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Development of Physics Teaching Materials Based on I-SETS (Islamic, Science, Environment, Technology, Society) to Improve Students' Critical Thinking Skills

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Abstract: Research has been carried out on the development of I-SETS (Islamic, Science, Environment, Technology, Society) based teaching materials to improve students' critical thinking skills which aims to describe the suitability of I-SETS based teaching materials, practitioners' assessments of I-SETS based teaching materials, increasing students' critical thinking skills, and producing I-SETS based teaching materials. This research uses 4D model development. The instruments used in this research were teaching material validation sheets, practitioner assessment questionnaires, and students' critical thinking skills test instruments. The practicality criteria are seen from practitioners' assessments of teaching materials, and the effectiveness criteria are seen from the increase in critical thinking skills which are analyzed using the N-gain equation. Based on the results of the analysis, conclusions were drawn: I-SETS based teaching materials developed based on expert assessment using Aiken's V index analysis were declared valid and suitable for use with minor revisions; I-SETS based teaching materials in terms of practitioner/teacher responses are in the very good category; The effectiveness of I-SETS based teaching materials is obtained from the results of students' critical thinking skills tests analyzed using N-gain with an average score of 0.56 in the medium category, which means that there is an increase in students' critical thinking skills so it can be said that the teaching materials The developed I-SETS is effective and can improve students' critical thinking skills.

Keywords: I-SETS Approach; Critical Thinking Skills; Teaching Materials

Introduction

In the era of globalization, life is full of competition which requires the quality of human resources as a determinant of success, so the importance of education in order to develop the potential of human resources is very necessary. In the 21st century, high quality human resources are needed who have skills, namely being able to work together, think at a high level, be creative, skilled, understand culture, communication skills, and be able to learn throughout life. Science that is based on the aim of understanding and exploring nature through the activities of observing, classifying, hypothesizing and concluding is physics. Physics is a science that deals with nature and its phenomena, often from real to abstract concepts.

Based on the 2013 curriculum, apart from providing knowledge, physics is taught as a material for solving problems in everyday life, as well as developing the ability to think and behave scientifically (Puspitasari et al., 2021). Students are required to understand and interpret the knowledge gained in order to solve and respond to natural phenomena and events critically and scientifically (Herman et al., 2019). However, in reality this goal is still difficult to achieve properly due to several factors, including: deficiencies in meeting learning needs, teaching materials that are less contextual and tend to be monotonous and a lack of habits for critical thinking. Critical thinking skills are a

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demand for the 21st century in accordance with the 2013 curriculum.

Critical thinking has an important role in learning because by thinking critically, students will be able to conclude and utilize the information they obtain in solving problems. Apart from that, critical thinking also has long-term benefits, supporting students in managing their learning skills, and then empowering individuals to contribute creatively to the profession they choose (Sellars et al., 2018; Golden, 2023). This means that, armed with critical thinking skills, teachers help prepare students for their future. In line with this, researchers conducted preliminary research at the initial analysis stage to determine the extent of the critical thinking skills of class XI IPA 4 students at MAN Jeneponto. Based on this, it was found that the tendency of students' critical thinking skills in class

The success of the learning process cannot be separated from the creativity of educators in implementing the learning process (Beghetto, 2021; Le et al., 2018; Davies et al., 2013). One of the sources in the learning process is teaching materials. Teaching materials act as effective teaching instructions for educators and become materials for training students' abilities in independent learning activities, either with the help of a teacher or independently, so that they can improve students' critical thinking (Ng et al., 2023). Improving critical thinking skills in teaching materials can be done with a series of activities based on real experience obtained by students, the better the learning process that occurs within them. So that students can explore and interact directly with friends and their environment.

Teachers as one of the main components of education are required to be able to develop their professionalism continuously (Riadi et al., 2022). If in the past teachers were required to actively deliver material, now the teacher's function is as a facilitator and motivator (Abdulrahaman et al., 2020). In connection with this function, teachers must be able to prepare their own teaching materials in order to provide appropriate, relevant, systematic and comprehensive learning facilities. In line with this, based on the results of interviews with educators at MAN Jeneponto, the learning resources used during the learning process at school are only printed books and LKPD. There are no teaching materials yet developed to train students' critical thinking skills. Apart from that, there are also no teaching materials that link scientific concepts, especially physics, with Islamic values. Meanwhile, MAN Jeneponto itself is the only State Madrasah Aliyah in Jeneponto Regency.

As one of the secondary schools under the supervision of the Ministry of Religion, the characteristics of this school are different from public schools. Apart from general lessons, this school also studies more Islamic religious lessons, so that most of the students who enter this school have the motivation to study Islam in addition to other general lessons. The role of religious values is very important in every educational process that occurs in schools (Pelupessy-Wowor, 2016; Nelson & Yang, 2023). Because the formation of people who are faithful and devout and have noble morals is impossible without the role of religion. So, by integrating Islamic values in teaching materials it will not reduce the quality of the scientific level of science itself, in fact it is the right effort because it means restoring the unity between Shari'a and nature. So, there is a need for an integration of Islamic values into physics.

In line with this, the 2013 curriculum for secondary schools has included KI-1 which states that every lesson material must contain moral values including religious values, thus teachers must be able to instill religious values in each lesson. The religious values in question are religious values such as Islam. One approach that can link physics concepts with Islamic values is the I-SETS (Isalmic, Science, Environment, Technology and Society) approach. The I-SETS approach is a combination of the SETS (Science, Environment, Technology, Society) approach and the Islamic approach (Harahap et al., 2023).

The SETS (Science, Environment, Technology, Society) approach is an approach that links the four elements, namely science, environment, technology and society in learning (Mahardika et al., 2020). The lesson material is linked to real examples related to the community around students which are often encountered in everyday life, so it is easy to understand the material. The SETS approach can help students to remain active during learning. The development of SETS-based teaching materials is designed to invite students to learn directly from actual phenomena in everyday life and is integrated with the SETS approach. With the development of SETS-based teaching materials, it is hoped that students will be able to carry out learning activities by providing initiative or responses both individually and in groups so that they can develop their critical thinking processes.

Apart from that, in physics there are many learning materials that contain values of beauty and order which ultimately lead to glorification of the creator and can dig deeper into the nature of the meaning behind these physical events so that many values will be obtained. Islam is very necessary for students as provisions for life in the world. So that the delivery of Islamic values in learning can be done through the preparation of teaching materials which are arranged in such a way (Sulthani, 2017). In line with the problem analysis above, it is deemed necessary to develop I-SETS-based teaching materials to help students practice their critical thinking skills and ease the burden on teachers in preparing

teaching materials that suit the needs and development of students. Based on the description above, the research title taken in this study is "Development of Physics Teaching Materials Based on I-SETS (Islamic, Science, Environment, Technology, Society) to Improve Students' Critical Thinking Skills".

Method

Types of research

This type of research is research and development which is used to produce new products and then examine the effectiveness of these products. This research uses the Thiagarajan 4D development model.

Research design

The research design used in this research is a 4-D research model (four D models) which was adapted from Thiagarajan's 4D model. The 4D development model consists of four main stages, namely: Define; Design (design); Develop (development); Disseminate (spread). The stages of this research are briefly presented in Figure 1 as follows.

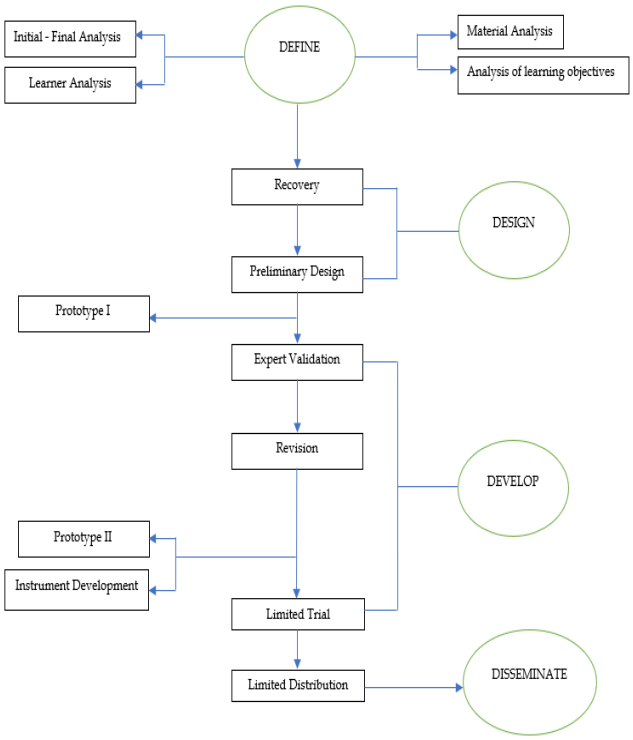

Figure 1. Adaptation of Thiagarajan's 4D Models

Research subject

The subjects used in this research were physics subject teachers at MAN Jeneponto and physics teachers from several private Madrasah Aliyah schools under the Ministry of Religion of Jeneponto Regency, totaling 9 people from 9 different schools. Apart from that, there are 36 students in class XI, especially class XI Science 4 for the 2023/2024 academic year.

Instrument

There were three research instruments used in this research, namely a content validation sheet for I-SETS based physics teaching materials, a practitioner assessment questionnaire and a test of students' critical thinking skills. The I-SETS-based physics teaching material content validation sheet is a sheet used to measure the quality and suitability of teaching materials. Practitioner assessment questionnaires provide input on the implementation or use of I-SETS-based physics teaching materials as assessed by physics teachers. The critical thinking skills test used in this research is a multiple choices test using indicators of critical thinking skills, namely: interpretation, analysis, inference, evaluation and explanation which is used as a reference to see the effectiveness of I-based Physics teaching materials. SETS has been tested on students in class XI Science 4 MAN Jeneponto.

Research procedure

Define Stage (Definition)

The purpose of this stage is to determine and define learning requirements. Determining and establishing learning requirements begins with an analysis of the objectives and limitations of the material to be developed. This stage includes: Start-finish analysis; student analysis; task analysis; concept analysis; formulation of learning objectives. Based on the results of interviews with MAN Jeneponto physics teachers, information was obtained that the learning resources used during the learning process were textbooks and LKPD. Apart from that, in the physics learning process the materials presented have never been linked to Islamic values, and there are no books that are used as intermediaries between physics teaching materials and verses from the Koran in order to improve the spiritual and religious aspects of students. and learning becomes more meaningful.

The student analysis stage includes a study of student characteristics which include background knowledge, level of cognitive development and students' critical thinking abilities. The subjects of this research were students of Class This means that students can be guided so they can develop their critical thinking skills. Apart from that, the researcher conducted preliminary research at the initial analysis stage to determine the extent of the critical thinking skills of class XI IPA 4 students at MAN Jeneponto. Based on this, it was found that the tendency of students' critical thinking skills in class. This material analysis stage is used as reference material for preparing I-SETS-based physics teaching materials, namely material for class XI odd semester. Conceptually, physics material that can be

integrated with I-SETS elements is material that has content and concepts that are directly related to the environment, technology and society as well as the Islamic values contained therein so that students will find it easier to see and understand. the science concepts they learn are more concrete. The materials developed in this research are static and dynamic fluid materials. Learning objective analysis stage Learning objective analysis is based on indicators that have been described in advance based on the Basic Competencies (KD) listed in the curriculum regarding the material concepts identified. The formulated learning objectives become a reference in designing and compiling I-SETS-based teaching materials according to the selected material topics. These learning objectives will also be the basis for achieving the expected learning process.

Design Stage (Designing)

The design stage is the planning stage for the I-SETS-based physics teaching material framework that will be developed. Product design at this stage cannot be separated from the definition stage. Activities at this stage include: Selecting the format and initial design. The format for I-SETS based physics teaching materials includes the type of font used, book antiqua with a 12 point font size, an attractive color combination, space between lines to make it easier to read the text, the shape and size of A4 paper (210 x 297 mm) with a vertical shape. , presentation of signs to make it easier to know important things to clarify the content of the material, preparation of teaching materials in a structured and systematic manner and arranged proportionally between titles, sub-chapters and the contents of the teaching materials.

The initial design of this teaching material includes: An introductory section consisting of: cover; introductory remarks; table of contents; characteristics of teaching materials; instructions for using teaching materials. The content of teaching materials is material arranged in chapters. The number of materials available from this teaching material is two materials (static and dynamic fluids). Each material chapter consists of: chapter cover; basic competencies; indicators of competency achievement; learning objectives; concept map; the concept of the relationship between static fluid materials and I-SETS elements; Fill in the material with the steps of the SETS approach; summary; evaluation; j) Fluid TTS. The content section contains "Fluid Concepts in the Al-Qur'an" so that students can understand the scientific concepts contained in the Al-Qur'an. Apart from that, in the content section there is also "Physics Lessons" which can instill religious values and can motivate students that there are many life lessons that can be taken from studying physics which is linked to the Al-Qur'an.

Each sub-chapter of material in this teaching material consists of "Introduction" which contains an introduction and questions that can train students' critical thinking skills before entering the core material. Apart from that, there is also a column for answering questions entitled "Let's Thinking"; "Concept Formation" which contains a simple practical activity entitled "Let's Trying"; "Introduction to Concepts" contains the material studied and example questions, "Application of Concepts in Life" contains the application of concepts learned in everyday life related to the surrounding environment, technology and social life; "Concept Strengthening" which contains practice questions to determine the extent of students' understanding. The "Evaluation" questions in each chapter are prepared based on the indicators of critical thinking skills used in this research so that they can help improve students' critical thinking skills in the form of multiple choices questions. Meanwhile, the closing part of the teaching materials consists of a bibliography and glossary.

Develop Stage (Development)

At this stage, the content components of the teaching materials have been created, then printed and bound so that they become I-SETS based physics teaching materials that are ready to be used. Apart from that, instrument development has also been carried out so that a draft instrument is obtained in the form of a practitioner assessment questionnaire instrument, and a critical thinking skills test instrument that will be used at the trial stage. The aim of this stage is to produce I-SETS-based physics teaching materials and research instruments that have been validated and have received advice from expert validators, namely Lecturers at the Makassar State University Postgraduate Physics Education Study Program.

Dissiminate Stage (Dissemination)

At this stage, distribution is carried out and asking for practitioner responses using a validated practitioner response questionnaire. The teachers who responded were 3 physics teachers at MAN Jeneponto and 9 physics teachers who came from several private MA schools majoring in science under the Ministry of Religion who are members of the MAN/MAS Physics MGMP throughout Jeneponto Regency. Apart from that, at this stage the researchers have provided I-SETS based physics teaching materials to MAN Jeneponto physics teachers and the MAN Jeneponto Library.

Data analysis technique

The data analysis technique in this research is data analysis of validation of I-SETS based Physics teaching materials, validation of practitioner assessment questionnaire sheets and validation of critical thinking skills tests analyzed by considering input, comments

and suggestions from experts. The analysis used to determine the level of relevance by three experts used the content validity coefficient (Aiken's V). The Aiken's V formula uses equation (1) according to (Ikhsanudin & Subali, 2018) as follows:

$$V = \frac{\sum s}{n\,(c-1)} \quad (1)$$

Information:
V = Index of expert agreement regarding item validators
s = Difference in scores determined by each expert with the lowest score $s = (r - I_o)$
r = Rater set score
I_o = Lowest assessment number
n = many experts
c = Highest validity assessment number

The conditions for the Aiken test are if V ≥ 0.4 then the expert agreement index is said to be valid. Analysis of practitioner assessment questionnaires on I-SETS based Physics teaching materials developed using equation (2) according to (Br Sitepu et al., 2021) as follows:

$$PRS = \frac{\sum A}{\sum B} \times 100\% \quad (2)$$

Information:
PRS = The percentage of practitioners who responded to the categories stated in the instrument
∑A = The total score obtained by each category is stated in the questionnaire
∑B = Maximum score from each category that provides a response to the questionnaire

The steps for determining categories for the practitioner assessment questionnaire can be determined based on the equations in Table 1. The effectiveness of I-SETS based Physics teaching materials can be obtained from calculating students' critical thinking skills using the N-gain score formula. According to (Arota et al., 2020), to find out N-gain, the following formula is used:

Table 1. Practitioner Assessment Score Percentage Criteria

Percentage (%)	Criteria
81 – 100	Very good
61 – 80	Good
41 – 60	Currently
21 – 40	Not enough
0 – 20	Very less

$$Normalized\ Gain\ (G) = \frac{X_{posttest} - X_{pretest}}{X_{Max} - X_{pretest}} \quad (3)$$

Information:
G : Normalized gain score
$X_{pretest}$: Score on the initial test
$X_{posttest}$: Score on final test
X_{max} : Maximum score

In line with this, according to (Bommert et al., 2020) the interpretation of the categorization of gain score effectiveness in the form of percent (%) is as in Table 2.

Table 2. Categories of Interpretation of N-Gain Effectiveness

Percentage (%)	Category
>76	Very effective
56 — 75	Effective
40 — 55	Effective enough
< 40	Ineffective

I-SETS based Physics teaching materials are said to be effective if the average gain score percentage is in the range of 56% or with effective criteria.

Result and Discussion

Validation Results of I-SETS Based Physics Teaching Materials

The results of the initial analysis in this research are then used as material for designing and developing I-SETS based teaching materials. The initial design that has been prepared is then validated by experts to determine the suitability of the teaching materials before a limited trial is carried out. Aspects of content validity assessed by the three experts were aspects of content suitability, presentation, language and graphics. The score obtained from the content validity coefficient analysis test of the expert agreement index using the Aiken's V index analysis is presented in Table 3.

In the content feasibility aspect, a validity index (V) was obtained with an average score of 0.78 and was in the valid category, then for the presentation aspect a validity index (V) was obtained with an average score of 0.77 and was in the valid category. For the language aspect, a validity index (V) was obtained with an average score of 0.78 in the valid category, and for the graphic aspect, a validity index (V) was obtained with an average score of 0.80 and it was in the valid category.

Table 3. Content Validity Analysis Test of I-SETS based teaching materials

Aspect	Number of Validity Item Scores	V	Category	Aspect
Content Eligibility	13.33	0.78	Valid	Content Eligibility
Feasibility of Presentation	11.56	0.77	Valid	Feasibility of Presentation
Language Eligibility	14	0.78	Valid	Language Eligibility
Graphic Feasibility	12.89	0.80	Valid	Graphic Feasibility

Practitioners' Responses to I-SETS Based Physics Teaching Materials

Practitioner responses to I-SETS-based teaching materials were obtained from practitioner assessment questionnaires, in this case physics teachers, to I-SETS-based teaching materials. Each assessment component available on the practitioner assessment questionnaire sheet consists of 40 statement items which are assessed on a Likert scale with a score range of 1 to 4 according to the specified category. Practitioner assessments of I-SETS-based teaching materials include aspects of appropriateness of content, appropriateness of presentation, appropriateness of language, and appropriateness of graphics. The percentage of score results from 12 teachers who provided assessments of I-SETS-based teaching materials were grouped based on the criteria in Table 1. The results of the analysis of practitioners' assessments of I-SETS-based teaching materials can be seen in Table 4.

Table 4. Practitioner Assessment Results of I-SETS Based Teaching Materials

Rated aspect	Average Earned Score	Percentage (%)	Category	Rated aspect
Content Eligibility	3.44	86.04	Very good	Content Eligibility
Feasibility of Presentation	3.45	86.25	Very good	Feasibility of Presentation
Language Eligibility	3.4 3	85.63	Very good	Language Eligibility
Graphic Feasibility	3.48	87.08	Very good	Graphic Feasibility

In the aspect of content suitability, an average score of 3.44 was obtained with a percentage of 86.04%. For the presentation aspect, an average score of 3.45 was obtained with a percentage of 86.25%. Meanwhile, in the language aspect, an average score of 3.43 was obtained with a percentage of 85.63%. And in the graphic aspect, an average score of 3.48 was obtained with a percentage of 87.08%.

Effectiveness of I-SETS Based Physics Teaching Materials

The critical thinking skills test instrument aims to measure the effectiveness of I-SETS based physics teaching materials which were developed by improving the critical thinking skills of class XI IPA 4 students at MAN Jeneponto. The application of I-SETS based physics teaching materials was carried out over eight meetings starting with a pretest on critical thinking skills and at the final meeting a posttest on critical thinking skills was carried out. The number of questions for each test is 40 items which are divided into five indicators of critical thinking skills, namely interpretation, analysis, inference, evaluation and explanation. Each question given during the pretest and posttest is the same question presented randomly. The results of the descriptive analysis of the critical thinking skills test are presented in Table 5.

Table 5. Descriptive Statistics of Students' Critical Thinking Skills Tests

Parameter	Pretest	Posttest
Number of Respondents	36	36
Maximum Ideal Score	40	40
Minimum Ideal Score	0	0
Maximum Empirical Score	17	32
Minimum Empirical Score	7	12
Average Score	12.78	24.06
Many Classes	5	5
Class Intervals	8	8

Descriptive analysis of critical thinking skills tests in Table 5 shows that there was an increase in the average score of students' critical thinking skills tests before and after the implementation of I-SETS based physics teaching materials. The average pretest score of students was 12.78 with the maximum test score of 36 students being 17 and the minimum empirical score being 7. Meanwhile the average score obtained by students on the posttest was 24.06 with the maximum empirical score being 32 and the minimum empirical score is 12. Next, an analysis of improving students' critical thinking skills was carried out using data from the Gain and N-Gain pretest and posttest results. The results of the N-Gain analysis can be seen in Table 6.

Table 6. Percentage of N-Gain Score for Critical Thinking Skills of Class XI Science 4 MAN Jeneponto Students

Criterion Interval	Category	Frequency	Percentage (%)
$0.70 < g \leq 1.0$	Tall	3	8.33
$0.30 < g \leq 0.70$	Currently	25	69.44
$0.0 < g \leq 0.30$	Low	3	8.33
$g = 0.0$	No Increase Occurred	2	5.56
$-1.0 \leq g < 0$	There was a decline	3	8.33
Amount		36	100
Average Overall N-Gain Score		0.56	56

The N-Gain score in Table 6 shows that 3 students or 8.33% of test subjects experienced an increase in the high category. There were 25 students who experienced an increase in the medium category with a percentage of

69.44%. Meanwhile, there were 3 students who experienced an increase in the low category with a percentage of 8.33%. And for students who did not experience an increase, there were 2 students with a percentage of 5.56%. And for the category where there was a decrease, there were 3 students with a percentage of 8.33%.

Discussion

Based on the validation analysis that has been carried out, it is obtained as shown in Table 3, which states that I-SETS based teaching materials are declared feasible to proceed to the trial stage. The results of this analysis are in line with research conducted by (Hartini et al., 2018; Kurutas, 2023; Hl et al., 2020), which states that I-SETS based physics teaching materials are complemented by local wisdom and the character content is declared valid or appropriate by experts. I-SETS based teaching materials are declared valid and suitable for use in four aspects of assessment (Surya & Aman, 2016), namely in the content suitability aspect, the material coverage is assessed as being in accordance with basic competencies and learning objectives, each image and illustration displayed contains up-to-date references, the I-SETS aspect in Material can help students foster curiosity and develop students' enthusiasm for innovation (Jesisca et al., 2023; Suhirman & Ghazali, 2022).

In the aspect of appropriateness of presentation, the three experts assessed that the technique of presenting interesting material, activity sheets can make it easier for students to understand physics concepts, related to the environment around students, presentation of questions and evaluations can help to train and improve students' critical thinking skills educate (Lodge et al., 2018; Xu et al., 2021). In the language aspect, the three experts assessed that the language used was in accordance with the development of students and the General Guidelines for Indonesian Spelling (PUEBI), the terms used used standard language and the formulas or equations used were in accordance with the correct way of writing (Aprilianti et al., 2024; Elvisa & Rifai, 2021). Meanwhile, in the graphic aspect, the three experts assessed the aesthetic appearance of teaching materials which could provide readers comfort in reading teaching materials and increase students' interest in reading. In the content of the teaching materials, typography and color combinations, the contents of the teaching materials are simple and harmonious so they are easy to read.

The practicality of the I-SETS-based teaching materials developed can be seen from the results of practitioner responses in Table 4. As for the results of the analysis of the practitioner assessment questionnaire, it was concluded that 12 practitioners on average gave a very good assessment to the I-SETS-based teaching materials developed. The results of this assessment are supported by practitioners' direct responses when assessing the teaching materials developed. The results of this analysis are in line with research conducted by (Rahmaniati & Supramono, 2015), regarding integrated magazine-based Physics teaching materials I-SETS (Islamic, Science, Environment, Technology, Society) and the character content was stated to be practical to use with the practicality test results showing a percentage of 75%.

The effectiveness of I-SETS based teaching materials can be seen based on the increase in critical thinking skills of class XI IPA 4 students at MAN Jeneponto. After implementing I-SETS based teaching materials, students began to be able to know and explain physical concepts from an event or statement through the teaching materials developed. Teaching materials developed using the I-SETS approach also have a positive influence on the relationship between students and the real world (Markula & Aksela, 2022; Darling-Hammond et al., 2020; Seo et al., 2021), students are encouraged to be more active, creative and think critically in solving problems in the surrounding environment and can make decisions about problems that arise is happening and can relate it to Islamic values (Zabidi et al., 2021). This is supported by research conducted by Koderi et al. (2023), El Kharki et al. (2021), Conilie et al. (2023), Sakti & Idamayanti (2021), that the development of audiovisual media for basic physics practicum based on I-SETS as a practicum solution when the new normal is declared effective.

This practicum also shows students how Islamic values are embedded in science and technology interact interdependently (Masud et al., 2023). The results of the analysis of the average N-gain score of 0.56 are in the medium category with a percentage of 56% based on the effectiveness interpretation criteria according to (Hasanah et al., 2019), which means that I-SETS based teaching materials are effectively used in learning. There are several factors that influence these results, including students not paying enough attention when participating in the learning process, students not having great motivation in participating in the physics learning process, apart from that, students are not used to practicing their critical thinking skills.

Conclusion

Based on the research that has been carried out, it can be concluded that firstly, the results of the development of I-SETS based teaching materials are in the valid category so that they can be declared suitable for use in learning. The I-SETS based physics teaching materials that have been developed are teaching materials with the characteristics of physics material integrated with verses from the Koran, the environment, technology and society and aim to improve students'

critical thinking skills. Second, practitioners' responses to the I-SETS-based physics teaching materials developed are in the very good category. This shows that practitioners responded very well to the developed I-SETS based physics teaching materials. Third, the effectiveness of I-SETS based physics teaching materials is obtained from analysis of students' critical thinking skills using N-Gain which is in the medium category. This means that there is an increase in the critical thinking skills of students in class XI IPA 4 MAN Jeneponto, and the teaching materials developed can be declared effective for use in the learning process.

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Author Contributions
S. W. conceptualized the research idea, research methods, and analyzed the data. M. A and K guided the writing of the review and editing, supervision and validation of the instruments used in the research.

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Conflicts of Interest
The authors declare no conflict of interest.

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