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Development of A Prototype Book Based on The Study of The Al-Quran as Teaching Material For Physics

Azmar[1)*], Lalu Usman Ali[2)]

[1),2)]*Department of Physics Education Faculty of Tarbiyah and Teacher Training, State Islamic University of Mataram, Mataram, 83112, Indonesia.*

**Corresponding author: azazmar25@gmail.com*

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Abstract – *Integration of the spiritual values and knowledge of students which are summarized into a learning outcome becomes the focus in the development of physics teaching materials based on Al-Qur'an studies with the main objectives: (1) to design a valid physics teaching materials based on Al-Qur'an studies at Madrasah Aliah, (2) to analyze the practicality of physics teaching materials based on Al-Qur'an studies at Madrasah Aliah, and (3) to analyze the effectiveness of physics teaching materials based on Al-Qur'an studies at Madrasah Aliah. The research design used was 4D Model (Definition, Design, Development and Deployment). The sample in its implementation was at MAN 3 Mataram. The technique analysis used were Validity Analysis, Practicality Analysis, and Effectiveness Analysis. The percentage of classical mastery of the students was 76.92% which was categorized as good. Thus, according to the theory put forward by J. Van Den Akker, that the teaching materials have been operationally effective to provide learning outcomes as expected. The results of these tests indicate that the development of teaching materials based on the study of the Qur'anic science is very effective in achieving students' learning outcomes as a form of mastery in learning. In concusion, the overall teaching materials in the development of the prototype book as physics teaching materials based on al-qur'an studies for Madrasah Aliyah Students can support students' learning achievement both in the cognitive aspects and more specifically in the knowledge and spiritual aspects.*

Keywords: *Al-Quran-based physics; development research; science of the Qur'an; study of the Qur'an; teaching materials*

I. INTRODUCTION

Students' mastery of soft skills is a demand for successful learning in the era of the latest industrial 4.0 development in the 21st century. This need focuses on strengthening problem-solving skills, critical thinking, communication, collaboration and creativity as well as students' discovery towards quality global output (Azmar & Nurhilaliati, 2021). Physics is a science that develops thinking skills in solving analytical deductive problems about the relationship of the universe (Kadir & Permana, 2022). (Yusal et al., 2021) suggest educational transformation in honing students' skills to achieve goals in learning physics at Madrasah Aliyah and SMA, namely students

have the ability to master the concepts, principles of physics and competency knowledge, skills and abilities themselves (Setyaningsih & Fauziah, 2022).

(Muslih, 2018) suggests that the development of science/physics based on scientific religion is possible if it pays attention to the theological basis, philosophical foundation, scientific development, and basic theoretical framework, as well as scientific paradigm. Al-Qur'an is a holy book which is the first and main legal basis in the ideological teachings of Muslims revealed by Allah SWT. Thus, Islamic values based on the Qur'an become the basic foundation in developing the character of students as a basis for strengthening attitudes. As the basis of a complete book, the Qur'an becomes a point of study for responses to every important event/event, both timely and spiritually (Aeny et al., 2020; Karlina & Iryani, 2022).

The Qur'an encourages people to seek and uphold that knowledge (El-Fandy, 2013). As aenya sign that Allah swt gave through the first verses that came down, namely Surah Al-Alaq verses 1-5.:

It means:
(1) wrote the word read by (mentioning) the name of your Lord who created, (2) He has created man from a clot of blood.3. Read, and your Lord is the most gracious, (3) Read, and your Lord is the most gracious, (4) who teach (humans) through the intercession of kalam and (5) He taught man what he did not know.

Quraish Shihab in his book describes that iqra' which is translated as "reading" does not require a written text to be read, nor does it have to be spoken in order to be heard by others. Therefore, in the language dictionary, various meanings can be found, including conveying, studying, reading, exploring, researching, knowing their characteristics, and so on, all of which can be returned to the essence of "collecting" which is the meaning of the basic word. Shihab, “Earthly” the Quran: The Function and Role of Revelation in People's Lives in (Bahar, 2019).

Researchers believe that the holy book Al-Quran is always one step ahead of the development of science and knowledge. This is because the Qur'an which was revealed ± 14 centuries ago has shown many signs of natural phenomena, which are then interpreted and understood by experts as natural science, which is actually evidence for the masses today. However, it is unethical to assume that everything contained in the Qur'an can be scientifically proven, because the truth of the holy book is eternal and absolute, on the other hand the truth of science has a certain time span (Bahar, 2019). (Nurdyansyah & Mutala’liah, 2018) explains that the Development of Science Module Teaching Materials in Islamic Concepts reveals that this understanding explains that a teaching material must be designed and written with instructional rules because it will be used by teachers to assist and support the learning process. Development of learning tools reveals that teaching materials are prepared with the

aim of providing teaching materials that are in accordance with the demands of the curriculum, assisting students in obtaining alternative teaching materials and making it easier for teachers to carry out learning.

Integrating students' competencies in physics and the Qur'an requires strong guidelines such as teaching materials that can be used as the basis for strengthening student competency development. after conducting a needs-level analysis through an interview with one of the physics teachers at Madrasah Aliah that "there is a lack of learning resources that apply the concept of Al-Quran in science learning as a form of integration between the first core competence and third core competence so that student learning outcomes will also increase".

Based on the results of the research, the development of Al-Quran-based physics teaching materials is still very lagging and the average domain of the existing Al-Quran-based physics teaching materials development has not shown the integration between the first core competence and between the study of the Qur'an and the concept of science in third core competence The study of holy verses which was developed only as an introduction before starting the learning material as well as the development carried out by (Bahar, 2019), the study of the verses of interpretation was only limited to motivation and refresher learning, and did not show the integration between the study of the Koran and science. directly. This field of development studies is seen as effective in strengthening students' motivation and interest in learning. However, the development of teaching materials carried out cannot be used as an alternative solution to the needs of physics teachers as a form of integration of the first core competence and third core competence in achieving student learning outcomes of Madrasah Aliah.

Based on the results of initial observations of the analysis of learning development mapping, the development of physics teaching materials based on Al-Quran studies is seen as important as a source of student learning and a reference for educators in Madrasah Alyah with the realm of science implementation. the concept of learning that has scientific cues in the Qur'an, as a means of touching the spiritual aspect that can be used as a trigger in achieving student learning outcomes in addition to strengthening faith in the holy book which is a guide in living the life of the world. The researcher developed a prototype book as a physics teaching material based on the study of the Qur'an.

The formulation of the problem in this study is as follows (a) To design teaching materials for physics based on the study of the Qur'an, Madarasah Aliah, which is valid. (b) To analyze the practicality of physics teaching materials based on the study of the Koran at Madarasah Aliah. (c) To analyze the effectiveness of physics teaching materials based on the study of the Koran at Madarasah Aliah.

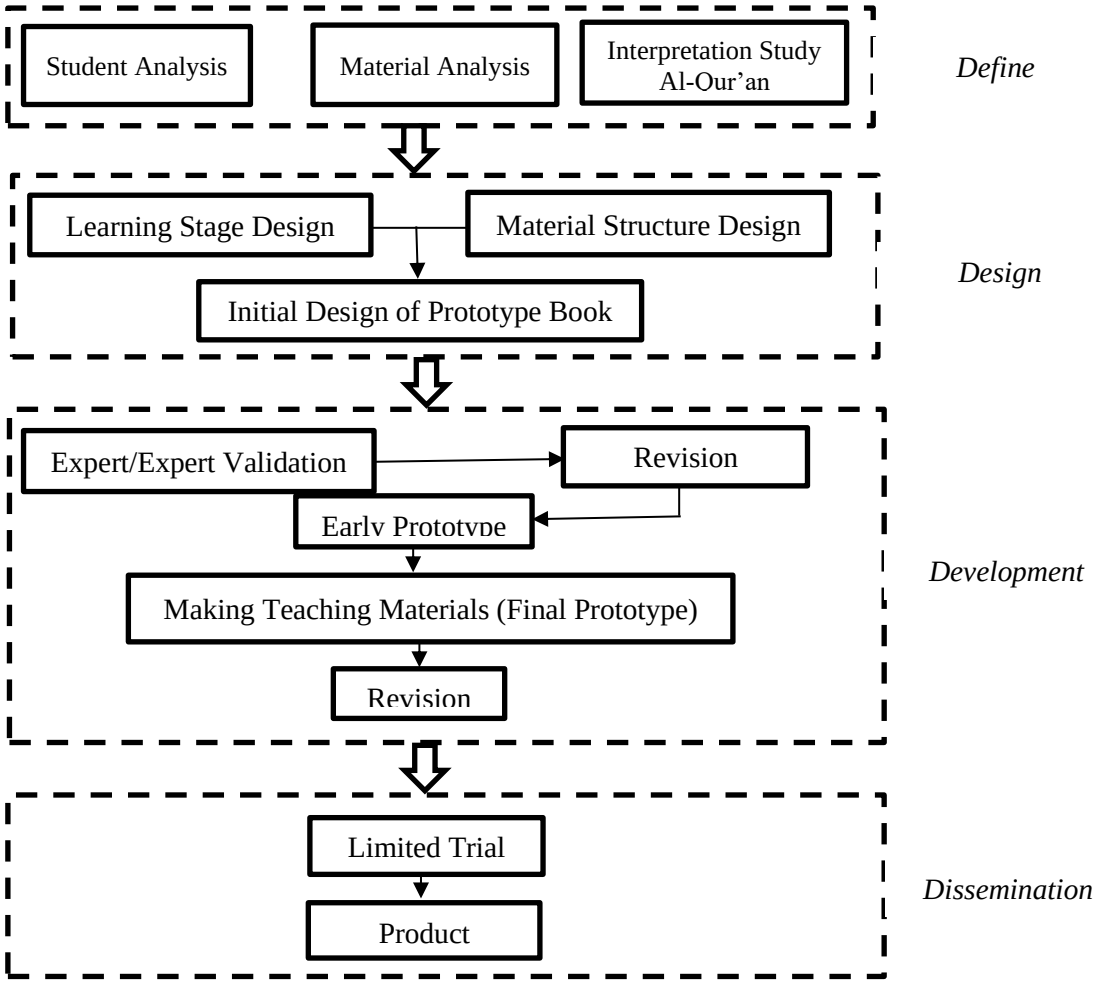
II. METHODS

Resesarch Design

This research uses the Four D Models (4D) Development Model, which consists of 4 main stages, namely define, design and develop as well as dissemination to picture 1 (Saputra et al., 2021; Said et al., 2021).

Picture 1. 4D Model Development Procedure

The research design uses an adaptation of the 4D Model, which can be described as follows to picture 2:



Picture 2. 4D Development Model Design

Research Subject

The subjects in this study were students of class XI MIA at Madrasah Aliah Negeri 3 Mataram City.

Research Procedure

The description of the development procedure is as follows:

1. Definition Stage

This stage refers to first analyzing students, namely identifying the ability of students' initial characteristics through an analysis of students' knowledge/understanding of the study reference physics material that has cues of science concepts in the Koran. This was don by using an interview with subject teachers. The second is Material Analysis, where we identified the main concepts of physics material and arranged systematically referring to the third core competence in curriculum, with the basic competence of learning outcomes, namely applying the laws of static fluid in everyday life. The materials are understanding fluid, the main law of hydrostatics, hydrostatic pressure, and Archimedes' law as well as Pascal's third law. Besides, we also identified verses and their interpretations as the basis for integrating physics learning which is adapted and summarized by analyzing the meeting point between the physics concepts and the verses.

2. Design Stage

This stage refers to the first design of physics learning through a scientific approach. Second, the design of the material structure in the study of the Qur'an, the preparation of the structure of the material reveals the signs of scientific science in the verses of the Qur'an. The study of scientific cues from the Qur'an is an introduction to enter the discussion of the concepts and interpretations of the Qur'an from experts. Fourth, the preparation of the Prototype book as teaching material with cover specifications, preface, table of contents, concept maps, physics material in the study of the Koran and sample questions and practice questions.

3. Development Stage

The development stage refers to the first validation by experts, namely general product validation with standards according to National Education Standards Agency including content feasibility, discussion feasibility, presentation feasibility, and graphic feasibility by two experts as supporters in the preparation of the prototype book. Both limited discussions and revisions from experts to perfect the preparation of the Prototype book.

4. Dissemination Stage

The first stage of this deployment was a limited trial, which was a test to see the response of the learning outcomes of students and educators to the use of physics teaching materials based on the study of the Koran. The test results became the basis for the revision of the prototype to produce the final draft of the textbook. Second, product packaging in the form of a prototype book with a description at the development design stage.

Research Data Analysis

The data obtained from the results of this study were then analyzed using descriptive and inferential analysis. Systematically, the conclusion of data analysis can be seen in Table 1:

Table 1. Data Analiysis for Each Problem Formulation

No	Formulation of the problem	Data Analysis
1.	How is physics teaching material based on the study of the Koran at Madrasah Aliah valid?	Validity Analysis: instruments and teaching materials by experts/experts or called the Gregory test or Judges test or content validity test or content test.
2.	How is the practicality of physics teaching materials based on the study of the Koran at Madrasah Aliah?	Practicality Analysis,: this test uses an instrument in the form of a questionnaire. Responses from practitioners, with an analytical step, namely, giving a score based on the category is a Likert scale, processing the score to produce a percentage of the total score with the help of the SPSS application. .
3.	How is the effectiveness of physics teaching materials based on the study of the Koran at Madrasah Aliah?	Effectiveness Analysis: This test uses an instrument in the form of a test of learning outcomes from practitioners, with an elaboration step, namely displayed in the form of mean, maximum score, standard deviation, minimum score, estimated population mean and percentage, frequency distribution.

III. RESULTS AND DISCUSSION

The teaching materials that have been developed by researchers have gone through a validation process by experts and analyzed through Gregorian analysis. These teaching materials were then tested to students of class XI IPA Madrasah Aliyah Negeri 3 Mataram City. A total of 26 students became the subject of the trial. 3 practitioners were also involved in responding to this teaching material.

a. Expert Validation Results

Teaching materials are submitted to two experts who provided an assessment of the teaching materials that have been developed. The aspects to be assessed were: (1) Content Feasibility, (2) Presentation Feasibility, (3) Language Feasibility, (4) Graphic Feasibility. The results can be seen as follows:

Table 2. Gregory's Validation Results of Teaching Material

		Expert Rating 1	
		Weak Relevance 1-2	Strong Relevance 3-4
Expert Rating 2	Weak Relevance 1-2	0	0
	Strong Relevance 3-4	5	28

$$\text{Internal consistency coefficient} = \frac{D}{A+B+C+D}$$

$$\text{Internal consistency coefficient} = \frac{28}{0+0+5+28} = \frac{28}{33} = 0{,}85$$

Because, R ≥ 0,75 (Relevant)

The results of the agreement by 2 experts provided a score which was then tested using the Gregorian test. The teaching materials developed have an internal consistency coefficient of 0.85. Therefore, the teaching materials developed have met the requirements of a valid category, which is considered valid if the internal consistency coefficient obtained is > 0.70. This price is in line with (Latukau et al., 2021) opinion that an instrument as a result of the validator's assessment will be considered valid if the value obtained is above >70. (Ulfa & Sucahyo, 2022) states that the material for a development must go through testing by at least two experts so that the resulting product can be considered valid.

Practicality

The practicality of teaching materials is measured through the responses of educators/teachers' responses. The practicality of teaching materials is one of the requirements for developing teaching materials. This was conducted by fulfilling practicality requirements, showing that teaching materials can practically be used by practitioners, in this case the subject teachers. It can be seen in table 3 below:

Table 3. Practicality Assessment of Teaching Materials

No	Indicator	No. Item	Responden		Total Score	Scor Maximum	Median	Percentage	Criteria
			1	II					
1	Contents	1	3	4	7	8	3.5	88%	Very Practical
		2	4	4	8	8	4	100%	Very Practical
		3	3	3	6	8	3	75%	Practical
		4	4	4	8	8	4	100%	Very Practical
		5	4	4	8	8	4	100%	Very Practical
2	Serving Method	6	4	4	8	8	4	100%	Very Practical
		7	3	4	7	8	3.5	88%	Very Practical
		8	3	4	7	8	3.5	88%	Very Practical
		9	4	4	8	8	4	100%	Very Practical
3	Language	10	4	3	7	8	3.5	88%	Very Practical
		11	4	4	8	8	4	100%	Very Practical
		12	4	4	8	8	4	100%	Very Practical
		13	4	3	7	8	3.5	88%	Very Practical
4	Illustration	14	4	3	7	8	3.5	88%	Very Practical
		15	4	4	8	8	4	100%	Very Practical
		16	3	3	6	8	3	75%	Practical
5	Completeness	17	3	4	7	8	3.5	88%	Very Practical
		18	4	4	8	8	4	100%	Very Practical
6	Physics	19	4	4	8	8	4	100%	Very Practical
		20	4	4	8	8	4	100%	Very Practical

The average percentage obtained is 93,33%. This figure is in the very practical category. This means that according to the assessment of the subject teacher, the teaching materials developed have fulfilled the practical requirements for use in the learning process. (Sirait et al., 2017) emphasized that the product developed is considered practical if it has been tested by practitioners and is considered to meet, this is in line with (Jaya, 2012) idea that the practicality of a development if the percentage of total response > 70%.

Thus, the product produced in the form of physics teaching materials based on the study of the Koran is categorized as very practical.

b. Effectiveness

The effectiveness of the developed teaching materials is assessed from the percentage of complete learning outcomes using the learning outcomes test. From the level of effectiveness of teaching materials, information is obtained about whether or not the teaching materials are effective when used in the learning process. The result can be seen as follows:

Table 4. Completeness of Student Learning

Interval	Middle Value	Frequency	Percentage	Category	Result
11 – 16	13,5	2	8,33%	Very Less	Not Completed
17 – 22	19,5	2	8.33%	Less	Not Completed
23 – 28	25,5	6	25.00%	Enough	Completed
29 – 34	31,5	8	33.33%	Good	Completed
35 – 40	37,5	6	25.00%	Very Good	Completed
Jumlah	**24**	**24**	**100%**		

The percentage of classical mastery of the students was 83,33% which was categorized as good. Thus, according to the theory put forward by J. van den Akker, that the teaching materials have been operationally effective to provide learning outcomes as expected. (Bahraeni, 2017) revealed that a development is effective if the percentage of classical completeness of respondents meets the minimum percentage. It is in line with (Istiqomah et al., 2019) who found that the effectiveness of teaching materials can be measured after going through testing on respondents as the final analysis of a development of teaching materials based on the ”four D model” method.

Similar views from (Putri et al., 2021; Chandra & Lizelwati, 2022) who found that the module teaching materials have been included in the very feasible or very practical criteria in improving scientific literacy in students with a percentage between 75%-100%. From the comparison results of several previous researchers, the results of developing teaching materials based on the study of the Koran are categorized as very effective.

This is in line with the opinion of (Sanjaya & Inawati, 2019) that Al-Quran-based

teaching materials imply that learning physics must be a strong foundation that can lead students towards scientific progress and achievement of learning outcomes. Another view is explained by (Hardianti et al., 2020) that in the development of a teaching material, three criteria must be met, namely validity, practicality and effectiveness to obtain a product that is completely successful in substance. Other opinions are also expressed by (Nurdyansyah & Mutala'liah, 2018) regarding the development of learning device. They suggest that teaching materials are prepared with the aim of providing teaching materials that are in accordance with the demands of the curriculum, assisting students in obtaining alternative teaching materials and making it easier for teachers to carry out learning.

IV. CONCLUSION AND SUGGESTION

Based on the results of the analysis, it can be concluded that the prototype of the Al-Qur'an Study-Based Physics text book for Madrasa Aliyah is very effective to used because it can achieve complete learning outcomes in learning.

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