

The Development of Monopoly Physics Science Media (MOFIN) on Simple Harmonic Motion at MA Al-Falah Tolutu

Abd. Rahman*, Raghel Yunginger, Citron S. Payu, Tirtawaty Abdjul, Mohamad Jahja, & Dewa Gede Eka Setiawan

Physics Education Study Program, State University of Gorontalo, Indonesia

*Corresponding Author: rahmanabd7676@gmail.com

Received: 28 February 2023; Accepted: 09 April 2023; Published: 30 May 2023

DOI: <https://dx.doi.org/10.29303/jpft.v9i1.4816>

Abstract – This research aims to determine the design and feasibility of the MOFIN learning media. This research model employs the 4D method (Define, Design, Development, and Dissemination). Data collection techniques include interviews (initial stage), observations, and tests (experimental stage). The validity of the MOFIN learning media design obtained an average scale of 3.43 from the validators, with the "Valid" criteria indicating that it can be used with some revisions. The results of the experimental testing (practicality) of the MOFIN learning media revealed that the implementation of the learning process was "Very Good," with a percentage of 93%. The response from the students showed the highest percentage in the aspect of "Character Education," with a percentage of 91% or received a "Very Good" response. The effectiveness of the media was assessed through the students' activities, which showed an average percentage of 94%. After conducting the learning assessment test, the students obtained an average score of 86.25, with the lowest score being 77, indicating that they have reached the Minimum Completeness Criteria (KKM) set by MA Al-Falah Tolutu.

Keywords: MOFIN; Simple Harmony Motion.

INTRODUCTION

The research problem is based on students needing higher scores in Physics and failing to meet the minimum passing criteria (KKM). A preliminary study conducted at MA Al-Falah Tolutu School, specifically in Class X, revealed that the average Physics scores in Class X were ≤ 75 , indicating that these scores did not meet the minimum score.

The preliminary study on the low Physics scores was further supported by related research, such as the observation conducted by (Hidayat & Sucahyo, 2019). Daily test scores obtained from academic activities at SMAN 1 Porong showed an average score of 58.5 out of a maximum total of 100 in two MIA classes. The findings from the preliminary study conducted at the research site and previous studies further strengthen the notion that low scores are a major issue.

The results of the preliminary study indicate that the low Physics scores of the students are due to the conventional teaching and learning process (KBM), which still relies on printed books and lecture-based methods. The interview results support the observations, as the school needs more facilities and learning media. Printed books are the only learning resource available, resulting in students' learning outcomes falling below the average KKM set.

One of the solutions to the problem mentioned above is to create learning media that can capture students' attention and serve as a tool to facilitate the learning process. The use of learning media is based on logical reasoning and related journals, such as the one written by (Iwan, 2014), which states that the utilization of media is intended to enhance the effectiveness and efficiency of the learning process in terms of energy, time, and cost.

MOFIN (Monopoly Physics Science) media is a learning tool designed as a game. MOFIN media is an appropriate tool to make the Physics subject more engaging. The inspiration for MOFIN media comes from Monopoly, well-known among children of various ages, from elementary to high school. This game is closely related to students' lives, making MOFIN media highly suitable for Physics learning at the high school level. The use of Monopoly as a learning media has been previously explored, as stated by (Dirgantara et al., 2018; Marwiliansyah et al., 2019), who even suggests that Monopoly learning media have positive effects on maximizing individuals' and groups' abilities to understand concepts and facts related to an event.

Previous studies have been conducted on Monopoly-related learning media, including the research conducted by (Dirgantara et al., 2018; Marwiliansyah et al., 2019). However, these studies did not integrate the MOFIN learning media with PhET simulations. The developed Monopoly-related learning media differs in

combination with PhET simulations. This difference is being explored in implementing and testing the MOFIN learning media, including assessing its validity, practicality (implementation and student response), and effectiveness (student activities and learning outcomes).

Based on the above discussion, the research aims to investigate the "Development of Monopoly Physics Science Media (MOFIN) on Simple Harmonic Motion at MA Al-Falah Tolutu."

RESEARCH METHODS

This study is a type of Research and Development (R&D) utilizing the 4-D development model developed by Thiagarajan. The model consists of four stages: defining (define), designing (design), developing (develop), and disseminating (disseminate). The study is limited to the third stage, the development stage. The research procedure can be seen in Figure 1 (Dermawati et al., 2019).

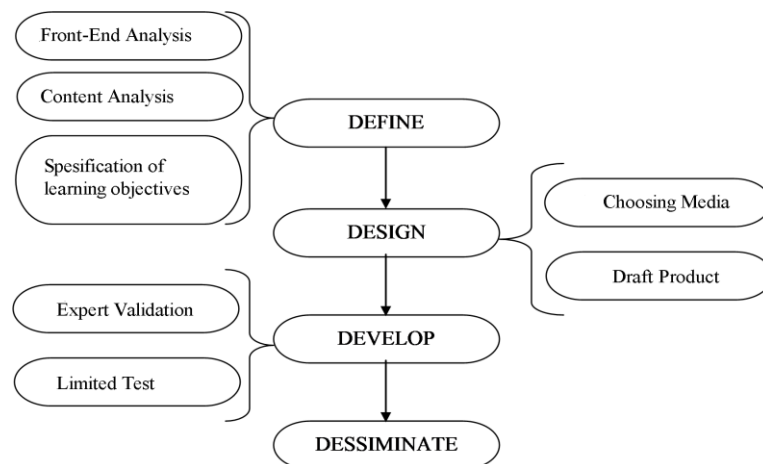


Figure 1. 4D Development Model

The data collection in this research was conducted through various methods, including interviews, observations, and tests of student learning outcomes. Quantitative data analysis was performed to assess the

feasibility of the MOFIN learning media, encompassing validity, practicality, and effectiveness. The analysis of validity, practicality (implementation and student response), and student activities was carried

out using the following equations (A. M. Sari & Gunawan, 2018).

$$\bar{x} = \frac{\sum x}{n} \quad (1)$$

Description:

- \bar{x} = Average Score
- $\sum x$ = Total score obtained
- n = amount of data

The results of the practicality and student activity calculations are based on Equation 1, which will be compared with the assessment criteria in Table 2.

Table 1. Criteria for Practicality and Student Engagement

Range of Score	Criteria
86% - 100%	Very Good
76% - 85%	Good
66% - 75%	Moderate
56% - 65%	Less
0% - 55%	Very Less

(Suharsimi, 2013)

The analysis of the test results of learning outcomes refers to the minimum mastery criteria determined by the Physics teacher at MA Al-Falah Tolutu. It can be seen in Table 2.

Table 2. Minimum Achievement Criteria

Achievement Criteria	Description
Score \geq 75	Pass
Score $<$ 75	Not Pass

(Source: KKM MA Al-Falah Tolutu)

RESULTS AND DISCUSSION

Results

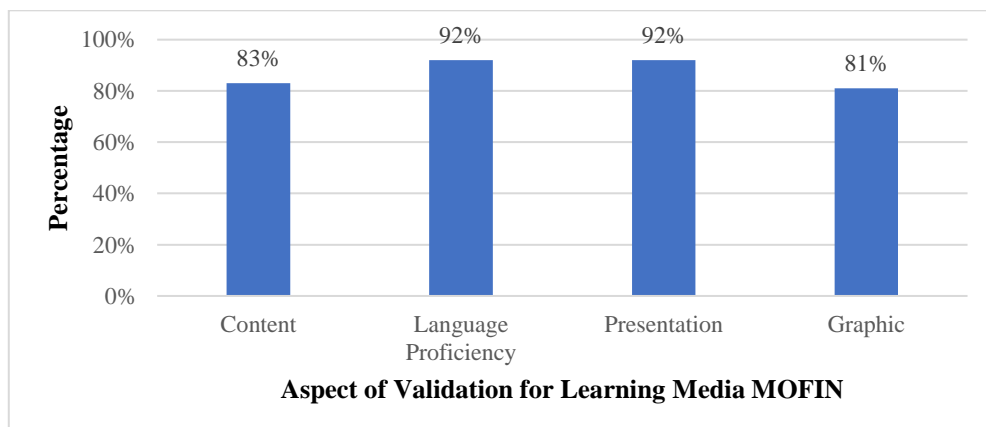


Figure 3. Assessment Results of the MOFIN Instructional Media by Validator(s)

The results of the design of the physics science monopoly instructional media (MOFIN) after being validated by three validators and deemed ready for use can be seen in Figure 2.

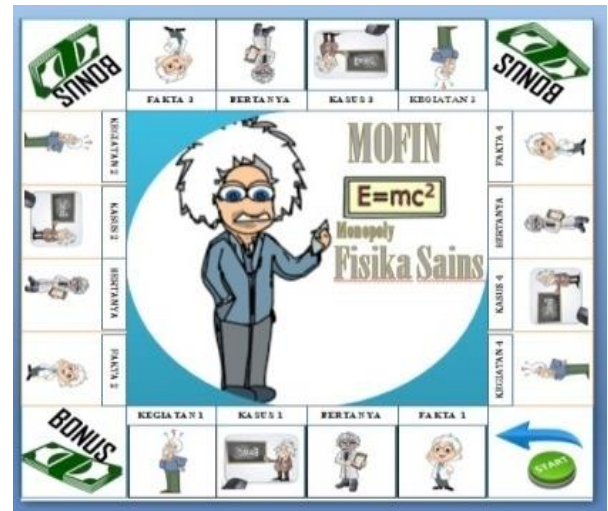


Figure 2. Media Board of Physics Science Monopoly Learning (MOFIN)

The MOFIN instructional media design results are formed with the inclusion of the following components: (1) Introduction, (2) Facts, (3) Questions, (4) Cases, (5) Activities, and (6) Bonus.

The suitability of the MOFIN instructional media is evident from the results of validity, practicality, and effectiveness. Based on the validity results of the MOFIN instructional media conducted by three validators, they are presented in graphical form in Figure 3.

The validation results in Figure 3 obtained from various indicators show that the highest average percentage is observed in the language indicator (92%). In comparison, the lowest percentage is seen in the graphics indicator (81%).

The analysis of the practicality of the MOFIN instructional media is based on its implementation and student responses. The results of the analysis of the implementation of the learning process can be seen in Table 3.

Based on the analysis of the implementation of the learning process using the MOFIN instructional media, as shown in

Table 3, the average percentage is 93% with the category "Very Good."

Table 3. Implementation of the Learning Process

Implementation of the Learning Process	Percentage	Description
Meeting 1	89%	Very Good
Meeting 2	92%	Very Good
Meeting 3	97%	Very Good
Average Percentage & Criteria	93%	Very Good

The results of the questionnaire response percentage from the students can be seen in Figure 4.

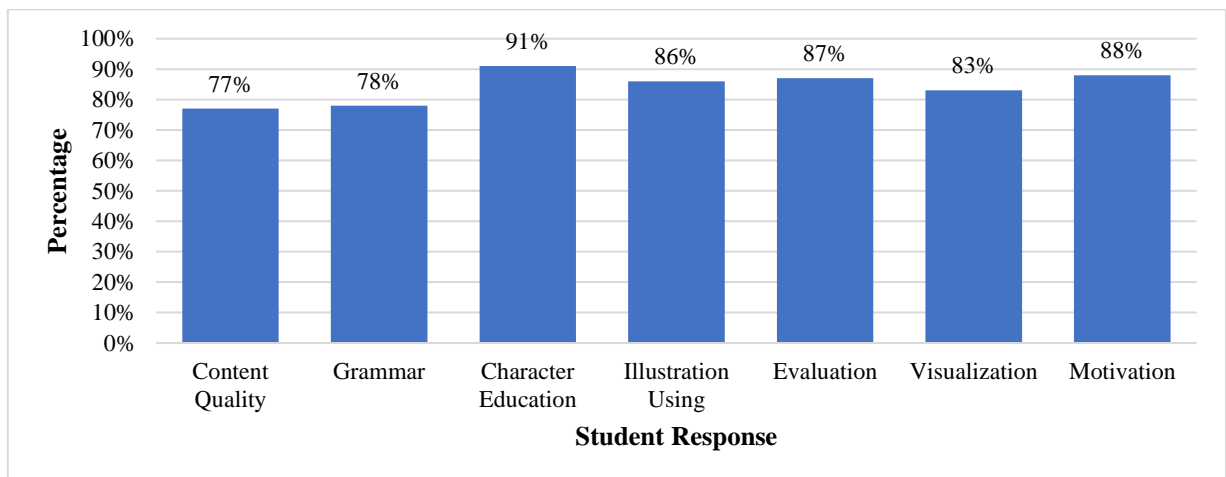


Figure 4. Percentage of Student Response to the MOFIN Instructional Media

Based on the analyzed student responses, as shown in Figure 4, it can be observed that the highest percentage of student response is in the aspect of "Character Education", with 91%. Students are more enthusiastic about solving problems in groups, fostering a sense of responsibility among each member. On the other hand, the aspect of "Content Quality" has the lowest percentage, which is 77%. It is due to the lack of "Facts" from the MOFIN instructional media.

The analysis of student activities can be seen from the average percentage from observers 1 and 2, as indicated in Figure 5, as follows. Based on the observations of

student activities in Figure 5, it can be seen that the aspect of "Discussion" has the lowest percentage, which is 93%, compared to aspects such as answering, paying attention, and following instructions, with an average percentage of 94%.

Based on the test results obtained from the pre-test and post-test, it can be seen that the average pre-test score from 27 students is 34.17, which does not meet the Minimum Mastery Criteria (70), indicating "Not Proficient." Meanwhile, the average post-test score is 86.25, higher than the Minimum Mastery Criteria (70), indicating proficiency. The learning outcomes test (THB) also displays the scores for each cognitive domain, as shown in Figure 6.

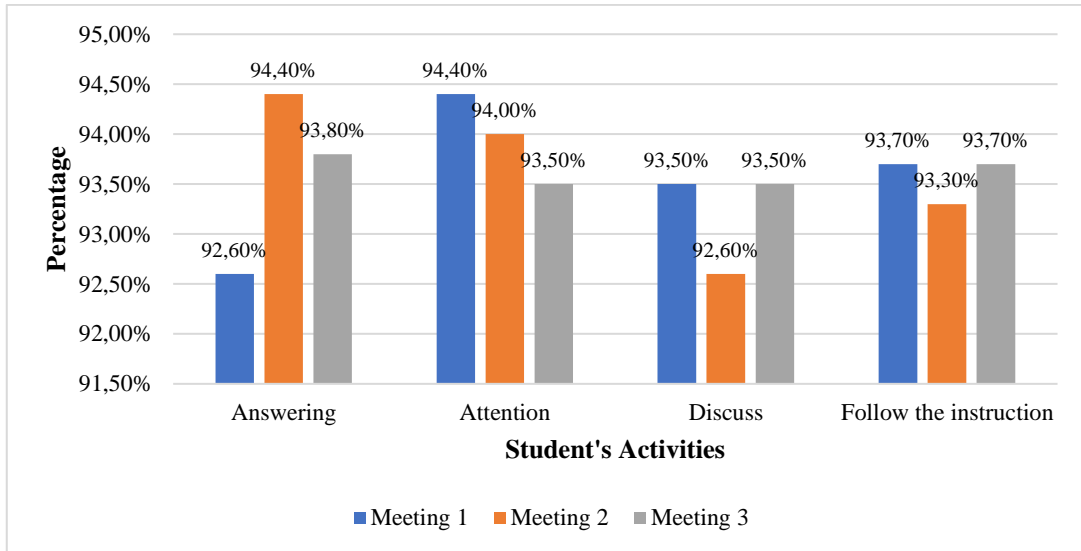


Figure 5. Diagram of Student Activities towards the MOFIN Instructional Media

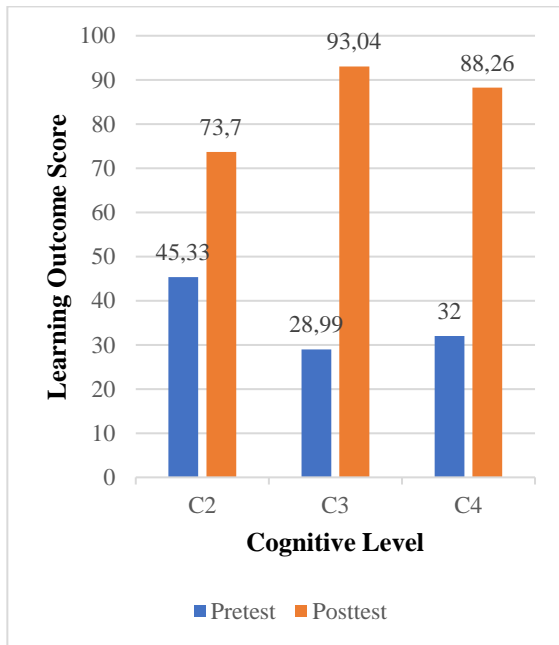


Figure 6. Mastery in the Cognitive Domain

Based on the scores in Figure 6, from the learning outcomes test for each cognitive level, it can be observed that the highest score (93.04) is in cognitive level C3, while the lowest score is in C2, which is 73.70. However, this does not affect the student's learning outcomes, as these scores have already reached the Minimum Mastery Criteria (KKM) set by MA Al-Falah Tolutu School.

Discussion

The development of the learning media was based on a preliminary field study concerning the issue of low physics grades. The field study identified several key points as the main basis, namely the centralized learning on a single learning source and the absence of learning media to assist in achieving learning objectives.

The results of the research data on the practicality of the MOFIN learning media showed that the learning process did not reach 100% due to some steps that needed to be fully implemented, including evaluating, distributing worksheets, and drawing conclusions. As for student response was observed that the content quality of the learning media was relatively lower compared to other student response indicators. The low content quality of the MOFIN learning media was attributed to the need for presented facts, causing some confusion for students in completing activities or dealing with the cases presented in the MOFIN learning media. However, despite these shortcomings, the implementation of the learning process and student response achieved the "Very Good"

category, indicating that the MOFIN learning media met the criteria for the practicality of learning media. It is in line with the statement made by (Kumalasani, 2018), that the practicality of learning media is assessed based on its clarity and the positive or very positive response from students.

In the trial of the MOFIN learning media, the effectiveness of the learning media was evaluated based on student activities. The students' activities using the MOFIN learning media showed a weakness in the answering aspect, evident from the lower student response in terms of content quality. Activities have a significant influence on students' learning outcomes. It was observed that the cognitive data of the students were obtained from cognitive levels C2, C3, and C4. The analyzed test results revealed that the cognitive level of C2 was lower compared to C3 and C4, primarily due to a limited understanding of factual concepts.

On the other hand, in C3 and C4, the understanding gained went beyond limited factual information, aided by the additional information provided in the worksheets. Regarding the issue of low-test results in C2, it did not affect the test results in terms of individual or class mastery, as the lowest score obtained by students was 75, indicating that they had reached the minimum mastery criteria set by MA Al-Falah Tolutu. The students' activities and test results indicated positive research outcomes, suggesting that the media met the criteria or standards of effectiveness (Apriyani et al., 2019; L. Y. Sari & Susanti, 2016).

Advantages of Media MOFIN

The advantages of the MOFIN learning media facilitate students' learning process, especially in schools that do not have learning media. The MOFIN learning

media is a visual medium that students can view directly and has important features such as facts, activities, and cases related to the teaching materials. The MOFIN learning media is not restricted in terms of content since it has MOFIN cards that can be replaced with the relevant content to be taught.

Disadvantages Media MOFIN

The MOFIN learning media has two areas for improvement. Firstly, in terms of its physical aspect, the size of the media is still relatively small (22 cm x 22 cm). Secondly, in terms of its content, it needs more relevant facts related to the teaching materials. The scarcity of these facts contributes to the test's low scores at the C2 level.

CONCLUSION

Based on the research conducted at MAS Al-Falah Tolutu with 27 students in Grade X, the developed MOFIN learning media is deemed valid, practical, and effective. The validity level of the MOFIN learning media shows an average score of 3.43, indicating that the media meets the validity standards with the criteria of "Valid" or can be used with slight revisions.

The practicality of the MOFIN learning media can be observed from the implementation of the learning process, where the first meeting was conducted with an 89% implementation rate, the second meeting with a 92% implementation rate, and the third meeting with a 97% implementation rate. The response of 19 students falls under the "good" category, while the remaining eight provided a positive response.

The effectiveness of the MOFIN learning media is evident from the students' activities, as 26 students performed their activities at a "very good" level, and one

student at a "good" level. The effectiveness is also reflected in the learning outcomes test, where the average score obtained by the students is 86.25, with the minimum score among the 27 students being 77. These scores exceed the minimum passing grade (70), indicating that they meet the criteria for minimum competency.

REFERENCES

- Apriyani, Y., Siswoyo, S., & Serevina, V. (2019). Pengembangan Media Pembelajaran Fisika Berupa Permainan Monopoli Pada Pokok Bahasan Dinamika Rotasi dan Kesetimbangan Benda Tegar Kelas XI SMA. *WaPFI (Wahana Pendidikan Fisika)*, 4(1), 42–48. <https://doi.org/10.17509/WAPFI.V4I1.15816>
- Dermawati, N., Suprpta, & Muzakkir. (2019). Pengembangan Lembar Kerja Peserta Didik (LKPD) Berbasis Lingkungan. *Jurnal Pendidikan Fisika*, 7(1), 74–78. <https://journal3.uin-alauddin.ac.id/index.php/PendidikanFisika/article/view/3143>
- Dirgantara, M. R. D., Susilowati, S. M. E., & Marwoto, P. (2018). The Use of Monopoly Media to Improve Primary Student's Critical Thinking Skills in Science Learning. *Journal of Primary Education*, 8(3). <https://journal.unnes.ac.id/sju/index.php/jpe/article/view/26652>
- Hidayat, N. W., & Suchyo, I. (2019). Penerapan media quipper school untuk meningkatkan hasil belajar fisika siswa pada materi gerak harmonik sederhana. *Inovasi Pendidikan Fisika*, 8(2), 708–711. <https://ejournal.unesa.ac.id/index.php/inovasi-pendidikan-fisika/article/view/28558>
- Iwan, F. (2014). Pemanfaatan Media dalam Pembelajaran. *Jurnal Lingkar Widayaiswara*, 1(4), 114–115. www.juliwi.com
- Kumalasan, M. P. (2018). Kepraktisan Penggunaan Multimedia Interaktif Pada Pembelajaran Tematik Kelas IV SD. *Jurnal Bidang Pendidikan Dasar*, 2(1A), 1–11. <https://doi.org/10.21067/jbpd.v2i1a.2345>
- Marwiliansyah, A., Ali, M. S., & Arsyad, M. (2019). Pengaruh Pembelajaran Berbasis Monopoly Game Physics dan Kemandirian Belajar Terhadap Minat Belajar Fisika Peserta Didik. *Prosiding Seminar Nasional Fisika PPs Universitas Negeri Makassar, 1*, 1–4.
- Sari, A. M., & Gunawan, I. (2018). Developing Physics Monopoly Game Learning Media for Light and Optical Devices. *Jurnal Ilmiah Pendidikan Fisika Al-Biruni*, 7(1), 71–79. <https://doi.org/10.24042/jipfalbiruni.v7i1.2564>
- Sari, L. Y., & Susanti, D. (2016). Effectiveness Test of Learning Media Interactive Oriented Konstruktivisme In Neurulasi Topic To Animal Development Subject. *BioCONCETTA: Jurnal Biologi Dan Pendidikan Biologi*, II(1), 158–164. <https://doi.org/https://doi.org/10.22202/bc.2016.v2i1.1806>
- Suharsimi, A. (2013). Dasar-Dasar Evaluasi Pendidikan. In *Jakarta: Bumi Aksara*.