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## Development of Pop Up Book Media Based on Qr Code to Improve Reading and Arithmetic Skills of Grade 2 Elementary School Students

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### ABSTRACT

Based on the results of a survey conducted by researchers, many students in the class still have difficulty in working on story problems in mathematics learning. This encourages researchers to help improve students' reading and arithmetic skills. This study aims to determine the level of validity, feasibility and attractiveness of learning media in the form of QR code-based pop-up books to improve reading and arithmetic skills in addition and subtraction story problems for grade 2 students at UPT SDN Tlogo 02, Blitar Regency. The research method used is research and development (R&D) with the ADDIE model. The research stages include analysis of student needs and characteristics, design of pop-up book concepts and specifications, prototype development, implementation, and evaluation. The results of the study indicate that the QR code-based pop-up book developed is feasible and valid for use in terms of material, media, and language. This media is also an attractive media for students as seen from the results of the attractiveness questionnaire with a percentage of 90.94% and is included in the very attractive category. In addition, the media can help improve reading and arithmetic skills for grade 2 with an N-Gain calculation result of 0.5364. Based on these results, it can be seen that QR code-based pop-up book media is a feasible, valid and interesting media and can help improve students' reading and arithmetic skills.

## 1. Introduction

Education is a teaching and learning process carried out both in school and outside of school which is received by anyone, both early childhood and old age. In education, the role of a teacher is very important, especially in determining the success of learning of his students. Education is said to be of quality if it can

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answer the challenges of existing problems from time to time, especially in reading and arithmetic skills. The Independent Curriculum is a learning method that refers to the talent and interest approach. With this independent curriculum, all students are required to learn with reading and arithmetic skills.

According to (Aunio, 2019) Arithmetic skills or the ability to count is the initial foundation for children in learning mathematics at school. Children need to understand counting activities before they can understand other activities in mathematics. Counting skills are part of mathematics by learning to count children will recognize the concept of numbers, have basic mathematical skills and the ability to solve problems. This must be equipped with Education where currently reading and arithmetic skills are a requirement in an Education. One of the things that can be used as a tool for providing Education is by using media.

According to Dalman (in Kurniawati, 2020) Reading is the process of changing the form of symbols/signs/writing into meaningful sounds. In early childhood, it is called the term initial reading ability. Initial reading ability is a unified activity that includes several activities such as recognizing letters and words, connecting them with sounds, their meanings, and drawing conclusions about the intent of the reading. It can be seen in visual activities involving understanding symbols or writing that is spoken and emphasizing the aspects of accuracy in voicing writing, good pronunciation and intonation, fluency and clarity of voice as a form of obtaining meaning or information.

Nowadays, learning media is the best solution in the world of education. Learning media is present as an essential tool for students to be able to learn to understand learning easily. Learning media is a tool that can help the teaching and learning process so that the meaning of the message conveyed becomes clearer and the goals of education or learning can be achieved effectively and efficiently (Sugiantara et al., 2024). Limitations in the use of learning media result in a lack of appeal in the learning process in the classroom or independent learning.(Fatih & Alfi, 2021).

Seeing this situation, the world of education has created many innovations in learning media. Learning media has many types that are developed through various sources, one of which is the Pop-Up Book Based Qr Code media. Pop-Up Book Based Qr Code media is a learning aid with a 3D display and also contains a barcode that can be scanned via student gadgets which are used as a teacher's aid in learning.

Based on the facts in the field, researchers found several problems at UPT SDN Tlogo 02 Kanigoro. Researchers conducted research at UPT SDN Tlogo 02 on Thursday, November 16, 2023, which was carried out using observation techniques to class 2 teachers at UPT SDN Tlogo 02 Kanigoro, that there were still several students who could not read and calculate addition and subtraction with story problems. So that many students still do not understand the various types of story problems on addition and subtraction material, how to calculate them. This is also a problem for class teachers to overcome these problems.

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The problem in class 2 UPT SDN Tlogo 02 Kanigoro, namely there are 15 students out of 27 students who do not understand addition and subtraction with story problems. During the learning process, there are still many students who do not listen to the teacher's explanation and play and talk to their friends. This is due to the lack of student attention to the addition and subtraction material with story problems delivered by the teacher so that students cannot understand the addition and subtraction material delivered by the teacher. In addition, the class 2 teacher of UPT SDN TLOGO 02 also does not use enough learning media so that learning seems monotonous and less interesting for students. During the learning process, the teacher is fixated on using LKS, textbooks, and learning videos so that class 2 students who are lower classes are less interested in following the learning process. The lack of teacher innovation in developing learning media is also one of the causes of this problem.

Based on the presentation of the problems in class 2 of UPT SDN TLOGO 02, it has a major impact on students' abilities and understanding of addition and subtraction material with story problems. The lack of use of learning media can result in many students who are less interested in following the learning delivered by the teacher. The impact of the lack of use of learning media resulted in 15 students out of 27 students in class 2 of UPT SDN TLOGO 02 who were not able to recognize, understand, and calculate addition and subtraction with story problems. Based on the problems in UPT SDN TLOGO 02 Kanigoro, one of the researcher's efforts to improve students' reading and arithmetic skills is to create a new innovation in the form of Pop-Up Book Based Qr Code learning media. The appearance of this Pop-Up Book Based Qr Code is made as attractive and beautiful as possible so that students can really easily understand the material about addition and subtraction in the form of story problems so that it can overcome the urgency of students' reading and arithmetic skills.

According to Setiyanigam (2020) explains that Pop-Up Book media is a type of 3D media that can provide an interesting effect, because each page opened will show a raised image and the material in the Pop-Up Book can be adjusted to the teaching material to be delivered. This is in line with the purpose of the study, namely to improve students' reading and arithmetic skills. In improving students' reading and arithmetic skills, media is needed that is easy for students to understand and interesting. Pop Up Book Based Qr Code Media is a 3D book that is beautifully and attractively designed and contains addition and subtraction material with story problems. According to (Candra & et al., 2022) explains that the Pop Up Book Based Qr Code Media consists of a book cover, basic competencies, and learning objectives, descriptions of addition and subtraction materials in the form of story problems, Qr Code, and bibliography. The images displayed on the Pop Up Book Based Qr Code media are also designed very attractively and can appear so that students always want to open the next pages.

QR-Code (Quick Response Code) is a development of Bar-Code which was previously a one-dimensional code into a two-dimensional code with the ability to store more data compared to BarCode, by using QR-Code the data that can be stored can be in the form of numeric codes, letters, binary and kanji characters,

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this code has been applied to various fields (Irawan & Adriantantri, 2019). Qr Code is an evolution of the barcode, 3 developments from barcodes or bar codes that are only able to store more information, both horizontally and vertically. This Qr Code is in the Pop Up Book media which aims to help teachers explain the material to students more clearly.

Pop Up Book Based Qr Code Media or commonly called 3D books which contain barcodes that can be scanned via student gadgets, which is also an innovation that is considered to have its own appeal for students during learning (Sejati et al., 2021). How to use this Qr Code by scanning it on the student's gadget via the barcode in the Pop Up Book Based Qr Code media, the QR code in this Pop Up Book media contains illustrations of addition and subtraction questions with story questions, interesting alphabets and numbers so that they are easy for students to remember and memorize so that students can more easily understand the addition and subtraction material with story questions through the Qr Code. This can be seen from the presentation of the Pop Up Book Based Qr Code media which is presented visually with shapes that are made to fold, move, and can appear so that there is a sense of interest from students (Ningsih et al., 2020). To open the page and easy to remember and understand by students and also supported by technological capabilities in the form of Qr Code which functions to project images of numbers, alphabets, story problems that appear real so as to increase student interest, to learn addition and subtraction materials with story problems.

This Pop Up Book Based Qr Code Media can improve students' reading and arithmetic skills. Reading and arithmetic skills are the skills in operating real numbers in the form of numbers, especially concerning addition, subtraction, multiplication, and division (Meutia, 2017). These reading and arithmetic skills highlight the importance of understanding and applying basic mathematical operations in everyday life. Language is an important tool to express and communicate with the others (Sari, 2023).

According to Soedarso (in Sarika et al., 2024) Reading is an activity to understand the contents of the reading. There is an interaction process between the text and the reader. Reading skills include a series of skills ranging from letter recognition to understanding more complex texts, as well as the ability to read in various situations. According to Petty and Jensen (in Kusmayanti, 2019) reading is the interpretation of symbols in the form of writing, and that reading is transferring ideas conveyed by the author of the reading. Based on the description above, it can be concluded that reading skills are the ability of students to recognize and understand letters and written symbols which are then pronounced by emphasizing the aspects of accuracy in pronouncing writing, pronunciation fairness, intonation fairness, fluency and clarity of voice.

Basic Arithmetic Skills of science related to human life (Turmuzi et al., 2022). Given the importance of numeracy skills for humans, this numeracy skill needs to be instilled early on, with various media and appropriate methods so as not to damage the child's development pattern. Learning mathematics for lower grade students must be done in a simple and appropriate way and carried out

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consistently in a conducive and enjoyable atmosphere, so that the child's brain will be trained to continue to develop so that the child can master, even enjoy mathematics.

Reading and arithmetic skills are students' abilities in performing mathematical operations such as addition, subtraction, multiplication, and division. These two abilities can be seen as the basis for solving problems in everyday life. Not only that, reading and arithmetic skills are also students' abilities in understanding and solving problems. These reading and arithmetic skills are very necessary for students in everyday life. In everyday life, students will definitely not be separated from reading and arithmetic skills, for example when students are buying something, they will definitely need reading and arithmetic skills.

The researcher took this research based on previous research with the title "Development of Pop Up Book Science Learning Media Assisted by QR Codes on Water Pollution Sub-Material for Class VII SMP/MTS" compiled by Azizah(2022)with the results of the study showing that the use of Pop-Up Book media Assisted by Qr Code can improve students' knowledge of water pollution material in class VII SMP/MTS. This can be proven by the increase in students' knowledge of water pollution material delivered using the help of Pop Up Book media Assisted by Qr Code.

Furthermore, researchers also took research from the Marlina Journal (2018) entitled "Development of Pop Up Book Media for Addition and Subtraction Story Problem Material for Class 1" which showed very good results as evidenced by the results of the media feasibility assessment by media experts of 88%, by material experts of 98%, and by education experts of 95% which means that the Pop Up Book 5 media has an effect on the understanding of addition and subtraction story problem material for class 2. Based on the background description above, to solve the problems that exist in UPT SDN Tlogo 02, the researcher made an innovation by conducting a Research and Development (RnD) study entitled "Development of Pop Up Book Media Based on QR Code to Improve Reading and Arithmetic Skills of Grade 2 Elementary School Students".

## **2. Methodology**

This study uses a research and development (R&D) approach. Research and development is a research method used to produce certain products, and test the effectiveness of the product (Sugiyono, 2022). The model used by researchers in this study is the Borg and Gall model. The research and development steps that researchers use in this study are using the Borg and Gall research model (Sugiyono, 2022) which consists of 10 steps as follows: (1) Potential and problems, (2) Data collection, (3) Product design, (4) Design validation, (5) Design revision, (6) Product trial, (7) Product revision, (8) Usage trial, (9) Product revision, and (10) Mass production(Sugiyono, 2022). The subjects of this study were students of grade 2 of SDN Tlogo 02, Blitar Regency. This study used several research instruments in the data collection process. Among the

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instruments used by researchers include interviews, questionnaires, tests and documentation.

### **3. Results and Discussion**

This study develops research in line with the capabilities and problems that exist in UPT SDN Tlogo 02 Blitar Regency. The development used by the author is the Borg and Gall development model which has been matched to the research needs (Syaiviana et al., 2023). This development model uses 7 modified stages as follows: 1) potential and problems, 2) data collection, 3) product design, 4) expert validation, 5) design revision, 6) product trial, and 7) product revision. The data obtained from the 7 stages of development are:

#### **A. Potential Problems**

At this stage, researchers conduct research to find out the problems that occur in schools. Researchers use interview instruments in the data collection process. Interviews are communication between two or more parties that can be done face to face where one party acts as an interviewer, with a specific purpose, for example to obtain information or collect data (Fadhallah, 2021). The interview was conducted with class 2 teachers of SDN Tlogo 02, Blitar Regency.

Based on the results of the interview with Mrs. Desi Kusuma Dewi as a grade 2 teacher, it was obtained information that students' reading and arithmetic skills declined due to the lack of supporting learning media. Learning is centered on the teacher with only lectures, and the lack of supporting books causes students to have difficulty understanding and remembering the material. In addition, it was also found that students lack awareness of the use of tolerance character strengthening in schools. One solution that researchers can provide to grade 2 teachers is the use of learning media. Learning media is media that conveys messages or information that contains the intent or purpose of learning (Hasan et al., 2021). The main function of learning media is to create conditions for students to capture knowledge accurately and deeply, develop cognitive capacity and shape students' personalities (Saleh & Syahrudin, 2023). Based on this, it is expected that learning media can be a solution to what happens in schools.

Researchers offer an alternative solution in the form of developing a Pop-Up Book learning media based on QR Code. Pop up book is an innovation in the form of a book that is able to display the potential and contents of the book through a 3-dimensional design that appears through a combination of folds, rolls, or rotations (Umam et al., 2019). Different from other Pop-Up Books, in this Pop-up Book the researcher integrates technology in the media in the form of using QR Code. QR Code is an image in the form of a two-dimensional matrix that has the ability to store data in it. (Wijaya & Gunawan, 2016). In addition to being useful for making it easier for students to understand the material, this media also provides students with experience regarding media by utilizing technology.

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## B. Data collection

The literature sources used by researchers to support the development of Pop Up Book Based QR Code products on addition and subtraction materials with story problems at UPT SDN Tlogo 02, Blitar Regency, namely using journals, books and the internet and have the aim of making it easier for researchers during the product creation process.

## C. Product Design

Based on product design, it is divided into 2 stages, namely:

### 1. Material Selection

The selection of materials in the development of Pop Up Book Based QR Code media products is through books, journals, and the internet that are relevant to the selected material. This is also through consideration by class teachers and media experts who are adjusted to the CP and ATP learning provided in supporting learning, so that it can make it easier for researchers to create development products.

### 2. Initial Design Planning

In developing learning media, researchers conducted several stages, namely: First, analyzing student needs through interviews and observations. This was done to determine learning media that were in accordance with existing problems, namely low reading and arithmetic skills of students and the lack of variation in learning media. Second, selecting materials related to addition and subtraction with story problems, which were adjusted to the potential and problems at UPT SDN Tlogo 02 Blitar Regency. Third, compiling Pop-Up Book media based on QR Code consisting of cover, foreword, table of contents, instructions for use, basic competencies, materials, barcodes, evaluations, and biographies of the author and supervising lecturer. Fourth, developing the final product in the form of Pop-Up Book media based on QR Code on addition and subtraction material with story problems. This media aims to improve students' reading and arithmetic skills, as well as assist teachers in achieving learning objectives. This initial design planning can be seen in Figure 1.

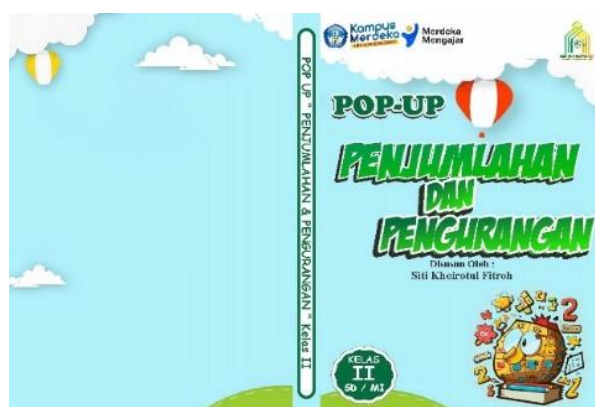


Figure 1. Initial Design Planning

## D. Expert Validation

Expert validation describes a set of processes carried out by researchers to assess finished goods for the purpose of (Windawati & Koeswanti, 2021). The results of the assessment are useful for determining the level of feasibility and validity of the product developed by the researcher. Validation of this product is carried out using a research instrument in the form of a questionnaire. A questionnaire is a data collection tool in the form of a series of written questions submitted to the subject to obtain written answers (Supriadi et al., 2020). This product uses 5 stages of validation including:

### a. Subject Matter Expert

#### 1) Material Expert Instrument Test

The Pop-Up Book learning media product based on QR Code developed by researchers has gone through a material expert instrument test. The assessment was carried out by Mrs. Cindy Alf, M.Pd., a lecturer at Nahdlatul Ulama University, Blitar, on May 29, 2024. The material expert assessment covers five aspects, namely clarity, content accuracy, relevance, content validity, and language accuracy. The assessment results show a percentage of 97.5%, which means that the learning media is in the "Very Valid" category. This shows that the Pop-Up Book learning media based on QR Code can be applied well in the learning process. The assessment guidelines for the recapitulation of values are presented in full in the appendix. The following is a graph of the results of the validation of the material expert instrument which can be seen in Figure 2.

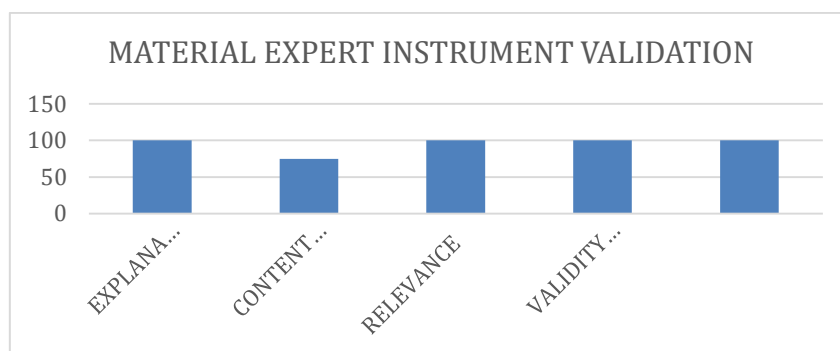


Figure 2. Material Expert Instrument Validation Test Graph

#### 2) Material Expert Validation Test

Validation of the material on the QR Code-based Pop-Up Book learning media product has also been carried out by Mr. Fathul Niam, M.Pd., a lecturer at Nahdlatul Ulama University Blitar, on May 31, 2024. The assessment covers three aspects, namely content/material, the feasibility of the QR Code-based Pop-Up Book content/material, and the QR Code content. The results of the material expert assessment showed a percentage of 100%, which means that the QR Code-based Pop-Up Book learning media is in the "Very Valid" category. Thus, this learning media can be applied well in the learning process.



The assessment guidelines for the recapitulation of values are presented in full in the appendix. The following is a graph of the results of the validation by material experts which can be seen in Figure 3.

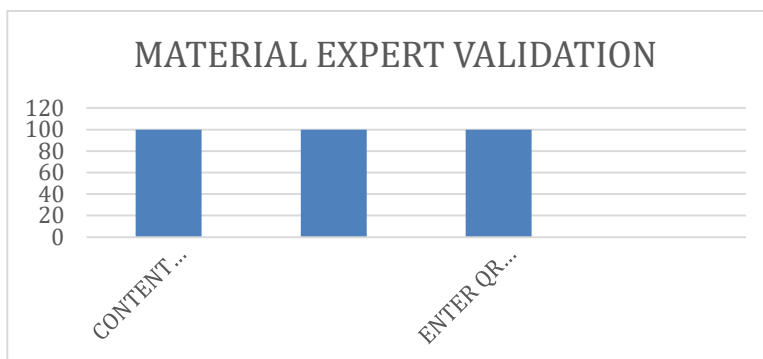


Figure 3. Material Expert Validation Graph

Based on the results above, it can be seen that the results of the validation test from the material expert obtained a percentage of 100% with a very valid category. This is in line with the results of the instrument validation conducted by Yunanda Pradiani et al., (2023) get a percentage of 90.96% from material experts. This shows that the material chosen by the researcher is valid material when used in learning and helps carry out research activities.

#### b. Media Expert

##### 1) Media Expert Instrument Test

On May 29, 2024, the media expert instrument was tested by Mrs. Cindy Alfi, M.Pd, a lecturer at Nahdlatul Ulama University, Blitar. The assessment includes: 100% clarity, 75% content accuracy, 100% relevance, 100% content validity, and 100% language accuracy. The total percentage is 97.5%, very valid category without revision. Based on the results, the instrument can be used without revision, in the interval 85.01% - 100%. The following graphic image of the results of the media expert instrument test can be seen in Figure 4.

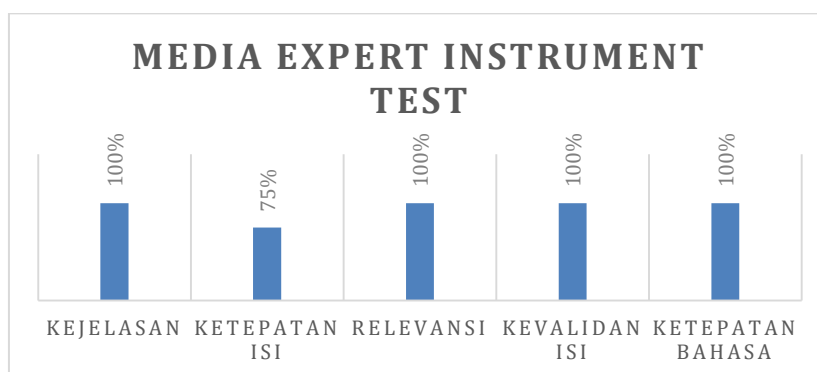


Figure 4. Media Expert Instrument Test Graph

## 2) Media Expert Validation Test

On May 30, 2024, Mr. Fernadiksa Rasta PP, M.Pd, a lecturer at Nahdlatul Ulama University Blitar, conducted media validation on the Pop Up Book Based QR Code product. The assessment includes 5 aspects: (1) Media Size, (2) Cover Design, (3) Content Design, (4) Use of QR Code, and (5) QR Code Design. The assessment results show: (a) Media Size 100%, (b) Cover Design 83.3%, (c) Content Design 100%, (d) Use of QR Code 100%, and (e) Video design in QR Code 93.75%. The total percentage is 96.25%, which is included in the "Very Valid" category without the need for revision.

Based on the above information, it can be concluded that the category standard obtained in the validation of the media expert instrument with an interval of 85.01 - 100%, with test provisions that have been equated with the number of calculations that obtain results, can be used without revision. The following graphic image of the media expert test results can be seen in Figure 5.

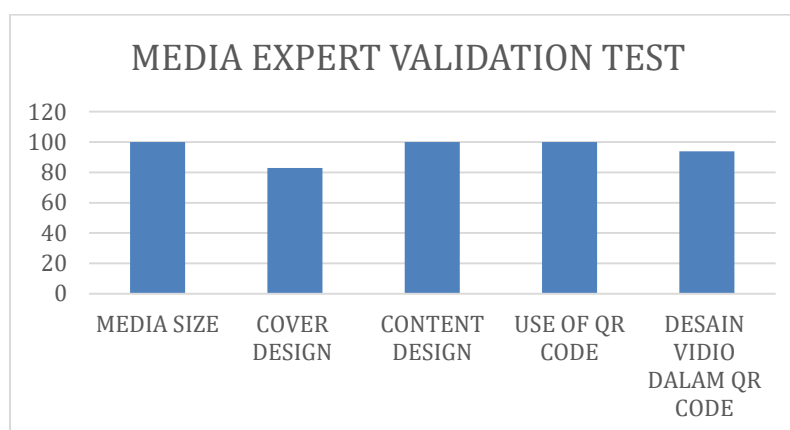


Figure 5. Media Expert Instrument Validation Test

Based on the results above, it can be seen that the results of the validation test from media experts obtained a percentage of 96.25% with a very valid category. This is in line with research conducted by Hartanti et al., (2020) get a percentage of 92.3% and 86.636%. It can be concluded that the media developed by researchers is a valid media when used in learning and helps carry out research activities.

## c. Linguist

### 1) Language Expert Instrument Test

On May 29, 2024, the language expert instrument for the Pop Up Book Based QR Code product was tested by Mr. Mohamad Fatih, M.Pd, a lecturer at Nahdlatul Ulama University, Blitar. The assessment includes 5 aspects: 100% clarity, 75% content accuracy, 87.5% relevance, 87.5% content validity, and 87.5% language accuracy. Overall, the assessment percentage was 90%, falling into the "Very Valid" category without revision. Based on these results, the language expert instrument can be used to assess the Pop Up Book Based QR Code learning media.

Based on the previous description, the results of the language expert instrument test for the Pop Up Book Based QR Code media showed a total percentage of 90%. This figure is in the interval of 85.01% - 100%, so it is included in the "Very Valid" category and can be used without revision. The following graphic image of the media expert validation results can be seen in Figure 6.

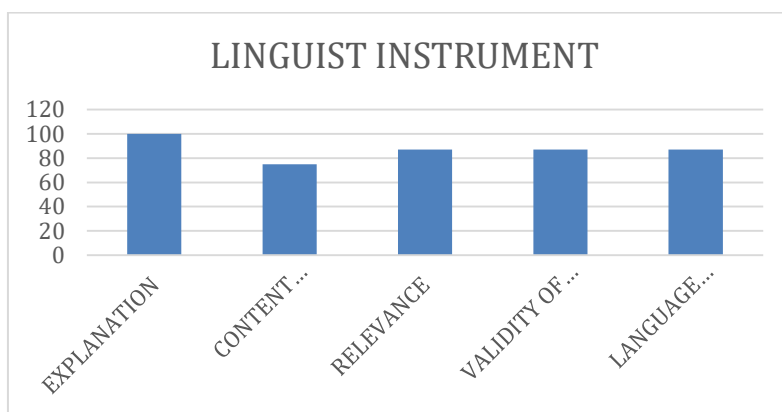


Figure 6. Language Expert Instrument Test Graph

## 2) Language Expert Validation Test

On May 31, 2024, language validation for the Pop Up Book Based QR Code product was carried out by Mrs. Latifatul Jannah, M.Pd, a lecturer at Nahdlatul Ulama University, Blitar. The aspects assessed include the relevance of language rules, clarity and communicativeness, and the use of terms, symbols, and icons. The assessment results showed: (a) conformity of language rules 87.5%, (b) clarity and communicativeness 95%, and (c) use of terms, symbols, and icons 75%. Overall, the assessment percentage was 87.5%, which fell into the "Very Valid" category without revision. Based on the description above, the validation of the language expert instrument for the Pop Up Book Based QR Code product obtained a percentage assessment of 87.5%. This figure is in the interval of 85.01% - 100%, so it is included in the "Very Valid" category and can be used without revision. The following graphic image of the language expert validation can be seen in the Figure 7.

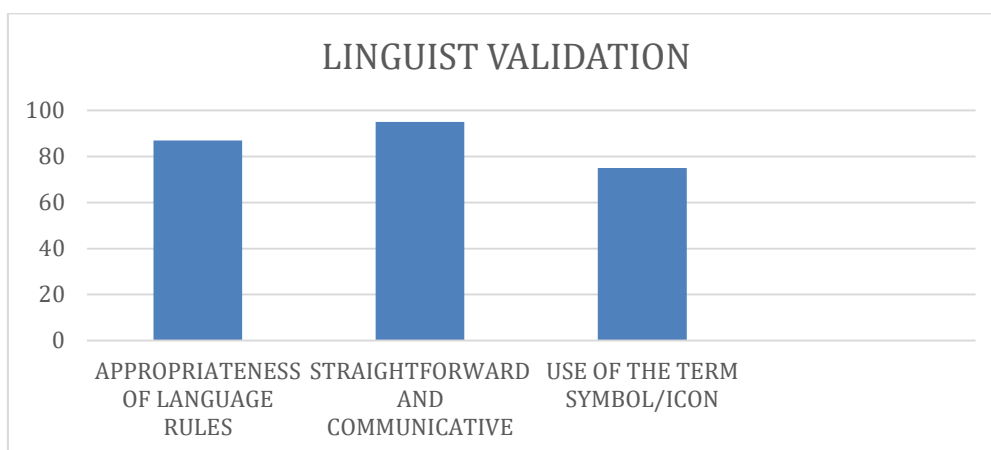


Figure 7. Validation Graph of Language Expert Instrument

Based on the results above, it can be seen that the results of the validation test from language experts obtained a percentage of 87.5% with a very valid category. This is in line with research conducted by (Nursela et al.,(2022)which received a percentage of 85.5% from language experts. So it can be concluded that the language used by researchers is a valid language when used in learning and helps carry out research activities.

#### d. Media Eligibility

The media feasibility instrument for the Pop Up Book Based QR Code product has been tested by Mr. Mohamad Fatih, M.Pd, a lecturer at Nahdlatul Ulama University, Blitar, on May 29, 2024. The assessment was carried out on 5 aspects: (1) Clarity, (2) Accuracy of Content, (3) Relevance, (4) Validity of Content, and (5) Accuracy of Language. The assessment results showed a total percentage of 90%, which is included in the "Very Valid" category. Thus, the learning media can be applied without revision.

The assessment guidelines for the recapitulation of values are presented in full in the appendix. The following is a graphic image of the results of the validation of the media suitability instrument.

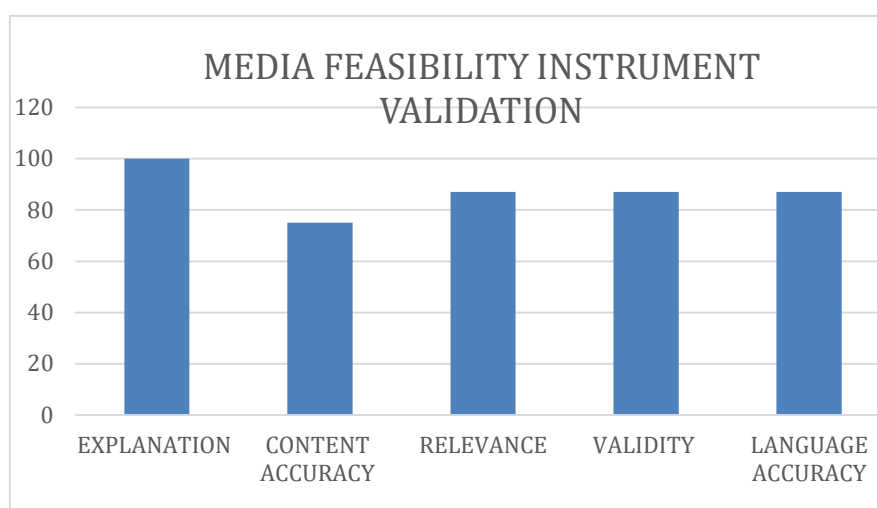


Figure 8. Media Feasibility Validation Test Graph

On May 29, 2024, validation of the media feasibility for the Pop Up Book Based QR Code product was carried out by Mrs. Desi Kusuma Dewi, S.Pd, a grade 2 teacher at UPT SDN Tlogo 02 Blitar. The aspects assessed include the appearance, presentation of materials, and benefits of the media. The assessment results showed a percentage of 97.5%, which is included in the "Very Feasible" category. Thus, this learning media can be applied. In full, the assessment guidelines for the recapitulation of values are presented in the appendix, accompanied by a graphic image of the results of the media suitability validation Figure 9.

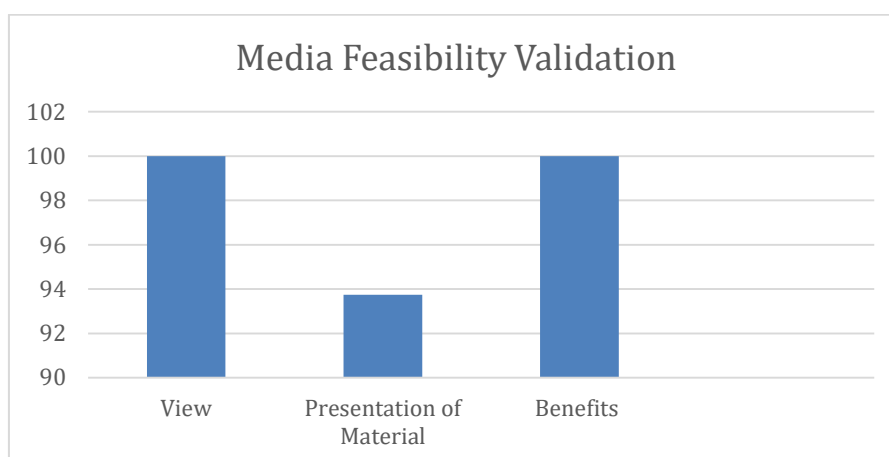


Figure 9. Media Feasibility Validation Graph

Based on the results above, it can be seen that the results of the media feasibility test obtained a percentage of 97.5% with a very very feasible category. This is in line with research conducted by Amalia et al.,(2019)which states that the Pup-Up Book media is a media that is suitable for use in classroom learning activities. So it can be concluded that the media developed by the researcher is a media that is suitable for use in learning and helps carry out research activities.







#### e. Student Interest Result Data

On June 10, 2024, 27 2nd grade students of SDN Tlogo 02 filled out a questionnaire to find out the attractiveness of the Pop Up Book Based QR Code product that had been developed by the researcher. The aim was to find out whether this pop-up book-based learning media was interesting and could help students understand the material easily. The aspects assessed included students' understanding, enjoyment, and their tendencies towards the media. Based on the results of the questionnaire, it was concluded that the Pop Up Book Based QR Code media met the attractiveness standards with a percentage of 90.94% which was included in the "Very Interesting" category. Therefore, this media can be applied as a learning tool in 2nd grade Elementary School. This is in line with research conducted by Lailatul et al.,(2021) get a percentage of 97.4% and is included in the very good category. So it can be concluded that the media developed by the researcher is an interesting media for students when used in learning and helps carry out research activities.

#### E. Design Revision

Design changes were implemented after the media validation process carried out by experts including material experts, media experts, and language experts with the aim of estimating the weaknesses and deficiencies in the Pop Up Book Based Qr Code. The results of the Pop Up Book Based Qr Code media revision will later make the Pop Up Book Based Qr Code more feasible to be tested on students. Regarding the results of the design revision from several experts shown in Table 1.

Table 1. Design Revision

| No. | Before Revision                                                                                                                                                 | After Revision                                                                                                                                                                          |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.  |  <p>Fix the formula words so they are easy to understand</p>                   |  <p>The selection of formula words has been improved to make it easier for students to understand.</p> |
| 2.  |  <p>Improve your word choice to make it easier for students to understand.</p> |  <p>The choice of words has been improved to make it easier for students to understand.</p>            |
| 3.  |  <p>Fix addition story problems</p>                                           |  <p>The learning story related to the material has been fixed</p>                                     |

## F. Product Trial

The trial of the Pop Up Book media product based on QR Code was conducted in two stages, namely a small-scale trial and a large-scale trial. The aim was to determine the level of success in developing the media. One of the aspects tested was the improvement of students' reading and arithmetic skills (Reading and Arithmetic Skills). The results of the small-scale trial and the large-scale trial related to the test of improving students' reading and arithmetic skills are presented in the next section.

### a. Test Instrument for Improving Students' Reading and Arithmetic Skills.

To determine the validity of the test instrument for improving students' reading and arithmetic skills, a product trial and test were conducted on students. The test instrument consisted of 10 multiple-choice questions that were tested on grade 3 students at UPT SDN Tlogo 02, Blitar Regency. The results of the validity test showed that all questions were declared valid, because the Person correlation value was greater than the  $r$  table. Thus, the test instrument can be used to assess the improvement of students' reading and arithmetic skills related to the Pop Up Book Based QR Code media. In addition, a reliability test was also conducted on the instrument, the results of which are presented in the following table.

Table 2. Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| ,928             | 10         |

Based on the reliability test utilizing SPSS 21, it can be said that the reliability instrument with the Cronbach's Alfa 928 criteria with a total of 10 items is at a reliability standard of  $0.90 < r_{11} \leq 1.00$  with a very high reliability category. So, the student instrument can be run to see the improvement of students' reading and arithmetic skills through the Pop Up Book Based Qr Code media.

#### b. Small Scale Test Improvement Test

A small-scale trial of the Pop Up Book Based QR Code media product was conducted on May 29, 2024 with 15 grade 4 students as subjects. The results of the small-scale test related to improving students' numeracy skills showed a final percentage of 93.3%. Based on the established category criteria, the results of this small-scale test are in the interval of 85.01% - 100%, so it can be concluded that the Pop Up Book Based QR Code media can be used without the need for revision.

#### c. Large Scale Test of Students' Improvement in Reading and Arithmetic Skills

A large-scale trial of the Pop Up Book Based QR Code media product was conducted on June 10, 2024 with 27 grade 2 students as subjects at UPT SDN Tlogo 02, Blitar Regency. The results of the large-scale test related to improving students' numeracy skills showed a final percentage of 95%. Based on the established category criteria, the results of this large-scale test are at the interval of 85.01% - 100%, so it can be concluded that the Pop Up Book Based QR Code media can be used without the need for revision. The assessment data from each aspect is also shown in graphical form.

#### d. Improving Students' Reading and Arithmetic Skills

The improvement of students' reading and arithmetic skills refers to changes in the ability to use numbers or basic mathematical symbols to solve everyday life problems, analyze information in various forms (graphs, tables, diagrams, etc.), and interpret the results of the analysis to make predictions and decisions. In this study, the application of Pop Up Book Based QR Code media was tested to determine the extent of its effect in improving students' reading and arithmetic skills. The results of the data on the improvement of students' Reading and Arithmetic Skills obtained from this study are presented Table 3.

Table 3. Improvement of Students' Reading and Arithmetic Skills

|                    | N  | Statistik Deskriptif |         |         |                |
|--------------------|----|----------------------|---------|---------|----------------|
|                    |    | Minimum              | Maximum | Mean    | Std. Deviation |
| Gain_score         | 27 | ,00                  | ,75     | ,5364   | ,20980         |
| Gain_percent       | 27 | ,00                  | 75.00   | 53,6420 | 20.98044       |
| Valid N (listwise) | 27 |                      |         |         |                |

The trial phase of the Pop Up Book Based QR Code media product, both on a small scale (May 29, 2024) and a large scale (June 11, 2024), which was carried out at the UPT SDN Tlogo 02 Blitar Regency, has obtained a "Very Interesting" assessment result. This is in line with research conducted by Putra(2022) which found that there was an effective increase in ability after implementing learning

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using Pop-Up Book media. Thus, the media development product to improve students' reading and arithmetic skills on addition and subtraction material with story problems, can be used as a learning medium at UPT SDN Tlogo 02 Blitar Regency. Several criticisms and suggestions from respondents were also obtained as input for further development.

From the description above in the discussion section, it can be concluded that the researcher will develop a Pop Up Book learning media based on QR Code to improve reading and arithmetic skills on addition and subtraction material with story problems for grade 2 students at UPT SDN Tlogo 02 Blitar Regency. The development of this media aims to help improve students' abilities in understanding the concept of addition and subtraction presented in the form of story problems. Through Pop Up Book media based on QR Code, it is hoped that students can learn interactively and interestingly so that they can increase their motivation and learning outcomes. The author will use the ADDIE development model which consists of the stages of analysis, design, development, implementation, and evaluation. In addition, product validation will be carried out by material experts, media experts, and language experts to determine the feasibility of the media being developed. Product trials will also be conducted on grade 2 students to determine the effectiveness of the media in improving reading and arithmetic skills.

#### 4. Conclusion

Based on the data analysis that has been carried out, it can be seen that QR code-based pop-up book media is a feasible and valid media to be used in the learning process. QR code-based pop-up book media is also an interesting media for students so that they are more interested, easy to understand and motivated in participating in the learning activities that have been carried out. The use of QR code-based pop-up book media in learning can improve the reading and arithmetic skills of grade 2 students of UPT SDN Tlogo 02, Blitar Regency. This is evidenced by the results of the pre-test and post-test which showed a significant increase in the reading and arithmetic skills of grade 2 students of SDN Tlogo 2, Blitar Regency. These results indicate that QR code-based pop-up book media is a media that can be used as a means for students to understand the learning materials given by the teacher.

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