



Development of Science E-Modules Based on Socio-scientific Issues Integrated with The Quran Verses to Establish Pancasila Student Profiles

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ABSTRACT

Science learning uses more teaching materials in the form of textbooks, student worksheet and animated videos and still rarely use module or electronic module teaching materials. The role of teaching materials is very important for the continuity of the process science learning in class. Technological advances and developments over time, teaching materials used in the learning process have also experienced developments expressed in the form of technology and digital formats. Teaching materials must be based on efforts to instill moral values in schools and integrate Al-Quran verses and social life into learning materials. This research aims to develop a science e-module based on Socio-scientific Issues (SSI) integrated with Islamic values to establish the Pancasila student profile. The research uses research and development methods according to Borg and Gall. Based on validation of the instrument contents by 3 experts, the instrument is suitable for use. Based on the results of the e-module content validation carried out by 3 experts, the e-module is suitable for use in science learning. Based on practicality results by 6 teachers in 6 junior high schools, it was found that the practicality value was 91.82%, which means that e-modules are very practical to try out in science learning. Based on 130 student responses, the e-module was in value 93% which means the student response was very good towards the development of the e-module.

Keywords: *electronic module, socio-scientific issue (ssi), integration of quranic verses*

INTRODUCTION

Education is fundamental to development and growth of the nation. The education system in Indonesia contains teaching strategies or methods referred to the general pedagogy and learning process to achieve goals and thus students can actively develop their potential (Fathurrahman, 2002). However, in practice, students always make the teacher ceased to be the sole source of learning, accordingly, this is notably contrary to the learning process that should be applied in enhancing student activities (Cholik, 2017).

Advances in science and technology have influenced the development of education in the world, especially in Indonesia (Surani, 2019). In line with such obvious issue, emerging trends in new world of education shall also undergo changes for the better (Nurasiah et al., 2022). In this regard, the development of the education world requires teachers to recognize how to package the learning processes to be more interesting and the skills needed by students can also be facilitated

in the industrial revolution 4.0. In this regard, it is expected to get an outstanding and innovative generations that produce products and strengthens the people's creative economy (Sunarno, 2018).

Science learning is a process to assist students so that their learning is more meaningful and capable of mastering science knowledge and concepts as well as science laws and being able to apply them in everyday life (Prasetyowati, 2014). The approach of integrating Islam with science and technology places various disciplines (Islamic-Studies, Natural Studies, Social Studies and Humanities) that are interrelated so that they become a complete building of knowledge. (Zain & Vebrianto, 2017). Thus, through technological advances and the development of the times, the teaching materials used in the learning process are also experiencing developments as outlined in the form of technology and digital formats, they definitely shall be based on efforts to instill moral values in schools and integrate The Quran verses or ayat and social life towards learning materials (Wirawan & Pradnyana, 2017).

Teaching materials that can be used are in the form of electronic modules (e-modules). In this regard, e-modules are modules that are more interactive, flexible in nature, and supported by an online learning system implemented during the Covid-19 pandemic. The use of e-modules makes it easy to carry and reach anywhere and everywhere when compared to printed modules. In the e-module, images, audio, video, animation, and the like can be inserted so that the appearance can be more attractive to students to use it (Suryani et al., 2022).

Learning using Socio Scientific Issues (SSI) is a learning that displays controversially social issues related to science (Sadler & Zeidler, 2005). SSI has great potential if used as a basis for learning science in schools. The SSI can be used as a link to obvious problems in society and a basis for students in exploring science content (Nuangchalerm, 2010). The syntax of the term SSI model includes issue orientation, reviewing material, exploring ethical values, discussing, constructing statements, studying ethics, making decisions and reflecting (Aisya et al., 2017). Where the nature of science includes scientific attitudes, scientific processes and products. The use of SSI-based Science E-Modules in learning seeks to stimulate intellectual, moral and ethical development as well as awareness of the relationship between science and social life integrated with Quran verses (Hanifah et al., 2021).

Ministerial Decree Number 1177/M/2020, states that the purpose of the curriculum is to strengthen skills and personality with Pancasila student profile. Ensuring uniform quality of education by increasing the capacity of school leadership programs that are competent in primary education units within the range of quality learning, building an education ecosystem with a stronger emphasis on quality improvement, as well as creating a collaborative environment for stakeholders interested in the education sector, both across schools, the government sector, and the center (Syaff'i, 2021).

In an effort to realize the profile of Pancasila students, it is necessary to establish and strengthen character education for students. The Ministry of Education and Culture has adopted the Pancasila student profile as its vision and mission. This has been stated in the Strategic Plan for the year 2020-2024 (Rusnaini et al., 2021 ; Juliani & Bastian, 2021).

The Pancasila Student Profile can be implemented through habituation, coaching and in the learning process both online and offline. The Pancasila Student Profile can be applied to realize Indonesian students as lifelong students who have global competence and behave in accordance with Pancasila values. The 6 elements of the Pancasila Student Profile include faith, Fear of God Almighty and noble character, global diversity, mutual cooperation, independence, critical and creative reasoning (Halim et al., 2021).

Based on the description above, the development of e-modules in the learning process is mainly important because it can add learning materials for students. In an effort to address such

situation, the present study aims to develop an e-module based on socio scientific issue (SSI) integrated with The Quran verses to realize Pancasila student profiles.

METHODOLOGY

The current research method is classified as research and development (R&D). Further conducted through the Borg and Gall model, the research design has ten stages cited as follows: 1) research and data collection, 2) planning, 3) initial product development, 4) initial field trials, 5) initial product revisions, 6) main field trials, 7) product revisions operations, 8) operational field testing, 9) final product revision and 10) dissemination and implementation (Sugiyono, 2019). This type of research is a research method used to produce a certain type of product, and test the effectiveness of the product. This type of research was chosen because the procedures in it are very appropriate for developing a teaching material that has the aim of developing and validating products. However, researchers only limit it to the 7th stage due to time constraints. The product developed in this study is an e-module based on socio scientific issue (SSI) integrated with verses of the Koran to realize the Pancasila student profile.

This research was conducted from January to December 2022 and took place in six junior high schools located in Pekanbaru, as shown in the following Table 1.

Table 1. Research Sample

No	School name	Number of Samples on Limited Test
1	MTS Al Muttaqin	10 students
2	MTs An Najah	10 students
3	MTs Muhammadiyah	10 students
4	SMP Al-Fityah	10 students
5	SMP Telkom	10 students
6	SMP Muhammadiyah	10 students

The data were collected through questionnaires and interviews. The detailed data collection techniques can be seen in the following Table 2.

Table 2. Data collection technique

No	Data Type	Method	Data Collection Tools
1	Information about learning resources	Questionnaire	Questionnaire, interview
2	Analysis of e-module needs	Questionnaire	Questionnaire
3	e-module validity	Questionnaire	Questionnaire
4	E-module practicality	Questionnaire	Questionnaire
5	Student response	Questionnaire	Questionnaire

Before the questionnaire is distributed, the instrument needs to be validated first. The feasibility of using instruments in research needs to be conducted through a validity test. According to Fraenkel, Wallen and Hyun (2012, pg. 112), validity is a measure of the accuracy of an instrument to be able to measure what necessary. Neolaka (2014, pg. 114) also declared that validity is an index that shows the extent to which a measuring instrument actually measures what it needs to be measured. The validity test used in this research is content validity by asking for judgment from either lecturers or experts and Integrated Science subject teachers. In this regard, the judgment is carried out with the aim of knowing whether the instrument that has been prepared is capable of measuring what is to be measured.

Validation of the content feasibility aspect is used to obtain values regarding the suitability of the material and the integration of science concepts presented in the socio-scientific issue (SSI)-

based science e-module integrated with Quranic verses and hadith. The material aspect validation questionnaire instrument lattice can be seen in Table 3.

Table 3. Material Validation Questionnaire Grid

Indicator	Question Number	Total Question
I. Content eligibility aspect		
A. The suitability of the material description with the core competencies (KI) and basic competencies	1,2,3	3
B. Correctness of the material	4,5,6,7,8,9,10,11,12,13	10
II. Presentation Aspect		
A. Systematics of Presentation	14,15,16,17, 18,19	6
B. Presentation Support	20,21,22	3
III. Material linkage and integration	23,24	2
IV. Socio-scientific Issue (SSI)	25,26,27,28, 29,30,31	7
Total		31

Validation of the presentation feasibility aspect is used to obtain values regarding the teaching materials presented in the SSI based science module integrated with Quranic verses and hadith on Class VII science material. The lattice of teaching material aspect validation questionnaire instruments can be seen in Table 4.

Table 4. Teaching Material Aspect Validation Questionnaire Grid

Indicator	Question Number	Total Question
I. Layout Aspect		
a. E-module size	1,2	2
b. E-module cover	3,4	2
c. Content	5,6,7,8	4
II. Multimedia and Language Aspect		
a. Clarity and Accuracy of E-Modul	9,10,11,12	4
b. Accuracy in language	13,14,15	3
III. Practicality and operation	16,17,18	3
Total		18

The validity aspect questionnaire of the integration of the Qur'anic and Hadith verses used in this validation was constructed by the researcher. The validation of the integration aspects of the verses of the Qur'an and Hadith is used to obtain Islamic values in the Qur'an and Hadith regarding the teaching materials presented in the SSI based science e-module integrated with the verses of the Qur'an and Hadith on Class VII science material. The grille of the questionnaire instrument for validating the integration aspects of the verses of the Koran and Hadith can be seen in Table 5

Table 4. Lattice of Questionnaire Validation of the Integration Aspect of the Qur'an and Hadith Verses

Indicator	Question Number	Total Question
Appropriateness of Qur'anic verses and hadith	1	1
The placement of the Qur'anic verses and hadiths is systematically arranged in each sub-matter.	2	2
Correctness of the writing of the verses of the Qur'an and hadith	3	3
There is a further explanation of the relevance of the	4	4

Indicator	Question Number	Total Question
material to the verses of the Qur'an and hadith		
The explanation of the connection between the material and the integrated verses of the Qur'an and hadith is easy to understand.	5	5
The integration of the verses of the Qur'an and hadith in the E-Module can instill Islamic values (religiosity).	6	6
Total		6

Experts were asked to provide feedback regarding the instrument and provide overall comments on the scope of the instrument. Instrumental judgments were carried out by nine experts who were competent in their respective fields, namely material experts, teaching material experts, integration experts of the Al-Quran and Hadith, and Integrated Science subject teachers. Furthermore, questionnaires were distributed to measure the validity of the e-module according to teaching material experts, material experts and experts on the integration of science and Islamic values in the Al-Quran and Hadith.

A brief description of the data analysis technique is described as follows:

1. Analysis of e-module validity data

Analysis of e-module validity data is intended to determine the extent to which e-modules that have been made meet the criteria based on the validator's assessment. The data obtained through the expert validation sheet instrument. The results of expert validation become the basis and consideration in making revisions. The validators consist of three material expert lecturers, teaching material experts and experts on integration of verses of the Quran and Hadith, as well as six science teachers.

Validation scoring by the validator uses a Likert scale of 1–4 for rating points. The Likert scale is used to measure attitudes, perspectives, perceptions of a person or group of people regarding social phenomena. The answers of each instrument using a Likert scale have very good to poor gradations (Cresswell, 2018). To further analyse the validity of the module can use the following formula.

$$\text{Percentage level of validity} = \frac{\text{overall means}}{\text{the highest scoring score}} \times 100\%$$

The results of the percentage validity level are then interpreted in a qualitative statement based on the following Table 5.

No	Percentage (%)	Assessment criteria
1	76% - 100%	Very Valid
2	51% - 75%	Valid
3	26% - 50%	Fair
4	0 - 25%	Invalid

(Riduwan, 2007)

2. Practical Data Analysis

The data used in the practicality analysis were obtained from practicality questionnaires by educators. The data analysis technique used in this study was carried out by calculating the percentage of practicality values. Practitioners scored practicality using a Likert scale of 1–4 for rating points. To analyze the practicality of the module, the present project uses the following formula.

$$\text{Percentage level of validity} = \frac{\text{overall means}}{\text{the highest scoring score}} \times 100\%$$

The practicality of percentage results is then interpreted in a qualitative statement described in the following Table 6.

Table 6. Criteria of Practical Result on Science Module

No	Percentage (%)	Assessment criteria
1	76% - 100%	Very Practical
2	51% - 75%	Practical
3	26% - 50%	Fair
4	0 - 25%	Impractical

(Riduwan, 2007)

The response questionnaire data is employed to the analysis. To further calculate percentages, the score of the survey results is calculated from the average score of each aspect. The score of the review results is calculated by the average score of each aspect assessed, the score obtained will be percentage with the equation:

$$\text{Percentage} = \frac{\text{overall means}}{\text{the highest scoring score}} \times 100\%$$

The percentage results are then converted into statements to determine students' responses to the SSI-based science e-module integrated with Islamic values in Class VII science material. Product assessment criteria as can be seen in Table 7.

Table 7. Criteria for Student Response Results

No	Percentage (%)	Assessment criteria
1	0% - 25%	Poor
2	25% - 50%	Fair
3	51% - 75%	Good
4	76% - 100%	Very Good

(Arikunto, 2014)

RESULTS AND DISCUSSION

Based on the formulated stages, the first stage in the development of this e-module seeks to determine the subjects generally referred to Natural Sciences as the objects of development. Furthermore, it also collected information related to the problems studied, and preparing to formulate a research framework. At this stage, a literature study related to the E-module was carried out through the aid of open knowledge maps website and Google Scholar.

The researchers conducted a needs analysis at the second stage in the development of the Science E-Module Based on SSI Integrated with Islamic Values in the Quran and Hadith to establish Pancasila Student Profiles. In this regard, needs analysis is an activity of analysing material in subjects from the syllabus to obtain module information needed by students in learning the required basic competencies. In this study, needs analysis is generally assumed as the curriculum, teacher and student analysis. Curriculum analysis was carried out to find out the curriculum used in the research locations and thus the modules developed were in accordance with competence. In this line of research, the chosen location was carried out using the 2013 curriculum.

Based on the results of interviews with science teachers in 6 schools, it was found that all of these schools use package books as the main learning resource. In addition to textbooks from schools, teachers also use books from other sources. Only 2 schools use LKS as learning materials.

There is 1 school that utilizes the use of electronic books, the internet, YouTube and journal articles. Furthermore, 5 schools use PPT as learning media. But there are also those who use charts, YouTube videos, virtual labs, visual media, audio-visual media and even the surrounding environment. The teaching materials that have been used in the 6 schools include teacher's textbooks. Only 4 out of 6 schools have used modules as teaching materials in addition to the teacher's textbook. 4 out of 6 teachers who gave statements that they used modules only as additional teaching references for teachers but not for distribution to students. 1 teacher mentioned that he had used e-modules but only when learning during covid. Only 1 teacher also stated that e-modules had been used in grade 7 last year. All teachers have used modules but only 1 person has used e-modules. 4 out of 6 teachers stated that they had used modules integrated with Quranic verses and hadith but had never used modules that integrated socio-scientific issues.

The next step, the researchers formulate material related to SSI and the integration of the Quran verses and Hadith. This is because the SSI-based e-module and its integration are able to foster the inculcation of Pancasila character and student profiles in students through natural science learning materials. The next step is to determine Basic Competency (BC) and learning objectives. Based on the curriculum analysis, there were six materials in class VII related to Socio-Scientific Issues (SSI). The SSI topics chosen are local or global problems that require immediate answers. Socio-Scientific Issues (SSI) are dilemmatic or controversial problems that do not yet have clarity and without definite answers (Hadjichambi, et.al., 2015). According to Tekin et.al., (2016). Socio-scientific issues (SSI) are complex problems that can generate debate with open-ended answers (Sadler, 2004). SSI refers to social issues that are controversial about science concepts, science procedures or technology. Examples of SSI in the world context are issues such as genetic engineering, global warming and climate change (Sadler, 2004). SSI does not just fulfill contextualized science learning but is a strategy to foster and improve intelligence, morals and ethics, and realize the correlation of science with everyday life socially (Zeidler, et.al., 2005; Nuangchalerm, 2010). SSI-based learning can increase students' critical thinking in dealing with issues faced in everyday life (Andryani, 2016; Mazfufah, 2015). It can improve students' scientific argumentation skills (Siska, et.al., 2020), improve reflective judgment (Subiantoro, A. W., & Ariyanti, N. A., 2013), and improve students' science literacy (Rostikawati, D. A., & Permanasari, A., 2016).

The following are the science learning materials selected to integrated with SSI issues, which can be seen in Table 8.

Table 8. Material related to Socio-Scientific Issues (SSI)

No	Semester	BC	Material	SSI	Integration of Al-Qur Verses
	Odd	3.2	Diversity of living things	Objects in the Environment “KMHE Seeks Safe and Environmentally Friendly Car Innovation Work” http://kliping.um.ac.id/index.php/kmhe-cari-karya-inovasi-mobil-aman-dan-ramah-lingkungan/	Chapter Qaf Verse 4: Meaning: “(Thus do they imagine, although) We know well what the earth takes away from them. With Us is a Record that preserves everything”.
		3.5	Energy in Living Systems	“Fossil Fuels Are Depleting, ESDM Encourages Energy Transition” https://katadata.co.id/sortatobin/g/ekonomi-hijau/5f90073b81977/bahan-bakar-fosil-menipis-esdm-dorong-transisi-energi	Chapter Al-Waqi’ah Verse 71-74: Meaning : Did you consider the fire which you kindle? Did you make its tree grow or was it We Who made it grow? We made it a reminder and a provision for the needy. Glorify, then, (O Prophet), the name of your Great Lord.

No	Semester	BC	Material	SSI	Integration of Al-Qur Verses
		3.7	Living creature interactions	<p>“The biotic and abiotic natural phenomena resulting from these interactions give rise to phenomena. This is because the natural phenomena of biotic and abiotic mutually support each other.”</p> <p>https://www.liputan6.com/citizen6/read/3920747/gejala-alam-biotik-dan-abiotik-yang-terjadi-di-sekitar-tanpa-disadari</p>	Chapter Ash-Shu'araa (26):7 Meaning: <i>Do they not look at the earth, how We caused a variety of fine vegetation to grow from it (in abundance)?</i>
Even		3.8	Environmental pollution	<p>Thrash problem in Pekanbaru is getting worse.</p> <p>Link : (https://news.detik.com/berita/d-5323908/masalah-sampah-di-pekanbaru-makin-parah).</p>	Chapter Ar-Rum, verse 41: Meaning: <i>Evil has become rife on the land and at sea because of men's deeds; this in order that He may cause them to have a taste of some of their deeds; perhaps they will turn back (from evil)</i>
		3.9	Global warming	<p>Jakarta Air Pollution, BMKG Calls PM 2.5 Trends in DKI High. (https://metro.tempo.co/read/1577008/pencemaran-udara-jakarta-bmkg-sebut-tren-pm-25-di-dki-tinggi)</p>	Chapter Ar-Rum:41: Meaning: <i>Evil has become rife on the land and at sea because of men's deeds; this in order that He may cause them to have a taste of some of their deeds; perhaps they will turn back (from evil)</i>
		3.10	Subsoil	<p>The Earth's Core “This is the Distribution of Geothermal Power Plants in Indonesia”</p> <p>https://www.esdm.go.id/id/media-center/arsip-berita/ini-dia-sebaran-pembangkit-listrik-panas-bumi-di-indonesia</p>	Chapter Ath Thalaq (65:12) Meaning: <i>Allah it is He Who created seven heavens, and, like them, the earth.23 His commandment descends among them. (All this is being stated so that you know) that Allah has power over everything, and that Allah encompasses all things in His knowledge.</i>

Based on results obtained in this line of research, student analysis is a study of the characteristics of students who are the subject of research. These characteristics include students' cognitive development and learning skills possessed by students. Analysis of the needs of students is carried out in order to find out the needs of students in learning Sciences. Analysis of student needs was carried out by distributing questionnaires through Google Forms and conducting interviews with science teachers.

Based on the results of the questionnaire, it was found that there were 130 students have filled out questionnaires regarding difficulties in participating in Natural Sciences learning at school, 62.3% of students experienced difficulties in participating in learning and the rest 37.7 students did not experience difficulties. This data can be seen in Figure 1.

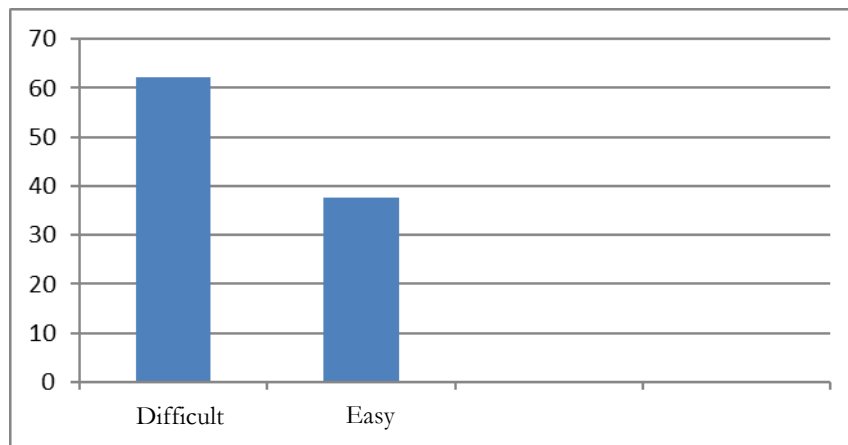


Figure 1. Students' responses about the difficulties of learning science

A total of 130 students have filled out questionnaires regarding difficulties in the material on the classification of living things, and 26.5% of students experienced difficulty in the material on the classification of living things and the rest 73.5% of students did not experience any difficulty in the material on the interaction of living things with the environment. This data can be seen in Figure 2.

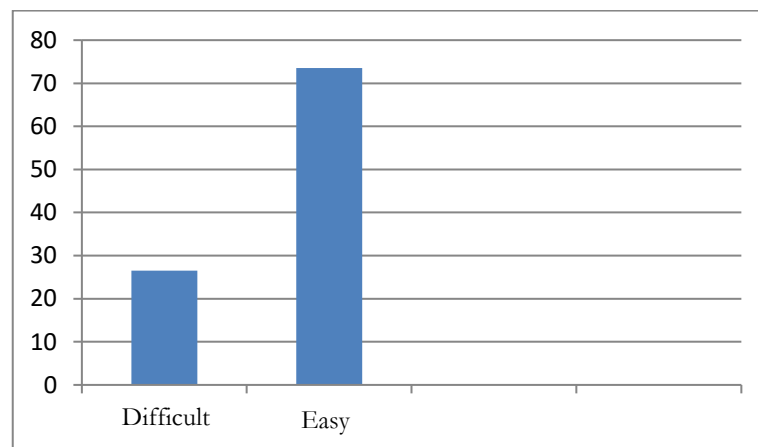


Figure 2. Student responses about science topics that are difficult to understand

A total of 130 students have filled out a questionnaire regarding what teaching materials were used during the learning, 65% of students used textbooks, 15% of students used Student Worksheets, 2% of students used animated videos, 16% of students used modules, and the rest 2% of students use e-modules. This data can be seen in Figure 3.

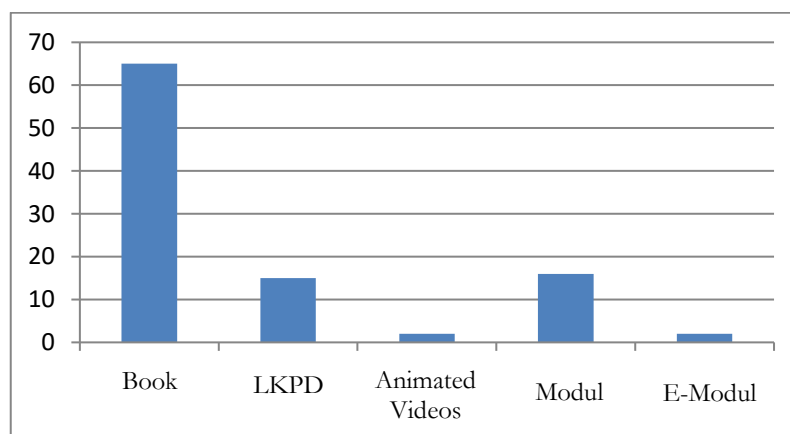


Figure 3. Student responses regarding teaching materials that have been used during the learning

A total of 130 students have filled out questionnaires regarding the use of learning modules at school, 28.5% of students used modules and 71.5% of students have never used modules. This data can be seen in Figure 4.

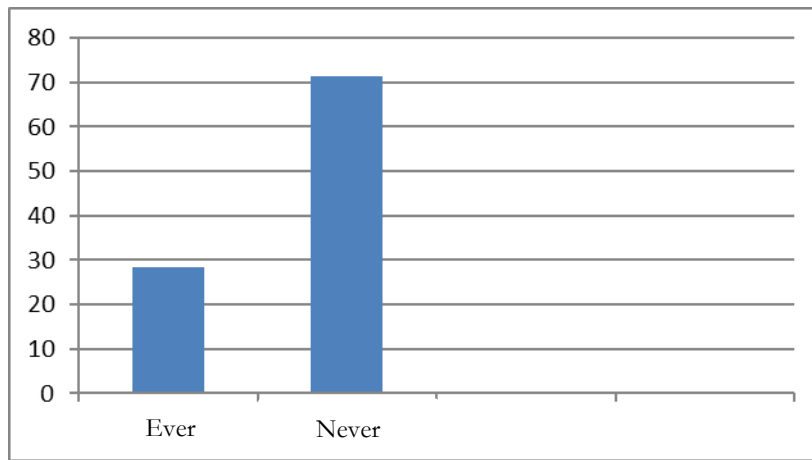


Figure 4. Student responses regarding the use of the module

A total of 130 students have filled out questionnaires regarding when starting a lesson at school, the teacher connected the material to be studied with the students' previous knowledge. In this regard, there are 76.5% of students stated that the teacher has connected the learning material with the students' previous knowledge, and the rest 23.5% of students stated that the teacher has not connected the material to be studied with the students' previous knowledge. This data can be seen in Figure 5.

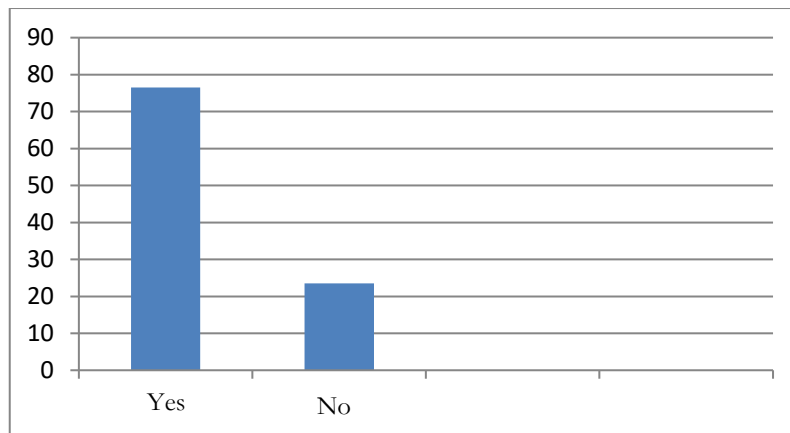


Figure 5. Student responses regarding integration of material studied with prior knowledge

A total of 130 students have filled out questionnaires regarding the use of e-modules based on SSI, there are 13% of students stated that they have used e-modules based on SSI, and the rest 87% of students have never used e-modules based on SSI. This data can be seen in Figure 6.

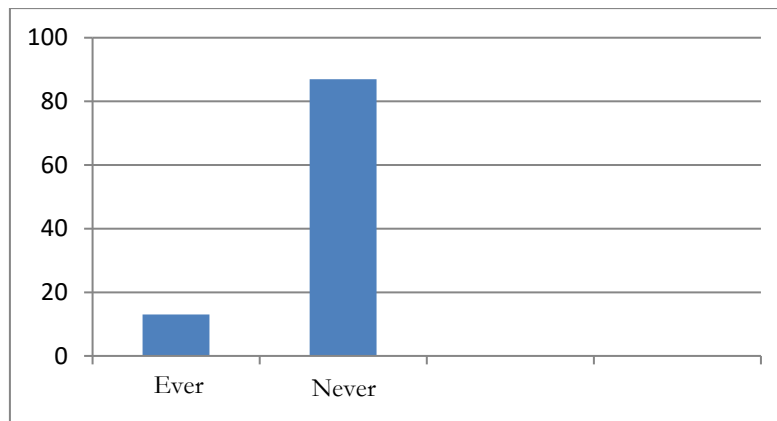


Figure 6. Student responses regarding the experience of using SSI-based e-modules

A total of 130 students have filled out questionnaires on using modules that integrated verses from the Qur'an and Hadith, 43% of students have used modules that integrated verses from the Qur'an and Hadith, and 57% have never used such integrated modules. This data can be seen in Figure 7.

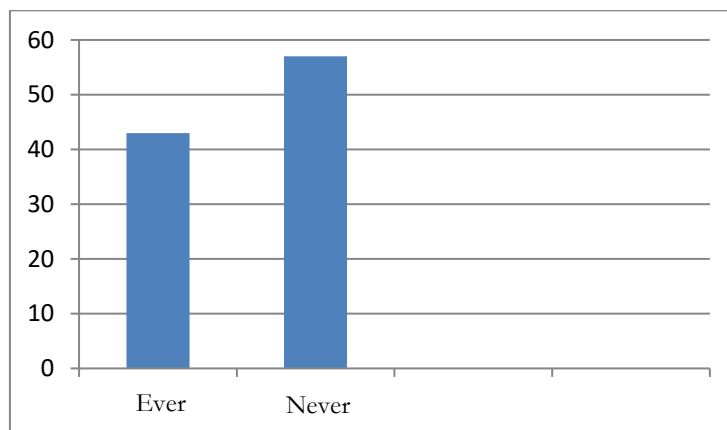


Figure 7. Student responses regarding the use of integrated e-modules of Al-Quran verses and hadith

A total of 130 students have filled out questionnaires regarding student responses to the development of e-modules based on SSI integrated with verses from the Al-Qur'an and hadith, where 87.5% of students agreed and 12.5% of students disagreed. This data can be seen in Figure 8.

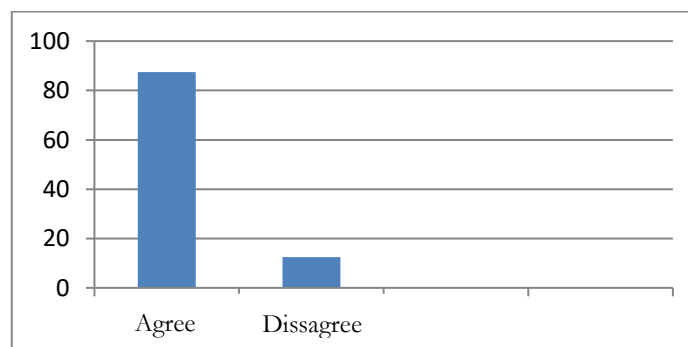


Figure 8. Student responses regarding the development of an e-module based on SSI integrated with verses from the Al-Qur'an and hadith

A total of 130 students have filled out questionnaires regarding the teaching materials they eager to learn. In this regard, there are 65% of students wanted textbooks that had lots of pictures,

45% of students wanted books that explained the material concisely, easy to understand and practical. This data can be seen in Figure 9.

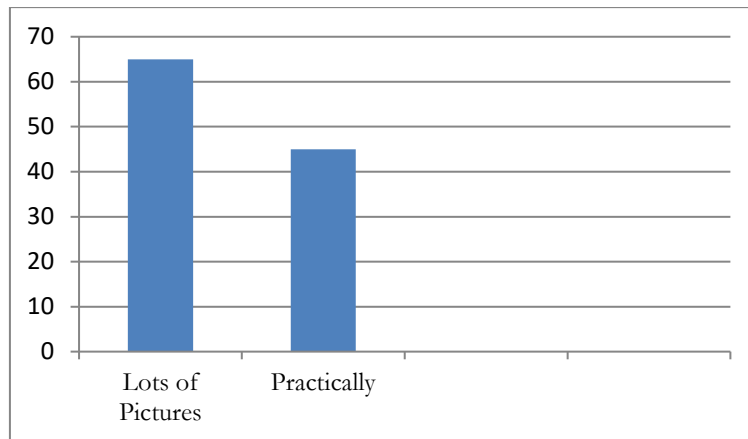


Figure 8. Student responses about desired teaching materials

The third stage is developing the initial form of the product to be produced. Included in this step is the preparation of supporting components, preparing guidelines and manuals, and evaluating the feasibility of supporting tools. At this stage also prepare validity questionnaire instruments (material/content, teaching materials, and integration of verses of the Koran and Hadith) and practicality and student responses. Determine applications in preparing modules (using Ms. Office Word, Canva and Flipbook, including Phet simulations if needed). Through Focus Group Discussion (FGD), the questionnaire instrument was validated by experts. Validity refers to the extent to which the intervention design includes "up-to-date knowledge" (content validity) and the various components of the intervention are consistently related to each other (Fauzan, A et.al 2013). The data used in the validity analysis were obtained from a validation questionnaire on the feasibility aspects of the material, teaching materials and integration in the Quran and Hadith. The data analysis technique used in this study was carried out by calculating the percentage of validation values. Content validity was conducted to ascertain whether the content of the questionnaire was appropriate and relevant to the study objectives. Content validity indicates the content reflects the complete set of attributes under study and is usually conducted by seven or more experts (DeVon et al 2007). An estimate of the content validity of a test is obtained by thoroughly and systematically examining the test items to determine the extent to which they reflect and do not reflect the content domain (Kowsalya, Venkat Lakshmi, and Suresh, 2012).

Validation scoring by validators uses a Likert scale of 1-4 for assessment points. The Likert scale is used to measure the attitudes, opinions, perceptions of a person or group of people regarding social phenomena. The answer to each instrument that uses a Likert scale has a very good to bad gradation (Cresswell, 2018). Following are the validation results from the validator.

Table 9. Content Validity for instruments

No	Validator	Revision
1	RV	a. Explain in detail the purpose of the systematic column b. Write down in detail the SSI indicators on the instrument
2	YL	a. In the instrument, add hadith-related not only the Koran in accordance with the title
3	MT	a. Assessment use Likert scale 1-4 b. Uniform the criteria on the material expert assessment rubric so that it is quantitatively clear c. The depth of the material is also presented quantitatively on the assessment rubric d. SSI consists of 3 core components, namely real, controversy, relevant to science. All three must be presented in the material not far apart and

No	Validator	Revision
		the images presented must be real and close to the area of origin to be contextual.
		e. The SSI instrument must be attached to the issue and its indicators.
		f. Translated with www.DeepL.com/Translator (free version)

Table 10. Content Validity for e-modules

No	Validator	Revision
1	RV	<ul style="list-style-type: none"> a. Bring together into one book all the study materials or chapters developed that are reflected in the overall table of contents. b. The format of the e-module presentation must be uniformed between chapters c. SSI must be addressed in the content of the module d. Standard issues that are the subject of SSI study (world, local so that it is contextual,) e. Strengthen the alignment of learning objectives with the material, stages and evaluation in the module. f. Specific tables of SSI issues in each chapter are attached to the validation instrument. g. Evaluation questions at the end of the chapter adjust to the learning objectives h. SSI concepts presented must be contextual and close to daily life
2	YL	<ul style="list-style-type: none"> a. Add learning objectives related to core competencies related to spiritual and social competencies, because there are only knowledge and skills competencies. b. Add hadiths to each material c. In the module present how to solve issues according to Islam (Al-Quran and Hadith) and according to science
3	MT	SSI consists of 3 core components: real, controversial, relevant to science. The three components must be presented sequentially in the material not far apart and the pictures presented must be real and close to the area of origin so that it is contextualized.

The fourth stage is product trials on a limited sample. At this stage involving as many as 6-12 subjects. In this step, data collection and analysis can be carried out by distributing practicality questionnaires and student responses. Based on the practicality test analysis, there are six aspects which can be seen in Figure 10.

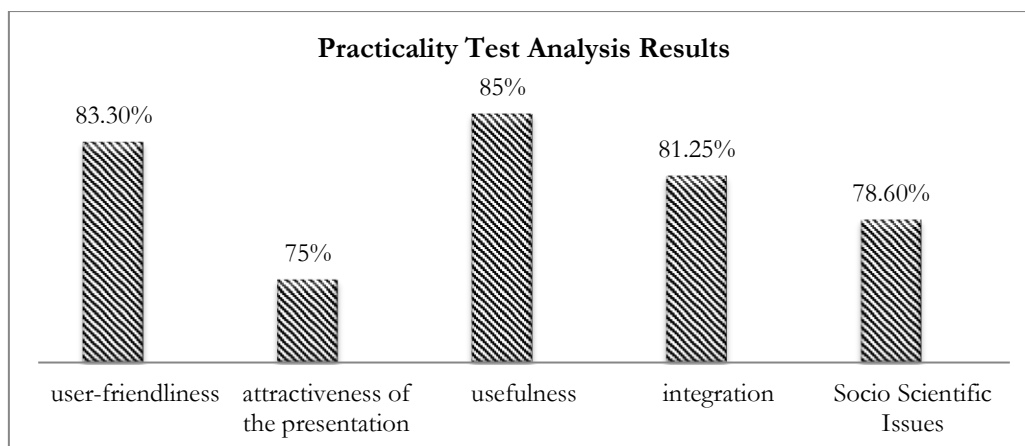


Figure 10. Graph of Practicality Test Analysis Results

Based on Figure 1, it is found that the developed teaching materials have a percentage value of 85% in terms of their usefulness. In terms of user-friendliness, it was rated at 83.30%, followed

by the integration of Islamic values at 81.25%. Socio-scientific issues received a score of 78.6% and the attractiveness of the presentation at 75%. Overall, the practicality is worth 80.25%.

Based on the analysis of student responses, there are three aspects which can be seen in Figure 11.

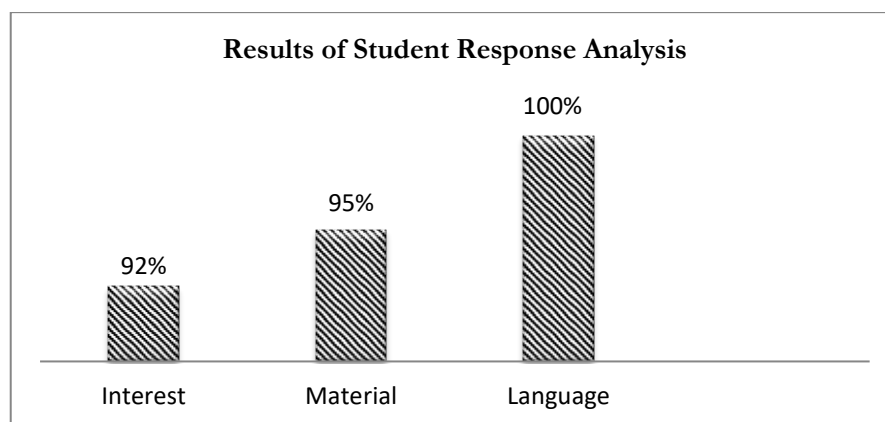


Figure 11. Graph of Student Response Analysis Results

Based on the results of the students' responses, it was found that the students' responses were very good, namely at a percentage of 95%. The fifth stage is to revise the product. Then the electronic module can be used. The module should not only be a guide for the teacher. It would be better if students also use the module so that more learning resources are owned by students. The development of SSI module integrated with Quranic verses is expected to explore students' science literacy. SSI complex, often controversial issues linked to the development of science and technology—are widely recognized as a valuable arena for the school curriculum to foster students' scientific literacy (Chen & Xiao, 2021). This is in accordance with research conducted by Chowdhury, Holbrook, & Rannikmäe (2020) that SSI is controversial, situated in a social context but has scientific considerations, requires various considerations such as - moral, ethical, cultural, traditional, economic, political, and environmental and intended to yield benefits for students in decision decision-making, increase scientific literacy, as well as enabling intellectual growth, moral development, and community engagement in local, social, and global contexts. The concept of SSI has been evolving and merging more and more potential areas in which it can play a role enabling students to achieve the goals of science education. based on survey research conducted by Nida, Rahayu, and Eilks (2020) stated that some teachers mentioned several challenges that hindered them from implementing SSI in their teaching practice. The reasons include lack of necessary student competencies, lack of teacher expertise, content in the official curriculum, inadequate facilities, and lack of time for lesson preparation and implementation. Through the development of e-modules based on SSI integrated with Al-Quran, it is expected to be an additional teaching material for teachers in the classroom in teaching and helping students improve scientific literacy and scientific argumentation.

Incorporating SSI in science learning has become very important in this century. SSIs have become an established part of science education, aiming to teach students not only about content knowledge but also about the nature of science and to offer them practice in argumentation and decision making (Schenk, et.al., 2021). For content, it was found that SSI is related to knowledge about science and knowledge about science and related to skills such as argumentation. In terms of teaching and learning strategies, SSI is mainly associated with Inquiry-Based Learning; and with student engagement techniques such as dilemmas and group discussions. Finally, performance assessment of student learning processes and outcomes is common when SSI is understood as a method of assessing STEM lessons. This conception provides a solid foundation for the design and evaluation of innovative SSI teaching. It will also help open up new lines of research that

establish links between SSI applications in different subjects, cultural contexts and educational systems (Alcaraz-Dominguez, & Barajas, M, 2021).

SSI provides an opportunity for risk researchers to engage with educators to incorporate risk into science education in schools and contribute to developing teaching materials that are fit for purpose (Schenk, et.al., 2021). We argue for more support for teachers to improve the quality of their implementation of SSIs. This review has implications for education policymakers, teacher educators, school leaders, and teachers to respond to the challenges facing teachers in teaching SSIs collaboratively. Potential directions for further research are also discussed (Chen & Xiao, 2021). We suggest that future researchers can investigate the effectiveness of using SSI-based modules in the application of classroom learning.

CONCLUSION

Based on results obtained in this line of research, the researchers would simply like to draw the attention once more to the fact that the development of the Science E-Module Based on Integrated Socio-Scientific Issues (SSI) Islamic Values is designed to seek the Pancasila Student Profiles and can be used for independent learning by students. Based on the validation results, the formulated E-Module Science is classified valid for use with a percentage score of 89%.

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