

## INTERACTIVE LEARNING MODEL OF THE QUR'AN AND NATURAL SCIENCE BASED ON QR-CODE INTEGRATED AUGMENTED REALITY FOR HIGH SCHOOL STUDENTS

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**Abstract:** This study aims to develop learning media of Al-Qur'an and physics based on augmented reality and to examine the effect of using learning media developed on students' learning motivation. This research method uses the ADDIE development model (Analysis, Design, Develop, Implement, and Evaluate). The results showed that: (1) the validation results of the learning media got a validity value of 87.27% with highly valid criteria; (2) the results of material validation get a validity value of 88% with valid criteria; (3) the physics teachers' response to the learning media obtained an average of 80%, with a good category; (4) peer Reviewers' responses obtained an average of 85.71%, with a particular category; (5) students' responses about learning media development obtained an average rating of 89.37%, categorized as very good. So, it can be concluded that the interactive learning media of Al-Quran and augmented reality-based physics is very feasible and fascinating to be used in high school learning.

**Keywords:** Al-Qur'an, augmented reality, learning media, natural science, physics

### INTRODUCTION

Nowadays, the development of science makes spiritual development a critical aspect of the learning process (Febrianto & Shalikhah., 2021). Spiritual development can increase students' moral responsibility, morals, and religious character (Asyiyifa et al., 2017). However, nowadays, science learning appears to be separated from the learning of Al-Qur'an. Facts in the field show that there is often segmentation between science and Al-Qur'an, which is considered separate from one another (Syarif, 2020).

Science learning has an enormous contribution to the development of science. Natural science is one of the branches of science, and it is split into three scientific substances, namely physics, chemistry, and biology (Sadikin et al., 2018). At the high school level, students often face difficulties understanding the laws and theories of natural science, particularly in physics (Istyowati et al., 2017). The material is abstract, and delivering the material is monotonous (Yaduvanshi et al., 2017).

Spiritual guidance in the learning process can be conducted by integrating physics material and verses of Al-Qur'an (Aqil, 2018). There are more than 800 verses that explain natural phenomena, and those verses can be used for science learning, especially physics (Zuhdi & Syamsuddin, 2018). This kind of verse is commonly known as the Kauniyah verse.

Unfortunately, efforts to integrate the Al-Qur'an with physics are deemed not optimal due to several obstacles, such as the direction of educational orientation that is not

based on Faith and Taqwa (Mubarok, dkk., 2018), and not all teachers can integrate the Qur'an and science (Zain & Vebrianto, 2017). Therefore, the role of learning media that integrates Al-Qur'an and physics is needed. The goal of the study is to develop interactive learning media based on QR-Code augmented reality on physics material, integrated with the verses of the Holy Qur'an, test the feasibility of the learning media developed, and test the growth in high school students' learning motivation.

## METHOD

This study uses the ADDIE development model (Analysis, Design, Develop, Implement, and Evaluate). This research step starts from the analysis stage: material analysis, job analysis, needs analysis, and students' characteristics. In the planning (design) stage, the researcher's team compiles materials and develops research instruments to validate the materials by material experts. The material is inserted into the media; then, the learning media validation is carried out by media experts. In the implementation and evaluation stage (Implement and Evaluate), a trial was conducted on 40 XI grader SMAN 2 Pare students, three high school physics teachers, and three peer reviewers. The result gained as material for consideration for improving learning media.

Instruments in material validation and media validation are in the form of a questionnaire using a Likert scale. This study uses the highest score of 5 and the lowest score of 1. The percentage of the final value of the validation results uses this formula:

$$V = \frac{T}{U} \times 100\%$$

V: Validity

T: Validity score obtained

U: Maximum score validity

(Wati et al., 2016).

Afterward, it is to look for the percentage of validation criteria. The validation criteria used can be seen in Table 1.

**Table 1. Feasibility Criteria adapted by Riduwan (2012:89)**

Percentage (%)	Criteria
0 – 20	Not feasible
21 – 40	Less feasible
41 – 60	Moderate
61 – 80	Feasible
81 – 100	Very feasible

## FINDINGS AND DISCUSSION

### Product Development

The development product is formed as the learning media of Al-Qur'an and Physics with an augmented reality-based book model. One display of the book page can be seen in Figure 1. Each book page is presented briefly with pictures to make the material understanding easier and escalate the students' reading interest. The components contained in the book page include (1) AR markers, (2) verses of Al-Qur'an, and (3) laws or physical theories.



Figure 1. Book Page Display

At the beginning of the page, there is a QR Code to connect it to a smartphone. The title of Al-Quran and natural science is at the top of the page as the first introduction. After that, the menu section consists of several features, including (1) material review, (2) asbabun nuzul, (3) verses tafsir, (4) audio verses, and (5) AR video. The menu display, material study, and asbabun nuzul can be seen in Figure 2. Then, the display of the tafsir features, audio verses, and AR video can be seen in Figure 3. The application color selection uses a combination of green, blue, and white colors. This color base is not overly flashy, so it is comfortable to use.

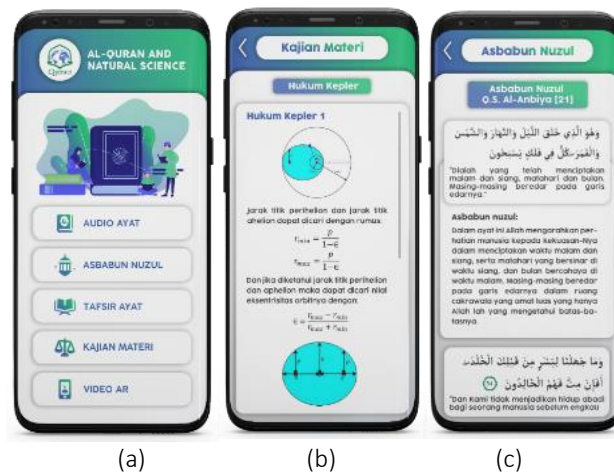


Figure 2. (a) Menu Display, (b) Material Review Features, and (c) Asbabun Nuzul Features

The material study feature will display theoretical studies based on students' essential competencies, integrated with Al-Qur'an verses. The asbabun nuzul feature is going to discuss the reasons why a verse of the Holy Qur'an was revealed. The reference kitab used is the kitab of Jalaluddin As-Suyuthi.



**Figure 3. (d) Display of the Tafsir Features, (e) Audio Features, and (f) AR Video Features**

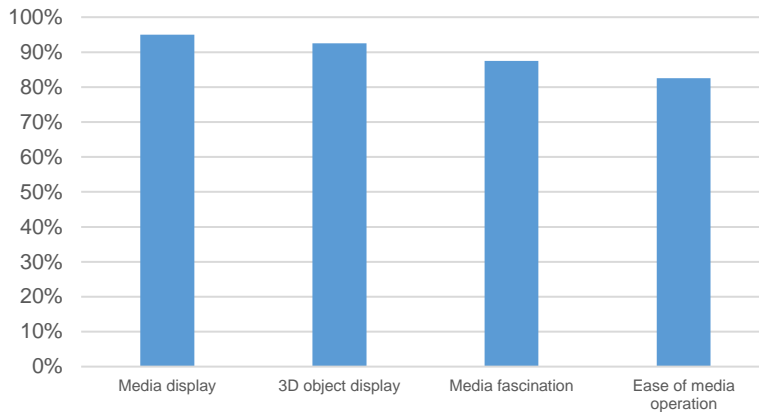
The tafsir feature will display several tafsirs, there are Tafsir al-Munir, Tafsir al-Tahrir wa al Tanwir, and Tafsir Ibn Kathir. The audio verse feature will contain verse readings presented in the book. Later, the audio of the Holy Qur'an verse uses the tartil method, and the use of the tartil method can help people to understand and tadabbur on the meaning of the Al-Qur'an. The AR video feature will be connected to a smartphone camera to detect AR markers on the book pages. A calibrated camera will detect the available marker; then, it will display the object in 3D. The use of augmented reality technology can explain abstract phenomena well visualized, thus making learning more interactive.

### Development Data Analysis

At the analysis stage, questionnaires were distributed to 40 students of the XI grader in SMAN 2 Pare, majoring in mathematics and natural sciences. The purpose of this analysis is to obtain data on needs analysis aspects of the students. From the 40 respondents, it was found that 90% of students had difficulty in representing microscopic objects in the natural science material, especially in physics.

The analysis results show that the learning process implemented at SMAN 2 Pare still uses an explanation-and-assignment-based learning module, and there has been no development of learning media of Al-Qur'an and smartphone-based physics. The use of interactive learning media creates students to be more motivated in studying physics material. The researchers developed an augmented reality-based learning media of Al-Qur'an and physics-based on the needs analysis results.

The results of the study obtained a media feasibility test using product validation. Material experts and learning media experts did the validation. The results of material validation by two material experts are physics lecturers and PAI lecturers. This result showed an average percentage of 88% with the criteria for the material to be tested with revisions according to suggestions, particularly on the achievements in material suitability, material completeness, clarity of Kauniyah verses, media illustrations, and tafsir appropriateness. Moreover, the suggestion given is to necessarily develop explanations of the relationship between the verses of the Holy Qur'an and the material that the students will learn with more concrete examples. The details of the average percentage of material expert validation are presented in Figure 4.



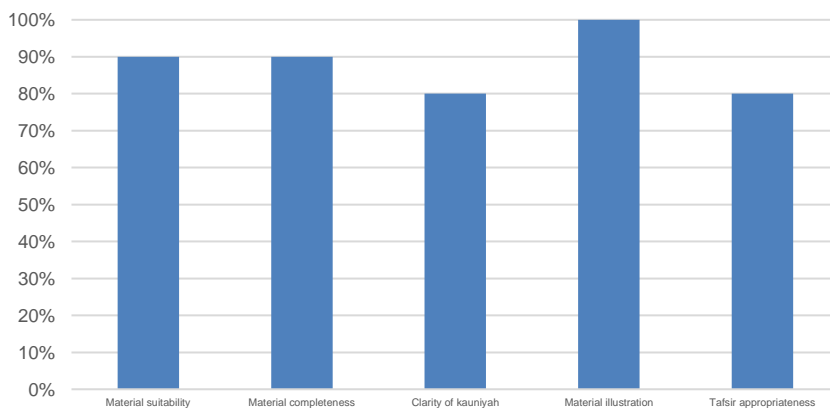
**Figure 4. Material Validation Test Results Graphic**

After the validation test by a material expert is gone through, the media validation is conducted by a learning media expert. The results of the media validation are 87.27% with an immensely valid media category and can be used without any revision. In addition, the results of responses and comments from 3 high school physics teachers and three peer reviewers from S2 students majoring in physics regarding the material in learning media were also obtained. The overall assessment is presented in the following details:

**Table 2. Overall Results of Learning Media Assessment**

Aspects	Averages	Criteria
2 Material Experts	88%	Very Feasible
Media Experts	87,27%	Very Feasible
3 Physics Teachers	80%	Feasible
3 Peer Reviewers	85,71%	Very Feasible

The implementation stage using 40 students of XI grader in SMAN 2 Pare showed an average percentage of achievement of 88.5% with a fascinating interpretation of the value on several aspects measured, such as media display, the use of technology, material suitability, application display, and 3D object display. Details of the percentage of student responses are presented in Figure 5.



**Figure 5. XI Grader Student Trial Graphic**

Students' responses on the developed learning media have an average of 89.37% with media display, 3D object display, media attractiveness, and ease of the media operation. These results indicate that Augmented Reality-based physics learning media developed can increase students' interest and motivation in learning physics material. Furthermore, students can use this media as an independent study material in their learning activities.

## CONCLUSIONS AND SUGGESTIONS

This study uses the development of ADDIE (Analysis, Design, Develop, Implement, and Evaluate) to develop an augmented reality-based interactive learning media of Al-Qur'an and physics. The results of material expert validation got an average percentage of 88%, and the media expert validation results were 87.27%. The trial results to class XI students obtained an average score of 88.5%, with a vastly exciting category. This media can increase motivation to learn Al-Qur'an and physics, which can also be the spiritual and intellectual development for high school students in the 4.0 era.

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