] found that “The comic textbooks can help improve learning outcomes and learning attractiveness”.

Then, the use of technology is also very important considering that we have entered the digital era. This is following the opinion Bus et al. [27] which says that in the digital era, it is now quite clear that apps, digital books, and video streaming services are games change in the learning. the environment of young children to be more interesting.

The use of story-based teaching materials that utilize video also has many benefits. The benefits of learning by using picture story videos were conveyed by Niemi & Niu [28]. Using digital technology in the classroom as a teaching means creates an intersting learning atmosphere for learners and it motives students to learn autonomously [29–31]. The findings found several benefits including Digital storytelling improved students' ability to see math learning as useful. They felt more confident that they could learn math and understand what they had learned. They also felt more confident talking to their classmates about math concepts. Self-efficacy played a twofold role: it supported the students' learning during the project and was reinforced by meaningful math learning experiences.

Based on the results of research and development and supported by previous research, it can be concluded that the use of video-assisted picture storybooks is effective in increasing students' understanding of learning materials. Likewise, in this study, the video-assisted picture book developed in this study was effective in increasing the understanding of the concept of fractions in fourth-grade students of Primary School Gugus Yos Sudarso, Pulokulon District.

Conclusion

Based on the results of preliminary research, the level of teacher and student needs for the development of video-assisted picture books is high. It can be seen from the results of the questionnaire recapitulation that the level of need for video-assisted picture storybooks is considered high with a student answer score of 84.67%, and a teacher's response of 86.67%. The illustrated storybooks that have been developed are then tested for feasibility with expert validation results. The average expert validation results are in the appropriate category with details of the average score of linguists of 3.07, material experts of 2.94, and media experts of 3.17. Based on the results of testing the effectiveness of the video-assisted picture book developed in this study, it was effective in increasing the understanding of the concept of fractions in fourth-grade students of Primary School Gugus Yos Sudarso, Pulokulon District. This can be seen from the results of the paired t-test which gives the result that there is a significant difference in students' understanding of the fraction concept before and after participating in learning using video-assisted picture storybooks. The results of the independent t-test (independent sample t-test) also prove that there is a difference in understanding the concept of fractions between students who take part in learning by using video-assisted picture storybooks and those who do not use video. with the help of picture books. The results of the independent t-test (independent sample t-test) also prove that there is a difference in understanding the concept of fractions between students who take part in learning by using video-assisted picture storybooks and those who do not use video. with the help of picture books. The results of the independent t-test (independent sample t-test) also prove that there is a difference in understanding the concept of fractions between students who take part in learning by using video-assisted picture storybooks and those who do not use video. with the help of picture books.

Recommendations

Some suggestions that the author can convey based on the conclusions above are: 1) The use of books as learning media should pay attention to conformity standards in the form of language, material, and media suitability. Books that meet the appropriate criteria will have a significant impact on the learning objectives to be achieved. 2) Other researchers can use the results of this research and development as a reference in conducting research and development of similar products but with different studies or materials and grade levels.

REFERENCES

1. Arend, R. I., & Kilcher, A. (2010). Teaching to Learn Students Become Outstanding Teachers. New York: Taylor & Francis Routledge Group.
2. Mansor, R., Halim, L., & Osman, K. (2010). Teacher knowledge that encourages students' conceptual understanding. Procedia - Social and Behavioral Sciences, 9, 1835–1839.https://doi.org/10.1016/j.sbspro.2010.12.410.
3. Pitadjeng, (2006). Fun Mathematics Learning. Yogyakarta: Graha Ilmu.
4. Harun, F., Suparman., Hairun, Y., Machmud, T., & Alhaddad, I. (2021). Improving Students' Mathematical Communication Skills through Interactive Online Learning Media Design. Journal of Technology and Humanities, 2(2), 17-23. https://doi.org/10.53797/jthkkss.v2i2.3.2021
5. Schaeffer, M.W., Rozek, C.S., Maloney, E.A., Berkowitz, T., Levine, S.C., & Beilock, S.L. (2021). Elementary school teachers' math anxiety and students' math learning: A large scale replication. Developmental Science, 24(4), e13080.
6. Ciosek, M., & Samborska, M. (2016). False beliefs about fractions - What is the source? Journal of Mathematical Behavior, 42, 20-32. https://doi.org/10.1016/j.jmathb.2016.02.001.

ISSN-p 2306-7365
ISSN-e 2664-0686

7. Pujiati, P., Kanzunnudin, M., & Wanabuliandari, S. (2018). Analysis of Understanding Mathematical Concepts for Fourth Grade Students of SDN 3 Gemulung on Fractions (Analysis of Mathematics Concept Understanding of Fourth Grade Students of SDN 3 Gemulung on Fractions). ANARGYA: Scientific Journal of Mathematics Education, 1(1), 37–41. https://doi.org/10.24176/anargya.v1i1.2278.
8. Siegler, R.S., & Pyke, A.A. (2013). Developmental and individual differences in understanding fractions. Developmental Psychology, 49(10), 1994-2004.https://doi.org/10.1037/a0031200.
9. Cahyady, A., Wayan, I., Astawa, P., & Suarsana, IM, Fendy, P. (2020). Development of Fraction Learning Media with Scientific Approach to Support Efforts to Improve Understanding of Fraction Concepts for Class VII Students (Development of Fraction Learning Media with Scientific Approach to Support Efforts to Improve Understanding of Fraction Concepts for Class VII Students). Journal of Mathematics Education Undiksha, 11(2). http://dx.doi.org/10.23887/jjpm.v11i2.27663
10. Nurhidayah, I., & Wangid, M.N. (2020). Pengembangan Bahan Ajar Buku Dongeng Berbasis Sainsmatika untuk Meningkatkan Pemahaman Konsep [Development of science-based fairy tale book teaching materials to improve understanding of concepts]. AKSIOMA // Jurnal Program Studi Pendidikan Matematika, 9(2), 259-268. [in Indonesian]
11. Widyastuti, N. S., & Pujiastuti, P. (2014). The Effect of Indonesian PMRI Realistic Mathematics Education on Students' Concept Understanding and Logical Thinking (The Effect of Indonesian PMRI Realistic Mathematics Education on Students' Conceptual Understanding and Logical Thinking) // Prima Edukasia Journal, 2(2): 183-193.https://doi.org/10.21831/jpe.v2i2.2718.
12. Monfort, D., Brown, S. & Pollock, D. (2009). An Investigation of Students' Conceptual Understanding at Sophomore Associated for a Fraduate-level Engineering and Mechanical Program // Journal of Technical Education, 98(2), 111-129. https://doi.org/10.1002/j.2168-9830.2009.tb01011.x.
13. Nelson, T., Burton, L., & Bennett, A. (2010). Mathematics for elementary teachers: A conceptual approach. New York: McGraw-Hill.
14. Novak, D., & Renzo, AD (2013). Twelve math concepts: study guide for ithaca college math placement exam. New York: University of Ithaca.
15. Musser, G., Burger, W.F., & Peterson, B.E. (2011). Mathematics for elementary teachers, contemporary approach (9th ed.). Hoboken: John & Willey, Inc.
16. Muhamad, A., Murtono, Suad, & Gui, Y. (2021). The Effect of Manipulative PBL Model on The Understanding Mathematic Concepts for Elementary Students // Asian Pendidikan, 1(2), 17-22. https://doi.org/10.53797/aspen.v1i2.3.2021
17. Kobylin, O.A., Gorokhovatskyi, V.O., Tvoroshenko, I.S., & Peredrii, O.O. (2020). The application of non-parametric statistics methods in image classifiers based on structural description components. Telecommunications and Radio Engineering, 79(10).
18. Madaki, U.Y., B.M. Hameed, A.A., & Daya, A.A. (2021). Optimal Solution of Mathematical and Statistical Modelling for The Study of Spread, Transmission and Control of Tuberculosis (TB) in Damaturu, Nguru and Potiskum Major Cities of Yobe State. ASEANA Science and Education Journal, 1(2), 15-33. https://doi.org/10.53797/aseana.v1i2.2.2021
19. Miosga, C. (2020). Cognitively activating and emotionally attuning interactions: their relevance for language and literacy learning and teaching with digital media. In International Perspectives on Digital Media and Early Literacy (pp. 27-49). Routledge.
20. Santoso, S. (2015). AMOS 22 untuk structural equation modelling. [AMOS 22 for structural equation modeling]. Elex Media Komputindo.
21. Wiratna, S. (2014). Metodologi Penelitian Lengkap, Praktis, dan Mudah Dipahami. [Complete, Practical, and Easy to Understand Research Methodology]. Yogyakarta: Pustaka Baru. [in Indonesian]

22. Tarigan, N.T. (2018). Development of Picture Storybooks to Increase Reading Interest of Grade IV Elementary School Students // Curere Journal, 2(2) http://dx.doi.org/10.36764/jc.v2i2.157.
23. Wicaksono, G., Nuryanto, S. (2019). Development of Interactive Picture Storybooks on Students' Ability to Find Story Content. In JLJ, 9(4).
24. Pratiwi, S., Komala, E., & Monariska, E. (2020). Development of teaching materials based on math picture stories // Journal of Analysis, 6(2), 143–152. https://doi.org/10.15575/ja.v6i2.9033.
25. Mei, F., Sidabalok, D.M., Widiaputri, C.L., & Cucus, A. (2020). The Use of Reading Storybook on Children's Vocabulary Mastery. Beyond Linguistics, 3(2).
26. Nisak, N., By Arifin, M., Fahyuni, E., & Rahmawati, I. (2021). The Development of Comic Formatted Fiqh Textbook for Islamic Elementary School // European Journal of Education Studies, 8(1).
27. Bus, A.G., Neuman, S.B., & Roskos, K. (2020). Screens, Apps, and Digital Books for Young Children: The Promise of Multimedia. AERA Open. https://doi.org/10.1177/2332858420901494.
28. Niemi, H., & Niu, S.J. (2021). Digital Storytelling Enhancing Chinese Primary School Students' Self-Efficacy in Mathematics Learning // Journal of Pacific Rim Psychology. https://doi.org/10.1177/1834490921991432
29. Arlinwibowo, J., Retnawati, H., & Kartowagiran, B. (2021). How to Integrate STEM Education in Indonesian Curriculum? A Systematic Review. Challenges of Science. Issue IV, 2021, pp. 18-25. https://doi.org/10.31643/2021.03
30. Pratama H, Azman MNA, Zakaria NA, Khairudin M. The effectiveness of the kit portable PLC on electrical motors course among vocational school students in Aceh, Indonesia. Kompleksnoe Ispolzovanie Mineral'nogo Syr'a = Complex Use of Mineral Resources. 2022; 320(1): 75-87. https://doi.org/10.31643/2022/6445.09
31. Kassymova, G.K., Vafazov, F.R., Pertiwi, F.D., Akhmetova, A.I., Begimbetova, G.A. (2021). Upgrading Quality of Learning with E-Learning System. Challenges of Science. Issue IV, 2021, pp. 26-34. https://doi.org/10.31643/2021.04