

Development of Musical Instrument Multiplication Learning Media for Memorizing Student of Elementary School

Ida Sukowati¹, Novi Wardana², Felmi Azzahra³

¹Universitas Darul Ulum Lamongan, idasukowati22@gmail.com

² Universitas Bilfath Lamongan, noviwardana123@gmail.com

³ Universitas Bilfath Lamongan, felmiazzahraa@gmail.com

ARTICLE INFO

Keywords:

*Media; Multiplication suitcase;
Musical instruments;
Elementary school students.*

Article history:

Received 08-05-2026

Revised 15-05-2026

Accepted 27-05-2026

ABSTRACT

The This research aims to develop a learning medium for musical instrument multiplication suitcases and assess the quality of the product. The method used in this research is the development with the Borg and Gall development model design which the researcher simplified into 7 stages. The results of the media expert validation showed a final score of 27 out of a maximum score of 32, with a percentage of 84% and a classification of the 'Very Appropriate' category. The material expert gave a final score of 25 out of a maximum score of 28, with a percentage of 89% and a classification of the 'Very Appropriate' category. Based on the pretest and posttest results, there were significant changes, with an average pretest result of 60, while the average posttest result reached 92. These results indicate that the average posttest result is higher than the average pretest result. By using the measurement of media effectiveness using N Gain, the result score of 0.80 or 80% is included in the 'Effective' category as a learning media for musical instrument multiplication suitcases to memorize multiplication in grade 2 of PaciranElementary School.

This is an open access article under the [CC BY-NC-SA](https://creativecommons.org/licenses/by-nc-sa/4.0/) license.



Corresponding Author:

Ida Sukowati

Universitas Darul Ulum Lamongan; idasukowati22@gmail.com

INTRODUCTION

Mathematics is a fundamental science for dealing with changes in human life, such as changes for progress and opportunities in the digital world. Suherman (2020) states that mathematics is useful for preparing someone to be able to face life's constant changes, through training in logical and rational thinking, critical, careful, objective, creative, effective, and analytical and synthetic calculations. For elementary

school children, mathematics is important to teach because at the basic level, children master mathematical concepts that will then be used in more advanced levels.

The development and characteristics of children during elementary school age vary from one child to another. The characteristics of children in the lower grades differ from those in the upper grades, as can be seen in the child's learning process. Elementary school age children, especially those in the lower grades, have not yet fully developed their cognitive skills, but children in the upper grades are already able to think and create broadly. The characteristics of children during elementary school are:

According to Sumantri and Nana Syaodih (2006), the Lower Class enjoys playing, moving, working in groups, and experiencing or doing things directly. Listening activities can help train the ear and mind. This exercise is designed to help improve skills, especially those related to listening to music. Everyone loves music and everyone has heard music. Listening to music is an activity that is often enjoyed by all groups, from babies in the womb or fetuses to adults and the elderly. Music lays the foundation for the development of language skills, speaking, understanding, expression, and vocabulary (Philip Sheppard, 2007: 116). Listening to music can stimulate or stimulate emotional responses, which in therapeutic terms is referred to as the activation of various feelings.

Music is a useful tool for stimulating the intellectual and emotional intelligence of children from the infancy phase in the womb, toddlerhood, and motivating children from preschool to school age. Based on observations at SD IT Al Muslimin, every morning before class there is always a habit of memorizing multiplication together, so that students understand the basics of multiplication for the lessons to be learned. Then the researcher observed and interviewed also to the Public Elementary Schools in the Cihideung sub-district, namely MI Teladan, SDN Tuguraja 2 and SDN Sukarame, the researcher found the problems that emerged were that from the three Elementary Schools observed, each class experienced difficulties in the process of calculating mathematics, especially in the material of the concept of multiplication and grades below the KKM, the learning atmosphere in the classroom seemed less active because only a few students dared to ask and answer, and some students thought that mathematics learning was considered difficult.

So that students were less interested and felt bored during mathematics learning, this showed a lack of interaction in the learning process. Thus, student interest in the learning process was very low. As a result, students were less enthusiastic and paid less attention in learning and tended to do their own activities. These problems resulted in some students who still had little memorization of multiplication so that it affected the value of mathematics lessons in learning. Thus, the right learning media was needed to attract students' interest in learning in the learning process. As a result, student interest in the learning process is very low. Consequently, students lack enthusiasm and pay less attention to learning, tending to engage in individual

activities. These issues result in some students having limited multiplication comprehension, which impacts their math grades.

Based on the problem description above, this study aims to develop a learning media for the Multiplication Suitcase Musical Instrument to Memorize Multiplication for Grade 2 Elementary School Students. It is hoped that with this learning media, students will be more involved and enthusiastic in the mathematics learning process, improve their understanding of the concept of multiplication, and strengthen their counting skills in a fun and creative way. Thus, it is hoped that this learning media can be an effective tool in motivating students to learn mathematics, creating an interactive learning atmosphere, and improving student learning outcomes in Grade 2 Elementary School.

METHODS

This research is a development research. Research and Development (R&D) which is used to produce products in the field of education. According to Borg and Gall (1989), Research and Development (R&D) is an educational development research method that aims to develop and validate educational products. This research adopts the Borg and Gall development model design in Sugiyono (2017: 298), which includes 10 research steps or stages, namely research and information collecting, planning, develop preliminary form of product, preliminary field testing, main product revision, operational product testing, final product revision, operational product testing, dissemination, dan implementation.

Researchers simplified these stages into 7 stages, namely until final product revision, considering that at the undergraduate level, this step is considered quite appropriate. This simplification was also taken into account by considering the researcher's time and budget constraints, in line with Borg and Gall's opinion, as cited by Adelina Hasyim (2016: 88), that large-scale R&D research requires significant costs and a considerable amount of time. The following are the seven stages undertaken during the research:

1. Research and Information Collecting. At this stage, researchers collected data to identify problems by conducting literature studies, observations, and interviews in several elementary schools, such as MI Teladan, SDN Sukarame, and SDN Tuguraja.
2. Planning After identifying the problem, the researcher sets research objectives based on the problem findings and plans the steps to be taken to achieve these objectives.
3. Develop Preliminary Form of Product Researchers designed learning media using multiplication musical instruments to make learning more enjoyable. Research instruments were also developed, including expert validation to assess the appropriateness of the learning media.
4. Preliminary Field Testing. The learning media was tested on small groups (5 elementary school students) to obtain student input and responses.

5. Main Product Revision. After the first trial, researchers refined the media based on input from student response questionnaires to ensure that the learning media met needs and provided an optimal learning experience.

6. Operational Product Testing The learning media was tested on a large group (15 elementary school students) to measure the effectiveness and feasibility of the media more broadly.

7. Final Product Revision. Based on the results of the second trial, the researcher made final revisions to the learning media before reporting the research results.

FINDINGS AND DISCUSSION

The results of this study produced a product in the form of a musical instrument multiplication suitcase developed for mathematics learning in grade 2 multiplication material at Paciran Elementary School. The resulting learning media aims to help students understand the concept of multiplication, and this study also tests the feasibility of the musical instrument multiplication suitcase product. The research method used is Research and Development (R&D) with the Borg and Gall development model in Sugiyono (2017: 298), which includes 10 steps or stages of research. However, the researcher simplified these stages into 7 stages for the purposes of this study.

The following is an explanation of the research results using the musical instrument multiplication suitcase learning media product, with details at each stage:

1. Research And Information Collection. At this stage, the researcher collected data to identify the problem through literature review, observation, and interviews in several elementary schools, including MI Teladan, SDN Sukarame, and SDN Tuguraja 2, especially in grade 2.

2. Planning. After collecting information and data, researchers plan steps based on the problem findings to determine the research objectives to be achieved.

3. Develop Preliminary Form of Product at this stage, the researcher began to develop learning media for musical instrument multiplication suitcases based on previous planning.

4. Preliminary Field Testing. The learning media was tested on a small group elementary school students to obtain student input and responses regarding the effectiveness and adequacy of the media.

5. Main Product Revision. After the first trial, the researcher made revisions to the media. learning based on input and suggestions obtained from student response questionnaires.

6. Operational Product Testing at this stage, the revised learning media was trialed on a large group (15 elementary school students) to measure the effectiveness and feasibility of the media more broadly.

7. Final Product Revision After the large-group trial, feedback and suggestions were obtained. This is the final stage, involving final revisions to the learning media before reporting the full trial results.

Small group trial was conducted with five elementary school students in the researcher's neighborhood. The analysis results from the small-group trial are shown in Table 1 below.

Table 1. Small Group Trial Results

No	Number	Mark
1.	Azizilia	18
2.	Cooking	19
3.	End	18
4.	Reifan	18
5.	Reinisa	19
Amount		92
Rate-rate		18.4
Media Qualifications		96.8%

Based on the table, it can be seen that the musical instrument multiplication suitcase learning media obtained an average score of 18.4 with a feasibility of 96.8% so that it can be categorized as a learning media in the "Very Feasible" category. A large-group trial was conducted at SDN Tuguraja 2 in second-grade elementary school. The number of respondents in the large group was 10. The results of the large-group trial are shown in the following table:

Table 2. Large Group Trial Results

No	Number	Mark
1.	Justice	20
2.	Alps	20
3.	Alya	18
4.	Alisa	20
5.	Asipa	20
6.	Asila	20
7.	Azril	20
8.	Fauzan	18
9.	Kite	20
10.	There	20
Amount		196
Rate-rate		19,6
Media Qualifications		98,0%

Based on the table, it can be seen that the musical instrument multiplication suitcase learning media obtained an average score of 19.6 with a feasibility of 98.0%. Therefore, it can be categorized as a learning media with the category of "Very Feasible." In addition to conducting small and large group tests, the researchers also conducted an effectiveness test on the learning media that had been developed by conducting a protest and pretest. The results of the effectiveness test analysis can be seen in Table 3 below.

Table 3. Experimental Class Research Results

Experimental Class
Rate-Rate0,80 80%
Minimal 80 80%
Maximum100 100%

Based on the research results by calculating N-Gainscore It can be seen that the experimental class obtained an average score of 0.80 or 80%, which is classified as 'Effective'. With a minimum N-Gain value of 80% and a maximum of 100%.

Table 4. Results of the Control Class Research

Experimental Class
Rate-Rate0,48 48%
Minimal 40 40%
Maximum100 100%

Based on research results with N-Gain calculations score It can be seen that in the control class the average score was 0.48 or 48%, which is classified as 'Less Effective'. With an N-Gain value of score a minimum of 40% and a maximum of 100%. Therefore, it can be concluded that the use of the lecture method in learning is declared "quite effective" in the mathematics subject of multiplication.

Discussion

The learning process of musical instrument multiplication suitcase learning media in this study uses the research type Research and Development (R&D) with the Borg and Gall learning model in Sugiyono (2017: 298) which states 10 steps or stages of research, namely: research and information collecting, planning, develop preliminary form of product, preliminary field testing, main product revision, operational product testing, final product revision, operational product testing, dissemination and implementation. Researchers simplify these

stages into 7 stages that will be carried out during the research, namely until *final product revision* because at the undergraduate level this step is already suitable for use and also considering the length of time for research on learning media for musical instrument multiplication suitcases.

The first stage is research and information collecting. At this stage, the most important thing to do is analyze the needs of the product developed through a structured interview with the teacher of Paciran Elementary School, Mrs. Herni Rosteti, S.Pd., that in class II the teacher only uses simple learning media such as multiplication tables, so that students are less enthusiastic and do not understand the concept of multiplication in the learning process.

The second stage is planning, The researcher conducted an analysis of similar media to determine suitable media for multiplication material, after which the researcher made product sketches and song lyrics for the learning media, and also prepared the tools and materials used to make the suitcase media. The third stage is develop preliminary form of product, Researchers began developing and compiling learning media designs and also created instruments for validation with experts (validators), namely media experts, material experts, and language experts. The role of the experts is to find out the truth about the design, content of the media created along with its appearance, then the role of the material expert is to find out the truth about the material, learning, and content. While the language expert is to find out the truth and suitability of the language used in the media.

The fourth stage is preliminary field testing. Researchers conducted a field trial of the learning media. Researchers conducted a trial of the learning media with elementary school children around the house for a small group and at SDN Tuguraja 2 for a large group test. This trial was conducted to determine the effectiveness of the learning media on student learning interest, supported by an interesting and easy-to-use method. To determine the assessment of respondents or students towards the learning media for musical instrument multiplication suitcases, the average score was calculated from the results of the student response questionnaire sheet for the learning media for musical instrument multiplication suitcases.

The fifth stage is Main Product Revision. After small and large group trials and expert validation, the musical instrument multiplication suitcase learning media was found to be highly suitable and could proceed to the next stage. Based on the experts' suggestions, the musical instrument multiplication suitcase learning media was already good and required no further revision.

The sixth stage is operational product Testing. At this stage, questions are given in the form of pretest to all students in the experimental and control classes to measure their initial abilities. After the pretest, the experimental class was

shown the multiplication suitcase learning media for musical instruments as a form of treatment. After that, the experimental class was given *posttest* to all students in the experimental and control classes. The media was used in 3 meetings.

The seventh stage is final product revision the final stage was revision after the trial. However, because there were no suggestions or deficiencies, no improvements were made. Therefore, at this stage, the researchers did not revise the musical instrument multiplication suitcase learning media.

The feasibility of the musical instrument multiplication suitcase learning media was obtained from the results of feasibility test data by media experts, material experts, and language experts. The feasibility data obtained are described as follows:

a. Media Member Qualification Data Results

Based on the results of the respondent assessment with an average score of 0.84 with a very good category classification and an assessment statement with a suitable category for use.

b. Results of Material Expert Feasibility Data

Based on the results of the respondent assessment with an average score of 0.89 with a very good category classification and an assessment statement with a suitable category for use.

c. Linguist Qualification Data Results

Based on the results of the respondent assessment with an average score of 0.91 with a very good category classification and an assessment statement with a suitable category for use.

Based on the data above, it can be concluded that the music multiplication suitcase media is declared to be included in the very suitable category for use according to the validation results from the experts. After being declared very suitable by the expert team, the suitability of the musical instrument multiplication suitcase media was obtained from the suitability results of student respondents, namely as follows:

a. Results of Small Group Trials

The small group test results yielded an average score of 18.4, with a feasibility rating of 96.8%. Therefore, it can be categorized as a learning media with a "Very Feasible" rating.

b. Results of Large Group Trials

c. The results of the small group test showed an average score of 19.6 with a feasibility of 98.0%. Therefore, it can be categorized as a learning media with the category of 'Very Feasible'. This indicates that the media is feasible and that student responses during both the small and large group tests both had a positive response to the musical instrument multiplication suitcase media.

Furthermore, testing was conducted to determine the effectiveness of the musical instrument multiplication suitcase learning media developed by administering questions using a test instrument consisting of 10 multiple-choice questions. The results of the question validation by the material expert showed that the questions were in accordance with the material, with a percentage score of 98%, categorized as 'Very Valid'. Furthermore, the questions were in accordance with the indicators, with a percentage score of 96%, categorized as 'Very Valid'.

After knowing the results of the question validation from the material experts, it can be concluded that the questions are 'Suitable' for use. Then, it is carried out pretest First, the two classes being tested were the experimental class using musical instrument multiplication suitcase learning media and the control class without learning media. Then, it ended with the provision of questions posttest.

CONCLUSION

The validation results of the musical instrument multiplication suitcase learning media were carried out to experts, including: media experts, material experts, and language experts. Each expert had the following results: media expert validation obtained a score of 27 out of a maximum score of 32. With a percentage of 84%. The score obtained was 84%, which is in the 'Very Appropriate' criteria. Material expert validation obtained a score of 25 out of a maximum score of 28. With a percentage of 89%. The score obtained was 89%, which is in the 'Very Appropriate' criteria. Language expert validation obtained a score of 22 out of a maximum score of 24. With a percentage of 91%. The score obtained was 91%, which is in the 'Very Appropriate' criteria. Small group trials were conducted by 2nd grade elementary school children in the researcher's neighborhood. The number of respondents in the small group was 5 students.

The musical instrument multiplication suitcase learning media obtained an average score of 18.4 with a feasibility of 96.8%. So it can be categorized as a learning media with the category 'Very Feasible'. A large group trial was conducted at SDN Tuguraja 2 in class II. The number of respondents in the large group was 10 students. The musical instrument multiplication suitcase learning media obtained an average score of 19.6 with a feasibility of 98.0%. Sourced from the results of expert research and trials on small and large groups, the musical instrument multiplication suitcase learning media is 'Very Feasible'. To be used as a learning media in mathematics subjects with multiplication material. Based on the results of field research for the effectiveness of media with N-Gain score calculations, it can be seen that in the experimental class, the average value is 0.80 or 80%, including the interpretation category 'Effective'. With a minimum N-Gain score of 80% and a maximum of 100%.

Based on the results of research with N-Gain score calculations, it can be seen that the control class gets an average of 0.48 or 48%, including the interpretation category 'less Effective'. With a minimum N-Gain score of 40% and a maximum of 100%. Based on the experimental class and the control class, the results obtained mean that the musical instrument multiplication suitcase learning media is declared feasible and effective for use in mathematics subjects with multiplication material.

REFERENCES

- Abdillah, W. C., & Sukamto, S. (2018, August). Pengembangan Media Pembelajaran Koper Matematika Untuk Meningkatkan Kemampuan Pemecahan Masalah Matematika Siswa SD. In *SEMINAR NASIONAL PGSD 2017*.
- Abu Achmadi dan Widodo Supriyono, 2004. Gagne. Robert M, 1989. Kondisi Belajar dan Teori Pembelajaran.
- Borg, W. R. and M. D. Gall. 2020. Educational Research: An Introduction. Fifth Edition. New York and London: Longman
- Djohan. 2009. Psikologi Musik. Yogyakarta: Penerbit Best Publisher
- Eko Putro Widoyoko. (2013). Teknik Penyusunan Instrumen Penelitian. Yogyakarta: Pustaka Pelajar. Furi, Meitha Dewi. (2020). Pengembangan Media Pembelajaran Tas Pintar Pada Konsep Perkalian di SDN 1 Papayan. Tasikmalaya.
- Jamalus. 1988. Panduan Pengajaran Buku Pengajaran Musik Melalui Pengalaman Musik. Jakarta: Proyek Pengembangan Lembaga Pendidikan.
- John M dan Ortiz, Ph.D. 2002. Nurturing Your Child With Music. Jakarta : PT Gramedia. Pustaka Utama. Jamalus. (1975). Musik II. Bandung : Masa Baru. Mulyadi.
- Kamus Besar Bahasa Indonesia. (1990). Jakarta: Balai Pustaka. Hasbullah. (1999) Dasar – Dasar Pendidikan. Jakarta: RajaGrafindo Persada.
- Rusman. (2013). Model-model Pembelajaran. Jakarta: Rajawali Pers.
- L Ariani · 2014 - 2008. Evaluasi Pembelajaran. Yogyakarta: Multi Pressindo. Martono, Nanang. 2010. Metode Penelitian Kuantitatif. Jakarta: PT Raya. Grafindo Persada.
- Malm, William P. 1996. Music Cultures of the Pacific, The Near East, and Asia Third Edition. London: Oxford University Press
- Martasera, L., Listyarini, I., & Untari, M. F. A. (2018, March). Keefektifan Media Kantong Perkalian (Koper) Terhadap Kemampuan Berhitung Dalam Mata Pelajaran Matematika Kelas Ii Sdn Tlogosari Kulon 05 Semarang. In *Prosiding Seminar Nasional Hima Dan Prodi Pgsd 2017*.
- Philip Sheppard. 2007. Musik Makes Your Child Smarter. Jakarta: PT Gramedia. Pustaka Utama. B. Esti Pramuki, dkk. 2008 – 2009. Bahasa Indonesia.
- Satiadarma, M. P & Zahra. (2004), Cerdas dengan musik. Jakarta: Puspa Suara. Satrianingsih 2006, Pengaruh musik terhadap perkembangan emosi anak usia tk (ditinjau dari aspek psikologi)', Skripsi Program Studi Ilmu Psikologi, Universitas

Negeri Semarang, diakses 18 Agustus 2018

- Setiawan, Y. (2020). Pengembangan Media Koper Perkalian Hitung (Kotatung) Pada Pembelajaran Tematik Tema 2 Subtema 4 Kelas 2 Sekolah Dasar (Doctoral dissertation, Universitas Muhammadiyah Malang).
- Suherman, Eman dkk. (1992). Strategi Belajar Mengajar Matematika. Modul 1-9. Jakarta: Departemen Pendidikan dan Kebudayaan.
- Sylado, Remy. 1983. Munuju Apresiasi Musik. Bandung: Angkasa
- Sugiyono. (2014). Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D. Bandung: Alfabeta.