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Integrated Science E-Module assisted by the Flip PDF Professional Application to Integrate Character Education Values in Science Learning for Junior High Schools

Prima Aswirna*, Media Roza, Mela Zainia

Department of Sciences, State Islamic University of Imam Bonjol Padang, Indonesia

*Correspondence Author: *primaaswirna@uinib.ac.id*

ABSTRACT
The current impact of globalization has made Indonesian people forget about character education. The National Education System declared that national education has the function of developing abilities and forming dignified national character and civilization in the framework of educating the nation. In this regard, rapid technological changes have brought the popularity of computer-based learning as an effort to develop specific knowledge and skills in the educational environment. In order to establish the cited functions, education provides teaching materials that can be accessed independently by students. This study aims to develop an Integrated Science E-Module to integrate the values of character education at Junior High Schools. In this study, the Integrated Science E-Module prototype was designed using the Plomp model. Moreover, a validated functional prototype was also carried out. Based on results of the analysis, the data demonstrated that the Integrated Science E-Module is successful in integrating the values of character education in student learning and the results of the product developed have assisted them to have character values such as religious, responsible, curious, have mutual cooperation, communicative, and care for the environment.

Keywords: *integrated science e-module, flip pdf professional, values of character education*

INTRODUCTION

The current impact of globalization has made Indonesian people forget about national character education. In fact, character education is a nation's foundation that is mainly important and needs to be instilled since early students. Based on various current cases, people are currently aware on the importance of character education instilled from an early age (Rotherham, 2010). The National Education System declared that national education functions to develop abilities and shape dignified national character and civilization in order to educate the nation. National education aims to develop the potential of students to become human beings who have good faith and are devoted to The Almighty God. Moreover, they have noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic citizens and responsible to the state. Based on the functions and objectives of national education, it is clear that education at every level including junior high school (SMP) shall be organized systematically in order to achieve such obvious goal. It deals with the formation of students character hence they are able to compete, to be ethical, moral, polite and they can interact with society (Affandi, 2019).

Character education not only teaches what is right and what is wrong to students, but also instills good habits (habituation) thus students can understand, feel, and are willing to practice them. And therefore, character education conducts the same mission as moral education or moral education (Affandi, 2019). Character education that needs to be instilled in students is religious,

responsible, curious, have mutual cooperation, communicative, care for the environment (Maulidah, 2019). Character values describe a person's personality in interacting and behaving with others. (Aswirna & Ritonga, 2020)

Character education is very important for each student, because character education can form a person's personality to be good and directed. Through such formulated character assessment, every teacher will always observe the behavior of students and assess it. The birth of character education can be regarded as an attempt to live a spiritual ideal. A scientist once said that the main purpose of education is to form character because character is an evaluation of a person or individual and character can give unity of strength in taking a stand in every situation. Character education can also be used as a strategy to overcome ever-changing experiences so as to be able to form a strong identity for each individual. In this case, it can be seen that the purpose of character education is to form attitudes that can lead us towards progress without conflicting with prevailing norms (Surya , 2017).

Ningsih (2015) stated that the condition of education faced by the Indonesian nation tends to experience the dynamics of a change in orientation regarding the expected educational goals, and even faces conditions that lead to a crossroads. On the one hand, a competency-based curriculum has succeeded in improving the quality of science and technology, but on the other hand, competence in the field of character has been neglected. In fact, character is a very important foundation of the nation and needs to be instilled in students since early ages. This is due to the fact that the measurements in education are not returned to the character values of students, but the tendency of society to be rational-capitalism. The idea is that after students complete the educational process, they can immediately get a job according to competence in the field of science and technology which is generally returned to their needs. market (demand) workplace. Nowadays, the tendency to accept employees in various fields of work requires a high GPA, regardless of character and moral values as the first and foremost prerequisite, adding justification for most people to prioritize their intellectual abilities and competence over other considerations. The perceived impact is that national education is still not able to enlighten this nation, especially in terms of aspects of moral values and character (Ningsih, 2015).

Science is a branch of science that underlies technological development and the concept of living in harmony with nature (Aswirna, 2017). Therefore it is necessary to integrate character values are carried out by utilizing technological resources in learning, namely e-Modules (Aswirna et al., 2020) E-modules have an important role in optimizing the teacher's function as a motivator, facilitator, and evaluator in learning. Quality education will create quality human resources. Quality education in question is education that is able to produce graduates who are faithful, pious, and have the ability to communicate in foreign languages and master science and technology (IPTEK) (Mardiansyah, 2010). The integration of character education with this learning E-Module is to insert positive character values in every aspect of learning. It is expected that students will be able to apply the character values that have been embedded in the teaching E-Module.

E-Modules are teaching materials arranged sequentially with reference to the curriculum and are packaged in the form of a certain time unit that can be presented with electronic media such as computers or Android. E-Modules assist in navigation which contain images, audio, video, and are equipped with formative tests or quizzes (Aswirna et al., 2020)

Establishing the Integrated Science E-Module has an objective to integrate student character education values using the *Flip PDF Professional application* . Such multimedia tool includes files in the form of pdf, images, videos and animations so that *Flip PDF Professional* has template designs and features such as backgrounds. Students can read by feeling like opening a book Scienceally because there is an animation effect where when switching pages it will look like opening a book Scienceally. The final result can be saved to html, exe, zip, screensaver and app formats.

E-Module development has been carried out by many researchers before. Research conducted by Nisa with the title Integrated Thematic Module Development Character Values Concerning Social Environmental Themes Class III in SD/MI. The advantage of this thematic module is that it can integrate the character values of caring for the environment into the subject matter. research conducted by Salmi with the title Guided Inquiry-based E-module Development using the 3d Pageflip Professional application in Sciences learning towards learning independence. The advantages of E-modules can help educators and students in the learning process. Existing E-Modules still have some drawbacks, from the research that has been developed there are already ones in the form of E-Modules but none that leads to the integration of character education values such as religion, responsible, curious, have mutual cooperation, communicative, besides the modules developed are still not electronic. Researchers will develop a product in the form of an Integrated Science E-Module by applying the Discovery Learning model that integrates the value of student character education. the material used in the Integrated Science E-Module is Environmental Pollution and Global Warming.

The Flip PDF Professional application to integrate character education values in MTs/SMP students that are valid, practical, and effective. The reseachers expected that the development results can be used as a reference for further study to integrate the value of character education in a wider scope.

METHODOLOGY

The current study is type of research and development (*RnD*) which aims to produce an Integrated Science E-Module to integrate the value of character education in MTs/SMP student learning that has been tested for validity, practicality, and effectiveness. The author uses the Plomp development model (Preliminary Research, Development or Prototyping Phase, Assessment phase).

At the Preliminary Research, the researchers conducted a needs analysis and literature review (analysis of teaching materials), for research. At the Development or Prototyping stage, the researchers make the design and systematics of the modules that will be used in learning. The stages of the activity are as follows designing prototypes, conducting formative evaluations, and revising prototypes. At this stage, product validation instruments, practicality instruments, and effectiveness instruments are also created. The next step is the Assessment Phase, the purpose of this stage is to figure out the practicality and effectiveness of the Integrated Science E-Module prototype II to integrate the character education values as the results of the development phase (Sofyan et al., 2021). Systematically, it can be seen in the following chart.

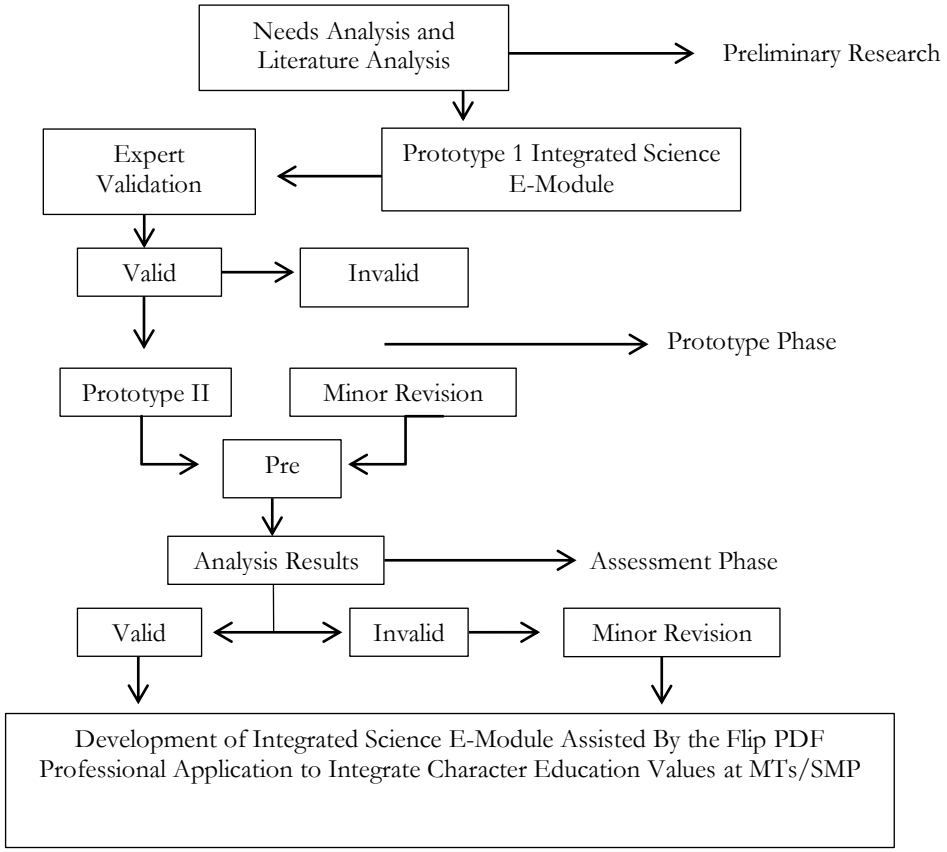

Figure 1. Procedures for developing the Plomp model E-Module

As described on the above research flow, the researchers details each phase in the Plomp model which consists of 3 phases. The description of the research procedure is connected between each phase with the research objectives. Here is a sketch regarding each phase:

Table 1. Preliminary Research Phase

Needs Analysis	**Literature Analysis**
In this phase the researchers collect, analyze information, and define problems related to the use of learning resources by making observations at SMPN 6 Solok Selatan. Based on observations made by researchers at SMPN 6 Solok Selatan, it was found that the learning resources did not integrate the values of character education for students, students only had printed books from the library which were used during learning so that students did not have learning resources that they could take anywhere. where, it also triggers the lack of character values in students.  **Figure 2.** Needs Analysis	This analysis was carried out to find the concepts that strengthen the Integrated Science E-module to integrate the character education values that were developed. At this stage it was found that the teaching materials used did not train students to carry out scientific processes, find a concept, and apply existing concepts in everyday life.  **Figure 3.** Literature Analysis

Table 1. shows the results of the preliminary stage, namely needs analysis (educators and students) and analysis of the literature when developing the Integrated Science e-Module to integrate the value of character education. Needs analysis is the first step that must be carried out in the Introduction activity. The analysis aims to raise and determine the main problems encountered in learning so that it is necessary to develop learning media. Needs analysis is carried out by conducting interviews with educators and students. While the second is literature analysis, which is an attempt to examine theories and research results that are relevant to the research being conducted.

Table 2. Prototype Development Phase

Designing Prototypes	Formative Evaluation	Prototype Revision
At this stage, the design of the E-module is carried out. The design stage of the Integrated Science E-module to integrate the values of character education in an outline is carried out as follows: Making concept maps to simplify material, Formulating learning indicators, Looking for interesting references and giving a relaxed and fun impression, Designing E-Modules according to their components.	After the design was completed, the researcher submitted the Integrated Science E-Module design to 3 experienced expert validators to obtain data validity on 3 aspects namely, material, language, and media aspects. After being given to the experts, revisions were obtained to make the E-Module even better	The aim is to perfect the design of the Integrated Science E-Module based on measurements provided by expert validators and qualitative assessments such as comments and suggestions on prototype 1. The product results at this stage are called prototype II. The results of prototype II are given to educators and students to be given an assessment

Figure 4. Designing Prototypes

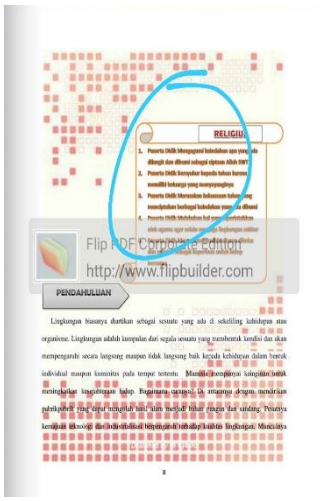

Figure 5. Formative Evaluation

Figure 6. Prototype Revision

Table 2 shows the stages of prototype development, namely those carried out by the material, media, language validators for the development of an integrated IPA e-Module by revising the refinement of the Integrated Science e-Module At this development stage, the goal is to produce an Integrated Science e-Module assisted by the Flip application PDF Professional to integrate character education values. At this stage there is repetition to improve the product

Table 3. Assessment Phase

Practicality Assessment	Effectiveness Assessment
To ensure the functionality of the prototype produced in the development phase, the resulting E-Module needs to test its practicality as teaching material from the perspective of educators and students. One that determines the functionality of the prototype	At this stage an assessment is carried out by implementing the Integrated Science E-Module to students in class. All respondents were guided to use the Integrated Science E-Module. All respondents followed the instructions given to determine the success of the

Practicality Assessment

is the instructional design which is structured as a work guide for educators and students. The purpose of this assessment is to ensure that at the implementation stage, the Integrated Science E-Module saves time and makes it easier for students to follow the lesson.

Figure 7. Practicality Assessment

Effectiveness Assessment

prototype with the aim of developing the expected skills. Feedback from respondents is very important to ensure the functionality of the given worksheet. students are able to understand the character values that have been integrated in the E-Module and can apply them in daily life.

Figure 8. Effectiveness Assessment

Table 3. is the stage of the assessment, namely to see the practicality and effectiveness of the developed e-Module which is developed to be filled by educators and students. This stage aims to see the practicality and effectiveness of the Integrated IPA prototype II e-Module assisted by the Flip PDF Professional application. The level of practicality can be seen from the questionnaire assessed by 2 Sciences educators and the practicality questionnaire for students. Its effectiveness can be seen from the questionnaires and test questions filled out by students. Each stage aims to produce valid, practical and effective products

The research object is the development of Integrated Science E-Modules assisted by *the Flip PDF Professional application* to integrate the developed character education. The Integrated Science E-Module trial consists of validity trials, validity trials are carried out based on the aspects of content, language, and media displayed in the E-Modules. The validity process is carried out to produce E-Modules that are valid and suitable for use in the science learning process. The product validity assessment is carried out by validators or experts from UIN Imam Bonjol Padang. Practicality trials were carried out to determine the eligibility of the product when used which shows the level of achievement and practicality of the IPA E-Module. The level of practicality can be seen from the responses of educators and students from their use. The product effectiveness trial aims to determine the level of effectiveness of the Science E-Module product to help integrate the values of character education. The aspect observed for effectiveness is the character education value of students after using the E-Module.

In this study, the tool for collecting data contained 8 statement items about the material aspects of presenting environmental pollution and global warming in supporting students' understanding, there were 11 statement items about media aspects as visualization supports, and 4 statement items used to determine the validity of language aspects. This statement item is given to expert lecturers to measure the validity of the developed E-Module. after being declared valid, the researcher can proceed to the product practicality test stage. Product practicality consists of 6 statements for educators and 11 statement items for students. To measure product effectiveness, research was conducted by distributing questionnaires based on indicators of character education values. The character education value questionnaire used in this study consisted of 19 statement items which were divided into 6 indicators of character education values. Each of the 19 statement

items is used to measure the extent to which students can follow the learning process. The effectiveness assessment instrument is prepared based on indicators of character education values.

Table 4. Indicator Grid on Character Education Values

Effectiveness Variable	Aspects of Character Education	Assessment Indicator	Question Number
Character building	Religious	1. Admiring the beauty of the heaven and the earth as creations of Allah SWT	1
		2. Expressing thanks to God for having a loved family	2 3
		3. Feeling the power of God who has created the various creations that exist on earth	4
		4. Doing things that are ordered by religion in order to protect the surrounding environment	
		5. Experiencing the benefits of classroom and school rules as a necessity for living together	5
	Responsible	1. Having awareness of keeping the environment clean	6
		2. Saving the use of practical materials	7
		3. Taking part in preserving the plants in the school and around the house	8
	Curious	1. Asking teachers and friends about environmental pollution and global warming	9
		2. Asking or reading sources outside of textbooks about material related to environmental pollution and global warming	10
	Mutual cooperation	Conducting community service or mutual cooperation both at school and at home thus the environment is always clean	11
	Communicative	1. Collaborating with classmates to always maintain environmental sustainability	12
		2. Providing solutions on how to tackle environmental pollution to classmates	13
	Environmental care	1. Regulating the disposal of residual chemical cleaning fluids, oil and materials that are difficult to decompose.	14
		2. Reducing the use of vehicles that can cause environmental pollution	15
		3. Avoiding using pesticides	16
		4. Managing trash	17
		5. Reducing the use of plastic and recycling the plastic that has been used	18
		6. Caring for animals whose feces do not pollute the environment	19

(Maulidah Evi, 2019)

In this study, an analysis of the data obtained from the validity, practicality and effectiveness of the Integrated Science E-Module questionnaire was carried out using a Likert scale with positive categories, namely (5) strongly agree, (4) agree, (3) quite agree, (2) disagree, (1) strongly disagree (Guo et al., 2020). The details of the data obtained from the validity, practicality and effectiveness aspects of the questionnaire were categorized based on the assessment criteria according to Ridwan (2012).

RESULT AND DISCUSSION

Based on the research objectives and procedures, the stages in this research procedure are: introduction, development, and assessment. At the development stage the Integrated Science E-Module was validated by some experts. Expert validation is carried out to figure out the validation of material, media, and language. In general, the results of the expert validation of the Integrated Science E-Module developed are in a very good category and can be used with minor revisions. The Flip PDF Professional application used by researchers to create Integrated Science E-Modules can be seen in Figure 2 below.

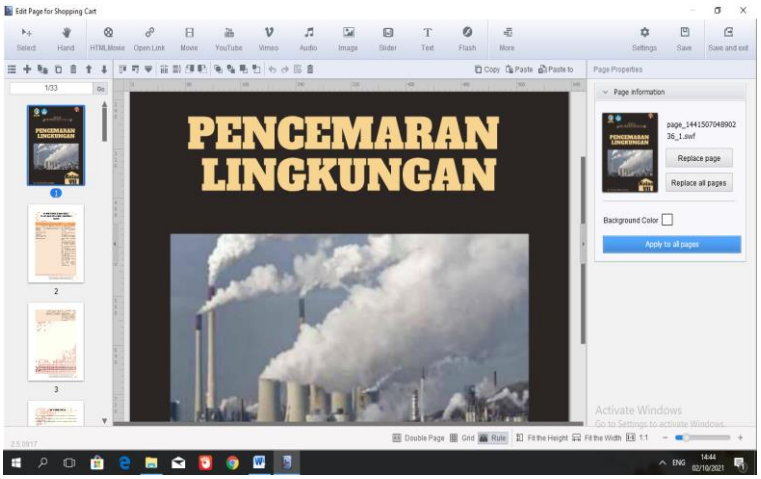

Figure 9. E-module Cover

Figure 9 shows the initial appearance of the Integrated Science E-Module assisted by the Flip PDF Professional application to integrate character values in environmental pollution and global warming material. Integrated Science E-module that has been developed by adapting the PLOMP model on the topic of environmental pollution and global warming.

The validity of the data was obtained by filling out a material/content validity questionnaire, a media validity questionnaire and a language validity questionnaire. The questionnaire was filled out by 3 professional validators consisting of 1 material/content expert, 1 language expert, and 1 media expert. These three variables are explained in several E-Module validation statements which can be determined from the average percentage of all statements which can be seen in Figure 3 below:

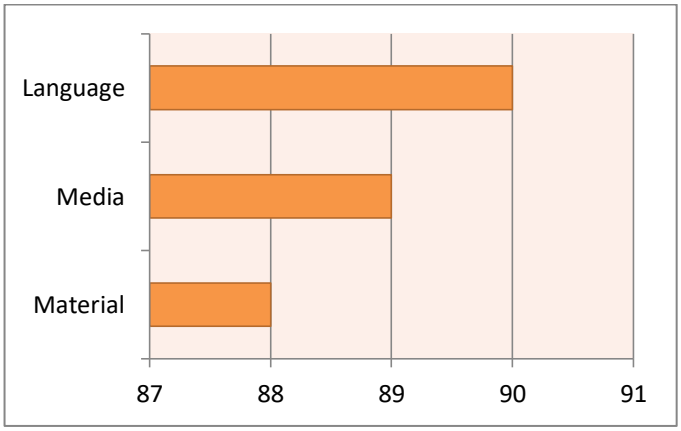

Figure 10. Graph of Test Results for The Validity of Data on Material, Language, and Media

The material aspect shows that the material contained in the e-module is in accordance with the curriculum and has paid attention to KI and KD as well as learning indicators. In line with (Wahyuni et al, 2018) content eligibility validation can be seen from the aspect of the

accuracy of the material concept, the suitability of the material described, according to the topics presented in the teaching materials being developed. according to (Hamzah & Mentari, 2017) from the content aspect seen from the presentation of the material with a scientific approach and practice questions. From the validation of the eligibility of the content / material filled in by 1 validator, namely the Sciences lecturer at UIN Imam Bonjol Padang, it was found that 88% were in the valid category.

In terms of language use, it is stated that the aspects measured in language validity include; accuracy (sentence structure, language), use of language appropriate to student development and delivery of communicative language texts, seen from the validity of language eligibility by 1 validator from a language lecturer. Sciences e-module has a validity of 90% with a very valid category. This shows that the writing and use of language in the e-Module is in accordance with good and correct Indonesian spelling rules(Yamin, 2012).

Based on the media aspect according to (Serevina, 2018) There are several aspects of media feasibility, including suitability with Sciences content, cover design, typeface, text layout, and images, which are considered appropriate for use as teaching materials. In line with (Ghaliyah et al., 2015) e-Module eligibility aspects include the completeness of components and e-Module display formats. Meanwhile, according to (Fonda & Sumargiyani, 2018) aspects of e-module eligibility include the use of letters in terms of type, color, size, animation, images, photos, and display design. This shows that the appearance and size of the text as well as the design of the e-Module are very good. From the results of the media feasibility test by 1 media validator, it was obtained an average of 81.43% with a very valid category.

Practicality given to teaching practitioners and students, there are 4 assessment variables, namely: time efficiency, ease of use, benefits, and appearance of learning media. In line with that (Auditor & Naval, 2014) that e-Modules are very suitable for use as practical teaching materials that help learning. This can prove that the e-Module is feasible to use in learning. Practicality can be seen from the cost and time in implementation and management in interpreting the results.

The validated Integrated Science E-module is then subjected to practical testing. Practicum data was filled in by 2 Sciences educators and 15 students at SMPN 6 Solok Selatan. The average practicality test results by educators and students can be seen in Figure 4 below:

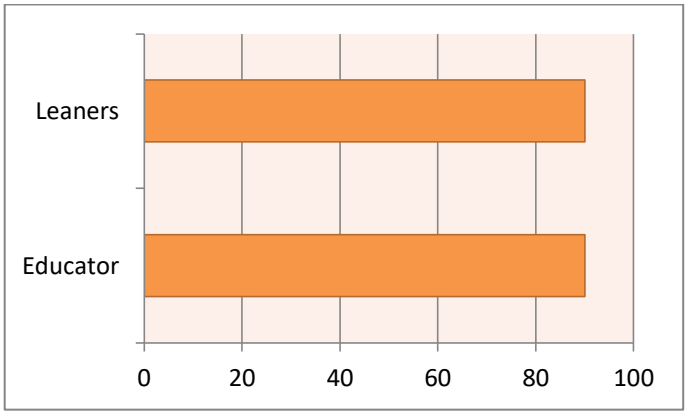

Figure 11. Graph of Practicality Test Results by Educators and Students

Figure 11 shows that the results of the e-Module practicality questionnaire analysis by educators amounted to 92% in the very practical category and the student questionnaire analysis was 92% in the very practical category. Based on the results of the validity above, the Integrated Science e-Module is assisted by the PDF Professional application to integrate character education values that can facilitate and save time in learning by educators and

students (Andromeda et al., 2018) and according to (Perdana et al., 2017) that learning using e-Modules is better than conventional learning.

The effectiveness test is used to see the integration of character values in students when using the Integrated Science e-module that was developed. The effectiveness of character values can be seen from the questionnaire filled out by students which consists of 19 statements from the questionnaire. The effectiveness sheet was filled in by 15 students. the average value of the student character value questionnaire can be seen in Figure 5 below:

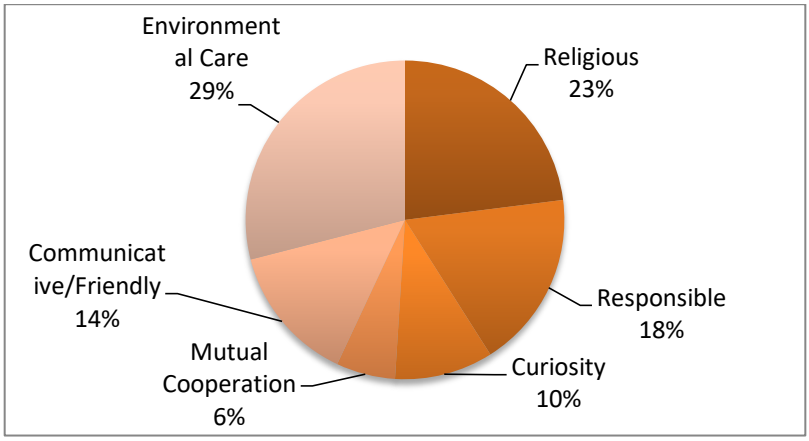

Figure 12. Graph of The Results of The Effectiveness Test of Students' Character Values

Figure 12. Judging from the results of an analysis of the effectiveness of the Integrated Science e-module for integrating the value of character education, the indicators that get the highest scores are religious with a percentage of 23% and caring for the environment 29%. While n other character values such as Communicative/Friendly 14%, Mutual Cooperation 6%, Curiosity 10% and Responsible 18%. The results that have been described mean that the Integrated Science E-Module can integrate the value of character education in a focus on environmental care, religion, responsibility, curiosity, mutual cooperation, and communicativeness in MTs/SMP student learning.

Based on the results of the analysis of the effectiveness of the e-module. In general, it can be interpreted that e-modules are a form of presentation of teaching materials which are arranged systematically into the smallest learning units to achieve certain learning objectives presented in electronic format which includes animation, audio, navigation which makes the user interactive with the program. (Arnila et al., 2021). The Integrated Science E-Module demonstrates its effectiveness in integrating the value of character education in environmental pollution and global warming. This is because the material in the e-Module is coherent and presented by providing information that is happening in the environment around students. In addition, e-Modules are developed according to the ability of students who are able to explain and detail a problem and can then provide a better understanding of character education and benefit the everyday environment. (Gumelar, 2017) In line with what Yamin (2012) said, the role of education for humans is to elevate dignity, degree, intelligence, morals and can make these humans more useful for other humans. This is in accordance with the goals of national education, namely to develop the potential of students so that they can become human beings who fear God almighty, have noble morals, are healthy, knowledgeable, capable, creative, independent, and become citizens of a democratic and responsible state, so as to form resources quality and character human resources (Sari, 2016).

The attitude of educators towards character values is positive. From the survey results. It seems that teaching experience helps educators to increase knowledge, as well as an emphasis on learning objectives in solving problems in everyday life and actions on character value issues must

be integrated into learning that aims to shape and improve student character (Dragos & Mih, 2015). In order for students to get used to character values, they need to know that character education is a national movement that fosters the spirit of an ethical, responsible and caring young generation by exemplifying the cultivation of good character through emphasizing universal values such as religion, curiosity, responsible, mutual cooperation, communicative, and care for the environment (Aynur, 2011).

The e-Module developed on Environmental Pollution and Global Warming material contains elements of good teaching materials, the use of good and appropriate learning media provides great benefits for educators and students (Emda, 2011) . The results of the data from the character value indicator can be seen in the following explanation: The results of the study obtained data from the questionnaire before distributing the Integrated Science E-Module scientific attitude to religious values obtained a score of 46, then after distributing the Integrated Science E-module a score of 90 was obtained. Data from the questionnaire before and after proved that the Integrated Science E-Module made participants students behave and behave obediently in carrying out the teachings of the religion they adhere to, are tolerant of the implementation of other religious worship, and live in harmony with adherents of other religions.

Research data obtained from questionnaires before distributing the Integrated Science E-Module scientific attitude to the value of responsibility obtained a score of 46, then after distributing the Integrated Science E-module a score of 86 was obtained. Data from the questionnaire before and after proved that the Integrated Science E-Module had make students carry out their duties and obligations, which they should do, towards themselves, society, environment (natural, social and cultural), the State and God Almighty.

The research data obtained data from the questionnaire before distributing the Integrated Science E-Module scientific attitude on the value of curiosity obtained a score of 43, then after distributing the Integrated Science E-module a score of 81 was obtained. Data from the questionnaire before and after proved that the Integrated Science E-Module integrate the character value of curiosity so that students always try to know more deeply and broadly from something that is learned, seen and heard.

Research data obtained from questionnaires before distribution of the Integrated Science E-Module scientific attitude to the value of mutual cooperation obtained a score of 53, then after distributing the Integrated Science E-module a score of 89 was obtained. Data from the questionnaire before and after proved that the Integrated Science E-Module was capable of providing teaching to students seen from the difference in values from the questionnaire before and after students can work together in cleaning the environment.

The research data obtained data from the questionnaire before distributing the Integrated Science E-Module scientific attitude on communicative or friendly values obtained a score of 49, then after distributing the Integrated Science E-module a score of 78 was obtained. make students have actions that show pleasure in working with others.

Research data obtained from questionnaires before distributing the Integrated Science E-Module scientific attitude to the value of caring for the environment obtained a score of 46, then after distributing the Integrated Science E-module a score of 90 was obtained. Data from the questionnaire before and after proved that the Integrated Science E-Module made students have attitudes and actions that always try to prevent damage to the surrounding natural environment and develop efforts to repair the natural damage that has occurred (Negi et al, 2020).

Judging from the results of the questionnaire data before and after the distribution of the E-Module to integrate the character values of the e-Module which was developed on environmental pollution and global warming material contains elements of good teaching materials, the use of good and appropriate learning media provides great benefits for educators

and participants students (Emda, 2011). The developed E-Module has advantages in terms of material contained in KI and KD due to a broader discussion. (Irmawati et al., 2021) .

CONCLUSION

Based on results obtained in this line of research, it is therefore argued that an Integrated Science e-Module can be categorized valid, practical, and possess effective character values. The validity of the Integrated Science e-Module to integrate character values in terms of material or content, language, and media is categorized very valid with an average score of 8.9 %. As well, practicality in terms of time and convenience is categorized very practical with an average score of 90 %. Finally, its effectiveness on student character values from questionnaire scores is categorized very effective with an average score of 87 %.

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