PILLAR OF PHYSICS EDUCATION
Vol. 16 (2), 2023, page.168-171
ISSN (Print) : 2337-9618
ISSN (Online) : 2684-8880

VALIDITY OF QR-CODE-BASED SCIENCE E-MODULES TEACHING MATERIALS TO IMPROVE LITERACY ABILITY SCIENCE

Inezty Salsabilla Adi[1], I Ketut Mahardika[1,2,3,4*], Diah Wahyuni[1]

[1] *Science Education S1 study Program, Jember University, Indonesia*
[2] *Physics Education S1 Study Program, Jember University, Indonesia*
[3] *Science Education S2 study Program, Jember University, Indonesia*
[4] *Science Education S3 Study Program, Jember University, Indonesia*
Corresponding author. Email:iketutmahardika202@gmail.com

ABSTRACT

This study aims to examine the validity of the QR-Code-based E-module to improve the scientific literacy skills of grade VIII junior high school students. Through QR-Code-based E-modules students can improve scientific literacy ability that need to be built. This research is quantitative research using the ADDIE model but in this development research it is carried out up to the validation stage. The validity test in this study was carried out by experts or validators who were experts in their field and consisted of three validators. The validation was carried out based on material and media validation. This research was conducted in class VIII-A in the32022/2023 academic year with a total of 23 students. The results showed that the QR-Code based E-module teaching materials met the validity criteria with an average percentage of 84.97% for material validity and an average percentage of 87.03% for media validity with valid criteria. This research can be useful in improving scientific literacy ability in eighth grade junior high school students.

Keywords :*E-modul, validation, scientify literacy*

I. INTRODUCTION

In the 21st century learning is centered on students and how students explore information from the material provided. If students are only given verbal explanations, it is not impossible that students will find it difficult to digest and understand, therefore science requires teaching materials to assist teachers in teaching [1]. Teaching materials are developed with the intention of being a learning support medium for students so they can learn independently [2]. Teaching materials are a medium used by teachers in the learning process, teaching materials can be in the form of paper or in the form of files / digital. The module is a teaching material with the concept of material and instructions for use so that students can learn independently. However, as technology develops, many factors cause teaching materials to be created digitally [3].

The module is a teaching material with the concept of material and instructions for use so that students can learn independently. However, as technology develops, many factors cause teaching materials to be created digitally. One of the learning media that is often used by teachers in welcoming students' understanding is by using E-modules [4]. E-module is one of the learning media in which there are advantages, one of which is that it can be accessed anytime and anywhere and contains other content such as audio, video, and image visualization in the form of animations that assist in the learning process [5]. E-modules combined with more sophisticated features will make teaching materials more efficient and practical like QR-Code. QR-Code is used because it provides advantages in terms of practicality and customization. In addition, the QR-Code is easy to use for various groups who have smartphones, because almost every smartphone can certainly be used to access it [6]. By using QR-Code-based e-modules, learning does not only come from paper and pencil. Information sources can be accessed anywhere and anytime, so educators and students must be able to adapt to reading, writing and absorbing information through digital platforms [7].

The 21st century encourages education in Indonesia to have skills that support the changes that occur and will occur, students are expected to be able to be more responsive to these changes. Developing scientific literacy can influence the character development needed in the 21st century [8]. The ability to understand scientific processes and their concepts that are used to solve problems in everyday life is called scientific literacy. The purpose of this study was to review the validity of QR-Code based E-module teaching materials to improve scientific literacy skills.

II. METHOD

This research is included in quantitative research using the ADDIE model (Analyze, Design, Development, Implementation, and Evaluation). The procedures or stages in this research are analysis, design, development, validation, and revision. Analysis is carried out to explore needs by carrying out observations in schools to find out the needs of teachers and students. The next stage is making E-modules or designs. At this stage, modules are made based on an analysis of learning needs in schools. Validation is the next stage after the E-module creation process. The validation sheet consists of material and media validation, to analyze the validity using the following formula.

$$V_a = \frac{T_{SE}}{T_{SM}} \times 100\%$$

Information :

V_a= Expert Validation

T_{SE}= Total empirical score achieved (expert judgment)

T_{SM}= Expected total score

The validation values from experts are averaged using the following formula:

$$V_a = \frac{V_{a1} + V_{a2} + V_{a3}}{3}$$

Information :
V_a = Average total expert validation
V_{a1} = Validator value 1
V_{a2}= Validator value 2
V_{a3}= Validator value 3

The criteria used in the validity assessment percentage are described in the following table:

Table 1. Criteria for the validity of QR-Code-based E-modul [9]

Percentage (%)	Criteria
90,01% – 100,00%	Very Valid
70,00% - 90,00%	Valid
50,01% - 70,00%	Invalid
25,00% - 50,00%	Invalid

Based on the table, the data obtained based on the research will be said to be valid if it meets the criteria in the table in the range of 70% to 100%.

III. RESULTS AND DISCUSSION

The QR-Code based e-module has been validated by three experts covering aspects of material, language, presentation and graphics. The results of the material and media validity test can be explained in the following table.

Table 2. Results of material expert validation of the QR-Code-based E-module

No.	Aspect Validation	Average Score of each Aspect (%)	Validity (%)	Level of Validity
1.	Material	85,72	84,97	Valid
2.	Sistematic presentation	87,50		
3.	Language	83,33		
4.	Contextual aspects	83,33		

Table 3. The results of the validation of QR-Code-based E-module media

No.	Aspect Validation	Average Score of each Aspect (%)	Validity (%)	Level of Validity
1.	Accessibility and Navigation	94,40	87,03	Valid
2.	Communication and Display Quality	86,11		
3.	Overall Media Functions	81		

Based on the results of the validation of the material and media based on the QR-Code E-module in the table above, it is stated that the E-module based on the QR-Code on the material structure and function of plants is valid, with an average percentage of material validity, namely 84.97% and media validity with a percentage 87.03%, so the QR-Code based E-module is said to be valid. There were several improvements before the research was carried out by class VIII A students based on the results of the assessment and suggestions from the validator. Based on the suggestions given by the validator, then the E-module is repaired according to the aspects of the validation process.

Validity is a method in determining whether or not a research instrument is valid. In other words, whether an instrument is good or not can be measured using the validity method assessed by the validator. Measurements are made to determine the extent to which research instruments can be trusted and recognized. The instrument is said to be valid if it is balanced with the appropriate variable data [10]. Instrument validity is proven based on the results of content validity and construct validity or criterion validity [11]. The basic reference to research on the development of QR-Code based E-module learning media is a necessity and a novelty. The intended need is to improve the scientific literacy skills of SMPN 2 Ajung which are classified as low in the challenges of 21st century learning [11].

Based on the results of content validity analysis by three (3) validators obtaining an average percentage of 84.97%, it is declared valid and suitable for use as learning teaching materials. Teaching materials are determined to be suitable for use in the learning process if they meet the validation percentage, therefore the QR-Code based E-module is said to be feasible and meets the requirements of content validity [12].

Construct validity is a concept in demonstrating a measuring tool succeeds in measuring the extent to which the results are consistent with the theory [13]. The construct validity of the QR-Code-based E-module is carried out to measure whether the media fulfills various aspects as a basis for development. Construct validity in this study includes several aspects, namely accessibility and navigation, communication and display quality, and the overall function of the media. Based on the results of the analysis of construct validity data, it produces an average percentage of 87.03% with valid criteria. The suggestions given by the validator on content and construct validity will be a benchmark in improving the E-module. Aspects of content and constructs when presented systematically and coherently can help students achieve learning goals and improve scientific literacy skills [14].

IV. CONCLUSION

QR-Code-based E-module teaching materials on plant structure and function material for Grade VIII junior high school students that were developed met the validity criteria with an average percentage acquisition on material validation of 84.97% with valid criteria, and an average percentage on media validation 87.03% with valid criteria. This means that the QR-Code-based E-module is appropriate for use in the learning process of

class VIII junior high school students. This research can be useful in improving scientific literacy ability in eighth grade junior high school students.

REFERENCES

[1] F. Hervi, and R. Ristiono Pengembangan Modul Elektronik (E-Modul) IPA Bernuansa Emotional Spiritual Quotient (ESQ) tentang Materi Sistem Reproduksi pada Manusia untuk Peserta Didik Kelas IX SMP. *Journal for Lesson and Learning Studies*, Vol. 4, No. 3, Pp. 2615-7330, 2021

[2] S. H Hasasiyah, B. A Hutomo, B. Subali, and P. Marwoto. Analisis kemampuan literasi sains siswa SMP pada materi sirkulasi darah. *Jurnal Penelitian Pendidikan IPA*, Vol. 6, No. 1, Pp. 5-9, 2020

[3] H. A. Nisa, M. Mujib, and R. W. Y Putra. Efektivitas e-modul dengan flip PDF professional berbasis gamifikasi terhadap siswa SMP. *Jurnal Pendidikan Matematika Raflesia*, Vol. 5, No.2, Pp. 13-25, 2020

[4] I. K. Mahardika, S. Subiki, T. W. Ningrum, N. N. Mashitoh, L. Silvira, and A. Anshori. Pengembangan Handout Fisika Alat Pengumpul Sampah Pada Saluran Irigasi Sawah Berbasis Literasi Sains Fluida Dinamis. Edukatif. *Jurnal Ilmu Pendidikan*, Vol. 4, No. 4, Pp. 5661-5667, 2022

[5] N. Ismiyanti. Perancangan pembelajaran IPA menggunakan software videoscribe. *Vektor: Jurnal Pendidikan IPA*, Vol. 1, No. 2, Pp. 50-58, 2020

[6] A. S. T. Asri and K. Dwiningsih. Validitas E-Modul Interaktif sebagai Media Pembelajaran untuk Melatih Kecerdasan Visual Spasial pada Materi Ikatan Kovalen. *PENDIPA Journal of Science Education*, Vol. 6, No. 2, Pp. 465-473, 2022

[7] H. M. K. Ataji. Pengembangan Modul Berbasis Qr Code Technology Pada Materi Sistem Reproduksi Manusia Dengan Terintegrasi Kepada Al-Quran Dan Hadits Sebagai Sumber Belajar Biologi Kelas Xi Sman 1 Punggur. *Bioedusiana: Jurnal Pendidikan Biologi*, Vol. 4, No 1, Pp. 17-24, 2019

[8] H. Puspasari, and W. Puspita. Uji Validitas dan Reliabilitas Instrumen Penelitian Tingkat Pengetahuan dan Sikap Mahasiswa terhadap Pemilihan Suplemen Kesehatan dalam Menghadapi Covid-19. *Jurnal Kesehatan*, Vol. 13, No. 1, Pp. 65-71, 2022

[9] A. Y. P. Wijaya Pengembangan media pembelajaran jaringan komputer berbasis android untuk meningkatkan hasil belajar siswa di SMK antartika surabaya. *IT-Edu: Jurnal Information Technology and Education*, Vol 2, No. 1, 2017

[10] N. Sutrisna. Analisis kemampuan literasi sains peserta didik SMA di Kota Sungai Penuh. *Jurnal Inovasi Penelitian*, Vol. 1, No. 12, Pp. 2683-2694, 2021

[11] M. K. Pratiwi, and S. Indana. Pengembangan e-modul berbasis qr-code untuk melatihkankemampuan literasi digital siswa pada materi perubahanlingkungan. *Berkala Ilmiah Pendidikan Biologi (BioEdu)*, Vol. 11, No. 2. Pp. 457-468, 2022

[12] S. Sugiono, N. Noerdjanah, and A. Wahyu. Uji validitas dan reliabilitas alat ukur SG posture evaluation. *Jurnal Keterapian Fisik*, Vol. 5, No. 1, Pp 55-61, 2020

[13] R. A. Purba, A. T. Mawati, D. P. Y. Ardiana, S. M. Pramusita, J. E. Bermuli, S. R. F. Purba, and M. Recard. *Media dan Teknologi Pembelajaran*. Medan: Yayasan Kita Menulis, 2021.

[14] K. B. Dinata. Analisis Kemampuan Literasi Digital Mahasiswa. *Edukasi: Jurnal Pendidikan*, Vol. 19, No. 1, Pp. 105-119, 2021