# Pekendo Mystery Box Media to Improve Fourth Grade Science and Social Learning Outcomes for Elementary School Students

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**A R T I C L E   I N F O**

**A B S T R A K**

*Kurangnya media pembelajaran IPAS menyebabkan siswa merasa kesulitan dalam belajar. Hal ini berdampak pada hasil belajar yang rendah. Tujuan penelitian ini yaitu mengembangkan media pembelajaran Mistery Box Pekendo untuk peserta didik kelas IV SD pada materi Persebaran Kerajaan di Indonesia. Jenis penelitian ini yaitu yaitu Research and Development (R&D) dengan menggunakan model pengembangan Borg and Gall. Kelayakan produk yang telah dihasilkan diuji oleh validator ahli materi, ahli media, dan pengguna (guru) di. Subjek penelitian adalah siswa kelas IV SDN yang berjumlah 20 siswa. Metode pengumpulan data dalam penelitian yang dilakukan adalah wawancara, observasi, tes, angket, dan dokumentasi. Instrumen pengumpulan data menggunakan lembar kuesioner dan soal tes. Teknik yang digunakan untuk menganalisis data yaitu analisis deskriptif kualitatif, kuantitatif, dan statistik inferensial. Hasil penelitian yaitu Penilaian dari ahli media yaitu 95% (sangat layak) dan ahli materi yaitu 83% (sangat layak). Hasil uji-t menunjukan bahwa terdapat perbedaan hasil belajar siswa setelah menerapkan media mistery box pekendo pada pembelajaran materi IPAS. Hasil uji N-Gain menunjukan bahwa peningkatan hasil belajar peserta didik termasuk sedang. Disimpulkan bahwa media mistery box pekendo pada pembelajaran materi IPAS layak digunakan dan efektif meningkatkan hasil belajar siswa kelas IV SD. Implikasi penelitian ini yaitu media yang dikembangkan membantu siswa dalam belajar.*

**A B S T R A C T**

The lack of science learning media causes students to find it challenging to learn. This has an impact on low learning outcomes. This research aims to develop the Mistery Box Pekendo learning media for fourth-grade elementary school students on material about the Spread of Kingdoms in Indonesia. This type of research is Research and Development (R&D) using the Borg and Gall development model. The product's feasibility is tested by material expert validators, media experts, and users (teachers). The research subjects were 20 grade IV SDN students. Data collection methods in the research were interviews, observation, tests, questionnaires and documentation. Data collection instruments use questionnaires and test questions. The techniques used to analyze data are qualitative descriptive analysis and quantitative and inferential statistics. The research results are that the assessment from media experts is 95% (very feasible), and material experts are 83% (very feasible). The t-test results show differences in student learning outcomes after applying the mystery box pekendo media in learning science material. The results of the N-Gain test show that the increase in student learning outcomes is moderate. It was concluded that the mystery box pekendo media in learning science material is suitable for use and is effective in improving the learning outcomes of fourth-grade elementary school students. The implication of this research is that the media developed helps students learn.

## 1. INTRODUCTION

Education brings changes to humans so that they can increase their potential according to the developments of the times. National education develops students' potential to become citizens who are equal in fear, knowledge, democracy, and responsibility (Arifa & Prayitno, 2019; Diantoro et al., 2021;

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Suryadi S., 2017). If educational goals are achieved with good quality, then this needs to be embedded in the curriculum. The curriculum is a plan that must be integrated into the educational process, especially for national education goals (Arwanda et al., 2020; Sefriani & Sepriana, 2020). Efforts to improve the quality of education in Indonesia require the development of a curriculum that answers each educational unit's needs by utilizing each region's potential, such as educational foundations and the public sector. The curriculum must have maximum flexibility to adapt to individual student needs to achieve the desired competencies (Iqbal et al., 2020; Kumala et al., 2020; Kusumaningrum et al., 2020). The Independent Curriculum is currently being implemented in Indonesia's education system. The Merdeka Curriculum is a curriculum that leads to an intracurricular learning model that places greater emphasis on varied concepts and content so that students develop more optimal competencies (Budiwati et al., 2023; Fildza et al., 2023). The Independent Curriculum provides opportunities for students to develop creativity, independence, and the ability to express ideas and solutions according to their interests and talents (Dewi & Suniasih, 2023; Gusteti & Neviyarni, 2022). The Independent Curriculum introduced Natural Sciences and Social Sciences (IPAS) subjects. The Merdeka Curriculum presents innovations, namely P5 and IPAS, which are a combination of science and social studies concepts (Dewi & Suniasih, 2023; Gusteti & Neviyarni, 2022; Sulistyosari et al., 2022). Through science subjects, students will see natural and social phenomena in an integrated manner when studying the surrounding environment, so they are accustomed to carrying out inquiry activities such as observing and exploring.

Goals in the learning process can be achieved if teachers understand student characteristics, namely by prioritizing student involvement in utilizing learning resources (Rahmi & Samsudi, 2020; Zaharah & Susilowati, 2020). In science and science learning, teachers are expected to be able to direct students' critical and creative thinking. Teachers also need to plan and use innovative learning media to increase students' activeness in understanding concepts, material, and skills in solving problems (Dewi & Suniasih, 2023; Gusteti & Neviyarni, 2022). In line with the opinion of experts who state that the use of learning media is essential for teachers for the sake of learning so that students' interest during the learning process can increase (Aziz et al., 2020; Nafisah & Ghofur, 2020; Wulandari et al., 2020).

However, the facts that are happening in the field currently are different. Previous research findings stated that students still had difficulty learning science and technology, which resulted in low student learning outcomes (Budiwati et al., 2023; Muhardini et al., 2023). Other research also states that the lack of science and technology learning media that facilitates students' learning has an impact on increasing student learning outcomes (Saadah et al., 2022; Surya et al., 2023). The results of observations carried out at SDN Sekarteja also found a problem: teachers rarely use concrete and innovative learning media when learning takes place; only printed books are the only source of learning. Not all materials use learning media in the science and science learning process. Teachers only use videos from the internet or learning media available at school, so it can be concluded that the use of learning media in implementing science and science learning in the classroom still needs to be improved. Other observation results show that student activity and enthusiasm in participating in the science and science learning process still need to be higher. This is because students are only given the task of memorizing material and making additional notes, making the teaching and learning process monotonous and less attractive. Apart from that, there is also a need for student participation in asking questions about the science material being studied.

The results of an interview with the class IV class teacher at SDN Sekarteja stated that the main factor inhibiting learning was the lack of learning media caused by the teacher's busy schedule. Teachers already use LCDs and tend to use existing media such as video. However, concrete use of media has not been implemented due to a lack of information regarding innovative learning media, innovation efforts in planning and making economic learning media, and innovation efforts in planning and making economic learning media. Limited time is needed to create learning media. Therefore, the learning process in the classroom is more teacher-centered, so the teacher's role is more dominant, causing students to become less active, feel bored, and less interested, especially in the science and science learning context. Based on the learning results of class IV students at SDN Sekarteja in the sciences subject, it was found that nine students (45%) had yet to meet the KKM, and 11 students (55%) had met the KKM set at 70. It can be concluded that the subject of the science had low learning outcomes.

Based on these problems, the solution offered is to use innovative media that facilitates students' learning. Using innovative learning media is one of the keys to improving learning outcomes during the learning process (N. P. Sari et al., 2021; Wangi & Agung, 2021). Learning media are all forms used during learning that aim to provide knowledge and information to students (Jummita et al., 2021; Nurfadhillah et al., 2021; N. P. Sari et al., 2021; Wangi & Agung, 2021). Learning media can facilitate interaction between teachers and students so that it can make science learning in the classroom more meaningful and enjoyable. Learning media development can improve learning outcomes and make the learning process more active, fun, and meaningful for students (Abdullah et al., 2021; Habibi & Setyaningtyas, 2021). As an alternative

solution, this research develops a creative and exciting concrete learning media, the Pekendo Mystery Box (the spread of kingdoms in Indonesia). A Mystery Box is a medium that contains information about the subject matter when opened. The uniqueness of this box lies in its mysterious nature, where when the box is closed, students do not yet know what is inside. Students can only find what objects or materials are inside after the box lid is opened.

Previous research findings state that learning media designed appropriately for elementary school students can increase motivation and create a pleasant learning atmosphere (Fridayanti et al., 2022; Jannah & Atmojo, 2022). Other research also reveals that innovative learning media can significantly improve student learning outcomes (Harmonis et al., 2022; Purnianingrum & Manuaba, 2022; Sutriyono & Wiyono, 2022). The results of this research state that the use of media dramatically influences learning outcomes. However, there has yet to be a study regarding the Pekendo mystery box media (Spread of the Kingdom in Indonesia) for the fourth-grade elementary school science and science subject. The advantage of this media is that it presents images that are interesting and appropriate to the material, namely the Spread of the Kingdom in Indonesia, so it can help students understand the IPAS material. Based on this, this research aims to develop the Pekendo (Spread of the Kingdom in Indonesia) mystery box media for class IV science subjects. The Pekendo mystery box media (Spread of the Kingdom in Indonesia) for science subjects can help students in learning.

## 2. METHOD

This type of research is Research and Development (R&D). This research includes research and development, which produces the Mistery Box Pekendo learning media product for fourth-grade elementary school students on the Spread of Kingdoms in Indonesia. The development model in this research is the development model according to Borg and Gall, which consists of ten steps, namely (1) potential and problems; (2) data collection; (3) product design; (4) design validation; (5) design revision; (6) product testing; (7) product revision; (8) trial use; (9) product revision; (10) mass product manufacturing (Sugiyono, 2015). In the Pekendo Mystery Box research and development, only five steps were used due to time constraints, so the researchers did not make it to mass product production. The six steps carried out by researchers are: 1) Potential and problems, 2) Data collection, 3) Product design, 4) Design validation, 5) Product testing. At the potential and problem stage, the data is arranged according to empirical data. The data collection stage requires identifying initial data to solve a problem, then the initial data is converted into information, then used as material for designing products. The product design stage is designing a product equipped with complete specifications. In the design validation stage, experts evaluate and test the feasibility of the ideas and ideas that become a product. The product testing stage involves carrying out experiments, namely product simulations for small groups.

The location of this research is Sekarteja State Elementary School. The product's feasibility is tested by material expert validators, media expert validators in education, and users (teachers) at Sekarteja State Elementary School. The research subjects were 20 grade IV students at SDN Sekerteja. Data collection methods in the research were interviews, observation, tests, questionnaires, and documentation. The interview aims to obtain information regarding learning resources, learning media teachers use during class, and student responses during the learning process. Observation aims to observe the learning process in the classroom. Tests are used to determine student learning outcomes. Questionnaires obtain information from material expert validators, media expert validators, teachers, and students. Documentation aims to strengthen research in the form of evidence in the form of transcripts of student learning outcomes. Data collection instruments use questionnaires and test questions. The instrument grid is presented in Table 1.

**Table 1.** Research Instrument Grid

| No. | Rated aspect | Validity Level |
|---|---|---|
| 1 | The attractive appearance of the Mystery Box for students to learn | |
| 2 | Clarity of writing on the Mystery Box | |
| 3 | Grammar and sentence arrangement in the Mystery Box for students to understand | |
| 4 | Suitability of the material in the infographic with the material on the Distribution of Kingdoms in Indonesia in CP | |
| 5 | Suitability of the material presented with the learning objectives to be achieved. | |
| 6 | The presentation of media images is attractive and proportional. | |
| 7 | The ability of Mystery Box media to increase student learning motivation. | |
| 8 | Flexibility in using Mystery Box media in learning. | |

| No. | Rated aspect | Validity Level |
|---|---|---|
| 9 | The Mystery Box media makes it easy to understand the material presented | |
| 10 | The ability of Mystery Box media to increase students' knowledge. | |

The techniques used to analyze data are qualitative descriptive analysis and quantitative and inferential statistics. Qualitative descriptive analysis is used to manage data in the form of input provided by experts regarding the Mistery Box Pekendo learning media.  Quantitative descriptive analysis is used to manage data in the form of expert scores regarding the Mistery Box Pekendo learning media. Inferential statistical analysis was used to test the effectiveness of the Mistery Box Pekendo learning media in improving student learning outcomes. Data analysis in this study used the normality test, paired sample t-test, and N-Gain test. The normality test was carried out to test the normality of the distribution of pretest and posttest learning result data with the help of the SPSS 26 application using Shapiro-Wilk. The paired sample t-test aims to determine the average difference between two paired or related samples. The N-Gain test aims to improve student learning outcomes before and after using the Mistery Box Pekendo learning media.

## 3.   RESULT AND DISCUSSION

**Result**

The learning media development procedure used in this research uses the Borg and Gall development model. The first step is potential and problems. As a result of identifying potentials and problems that researchers found in the IPAS learning process, not all materials used learning media, teachers only used videos from the internet or learning media available at school, so it can be concluded that the use of learning media in implementing IPAS learning in the classroom is still limited. Other observation results show that the level of activeness and enthusiasm of students for participating in the IPAS learning process is still low. This is because students seem to only be given the task of memorizing material and making additional notes, thus causing the teaching and learning process to become monotonous and less interesting.Results are the main part of scientific articles, containing: final results without data analysis process, hypothesis testing results.

The second stage is data collection. At this stage, researchers collect information to be used as material for designing products. Supporting data from this research are the learning outcomes of students with IPAS learning content, interviews, observations, and documentation. IPAS learning outcomes for students who have not yet reached the KKM. Of the 20 students, 9 students (45%) have not met the KKM, and 11 students (55%) have met the KKM. Based on data collection in the form of media analysis, interesting and innovative learning media are needed to create a new learning atmosphere that is interesting and not saturated so that it has an effect on increasing student learning outcomes. The media that can be developed is the Mystery Box Pekendo Learning Media. Mystery Box is a learning media that has not been used in learning about the spread of kingdoms in Indonesia but can be an interesting media. The mystery box for this research has a modified learning method, namely a mystery box that contains an image of a map of Indonesia along with an understanding of the material on the distribution of the kingdom in Indonesia, which is packaged in the form of an infographic adapting to each kingdom's history, and a quiz to test students' understanding for good learning outcomes. Mystery Box media can make it easier for teachers to convey learning material, make it easier for students to understand the concepts of the material being taught, and improve learning outcomes.

The third stage is product design. At this stage it is necessary to fill in the teacher and student needs questionnaire data, the results of which will be analyzed and recapitulated. Researchers conducted a needs analysis by distributing needs questionnaires to teachers and students to design the Mystery Box Pekendo learning media product. To develop a product, it must adapt to student characteristics, namely attractive writing, appearance, and images, so that students are interested and enthusiastic about learning activities. The Mystery Box Pekendo design is made in the shape of a suitcase with a mystery inside because students don't know what challenges are in the box. Mystery Box Pekendo is also a box that can be opened lengthwise in a rectangular shape, in which there is a display of writing, pictures, and explanations of material about the spread of the Kingdom in Indonesia which is packaged in the form of infographics. Characteristics of the Mystery Box Pekendo is made of wood and acrylic in the shape of a box like a suitcase, which when opened can be extended, and the content can be seen in the form of images and text according to the theme. On the far right side, there are games and challenges for students. The product is shown in Figure 1.

**Figure 1.** Mistery Box Pekendo Learning Media

The fourth step in the media development procedure is design validation. The Mystery Box Pekendo learning media is validated by media experts and matter experts. Validation results from matter expert and media experts are displayed in Table 2.

**Table 2.** Recapitulation of Assessment by Experts

|  | **Matter Expert** | **Media Expert** |
|---|---|---|
| Score | 50 | 48 |
| Percentage | 83% | 95% |
| Description | Very Feasible | Very Feasible |

The validation results of material and media experts show that the Mistery Box Pekendo learning media is very feasible. The product is assessed as highly approved by matter experts because it meets the following aspects: suitability of the material; material feasibility; and usefulness of the material. The product is considered very suitable by media experts because it meets the following aspects: technical quality aspects; quality aspects; and ease of use.

The final step in this research is trial use. The use trial was carried out on 20 grade IV students who were selected using a purposive sampling method with cognitive levels ranging from 1 to low, 2 to medium, and 1 to high. This usage trial can be said to be a small-scale trial. The student response questionnaire results were 100%, while the fourth grade teacher response questionnaire results were 96%. This means that the product is considered very suitable by class IV students and teachers based on the percentage range. The next product use trial was carried out on a larger scale on 16 class IV students. The results of the student response questionnaire obtained a percentage of 100% in the very appropriate category.

The Mystery Box Learning Media that has been assessed and declared valid and suitable for use is then tested for product effectiveness. Data collection is in the form of student learning results before and after trial use of the product, or what can be called pretest and posttest score data. The data collection techniques used by researchers are the t test and the N-Gain test. The results of the normality test for the small group and large group are presented in Table 3.

**Table 3.** Normality Test Results for Small Groups and Large Groups

| Class | Hasil Belajar | | *Statistic* | *df* | *Sig* | Details |
|---|---|---|---|---|---|---|
| Small Group |  | *Pretest* | 0.863 | 4 | 0.272 | Normal Data |
|  | Learning | *Posttest* | 0.895 | 4 | 0.406 | Normal Data |
| Large Group | Outcomes | *Pretest* | 0.863 | 4 | 0.184 | Normal Data |
|  |  | *Posttest* | 0.895 | 4 | 0.064 | Normal Data |

The results of data analysis in small groups show that the pretest significance is 0.272, so it can be concluded that the pretest data values are normally distributed. While the posttest significance is 0.406, it can be concluded that the posttest data is normally distributed. The results of data analysis in the large group show that the pretest significance is 0.184, so it can be concluded that the pretest data values are normally distributed. While the posttest significance is 0.064, it can be concluded that the posttest data is normally distributed. Next, a T-test was carried out on the small group which is presented in Table 4. The large group T-test is presented in Table 5.

The results of the T-test in the Small group show that the results of the pretest and posttest average difference test show that the sig. (2-tailed) of 0.003. The t-test results show that sig. (2-tailed) 0.000 < 0.05 so it can be concluded that there is a significant difference between the results of pretest and posttest data in small-scale product trials. The results of the t-test in the large group show that the test results of the difference between the pretest and posttest averages show that the sig. (2-tailed) of 0.000. The t-test results

show that sig. (2-tailed) 0.000 < 0.05 so it can be concluded that there is a significant difference between the results of pretest and posttest data in large-scale product trials. The results of the T-test in the Large Group are presented in Table 6.

**Table 5.** Paired Sample T-Test Results on Small Scale Product Trials

| | | **Paired Differences** | | | | | | | |
| | | **Mean** | **Std. Deviation** | **Std. Error Mean** | **95% Confidence Interval of the Difference** | | **t** | **df** | **Sig. (2-tailed)** |
| | | | | | **Lower** | **Upper** | | | |
| Pair 1 | Pretest - Posttest | -31.25000 | 7.21688 | 3.60844 | -42.73366 | -19.76634 | -8.660 | 3 | 0.003 |

**Table 6.** Paired Sample T-Test Results on Large-Scale Product Trials

| | | **Paired Differences** | | | | | | | |
| | | **Mean** | **Std. Deviation** | **Std. Error Mean** | **95% Confidence Interval of the Difference** | | **t** | **df** | **Sig. (2-tailed)** |
| | | | | | **Lower** | **Upper** | | | |
| Pair 1 | Pretest - Posttest | -29.68750 | 11.96784 | 2.99196 | -36.06471 | -23.31029 | -9.922 | 15 | .000 |

The average increase in student learning outcomes before and after treatment can be tested using the n-gain test. Based on the table of n-gain test results in small groups, it can be seen that there is an average increase in learning outcomes of 1.6 with high criteria. Based on the table of n-gain test results in large groups, it can be seen that there is an average increase in learning outcomes of 0.62 with medium criteria. The results of the n-gain test calculation of pretest and posttest values in small and large scale product trials are presented in Table 7.

**Table 7.** N-Gain Test Results in Large-Scale Product Trials

| Class | Pretest Average | Posttest Average | Maximum Score | N-Gain | Criteria |
| --- | --- | --- | --- | --- | --- |
| Small Scale Product Trials | 53.1 | 84.3 | 100 | 1.6 | High |
| Large Scale Product Trials | 51.5 | 81.25 | 100 | 0.62 | Currently |

**Discussion**

The results of the data analysis show that Media Mystery Box Pekendo received very good qualifications from experts and students. Pekendo's Mystery Box media is suitable for use in learning due to several factors, namely as follows. First, the Pekendo Mystery Box Media is suitable for use in learning because it can improve student learning outcomes. Well-designed media can help improve student learning outcomes (Marliana & Subrata, 2023; Rachmawati et al., 2023; Wei et al., 2023). Based on the pretest and posttest scores, the Mystery Box Pekendo media used in the material to spread the Kingdom in Indonesia in science and technology learning content can influence learning outcomes. Mystery Box Media Pekendo Mystery Box can be a media of choice that makes it easier for teachers to convey learning material. This is supported by previous findings, which state that well-designed media can help students learn (Limin, SteLimin & Kundiman, 2023; Sahulatta & Suparman, 2023; Yanto et al., 2023). Media can be the medium of choice, making it easier for teachers to convey learning material using Pekendo's Mystery Box media. Students can see a picture of a map of Indonesia and the distribution of Kingdoms in Indonesia based on their regional location. The advantage of the mystery box pekendo media is that the learning material is presented to make it easier for students to understand. This makes Pekendo Mystery Box Media suitable for learning because it can improve student learning outcomes.

Second, the Pekendo Mystery Box Media is suitable for learning because it makes learning more accessible for students. Learning media are all media used in implementing teaching and learning activities (Marliana & Subrata, 2023; Rachmawati et al., 2023; Wei et al., 2023). In this case, learning media can be material about the knowledge, skills, and attitudes students need to achieve specific essential competencies

(Natasyah et al., 2023; Sahulatta & Suparman, 2023). Media can channel messages from the sender to the recipient to encourage student participants' thoughts, attention, and attention in learning activities (Desramaza et al., 2023; Sari et al., 2023). Pekendo's Mystery Box media is suitable for use because, in its development, it refers to learning objectives. This is supported by previous findings, which state that the creation of learning media must refer to established rules, such as national learning objectives and content or learning materials because learning media must be in line with the content and learning objectives that have been set (Natasyah et al., 2023; Partika et al., 2023; Sahulatta & Suparman, 2023; Utomo et al., 2023). Pekendo's Mystery Box media can make it easier for students to learn because it allows them to be directly involved in the learning process. Using this media, students can learn actively, havee fun, and improve learning outcomes.

Third, the Pekendo Mystery Box Media is suitable for learning because it can increase students' interest. Mystery Box Educational Learning Media is an innovation in learning media development thataims to increase students' interest in learning and abilities. This form of media is a box containing complementary materials designed to motivate children to want to learn and play. Learning activities while playing can create a fun learning atmosphere and make it easier for students to understand the learning material (Prawoko et al., 2019; Rahmatia et al., 2021). Mystery Box media allows students to participate in learning by collecting information and working on questions related to the material being studied. In this way, students can understand the material more effectively and increase their knowledge (Anjarani et al., 2020; Vitasari et al., 2017). With the Mystery Box media, learning activities become fun. Using Mystery Box media can increase students' interest in learning so that they are more active in the learning process and better prepared to understand the material being studied. Mystery Box media allows students to express themselves and solve problems creatively, thereby improving their thinking skills and abilities.

Previous research findings show that Mystery Box media can improve students' abilities and increase their interest in learning, so it can be categorized as an effective media for improving students' abilities (Wahyuningrum & Dwiyanti, 2022). Other findings state that using media can help overcome media limitations experienced by students so that they can learn more effectively and improve their abilities (Febriyanti & Sulistyawati, 2024; Ramadani & Nurharini, 2024). The Mystery Box media developed can help students learn. The limitation of this research is that the Mystery Box media developed was only intended for fourth-grade elementary school students. This research implies that the developed Mystery Box media can be used to support learning activities and make learning more accessible for students.

## 4.   CONCLUSION

The analysis shows that the mystery box pekendo learning media for class IV science and elementary school material has received very good qualifications from experts and students. The mystery box pekendo learning media for fourth-grade elementary school material is suitable for learning. The t-test results show differences in student learning outcomes after using the mystery box pekendo learning media. The n-gain results show that in the small group, there was an increase in the average learning outcomes with high criteria, and in the large group, it was with medium criteria. It was concluded that the mystery box pekendo learning media could improve student learning outcomes.

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