Analysis of Teaching Materials based on the Integration of Science and Technology in Improving the Learning Process of Islamic Education in Grade X Students of Madrasah Aliyah An-Nur Rambipuji Jember

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ABSTRACT

Background. PAI learning tends to focus on abstract concepts that feel far from everyday life, making it difficult for students to interpret and understand the values in PAI learning. Therefore, it is very important for teachers to prepare and pay attention to teaching materials well, because this has a significant influence on improving the quality and competence of students.

Purpose. The ultimate goal of this research is to improve the quality of PAI learning and provide a more holistic understanding to students or learners. By gaining a more complete and integrated understanding of religion, science and technology, it is expected that students will be able to better integrate this knowledge in their daily lives. This will help students make better decisions, solve complex problems, and face modern challenges with a richer and deeper understanding.

Method. This study uses a descriptive qualitative method by combining theories related to the object of research with observations of the research setting by validating the research findings found by the researcher to produce a conclusion that is valid and in accordance with the facts and natural conditions that occur in the research setting.

Results. The development of PAI teaching materials based on science and technology integration in class X M.A An Nur Rambipuji Jember is still not running optimally, and effectively so that there needs to be special guidance to educators, so that PAI teaching materials based on science and technology integration can run more effectively

Conclusion. Science and technology cannot be separated in Islamic education learning in educational institutions, so from it, there is a need for improvement and optimization regarding the development of science and technology-based Islamic religious education (PAI) teaching materials, with science and technology-based teaching materials the institution will get the expected results or goals, because currently formal institutions must be prepared with advances in technology and science which are increasingly becoming an interest for students and are also able to compete with the increasing number of other formal institutions.

KEYWORDS

Islamic Religious Education, Science, Technology, Teaching Materials
INTRODUCTION

Being aloof and lacking interaction with general education activities is an illustration of the current Islamic Religious Education (PAI), a model like this is not effective for embedding complex educational tools. Educators or teachers of Islamic religious learning should be even more creative in teaching and delivering Islamic religious education (PAI) materials (Azam dkk., 2019; Kartika dkk., 2019; Syiroj dkk., 2019). At present, the process and application of Islamic religious education (PAI) still faces several problems. PAI learning tends to focus on abstract concepts that feel far from everyday life, causing difficulties for students to interpret and understand the values in PAI learning (Alomair dkk., 2020; Maskur dkk., 2019). the tendency for knowledge to be general in nature and only to discuss issues about religion, is another weakness of learning Islamic Religious Education so that the learning material is not yet widespread.

Therefore, it is very important for teachers and teachers to prepare and pay attention to teaching materials properly, because this has a significant influence on improving the quality and competence of students (Syazali dkk., 2019). The purpose of learning is to increase potential, generate motivation, cultivate talents, develop interests, stimulate skills, and develop competencies with contextual and creative learning patterns. To overcome the limited understanding (Habib dkk., 2021; Hanafi dkk., 2020), it is necessary to develop teaching materials that are integrated with science and technology in Islamic religious education subjects or materials. The author made observations in class X MA Annur Rambipuji Jember and realized that the teaching materials contained in Islamic religious education (PAI) learning still focused on religious aspects and had not yet integrated general knowledge such as science and technology (Marzuki dkk., 2020; Suyadi dkk., 2020; Yudiawan dkk., 2021). This causes students' understanding of religion, science, and technology to become less intact. On the basis of the problems above, the way the authors propose to overcome this is to carry out the development of PAI modules that integrate technology and science. This study aims to research and develop teaching materials for Islamic religious education (PAI) based on integrated science and technology for class X MA students. Annur Rambipuji Jember.

In this study, researchers will focus on the study and development of Islamic Religious Education (PAI) modules that integrate aspects of science and technology in their learning (Gürses dkk., 2019; Razak, 2020; Sholikhah dkk., 2019). The main objective of developing this module is for students to gain a more complete understanding of religion, science and technology in an integrated manner. The PAI module that will be designed will include materials that are relevant to the Islamic religion, but will also include related elements of science and technology (Auliani dkk., 2023; Mustafiyanti dkk., 2023). It aims to show the relationship and relevance between religion, science and technology in everyday life. For example, the module could combine scientific concepts found in the Islamic religion, such as cosmology or natural sciences, with related modern technological applications.

By using this module, it is hoped that students will be able to see that religion, science, and technology are not separate fields, but are interrelated and can complement each other (Mulyasari dkk., 2023; Noer dkk., 2023; Wanti dkk., 2023). Students will be given a more comprehensive understanding of how science and technology can be used in the context of religion and how religion can provide ethical guidance and values in the development of science and technology. The ultimate goal of this research is to increase the quality of PAI learning and provide students with a more holistic understanding (Al Maarif dkk., 2023; Utami dkk., 2023). By gaining a more complete and integrated understanding of religion, science, and technology, it is hoped that students will be able to better integrate this knowledge in their daily lives. This will help students make better
decisions, solve complex problems, and face modern challenges with a richer and deeper understanding

**RESEARCH METHODOLOGY**

This study uses a descriptive qualitative method by combining theories related to the object of research with observations of the research setting by validating the research findings found by the researcher to produce a conclusion that is valid and in accordance with the facts and natural conditions that occur in the research setting.

**RESULT AND DISCUSSION**

The National Center for Competency Based Training, argues that teaching materials can be interpreted as a collection of materials arranged in a systematic manner with the aim of assisting teaching staff or becoming instructors in carrying out the learning process in class (Fadiyah dkk., 2023; Ranal dkk., 2023). Specific and unique are two characteristics that are inherent in teaching materials, said to be specific because the contents of teaching materials are designed and designed to vary only to achieve certain goals, said to be unique because of the limitations of teaching materials that can only be applied to certain audiences, and through certain learning processes (Fiqih dkk., 2023; Hermansyah dkk., 2023; Pamuji & Limei, 2023), besides In addition, the systematics and method of delivery are also adjusted to the characteristics of the students who apply them.

Teaching materials include all elements related to the learning process, such as information, text, and tools used in learning activities. The purpose of teaching materials is to assist in planning and implementing classroom learning (Azizah dkk., 2022; Nicholas dkk., 2023). Thus, the authors can conclude: teaching materials have an important role in the learning process. In the learning planning process, educators or teachers are responsible for preparing teaching materials that can help and support the learning process. Teaching materials also aim to help students achieve learning goals properly and optimally (Putri dkk., 2023). With the right teaching materials, students will more easily accept and understand the material, develop skills, and achieve the expected learning outcomes.

**Criteria for Teaching Materials**

There are aspects or criteria that must be met. Here are some characteristics that must be considered when choosing teaching materials:

a) Relevance to the curriculum: Teaching materials must include material or content that is in accordance with the applicable curriculum. This is important so that teaching materials can support the achievement of predetermined learning objectives.

b) Principles of learning: Presentation of material in teaching materials must meet the principles of effective learning. The material must be arranged systematically, using an appropriate approach and in line with the characteristics of students, and taking into account various learning styles.

c) Language and readability: The language used in teaching materials must be clear, easy to understand, and aligned with the level of understanding and ability of students. Teaching materials that have good readability can definitely help students understand and internalize the material better.

d) Attractive graphics and format: Visually appealing teaching materials, with good graphics and an attractive format, can increase students’ motivation and interest in learning. The use of relevant illustrations, diagrams or pictures can also help clarify the concepts being taught. By
paying attention to these characteristics in choosing teaching materials, it is hoped that teaching can be more effective, interesting, and useful for students.

In addition to the characteristics above, educators should also pay attention to the criteria that must be met in teaching materials (Holly dkk., 2023; Vicky dkk., 2023). Teaching materials must meet four main criteria so that they are considered good and suitable for use as a source of information in learning, namely content coverage, readability, presentation, and graphics.

**Forms of Teaching Materials**

In terms of form, teaching materials can be divided into four, namely:

1. Teaching materials in printed form: This form of teaching materials is in the form of a number of materials printed on paper. This printed teaching material is used in the teaching and learning process to meet the needs of students. Examples could be textbooks, worksheets, or information sheets that can be read.

2. Teaching materials in the form of audio: This form of teaching materials is in the form of material that can be heard by educators. Audio teaching materials can be in the form of sound recordings, podcasts, or material delivered through other audio media.

3. Teaching materials in the form of sight and hearing: This form of teaching material is a combination of sight and hearing. These teaching materials can include learning videos, multimedia presentations, or material presented through media that combines visuals and sound. Students can see and listen to the material simultaneously.

4. Interactive teaching materials: The form of these teaching materials is a combination of two or more types of teaching materials. For example, teaching materials can be a combination of video, audio, text, graphics and animation.

By having various forms of teaching materials like this, educators can use and choose methods that suit the learning needs and preferences of students. This can help increase learning effectiveness and provide a more engaging and varied learning experience.

**How Teaching Materials Work**

How teaching materials work can vary depending on the type of teaching materials used and the learning strategies applied. However, in general terms, here are the general steps involved in how teaching materials work:

1. Planning: Teachers or educators plan teaching materials to be used. This involves determining learning objectives, selecting relevant content, arranging material in a logical sequence, and determining effective delivery methods.

2. Presentation: Teaching materials are delivered to students through various methods such as lectures, visual presentations, group discussions, or the use of technology such as videos or multimedia. The purpose of presenting teaching materials is to convey information clearly and attract the attention of students.

3. Interaction: During the presentation, interaction between educators and students is very important. Learners can ask questions, participate in discussions, or carry out activities related to teaching materials. This interaction helps strengthen understanding and increases student engagement.

4. Evaluation: After the presentation of the material, an evaluation is carried out to measure students' understanding and achievement. Evaluation can be in the form of assignments, quizzes, or exams designed to test understanding of concepts, skills, or application of teaching materials.

5. Adjustments: Based on the evaluation results, educators can adjust teaching methods or teaching materials to improve students' understanding. This could mean providing additional
explanations, repeating difficult material, or providing additional teaching materials to reinforce understanding.

In the workings of teaching materials, the main objective is to assist students in acquiring the desired knowledge and skills through effective delivery of information and interactions that occur during the learning process.

The Nature of Teaching Materials

Judging from its nature, Prastowo groups it into four characteristics of teaching materials, namely:

1. Technology-based teaching materials: This type of teaching material uses modern technology in its presentation. Examples can be in the form of teaching materials delivered through online learning platforms, mobile applications, or interactive learning programs that use electronic media.

2. Print-based teaching materials: This type of teaching materials includes printed materials in the form of books, worksheets, or materials that can be read physically. Print-based teaching materials are often used in conventional learning in the classroom.

3. Teaching materials for project or practical needs: This type of teaching materials is specifically designed to support learning that requires practical aspects or application in real situations. These teaching materials can be in the form of practice guides, step-by-step instructions, or relevant case examples.

4. Teaching materials for the purposes of human interaction: This type of teaching materials is intended to support interaction between students and educators, especially in the context of distance education. These teaching materials can be in the form of interactive modules, online discussion forums, or meetings via video conferencing.

By understanding the different characteristics of these types of teaching materials, educators can use and select teaching materials or materials that suit learning needs, situations, and available technology. This can enable the creation of a more interesting and effective learning experience for students.

Principles in Selecting Teaching Materials

The principle of relevance is an important principle in selecting teaching materials. This shows that the selected material must have a close relationship with the established competency standards and basic competencies (Levan’s dkk., 2022; Saputra dkk., 2022). By choosing relevant material, students can relate learning to the goals to be achieved. The principles of consistency and adequacy are also important in selecting teaching materials. The principle of consistency means that there is a balance between the teaching materials presented and the basic competencies that must be achieved by students. For example, if there are five basic competencies that must be mastered, then the material delivered to students must also cover these five competencies. Thus, students will get a comprehensive understanding.

The principle of adequacy indicates that the material presented must be sufficient enough to help students master and understand the basic competencies being taught. The material should not be too little so that students do not get an adequate understanding (Fathia dkk., 2022; Liam dkk., 2023; Saskia dkk., 2023). On the other hand, the material should not be too much so that students feel overwhelmed and have difficulty understanding it properly. By paying attention to these principles, educators can choose teaching materials that are appropriate and in accordance with learning objectives. This will help increase the effectiveness of learning and ensure that students gain an optimal understanding of the competencies to be achieved (Sitohang, 2014).
Definition of Islamic Religious Education

According to Abdul Mu'thi and Chabib Thoha Islamic religious education or PAI is a deliberate effort to prepare students to be able to feel, understand, believe in and practice the values contained in Islamic religious teachings. This is achieved through activities such as mentoring teaching and exercises. In addition, Islamic religious education also emphasizes the importance of respecting and respecting other religions, in accordance with established guidelines.

PAI (Islamic religious education) is a conscious and planned effort to prepare students to be able to know, feel, understand, have faith and be pious and have good morals in applying the values of Islamic religious teachings which originate from the Qur'an as the main source.

According to Indonesian Government Regulation No. 55 of 2007, Chapter I Article 1, religious education is education that aims to provide knowledge and shape the attitudes, personality and skills of students in applying their religious teachings. This religious education is implemented through subjects or courses in all pathways, levels of education, and types of education. Meanwhile, religious education is defined as education that directs students to gain an understanding of religious teachings and values and become experts in the field of religious knowledge. The purpose of this religious education is so that students can master the knowledge of religious teachings and their values, and are able to practice and internalize these religious teachings. Meanwhile, religious education is defined as education that prepares students to have an understanding of religious teachings and values and to become experts in a religious science. The purpose of religious education.

By referring to the previous explanation, it can be concluded that Islamic religious education is a planned effort or effort to shape attitudes and behavior in accordance with Islamic teachings. The main objective of Islamic religious education is to develop understanding, faith, and deeds in accordance with Islamic religious principles.

Characteristics of Islamic Religious Education

Quoting Muhaimin's opinion about the characteristics of PAI (Islamic religious education), namely:

1. Islamic religious education aims to maintain the strength of the students' faith in all situations and conditions.
2. Islamic religious education is committed to preserving and maintaining the teachings and values contained in the Al-Qur'an and Sunnah as the main sources of Islamic religious teachings.
3. Islamic religious education emphasizes the unity between faith, knowledge, and charity in social life.
4. Islamic religious education seeks to shape and develop individual goodness as well as social goodness.
5. Islamic religious education becomes the moral and ethical foundation in the development of science, technology, culture, and other aspects of life.
6. Islamic religious education materials include rational and supra-rational aspects.
7. Islamic religious education explores, develops, and draws lessons from Islamic history and culture.
8. In Islamic religious education there is a diversity of understanding, interpretation, and opinion, so that an open attitude, tolerance, and a spirit of brotherhood are needed in ukhuwah Islamiyah.

In the special guidebook for Islamic religious education, there are several characteristics contained in the material or subjects of Islamic religious education as follows:
1. Islamic Religious Education is developed from the main teachings of Islam: PAI material is the result of the development of the main teachings in Islam. This includes an understanding of Islamic religious beliefs, values, and practices.

2. The purpose of learning Islamic religious education is to form students who have faith and piety to Allah SWT, and have noble morals: This subject aims to form students to have strong faith and devotion to God, as well as develop good behavior and sublime morals.

3. PAI includes three basic frameworks: PAI subjects cover three interrelated basic frameworks, namely aqidah, sharia, and morality.

By understanding the characteristics of these PAI subjects, educators can design suitable learning to help students understand and practice Islamic religious teachings holistically.

**The Aim of Islamic Religious Education**

The purpose of Islamic religious education (PAI) is to strengthen and increase students' faith through the process of cultivating appreciation, knowledge, and deepening of the religion of Islam. Ramayulis argues, the true purpose of Islamic religious education is to create perfect human beings, namely individuals who are whole and perfect in spiritual, moral, and social aspects. This goal includes the formation of students who have a deep understanding of religion, good attitudes, and noble personality qualities. Insan Kamil is an individual who is able to integrate religious values in every aspect of his life.

Meanwhile, H.M Arifin argued, the purpose of PAI is to organize and foster human life with the content of Shari’ah that is straight and in line with Islamic religious rules. This goal includes the development of proper morals, behavior and understanding of religion based on Islamic law. Through Islamic religious education, children will be provided with correct knowledge and understanding of religious teachings, and directed to practice them in everyday life.

According to Rochman, what is a weakness in the education system in Indonesia is too much emphasis on the cognitive domain, while the effective and psychomotor aspects rarely get enough attention. This causes the development of character and manners to be neglected. One of the weaknesses that occur in Islamic religious education material is the lack of integration with other learning.

**Definition of Science**

The General Indonesian Dictionary defines science as an orderly and systematic science that studies natural phenomena and can be tested or proven based on existing facts and evidence. Scientists try to uncover, explain, and describe the natural phenomena that surround us. They develop ideas and explanations about various natural phenomena and organize them in their thinking. Science provides a framework for constructing knowledge about the world we observe. In science, observation and prediction are the foundation of many methods used to solve problems and acquire new knowledge. Observation allows us to observe phenomena directly and collect accurate data. Predictions, on the other hand, allow scientists to make statements about what might happen based on their understanding of previously developed laws of nature. Science as a collection of knowledge consists of concepts, facts, theories, principles, laws and models that have been developed by scientists. This knowledge is arranged systematically according to relevant fields of study, such as biology, chemistry, physics, and so on. These findings provide a basis for our understanding of the natural world, broaden our horizons, and help answer existing questions.

From this understanding, the authors can conclude that science is a scientific discipline that focuses on understanding and researching natural phenomena. In the process of gathering data about the universe, science involves observing to gather facts, develop concepts, and make discoveries related to the observed phenomena. Scientists in science practice often encounter unexpected
pheno
mena. That is, not all understandings and experiments can produce the expected results. Sometimes, failure in such experiments can even cause losses, both materially and in terms of life.

Aspects of the Nature of Science

Aspects of the nature of science can be grouped into three groups, namely science as a product, process, and as a scientific attitude. Science as a product refers to the understanding of nature and existing phenomena, including behavior, characteristics, and various concepts developed through theories, principles and laws. Science as a process refers to a way of acquiring scientific knowledge. The scientific method is used in the natural sciences, which involves observing, researching, testing, and drawing conclusions based on the evidence obtained. In this context, the scientific process becomes an important part of science. Science as a scientific attitude is the cultivation of the attitudes needed by students (scientists) when carrying out the process of learning and scientific investigation. These attitudes include curiosity, hard work, persistence, openness to new ideas, and the ability to think critically. Through the development of a scientific attitude, students are expected to carry out scientific processes effectively.

Technology

Literally, the term "technology" is from the Greek word "tecnologia", which refers to the systematic problem of arts and crafts. This term has a root word in the form of "techne" in ancient Greek which means art or craft. In this context, the word technology found in ancient Greek can be interpreted as the art of producing and using products. This definition then extends to the use of science in accordance with human needs. On the basis of this understanding, the authors conclude that technology is a tool or knowledge that is used to make it easier for someone to do something. Technology also involves understanding the creation and execution of things. Technology has a very important role in religion. Within the framework of Islamic science, technology is considered as part of scientific activities. Although there are differences in emphasis and priority, technology is considered as part of a knowledge system that is in accordance with regulations derived from religious knowledge, in the form of revelations received by world science with technology playing an important role.

Technology Features

In the context of technology, there are several characteristics that can be explained as follows:

a) Rationality, which refers to changing spontaneous actions into actions that are planned and carried out with rational considerations.
b) Artificiality, which describes the artificial or unnatural nature of technological results.
c) Automatism, which refers to the implementation of methods, organizations and technological formulas that are carried out automatically. Technology is also able to replace non-technical activities with technical activities. Technological developments occur in a cultural context.
d) Monism, which shows that all technologies are connected, interact, and depend on each other.
e) Universalism, which indicates that technology transcends the boundaries of ideology and culture, even being able to control culture itself.
f) Autonomy, which means that technology develops according to its own principles and has the ability to regulate developments that occur.

Research Findings

Based on a number of data and information that the author has presented, the author concludes that the development of PAI teaching materials based on integrated science and technology in class X M.A An nur Rambipuji Jember is still not running optimally, and is effective so there is a need for special guidance for educators, so that the material teaching PAI based on the
integration of science and technology can run even more effectively, here we include the data and results of the author's analysis

First, the validity of developing PAI teaching materials based on being integrated with science and technology for class X MA students. AN NUR Rambipuji Jember At this stage, the author validates the teaching materials that have been developed at MA AN NUR Rambipuji Jember through interviews and observations. The author chose three teaching staff (TENDIK) at M.A AN NUR Rambipuji Jember. The names of the education staff (TENDIK) are as follows:

a) M. Saifan Shodiq, M. Pd (deputy head of Madrasah Aliyah an Nur Rambipuji Jember)
b) Abdul Rahman. S, Ag (teaching subject of PAI MA AN NUR rambipuji Jember)
c) Devi Dwi Pratiwi, S. Pd (teacher of Biology subject as well as deputy head of the MA ANNUR Curriculum Rambipuji Jember)
d) Tomi Wijaya, S.Pd. (ICT teacher and operator of Madrasah Aliyah AN NUR Rambipuji Jember)

Through observations and interviews that have been conducted by the author of the material, questions, and LKS (Student Work Sheets), the purpose of this research is to test the quality of the product theoretically, rationally, and aesthetically. This research also involves direct interaction with teaching staff to carry out assessments. Based on the results of this study, the following information was obtained:

a) Material Validation

Material validation was carried out through observation and interviews with related educators, which showed that the material in Islamic Religious Education (PAI) teaching materials based on the integration of science and technology was classified as valid. However, there are some additional materials that need to be adapted to the concept of integration of science and technology.

b) Question Validation

The results of interviews and observations by the authors concluded that the questions in Islamic religious education (PAI) teaching materials based on the integration of science and technology were in the valid category. However, there are several points that have not been integrated with the HOTS questions

c) LKS validation

The results of interviews and observations by the authors concluded that the LKS used in Islamic religious education teaching materials based on the integration of science and technology occupies a valid category status.

Second, this study aims to evaluate the practicality of using PAI teaching materials (Islamic religious education) based on integrated science and technology in class X M.A Annur Rambipuji Jember. Data regarding practicality was obtained through observation sheets observing the implementation of the teaching materials by teaching staff who handle Islamic religious education subjects. The trial was conducted at M.A Annur Rambipuji Jember and was observed by the author. The results of observations show that the use of PAI teaching materials based on the integration of science and technology is in the partially implemented category.

CONCLUSION

Science and technology cannot be separated from PAI learning in educational institutions, therefore, it is necessary to improve and optimize the development of science and technology-based Islamic religious education (PAI) teaching materials, with science and technology-based teaching materials the institution will get the desired results or objectives. is expected, because at this time formal institutions must be ready with advances in technology and science which are increasingly
becoming an interest for students and are also able to compete with an increasing number of other formal institutions, so because of that, skills and promotion are one of the efforts of formal institutions to break the competitiveness of institutions to society, the authors try to research and provide a touch of science and technology-based PAI teaching materials in MA. Annur Rambipuji Jember, with the hope that it can be the beginning of the progress of the institution and of course be able to produce students in accordance with the Institution's Vision and Mission.

AUTHORS’ CONTRIBUTION
Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; Investigation.
Author 3: Data curation; Investigation.
Author 4-5: Formal analysis; Methodology; Writing - original draft.

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