International Journal of Research and Review
Vol. 10; Issue: 12; December 2023
Website: www.ijrrjournal.com
Research Paper *E-ISSN: 2349-9788; P-ISSN: 2454-2237*

Development of E-Module Based on Augmented Reality Integrated with *Ethno-STEAM* for Carving Studies at MI Hasyim Asy'ari Bangsri

Fitria Tahta Alfina[1], Sri Wardani[2], Muh Fakhrihun Na'am[3]

[1]Master Program, Student of Primary Education, [2]Master Program, of Chemistry Education, [3]Master Program, of Engineering Universitas Negeri Semarang, Semarang City, Indonesia.

Corresponding Author: Fitria Tahta Alfina

DOI: https://doi.org/10.52403/ijrr.20231209

ABSTRACT

The problem faced at MI Hasyim Asy'ari is the lack of use of technology in learning and introducing local wisdom. This research aimed to examine the Properness of an *Augmented Reality*-based E-Module integrated with Ethno-STEAM for carving studies at MI Hasyim Asy'ari Bangsri. This research used the development method (R&D). The development procedure in this research was a 4D model including Define, Design, Develop and Disseminate. The research trial sample was carried out on a small scale, namely 20 class VI students, and on a large scale, namely 40 class V students at MI Hasyim Asy'ari Bangsri. Data collection techniques used interviews with class V teachers and carving craftsmen in Jepara, documentation carried out by taking photos during research, and questionnaires given to material experts, media experts, language experts, test instrument experts, questionnaire responses from class V art teachers, and student response questionnaire. Data analysis used Properness analysis with the Aiken's V test. The analysis results for material experts were 98% in the very valid category, media experts were 98% in the very valid category, linguists were 97 in the very valid category, first test instrument experts were 94 in the category very valid and the expert on the second test instrument was 97% in the very valid category, the class V art teacher response questionnaire was 97% in the very valid category, and the student response questionnaire was 79.5% in the good category. The overall results of the *Augmented Reality*-based E-Module Properness trial using the Aiken's V method were 0.84375 with a high validity category. So that the E-Module, which has been tested on class VI students, is declared suitable for use by elementary school students.

Keywords: E-Modul, *Augmented Reality*, *Ethno-STEAM*, Carve

INTRODUCTION

The use of media in the learning process is one of the factors for success in learning. The use of media makes the material easier to understand and the concepts easier to understand. The aim of using media in the learning process is to ensure that learning in the classroom can be maximized. Learning media has an important element in the learning process (Purba & Nirmala, 2023). The use of media also has an impact on students' knowledge processing and competencies. The use of media in the learning process can be concluded that media, especially in elementary schools, is highly recommended because it can make it easier for teachers to convey information during class and make learning more optimal.

Learning media should be designed to be interactive by paying attention to the components of good multimedia development (Hidayati & Munawwaroh, 2022). Media in the learning process is in the form of teaching aids and digital media. The use of digital media in the learning

process is not optimal so that students are less familiar with digital media. The solution to solve the problem of minimal use of digital media in schools is by using media in the form of digital books. The digital books used as learning media are electronic modules or E-Modules.

The development carried out in the current research is developing an *Augmented Reality*-based E-Module integrated with Ethno-STEAM for carving studies at MI Hasyim Asy'ari Bangsri. E-Module development uses *Augmented Reality* media to combine the virtual world and the real world by projecting virtual objects into three-dimensional objects in real time via a camera and to help students visualize abstract material in 3D, making it easier for students to understand the material (Zulfadzli et al., 2023). The material implemented in the learning process is carving. The aim of developing an E-Module using *Augmented Reality* media is to introduce students to *Ethno-STEAM* in carving studies.

The culture in Indonesia, especially in Jepara, needs to be preserved and introduced to elementary school children is carving. Carving is a fine art that has its own techniques (Ndruru et al., 2022). Carving has interesting characteristics ranging from different motifs, patterns and ornaments in each region, so this cultural heritage needs to be preserved and developed according to the times.

The culture of Jepara society is thick with religious life. That was the background to the emergence of the art of carving. The relationship between the religiousness of the Jepara people and carving is that there are three motifs that are characteristic of Jepara carving, they are the tassel leaf motif, the fruit motif that resembles grapes or wuni, and the trubusan motif (Azizah, 2023). Elements of the Jepara carving motif contain meanings of religious values and teachings in the fragments of tassel leaf carvings, namely that there are three fragments of lines following the shape of the leaves so that they look like rays. Religiously or in belief, this light represents light as a symbol of God's presence (Utami et al., 2021).

The craftsman's imagination and creativity in creating carvings can be seen from the results of his work. Craftsmen take ideas from everyday life that takes place around the craftsmen's environment. It is expressed in motifs that illustrate that survival cannot be separated from the environment as its support. Apart from that, people's lives are experiencing changes in the current technological era, these changes require cultural conservation by introducing traditions and culture to the nation's future young generation. Introduction needs to start early so that cultural literacy can be well maintained.

The form of introducing and preserving carving to elementary school students is through the development of *Augmented Reality*-based E-Modules. The contents of the *Augmented Reality*-based E-Module start from definitions, motifs, patterns, ornaments and precise carving techniques. The working principle of using *Augmented Reality* media for carving studies is that it is interactive, real time and objects are displayed in three dimensions (Riskiono et al., 2020). *Augmented Reality* is implemented in the E-Module for carving studies, where in the E-Module there is a barcode containing material about the fine art of carving in class V learning.

Further, the *Augmented Reality* application is directed over the E-Module which is already has a barcode, then a three-dimensional carved image will appear from within the scanned image. *Augmented Reality* in this E-Module, students are expected to be more enthusiastic when learning about carving studies through the learning media applications that are presented in the E-Module. An introduction to the art of carving was also introduced to fifth grade students using the Ethno-STEAM approach. Learning with STEAM teaches about a topic from a certain point of view such as science, technology,

engineering, art and mathematics (Kartika et al., 2022).

The *Ethno-STEAM* approach in learning the fine art of carving is by making carvings from lino rubber. The process of making carvings from lino rubber allows students to become familiar with carving motifs and carving techniques. The *Ethno-STEAM* approach in making carvings from lino rubber can be identified, such as students sketching plant or animal motifs on HVS (Science) paper, students opening guidelines for making carvings from lino rubber through E-Modul (Technology), students pasting sketches on rubber lino and start the process of sculpting lino rubber using a carving chisel (Engineering), students color the carved object with markers (Art), and students determine the length and width of the lino rubber then apply it to HVS paper to match (Mathematics).

The use of digital learning resources in the form of E-Modules and supported by interactive learning media is expected to make it easier for students to know and understand local wisdom, namely the fine art of carving, and students will not experience boredom during the learning process because they have used the *Ethno-STEAM* approach in the learning process. To find out what happened in the field regarding the use of learning resources, learning media, and approaches used in schools in carving fine arts, researchers carried out observation activities in several schools in Jepara. The results of observations carried out at three schools in Jepara regarding the use of E-Modules in SBDP subjects include:

Observations carried out at MI Miftahul Huda Kedungleper Jepara on Saturday 10 August 2023 in class V SBdp subject on carving fine arts, they are the teacher utilized the use of learning media such as textbooks or modules in conveying material on carving arts to students, so that students were able to learn on their own. without teacher help. Choosing learning media that is not varied makes students less interested in the learning process and results in students not focusing when the teacher explains. The results of interviews with class V teachers who taught SBDP about the fine art of carving explained that they had never used E-Modules in the learning process and that the school facilities and infrastructure were inadequate.

Observations carried out at MI Miftahul Ulum Pendem 02 Jepara on Thursday 12 August 2023 in class V SBdp subject on carving fine arts, that is learning resources used by teachers in conveying material to students using LKS books and teacher handbooks in the form of printed books. Then students get information about carving art material through worksheet books and teacher's handbooks in the form of printed books, resulting in students' understanding not being too broad and students' test results being less than optimal. Teachers in teaching still use a contextual approach. The results of interviews with class V teachers who taught carving arts explained that village schools lacked socialization regarding the use of electronic learning resources and teachers experienced difficulties in accessing information digitally.

Observations carried out at MI Hasyim Asy'ari Bangsri Jepara on Thursday 12 August 2023 in class V in the SBdp subject on carving arts, they are the teacher in delivering material to students using LKS books and LCD screens as learning media. Then, students are familiar with electronic media in the learning process but schools have not implemented electronic modules as a student learning resource. The results of interviews with class V teachers who teach SBDP about the fine art of carving explained that schools do not use electronic learning resources because there are some students who do not have supporting facilities such as smartphones and the costs incurred to subscribe to electronic modules are still expensive and not affordable by the school.

The results of observations that have been carried out show that schools in Jepara still use printed book learning resources, their

learning media also do not use digital media and use a teacher-oriented or *teacher-centered learning approach*. A learning process with minimal facilities and infrastructure will make it difficult for teachers to introduce local wisdom and students will have difficulty recognizing and understanding local wisdom. Local wisdom has a very important role for future generations and must be preserved.

The local wisdom of the Jepara people, which is steeped in religious life, is demonstrated through the remains of artifacts in the Mantingan mosque and tomb complex. The remains of artifacts in the form of mosques and Mantingan tombs reflect the religious life shown through *the mosque complex and Mantingan tomb are located in a higher place compared to the condition of the surrounding land (hills) which is considered a place of honor. This placement was influenced by pre-Hindu thinking which believed that the ancestors lived in trees, hills, and mountains. The gods and powerful figures are also believed to live in the highlands. This belief can be interpreted that a person must respect his ancestors. The figure of a deceased ancestor is believed to continue to protect and protect the lives of his offspring from high places* (Na'am et al., 2019).

The remains of Mantingan mosque and tomb artifacts influence the motifs, patterns and ornaments of Jepara carvings. In order for these artifacts to remain preserved and known, they need to be preserved through the education sector in a modern way, such as using *Augmented Reality*-based E-Module learning resources so that they are easy to understand and learn practically. The use of this *Augmented Reality*-based E-Module will package carved art materials based on local wisdom and artifact heritage in Jepara. Carving art materials that will be introduced to elementary school students, especially class V, are motifs, ornaments, patterns and carving techniques. Based on this description, the author feels it is important to study "the development of E-Module based on Ethno-STEAM integrated *Augmented Reality* for carving studies at MI Hasyim Asy'ari Bangsri". It is hoped that the research that will be carried out will help elementary school students understand the study of carving and preserve the culture that exists in Indonesia.

MATERIALS & METHODS

The method used in this research is research and development (R&D)(Cholifah & Muslihasari, 2022). This research and development uses the 4-D development model developed by Thiagarajan et al, 1978. The 4-D development model consists of 4 development stages. The stages of a 4-D model are defined, designed, developed, and disseminated (Zulkhi et al., 2022). This research uses an *Ethno-STEAM* approach in learning because it introduces students to local culture and teaches *Science, Technology, Engineering, Art, and Mathematics* in art learning. This *Ethno-STEAM* approach is used to research phenomena that occur in the learning process at MI Hasyim Asy'ari Bangsri.

Furthermore, the product design developed in this research is an E-Module based on *Augmented Reality*. This trial design explains the stages in developing learning media products. The purpose of the trial design is to measure the level of validity of the product that has been developed. There are two steps in the product trial design stage, that is expert evaluation by collecting questionnaires from material expert lecturers, media expert lecturers, language expert lecturers and art teachers. The aim is to identify product problems, accuracy of basic competencies, materials and questions. The second step, namely a small-scale trial, was carried out on 20 students with a total of 12 questions which aimed to measure students' understanding of carving studies and the level of product suitability.

The test subjects in this research were class V students at MI Hasyim Asy'ari Bangsri. The validation team for the Properness of the instrument is the art lecturer and art

teacher MI Hasyim Asy'ari Bangsri. The subject chosen at MI Hasyim Asy'ari Bangsri was because it suited the material to be studied there, namely the fine art of carving. The data collection techniques used to gain data that will serve as a basis for drawing conclusions in this research are interviews, documentation and questionnaires.

Data analysis techniques in this research were used to estimate expert validation questionnaires and student responses. The data analysis process started from data collection and was an integral part of data analysis activities (Mudarris et al., 2022). The data analysis technique aims to analyze the validity or Properness of the development product, that was the *Augmented Reality*-based E-Module.

Further, the data analysis technique used in this research was expert research data analysis including material experts, media experts, language experts, and class V art teachers at MI Hasyim Asy'ari Bangsri. The expert assessment test is carried out using the E-Module assessment sheet instrument which contains assessment criteria in accordance with the indicators. The student response questionnaire data analysis technique is that the results of the student response questionnaire are processed and analyzed further to determine the quality level of the *Augmented Reality*-based E-Module based on student assessments and responses.

Properness analysis of *Augmented Reality*-based E-Modules based on the results of a small-scale questionnaire at MI Hasyim Asy'ari Bangsri. The questionnaire aims to determine the Properness of the *Augmented Reality*-based E-Module that has been developed. The *Augmented Reality*-based E-Module Properness test was carried out using the Aiken's V method. Aiken's V is a method to ensure whether the contents of the questionnaire are in accordance with the research objectives (Hutagalung et al., 2023).

RESULT

Research that has been carried out at MI Hasyim Asy'ari Bangsri gained data about the process of developing E-Modules based on Ethno-STEAM integrated *Augmented Reality* for carving studies at MI Hasyim Asy'ari Bangsri. Research data includes the Properness of E-Module based on Ethno-STEAM integrated *Augmented Reality* for carving studies at MI Hasyim Asy'ari Bangsri.

Product Properness test in the form of an *Augmented Reality*-based E-Module used instruments that have been validated by experts (Telaumbanua, 2022). The Properness test aims to determine the implementation and usability of the product given on a small scale or to 20 class VI students. The *Augmented Reality*-based E-Module Properness test instrument uses a questionnaire containing three indicators, namely interest, material and language.

Indicators from small-scale questionnaires are tested for content validity using the Aiken's V method. The Aiken's V method aims to calculate the content-validity coefficient based on the results of an assessment from an expert panel of n people on an item in terms of the extent to which the item represents the construct being measured (Yusrizal & Rahmati, 2022). The tabulated data results from the small-scale questionnaire are:

Table 1 Results of Small-Scale Questionnaire Tabulation Data

Item	Evaluator		S1	S2	∑s	n (c-1)	V	Remark
	1	2						
1	3	4	2	3	5	8	0,625	High Validity
2	5	4	4	3	7	8	0,875	Very High Validity
3	5	5	4	4	8	8	1	Very High Validity
4	3	5	2	4	6	8	0,75	High Validity

5	3	5	2	4	6	8	0,75	High Validity
6	3	4	2	3	5	8	0,625	High Validity
7	5	4	4	3	7	8	0,875	Very High Validity
8	3	4	2	3	5	8	0,625	High Validity
9	5	5	4	4	8	8	1	Very High Validity
10	4	5	3	4	7	8	0,875	Very High Validity
11	4	5	3	4	7	8	0,875	Very High Validity
12	4	5	3	4	7	8	0,875	Very High Validity
13	4	4	3	3	6	8	0,75	High Validity
14	5	5	4	4	8	8	1	Very High Validity
15	5	5	4	4	8	8	1	Very High Validity
16	5	5	4	4	8	8	1	Very High Validity

The results of the small-scale questionnaire tabulation data explain that the small-scale questionnaire was assessed by two experts, they were lecturers and teachers. There are 16 questions in the small-scale questionnaire with different validity criteria.
The results of the Aiken's V test on item 1 was 0.625 in the high validity category, item 2 was 0.875 in the very high validity category, item 3 was 1 in the very high validity category, item 4 was 0.75 in the high validity category, item 5 was 0 .75 in the high validity category, item 6 is 0.625 in the high validity category, item 7 is 0.75 in the high validity category, item 8 is 0.625 in the high validity category, item 9 is 1 in the very high validity category, item 10 is 0.875 very high validity category, item 11 is 0.875 in the very high validity category, item 12 is 0.875 in the very high validity category, item 13 is 0.75 in the high validity category, item 14 is 1 in the very high validity category, item 15 is 1 category of very high validity, and item 16 has 1 category of very high validity.
The overall results of product trials using small scale data using the Aiken's V method can be seen in the data tabulation as follows:

Table 2 Overall Aiken's V Test Results

Item	Evaluator		S1	S2	∑s	n (c-1)	V	Remark
	1	2						
1-16	66	74	50	58	108	128	0,84375	Very High Validity

The overall Aiken's V test results were 0.84375 with a high validity category, the validity level criteria showed a high validity category. It concluded that the Augmented Reality-based E-Module which has been tested using the Aiken's V method was suitable to use by elementary school students.

DISCUSSION

This section explained important things regarding research findings at MI Hasyim Asy'ari Bangsri. The findings showed that product trials were carried out using expert validation and small-scale trials. The results of expert validation trials and small-scale trials are described as follows:

The expert validation stage aimed to validate the suitability of the product by experts in terms of material, media, language and test instruments. Products that have been validated and given suggestions for improvement will be revised again until the product is declared valid. Products that have been declared valid are used as small-scale trials in class VI.
The results of the material expert validator's assessment regarding the Properness of an Augmented Reality-based E-Module integrated with Ethno-STEAM for carving studies at MI Hasyim Asy'ari Bangsri are shown in table 3.

Table 3 Material Expert Validation Results

No	Scoring Aspects	Score	Deal Score	Percentage %	Criteria
1	Appropriateness of E-Module Content	65	65	100	Very Valid
2	Presenting of E-Modul Content	34	35	97	Very Valid
Total				197	
Average				98	

The results of the media expert validator's assessment regarding the Properness of an Augmented Reality-based E-Module integrated with Ethno-STEAM for carving studies at MI Hasyim Asy'ari Bangsri are shown in table 4.

Table 4 Media Expert Validation Results

No	Scoring Aspects	Score	Deal Score	Percentage %	Criteria
1	Design of E-Modul cover	20	20	100	Very Valid
2	Desain of E-Modul content	24	25	96	Very Valid
3	Desain of media *Augmented Reality*	14	15	94	Very Valid
4	Learning Process	10	10	100	Very Valid
Total				390	
Average				98	

The results of the language expert validator's assessment regarding the Properness of an Augmented Reality-based E-Module integrated with Ethno-STEAM for carving studies at MI Hasyim Asy'ari Bangsri are shown in table 5.

Table 5 Linguist Expert Validation Results

No	Scoring Aspects	Score	Deal Score	Percentage %	Criteria
1	Language in E-Module	38	40	95	Very Valid
2	Conformity with right and correct Indonesian language rules	14	15	95	Very Valid
3	Language used	10	10	100	Very Valid
4	Read	10	10	100	Very Valid
Total				389	
Average				97	

The results of the art teacher expert validator's assessment regarding the Properness of an E-Module based on Ethno-STEAM integrated Augmented Reality for carving studies at MI Hasyim Asy'ari Bangsri are shown in table 6.

Table 6 Results of Expert Validation of Art Teachers

No	Scoring Aspects	Score	Deal Score	Percentage %	Criteria
1	Material	94	100	94	Very Valid
2	Language	70	70	100	Very Valid
3	Media	68	70	97	Very Valid
Total				291	
Average				97	

The results of the test instrument expert validator's assessment regarding the Properness of an Ethno-STEAM integrated Augmented Reality-based E-Module for carving studies at MI Hasyim Asy'ari Bangsri are shown in table 7.

Table 7 Expert Validation Results of Test Instruments

No	Scoring Aspects	Score		Deal Score		Percentage %		Criteria	
		V1	V2	V1	V2	V1	V2	V1	V2
1	Clarity	9	10	10	10	90	100	Very Valid	Very Valid
2	Accuracy of content	9	10	10	10	90	100	Very Valid	Very Valid
3	Relevance	5	5	5	5	100	100	Very Valid	Very Valid
4	Content validity	10	10	10	10	100	100	Very Valid	Very Valid
5	Accuracy of language	14	13	15	15	94	87	Very Valid	Very Valid
Total						474	487		
Average						94	97		

The overall results of the validation assessment of material, media, language and test instruments, that was E-Module products based on Augmented Reality integrated with Ethno-STEAM for carving studies at MI Hasyim Asy'ari Bangsri, were 96%.

Table 1 Overall Validation Results

No	Validator	Percentage %
1	Material validator	98
2	Media validator	98
3	Language validator	97
4	Art teacher validator	97
5	Test instrument validator 1	94
6	Test instrument validator 2	97
Average		96
Remark		**Valid**

The overall expert validation results, that was 96%, showed that it was very valid. The expert validity results can be concluded that the E-Module product based on Ethno-STEAM integrated *Augmented Reality* for carving studies at MI Hasyim Asy'ari Bangsri is declared very valid and can be used as art teaching material in class V MI.

The assessment from material experts received a very valid category. The assessment of the Properness aspect of the E-Module content received a very valid category, namely 100%. The aspect of presenting the contents of the E-Module based on the consistency of learning materials and concepts, the steps of learning activities, and the attractiveness of the material content by providing media received a very valid category with a percentage of 97%.

The media expert's assessment was categorized as very valid. The E-Module cover design aspect received a percentage of 100% in the very valid category, the E-Module content design aspect received a percentage of 96% in the very valid category, and the content design aspect of the *Augmented Reality* media was 94% in the very valid category. The average assessment of media experts is 98%. As a result of assessments and improvements from media experts that have been carried out, *Augmented Reality* media can be tested on students.

The linguist's assessment was categorized as very valid. The linguistic aspect in the E-Module gets a percentage of 95% with a very valid category, the aspect of conformity with good and correct Indonesian language rules gets a percentage of 94% with a very valid category, the language aspect used gets a percentage of 100% with a very valid category, and the readability aspect gets a percentage of 100% with a very valid category. Based on the assessment of language experts and suggestions for improvements that have been made, this E-Module is appropriate from a language perspective and can be used by students.

The assessment from expert art teachers was categorized as very valid. The aspects assessed were material with a percentage of 94%, language with a percentage of 100%, and media with a percentage of 97%. Based on the art teacher's expert assessment and suggestions for improvements that have been made, this E-Module, according to the art teacher's assessment, is suitable and can be used by students.

The assessment of two test instrument experts received a very valid category. The aspects assessed are clarity with a percentage of 90% from the first validator and 100% from the second validator, the content accuracy aspect with a percentage of 90% from the first validator and 100% from the second validator, the content validity aspect with a percentage of 100% from the first validator and 100% from the second validator, and aspects of language accuracy with a percentage of 94% from the first validator and 87% from the second validator. The results of the expert assessment of the test instrument show that the test instrument is very valid and this test instrument will be used to test students' understanding of the carving study material.

As a result of the assessment and improvements that have been carried out based on expert validator suggestions, it can be concluded that the E-Module based on Ethno-STEAM integrated *Augmented Reality* for carving studies at MI Hasyim Asy'ari Bangsri that was developed can be declared valid or feasible based on the average score of expert validators with a percentage of 96% and can be tested on students. The quality of good teaching materials must meet the aspects of validity, practicality and effectiveness. Teaching materials are said to be valid if expert assessment ensures that the development of teaching materials is based on strong theories and has internal consistency, that is, there is a link between the components of the teaching materials being developed (Yuliastuti & Soebagyo, 2021).

A small-scale trial was carried out to get students' answers regarding the Properness

of the E-Module being developed. A small-scale trial was carried out at MI Hasyim Asy'ari Bangsri with a total of 20 students and was carried out in one meeting in class VI A. The trial was carried out by displaying the E-Module product on the class television screen then students studied together and the media section In *Augmented Reality*, there is a barcode display, then students scan the barcode that has been displayed on the television screen using the smartphone they have brought.

The results of the student response questionnaire regarding the Properness of *Augmented Reality*-based E-Modules are shown in table 9.

Table 9 Results of Student Responses

No	Scoring Aspects	Score	Deal Score	Percentage %	Criteria
1	Interest	477	600	79,5	Good
2	Material	544	700	77,7	Good
3	Language	244	300	81,3	Very Good
Total				238,5	
Average				79,5	

The results of student assessment via the questionnaire given to the E-Module gained a percentage of 79.5% in the good category. Based on the percentage gained, students provided responses through a questionnaire with the assessment aspect, namely the interest aspect with a percentage of 79.5% in the good category. Then it can be seen that the use of E-Modules in learning can foster students' interest in E-Modules.

The next student assessment was the material aspect with a percentage of 77.7% in the good category. The material presented in the E-Module is carving study material. The results of students' responses regarding carving study materials were good and one of the characteristics of enjoyable learning was that the material given to students was relevant to the child's level of development (Fatma & Santoso, 2022). So that the right carving material is given to students.

The final student assessment result was the language aspect with a percentage of 81.3% in the very good category. The language used in the E-Module is simple and easy to understand, the letters used are simple and easy to read, and the sentences used are clear and easy to understand too. Then it can be concluded that the language applied in the E-Module is in accordance with the rules and is communicative. Communicative language is a way of using language that is in accordance with the communication functions of language and is easy for readers to understand (Asri & Dwiningsih, 2022).

The overall results of student responses were in the good category, so that this *Augmented Reality*-based E-Module can be used by students in the learning process.

Research on the development of an *Augmented Reality*-based E-Module integrated with Ethno-STEAM for carving studies at MI Hasyim Asy'ari Bangsri has presented data on the Properness of an *Augmented Reality*-based E-Module. The findings of previous researchers related to the current research are:

The first researcher, Rizka Ramadhani, discussed findings regarding the development of an *Augmented Reality*-based discovery learning E-Module for animalia material, Riski Inayah also discussed her findings regarding the development of an Ethno-STEAM-based E-Module assisted by Canva integrated with gordang sideline on students' communication skills, and findings from Noor Fanika about the Ethno-STEAM study on the local potential of Jepara carving crafts as a source of science learning for SMP/MTs.

Rizka Ramadhani's findings regarding *Augmented Reality*-based E-Modules show that the characteristics of the media facilitate contextual learning and optimize mastery of the four basic taxonomic learning skills. The suitability of the media is based on the results of research by media experts, namely 88%, the results of the assessment of teacher and student responses are 91% and 85% in the very feasible

category. The results of media use also show that there is completeness of the criteria for a minimum student score exceeding 75. Based on expert assessment and limited media trials as well as the media's ability to answer challenges related to good media characteristics, E-Module characteristics and *Augmented Reality*, as well as making the learning process meaningful (Ramadhani, 2020).

Findings from Rizka Ramadhani state that the characteristics of *Augmented Reality*-based E-Modules are that they must have media suitability in the very feasible category and this statement is in accordance with the theory which states that teaching materials that facilitate the achievement of learning objectives are effective, efficient and owned by teachers and students (Ramadayanty et al., 2021).

CONCLUSION

Development of E-Module based on Ethno-STEAM integrated *Augmented Reality* for carving studies at MI Hasyim Asy'ari Bangsri has been carried out through several stages, namely define, design, develop and disseminate to get results. The overall expert validation test was 96% with a very valid category. The results of the trial by providing a questionnaire regarding students' assessment of the Properness of *Augmented Reality*-based E-Modules gained a percentage of 79.5% in the good category with the interest assessment aspect being 79.5% in the good category, the material assessment aspect with a percentage of 77.7% in the good category, and the language assessment aspect with a percentage of 81.3% in the very good category. The overall results of student responses were in the good category. The overall results of product trials using Aiken's V on a small-scale questionnaire were 0.84375 with a high validity category. Based on the criteria, the level of validity showed a high validity category. Then, *Augmented Reality*-based E-Module integrated with Ethno-STEAM for carving studies at MI Hasyim Asy'ari Bangsri was declared suitable for use by fifth grade SD/MI students.

Declaration by Authors

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Asri, A. S. T., & Dwiningsih, K. (2022). Validitas E-Modul Interaktif sebagai Media Pembelajaran untuk Melatih Kecerdasan Visual Spasial pada Materi Ikatan Kovalen. *PENDIPA Journal of Science Education*, *6*(2), 465–473. https://doi.org/10.33369/pendipa.6.2.465-473
2. Azizah, S. A. N. (2023). Bentuk Dan Makna Motif Ukir Jepara Pada Batik Jepara Di "Nalendra Batik." *Institut Seni Indonesia Yogyakarta*.
3. Cholifah, T. N., & Muslihasari, A. (2022). Pengembangan Digital Flipbook berbasis Dolanan Lokal untuk Meningkatkan Literasi Membaca Siswa SD di Desa Palaan pada Era Covid-19. *Jurnal Bidang Pendidikan Dasar*, *6*(2), 149–158. https://doi.org/10.21067/jbpd.v6i2.6843
4. Hidayati, S. M., & Munawwaroh, A. (2022). *Analisis Kebutuhan terhadap Media Pembelajaran HEDIBOOK (Herbarium Digital Book) sebagai Alat Peraga Berbasis Web pada Materi Pteridophyta*.
5. Hutagalung, R. K. D., Gea, A., & Manullang, H. G. (2023). *Penilaian Kinerja Pembelajaran Dosen Dengan Menggunakan Metode Aiken V*. *3*(1), 75–82.
6. Kartika, I., Aroyandini, E. N., Maulana, S., & Fatimah, S. (2022). Analisis prinsip konstruktivisme dalam pembelajaran fisika berbasis Science, Technology, Engineering, Art, and Mathematics (STEAM). *Jurnal Pembangunan Pendidikan: Fondasi Dan Aplikasi*, *10*(1), 23–33. https://doi.org/10.21831/jppfa.v10i1.46381
7. Mudarris, B., Rozi, F., & Islamiyah, N. (2022). Penggunaan media vlog dalam pengembangan kamampuan motorik anak. *Jurnal Ilmiah Potensia*, *7*(1), 1–10.
8. Na'am, M. F., Achmadi, T. A., & Zakiyyatussa'diyyah, Q. (2019). *Learning*

Improvement of Wood Carving Skills in SMK for Preservation of Local Wisdom and Its Contribution in Furniture Industrial Sector in Jepara. *379*(Veic), 276–282. https://doi.org/10.2991/assehr.k.191217.045

9. Ndruru, N., Syahra, Y., & Elfitriani, E. (2022). Penerapan Metode Fp-Growth Untuk Penjualan Produk Seni Ukir Pada Buulolo Galery. *J-SISKO TECH (Jurnal Teknologi Sistem Informasi Dan Sistem Komputer TGD)*, *5*(1), 45. https://doi.org/10.53513/jsk.v5i1.4770
10. Purba, Oktaviana Nirmala, dkk. (2023). Media Pembelajaran Digital Book Berbasis Kvisoft Flipbook Maker. *Jurnal Pengabdian Kepada Masyarakat*, *29*, 681–685.
11. Ramadayanty, M., Sutarno, S., & Risdianto, E. (2021). Pengembangan E-Modul Fisika Berbasis Multiple Reprsentation Untuk Melatihkan Keterampilan Pemecahan Masalah Siswa. *Jurnal Kumparan Fisika*, *4*(1), 17–24. https://doi.org/10.33369/jkf.4.1.17-24
12. Ramadhani, R. (2020). Pengembangan E-Modul Discovery Learning Materi Klasifikasi Animalia Berbasis *Augmented Reality*. *Repository.Usd.Ac.Id*, 1–19. https://repository.unsri.ac.id/12539/
13. Riskiono, S. D., Susanto, T., & Kristianto, K. (2020). *Augmented Reality* sebagai Media Pembelajaran Hewan Purbakala. *Krea-TIF*, *8*(1), 8. https://doi.org/10.32832/kreatif.v8i1.3369
14. Sukmawati, Fatma; Eka Budhi Santosa, T. R. S. (2022). *Pembelajaran Menyenangkan Dengan Virtual Reality*. Pradina Pustaka.
15. Telaumbanua, E. H. (2022). *Pengembangan Model WICDIE Dalam Pembelajaran Paduan Suara*. Publica Indonesia Utama.
16. Utami, R. N. F., Hermanto, R., Muhtadi, D., & Sukirwan, S. (2021). Ethnomatematika: Eksplorasi seni ukir Jepara. *JP3M (Jurnal Penelitian Pendidikan Dan Pengajaran Matematika)*, *7*(1), 23–38. https://doi.org/10.37058/jp3m.v7i1.2551
17. Yuliastuti, R., & Soebagyo, J. (2021). Pengembangan Bahan Ajar Matematika Berbasis Matematika Terapan pada Materi Matriks. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *5*(3), 2270–2284. https://doi.org/10.31004/cendekia.v5i3.811
18. Yusrizal; Rahmati. (2022). *Pengembangan Instrumen Efektif dan Kuisioner* (M. Ilyas (ed.)). Pale Media Prima.
19. Zulfadzli, M., Fadzil, M., Anida, N., & Mohd, Z. (2023). Mengintegrasikan *Augmented Reality* dalam Pembelajaran Bentuk 2D dan 3D. *Journal of Engineering, Technology & Applied Science*, 12–22. https://doi.org/10.36079/lamintang.jetas-0501.500
20. Zulkhi, M. D., Rusdyanti, & Astari, A. (2022). Pengembangan E-Modul Berbasis Kearifan Lokal Balumbo Biduk Sarolangun Menggunakan Aplikasi 3D Pagelip Profesional Sekolah Dasar. *Jurnal Pendidikan Dan Konseling*, *4*(3), 866–873.

How to cite this article: Fitria Tahta Alfina, Sri Wardani, Muh Fakhrihun Na'am. Development of *E-Module* based on augmented reality integrated with *Ethno-STEAM* for carving studies at MI Hasyim Asy'ari Bangsri. *International Journal of Research and Review*. 2023; 10(12): 68-78.
DOI: *https://doi.org/10.52403/ijrr.20231209*

******