

Smart Module Design: Innovation in Learning Media Technology-Based Character Education

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ABSTRACT

The purpose of this study is to determine whether the Smart Module learning media is valid for use and how the student learning outcomes are after using this module. The success or failure of a learning process, especially in Islamic religious education that focuses on character education, is determined by the learning media used. In realizing this success, a problem arises, namely that teachers are still monotonous in using learning media so that learning cannot be received properly by students. Seeing this problem, researchers created a new innovation, the Smart Module, a technology-based character education learning media innovation, namely technology that can combine the virtual world with the real world at the same time. This study uses the R & D type with the Borg and Gall development model. Data collection techniques are carried out through observation, questionnaires, literature studies, documentation and trials, then analyzed using media expert validation analysis techniques, material expert validation analysis techniques and trial analysis techniques. The results of this study indicate that the Smart Module has a validity level of 92% and can improve student learning outcomes.



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A. INTRODUCTION

The goal of education is a conscious effort to transfer and transform knowledge and internalize religious and cultural values, in all their aspects and forms, to future generations. The creation of a perfect human being is the ultimate goal of Islamic education (Rofi'ie, 2019). In actualizing these goals in Islamic education, education has the responsibility to guide students towards these goals (Afandi et al., 2022). Because the goal is not only to transform knowledge but also to internalize values in students. The forms of values that are internalized include at least ethical, aesthetic, social, economic, political, knowledge, pragmatic, and divine values (M. Akhyar, 2022)

The quality of education is very important in determining whether a country progresses or not. This is because the future fate of a nation can be seen from the quality and quantity of its educational institutions, whether formal, non-formal or informal (Y. Akhyar, 2024). Therefore, education is an important part of the life of every human being, where humans can develop their personality by developing their potential in accordance with the values that exist in societ (Aminuddin & Kamaliah, 2022). Thus, from the existing values, a process takes place that is in line with the main goal of education, namely developing the abilities, knowledge, skills and attitudes of students optimally (Akbar et al., 2024).

The ideals of the Indonesian nation as stated in the preamble to the Constitution of the Republic of Indonesia, namely to enlighten the life of the nation, of course this must be done through education (Azizah, 2019). The word "education" itself comes from the Greek word "paedagogie," meaning direction given to children. This term was later translated into English as "education," meaning direction or guidance. In Arabic, the word "education" is known as al-ta'lim, al-tarbiyah, and al-ta'dib. Al-ta'lim means imparting knowledge and skills, while al-tarbiyah means nurturing or educating, and al-ta'dib means the process of educating, beginning with improving the morals of students (Aulia et al., 2025).

Law No. 20 of 2003 concerning the National Education System states that "National education functions to develop capabilities and shape a dignified national civilization in order to enlighten the nation's life. National education aims to develop the potential of students to become people who believe in and fear God Almighty, have noble morals, are healthy, knowledgeable, capable, creative, independent and become democratic and responsible citizens." (Asy'arie et al., 2023).

Teachers are the most important human resources who deal directly with students (Azizah, 2019). In Government Regulation Number 74 of 2008 concerning teachers, Article 1 explains that teachers are professionals with the main task of educating, teaching, guiding, training, assessing and evaluating students in early childhood education on the formal education path, basic education and secondary education. (Afif et al., 2022)

A teacher has a very important role in efforts to form quality human resources (Akbar, 2021). A teacher is also a key factor in the success of a process in education because the teacher is an example and role model to be imitated and is a source of learning because if there is no teacher the goal of education itself will not be achieved (Alam, 2016). The development of science and technology in today's era makes the task of teachers in creating quality human resources increasingly difficult (Alam, 2016).

Teachers are required not only to master learning materials but also to be prepared to utilize technology as a learning medium. Teacher readiness includes digital pedagogical competence, technical skills in operating technology-based media, and mental readiness to adapt to learning innovations. Without such readiness, technology use tends to be suboptimal and does not have a significant impact on learning outcomes.

In addition to teacher readiness, school infrastructure is also a determining factor in the successful implementation of technology-based learning. The availability of devices such as smartphones, a stable internet connection, and other supporting facilities are key prerequisites for the use of digital learning media. Limited infrastructure can be a barrier to implementing learning innovations, thus requiring attention in the development of technology-based media.

Another factor influencing learning success is student motivation. Motivation is a driving factor that determines the level of student engagement in the learning process. The use of technology-based media is expected to increase student interest in learning through the presentation of more engaging, interactive, and contextual material. However, without adequate motivation, the use of technology will not produce optimal results.

In education, teachers are the main component that is required to provide a balance in science and technology which continues to develop (Zufiroh & Basri, 2023). Achieving this goal requires teachers with high qualifications, competence, and dedication to carrying out their professional duties. Any effort to advance education will fail without the support of a professional teacher. (Wasiyah et al., 2023).

Islamic religious education, especially character education, is an important subject in the world of education that must be included in the formal education curriculum in Indonesia (Muslim & Ruswandi, 2022). Through character education, it is hoped that it can help realize an integrated life, therefore character education is one of the very important subjects in Indonesia (Muktamar, 2023).

Character education also has goals that align with the philosophy and outlook on life outlined in the Quran. Sholeh's research states that the goal of Islamic education, which focuses on character education, is to enhance intellectual abilities and cultivate the mind, foster innate talents, and develop the potential of the younger generation. In realizing these educational goals, the primary agent plays a crucial role: the teacher. A teacher is the person most responsible for transferring knowledge to students (Sholeh, 2016).

Learning media are all forms of tools used to convey information for learning, ensuring that messages or materials are conveyed effectively. The communicative process that occurs within the system, therefore, makes learning media a valuable tool in the learning process. Without media, communication will not take place effectively, and the learning process cannot proceed optimally (Ali et al., 2025).

Another problem is that teachers still use learning media in a monotonous manner. A survey conducted via Google Forms revealed that 81% of students stated that teachers still use the lecture method during learning. 67% of students cannot understand the material solely from notes provided by the teacher. 93% of students prefer using learning media in their learning process. 91% of students agree with the development of technology-based modules in the learning process.

Based on initial observations, the author found data from Google Forms that showed 56% of seventh-grade students found it difficult to understand the history of Islamic culture. Addressing this issue, the author created a new innovation in the learning process, namely the Smart Module, a technology-based character education learning media innovation.

The Smart Module is a learning medium that integrates AR technology with learning modules in a systematic and structured manner. Unlike conventional AR media, which generally only displays three-dimensional visual objects without integration with the learning flow, the Smart Module is designed with a pedagogical approach that integrates material, evaluation, and interactivity into a single unit. Furthermore, compared to previous digital modules, which tended to be static and solely text- or image-based, Smart Modules offer a more immersive learning experience through 3D visualization, direct interaction, and contextual connections to the learning material.

The novelty of Smart Modules lies in the integration of AR technology with character-based learning design, easy access via mobile devices, and interactive features that support active student engagement. Smart Modules function not only as visualization media but also as learning tools that encourage conceptual understanding, increase learning motivation, and reinforce character values in the study of Islamic cultural history (Dendodi et al., 2024).

The research questions are: To what extent is the Smart Module learning media prototype valid for improving student learning outcomes? What are the student learning outcomes after using the Smart Module learning media?

The objectives of this research are to determine the validity of the Smart Module learning media prototype in improving student learning outcomes and to determine student learning outcomes after using the Smart Module learning media.

B. METHODS

In this development, the author uses the R&D (Research and Development) research type. The steps of this research use the model proposed by Borg and Gall in Herlina's research which has ten work steps which include: a) Collecting initial information b) Planning c) Developing the initial form d) Small-scale trials e) Product revision f) Limited trials g) Product revision h) Feasibility test i) Product revision j) Dissemination and implementation (Abdusamad, 2021).

The Borg and Gall model was chosen for this study because it has high validation and has been tested by several experts. The purpose of the model itself is to develop an effective model or product to meet the needs of specific program activities, which in this study emphasized student needs analysis. However, in this study, the researchers only reached the fifth stage, product revision (Ariska et al., 2020).

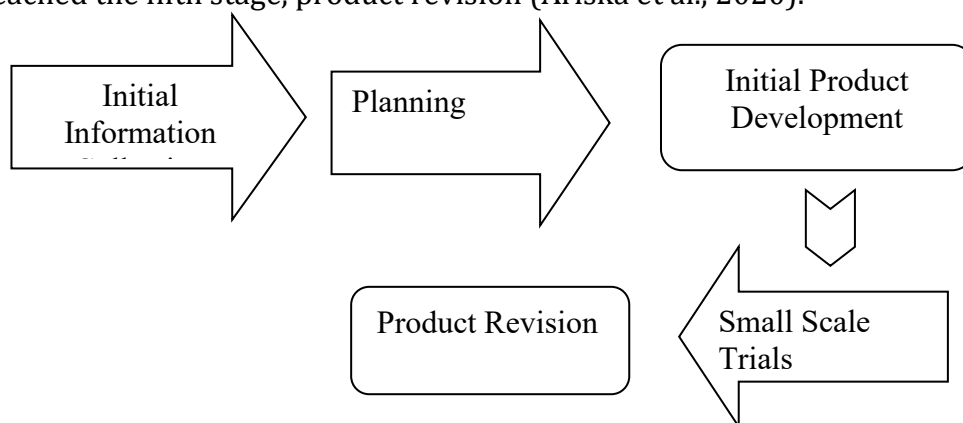


Figure 1 Stages of the Borg and Gall method that are in accordance with the author's research

In this development research, the author only reached the fifth stage, namely product revision as modified by Cuningham in Borg and Gall, namely: 1) reviewing initial information about product needs 2) planning the goals to be achieved 3) developing the initial product 4) testing on a small number of subjects. In addition, in this research, the researcher was limited in being able to only conduct R&D research on a limited scale, but this was felt to have fulfilled the core of development research (Adlini et al., 2022).

The development procedure in this study is as follows: a) initial information gathering: The research begins with the collection of information to serve as a basis for developing teaching materials; to achieve this, the researcher requires a needs analysis (Aswirna, 2023). This stage was carried out through the distribution of questionnaires to students. The author distributed the questionnaires with the aim of understanding the reality in the field regarding the Smart Module learning media and analyzing problems that have occurred during the learning process carried out in the classroom so far. In the needs analysis, the author analyzed three analyses: resource analysis, curriculum analysis, and student analysis. b) Planning: Based on the results of the initial information collection conducted by the author through the distribution of questionnaires, the researcher's next step was to plan the learning media to be developed, namely the Smart Module learning media. c) product trials, d) product revisions.

Data collection techniques for this learning media include questionnaires, observation, documentation, literature studies, and test questions. These data collection techniques are as follows: The questionnaire used in this case is a closed questionnaire, namely a questionnaire with pre-prepared answers, so respondents only need to choose and answer directly. The researcher's observations were carried out to gather initial

information so that results can be obtained for the development of the initial prototype. The documentation conducted by the researcher involved a review of K13 documents, both Document 1 and Document 2. Literature study, commonly known as library research, is one of the most popular data collection methods. Testing techniques include written tests. Test instruments can be in the form of exam questions (test questions) and inventories. The data analysis technique in this study was media validation and material validation, created using a rating scale with a maximum score of 4 and a minimum score of 1.

C. RESULT AND DISCUSSION

Starting from the problem of how to ensure students understand the material presented well because based on survey results, 67% of students cannot understand the subject matter only with explanations and notes given by the teacher. Also during the Covid-19 pandemic, students tend to be more active in using social media, especially TikTok, which has an impact on knowledge in the field of education. The lack of development of learning media in the field of Islamic religious education that focuses on character education between science or technology and religion and also the absence of learning media for people with disabilities who are visually impaired. For this reason, Smart Module comes with sophisticated AR technology that can display 3D learning videos and is equipped with a QR code that can be connected directly to TikTok social media so that learning is not boring. This multi-theme-based learning media is not only intended for normal students but can also be used by people with visual impairments.

a. Innovation Design

In accordance with the results of the survey conducted by the author, from the questionnaire distributed the author found that 86% of students tend to prefer the color blue and 79% of students tend to like Islamic children's cartoon animations and 55% of students have difficulty understanding the history of Islamic culture subjects and 100% of students have used Android-based smartphones with 78% spending more time using Tiktok social media and also the lack of learning media for people with visual impairments. From the results of the needs analysis, the author created a design for Smart Module learning media innovation, an innovation in character education learning media based on Tiktok. Has utilized the sophistication of augmented reality technology that can display 3-dimensional learning videos and this learning media is equipped with a Qr code that can be connected directly to Tiktok social media that displays an explanation of learning aqidah akhlak class VII K13 with a video creator made directly by the author. Smart Module learning media is presented with writing that is understandable by students. This media is also equipped with braille that can be used by people with visual impairments in the learning process.

b. Product Specifications

The development of Smart Module learning media for Islamic Religious Education (PAI) based on TikTok is a learning medium for Islamic faith and morals used by grade VII K13. This module presents material on character education.

The Smart Module media specifications include advanced augmented reality technology that can display 3D learning videos and is equipped with a QR code that can connect directly to TikTok social media, displaying videos from content creators, researchers, and researchers, providing brief explanations of the material on Islamic faith and morals for grade VII. The Smart Module learning media is also equipped with braille

for use by the visually impaired. This sheet also contains QR and AR codes that, when scanned using an Android smartphone, can display 3D creator videos and TikTok videos using green screen technology, providing audio and visuals to enhance learning.

c. Creation Process

The first step: prepare a printer and an Android smartphone, download the QR Generator, Assembler Edu, and TikTok applications. Then, create content using the green screen on TikTok and design the material to be explained. Then, create a QR code from the TikTok video link using the QR Generator. Also, prepare a 3D learning video created using the Assembler Edu app.

The next step is to prepare HVS paper and renglet (sticker board) and create learning materials using renglet to create braille-based materials that can be used by visually impaired people. Once all the materials are ready, the next step is to print the media using Art Paper, and the media is ready to use.

d. Advantages and Disadvantages

The Smart Module is equipped with advanced augmented reality technology, allowing it to display 3D learning videos, making learning more enjoyable. The Smart Module is also equipped with a QR code that can connect directly to TikTok social media, making the material easily understood through content creators. TikTok is no longer considered a social media platform solely for music videos but can also impact the world of education.

The Smart Module also features braille, which can be used by visually impaired people for learning. The Smart Module has the advantage of being a learning module for students during the pandemic, facilitating independent learning. It features attractive, concise presentations and colors.

The downside of this learning medium is that Smart Modules utilize advanced technology and the internet. Therefore, when there are network disruptions, learning can only be done through the modules without the use of TikTok videos and augmented reality videos.

e. Trial Data Presentation

1) Needs Analysis

At this stage, the author analyzed resources, curriculum, and students. Students tended to prefer the color blue and had difficulty understanding Islamic cultural history lessons. They also used Android smartphones and used TikTok more frequently than other social media platforms.

2) Planning

Designing a TikTok-based Smart Module learning media based on the needs analysis results resulted in the formation of an initial prototype.

a. Initial Product Development

At this stage, a prototype learning media design was created, allowing for validation by experts. After validation was completed, prototype 1 was created.

Table 1. Validation Results of Material Experts and Media Experts

No	Validator	Skor	Category
1	Validator 1 Ahli Media	100%	Very Valid
2	Validator 2 Ahli Media	92%	Very Valid
3	Validator 3 Ahli Media	83%	Very Valid
4	Validator 1 Ahli Materi	92%	Very Valid
5	Validator 2 Ahli Materi	97%	Very Valid
6	Validator 3 Ahli Materi	92%	Very Valid
	Amount	556%	
	Mean	92%	
	Category		Very Valid

b. Trial

After conducting expert validation, the next step was a limited-scale product trial with only six students.

Table 2 Comparison of scores before and after using the Smart Module media

No Responden	Initial Value	Final score
Responden 1	25	62
Responden 2	62	81
Responden 3	81	87
Responden 4	68	68
Responden 5	43	62
Responden 6	75	87

D. CONCLUSION AND SUGGESTIONS

The Smart Module has a validity level of 92%, meaning this learning media is valid and worthy of testing. Smart Module can improve student learning outcomes and make learning more enjoyable with TikTok videos and 3D learning videos. The Smart Module learning media design uses the Borg and Gall research and development procedure, only reaching step 5. This is due to the limited time required for research and the Smart Module learning media that will be created only up to limited testing, requiring only three media experts and three material experts.

Based on the research limitations identified by the researcher, suggestions for other researchers who will develop Smart Module learning media are as follows: Further deepen the learning material on Islamic cultural history and find a research location that provides Wi-Fi to avoid network disruptions when scanning QR codes and AR.

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REFERENCES

- Abdusamad, Z. (2021). *Qualitative Research Methods*. CV. Syakir Media Pres.
- Adlini, M. N., Dinda, A. H., Yulinda, S., Chotimah, O., & Merliyana, S. J. (2022). Qualitative Research Method Literature Study. *Edumaspul: Jurnal Pendidikan*, 6(1), 974–980. <https://doi.org/10.33487/edumaspul.v6i1.3394>
- Afandi, M., Erdayani, R., Afandi, S. A., & Rafi, M. (2022). Analysis of Education Autonomy Policy in Indonesia. *Journal of Government Science (GovSci): Jurnal Ilmu Pemerintahan*, 3(2), 85–99. <https://doi.org/10.54144/govsci.v3i2.32>
- Afif, N., Putra B, M. N., & Kastamin, N. (2022). Teacher Personality Competence in the Concept of Tazkiyatu An-Nafs. *Reslaj: Religion Education Social Laa Roiba Journal*, 5(1), 20–31. <https://doi.org/10.47467/reslaj.v5i1.1254>
- Akbar. (2021). *Teacher Pedagogical Competence in Effective Learning in Schools*. Alfabeta.
- Akbar, M. A. R., Safitri, I., & Rusydiyah, E. F. (2024). Implementation of the Mind Mapping Learning Method for Islamic Religious Education from the Perspective of Islamic Religious Education Teachers. *Journal of Education Research*, 5(2), 1899–1910. <https://doi.org/10.37985/jer.v5i2.1040>
- Akhyar, M. (2022). *Adaptation and Innovation Strategies for Islamic Education Curriculum in the Digital Era 4.0*. 5.
- Akhyar, Y. (2024). *Factors Inhibiting the Implementation of Quality Management in Islamic Education at Private Marasah Aliyah*.
- Alam, L. (2016). Internalization of Islamic Educational Values in Public Universities Through Campus Da'wah Institutions. *Jurnal Pendidikan Islam*, 1(2), 101.
- Ali, A., Dea Venica, S., Aini, W., & Faisal Hidayat, A. (2025). The Effectiveness of Interactive Learning Media in Increasing Elementary School Students' Interest and Motivation to Learn. *Journal of Information System and Education Development*, 3(1), 1–6. <https://doi.org/10.62386/jised.v3i1.115>
- Aminuddin, A., & Kamaliah, K. (2022). Contemporary Islamic Religious Education Planning. *Al-Aulia: Journal of Islamic Education and Sciences*, 8(1), 56–64. <https://doi.org/10.46963/aulia.v8i1.540>
- Ariska, D., Asril, Z., & Aswirna, P. (2023). *P Development of Higher Order Thinking Skills (HOTS) Assessment Assisted by the Lectora Inspire Application on Students' Critical Thinking and Creative Thinking Abilities*.
- Aswirna, P. (n.d.). *Development of Adobe Flash Application-Based Learning Media on the Material of Heat, Heat Transfer and the Kinetic Theory of Gases to Improve Students' Conceptual Understanding*.
- Asy'arie, B. F., Arif Ma'ruf, R., & Ulum, A. (2023). Analysis of Islamic Religious Education and Moral Education from Al-Ghazali's Perspective. *Al-Qalam: Jurnal Kajian Islam dan Pendidikan*, 15(2), 155–166. <https://doi.org/10.47435/al-qalam.v15i2.2279>
- Aulia, N., Harahap, U. H., Silitonga, N. E., Sihite, M. L., & Ketaren, M. A. (2025). *Challenges and Strategies of Curriculum Management in the Digital Era: A Literature Review for Educational Innovation*. (5).
- Azizah, F. R. (2019). Developing an Interconnective Interactive Paradigm in Islamic Education in Higher Education (Interdisciplinary Approach in Islamic Studies. *Journal of Islamic Education*, 4(2), 7.
- Dendodi, D., Simarona, N., Elpin, A., Bahari, Y., & Warneri, W. (2024). Analysis of the Application of Augmented Reality in Increasing the Effectiveness of Science Learning in the Digital Era. *ALACRITY: Journal of Education*, 293–304. <https://doi.org/10.52121/alacrity.v4i3.456>

- Muktamar, A. (2023). *Assessment in the Independent Curriculum from an Islamic Religious Education Perspective*. 1.
- Muslim, E., & Ruswandi, U. (2022). Challenges, Problems and Opportunities in Learning Islamic Religious Education in Higher Education. *Journal Of Islamic Education Studies*, 2(1), 57–71.
- Rofi'ie, A. H. (2019). Character Education Is a Must. *Journal of Values Education and Character Development*, 1(1), 113–128.
- Wasiyah, Mariati, Fitriana, Y., & Bakara, T. (2023). The Effectiveness of Using Learning Media on Teachers' Teaching Activities in the Classroom. *EDUKASIA: Journal of Education and Learning*, 4(1), 205–212. <https://doi.org/10.62775/edukasia.v4i1.227>
- Widya Helmalia, Andi, Putrid, Andi Dirpan. "The Potential of Traditional Spices as a Source of Natural Antioxidants for Functional Food Raw Materials". *Jurnal Teknologi* 2, no. 3, (2019): 26.
- Yuni Lestari, Eta, Slamet Sumarto, Noorahman Isdaryanto. "Fulfillment of Rights for Persons with Disabilities in Semarang Regency Through the Implementation of the Convention on the Rights of Persons with Disabilities (CPRD) in the Field of Education", *Jurnal Integralistik* 28, No. 1, (2017): 9.
- Zaki, Muhammad. "Islamic Religious Education in Public Universities Based on Multiculturalism". *Jurnal Nur El-Islam* 2. No. , (2015):42.
- Zufiroh, L., & Basri, S. (2023). *Challenges of Islamic Religious Education Teachers in Facing the Era of Society 5.0*. 9(1).