Evaluation of the Usage of SSCS-Based E-Module Among Students

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Abstract - Knowledge is an ability that students must possess in solving various problems and applying them in everyday life. This study aimed to determine how far the Effectiveness of knowledge variables for students in the learning process. This study uses the ADDIE development model. with the instrument in the form of a questionnaire consisting of 2 constructs. The survey study was carried out by involving ten teachers from various schools. Data collection techniques were carried out by filling out online questionnaires, which were then analyzed with the help of the SPSS program. The results of the research prove that: 1) the preparation and development of the evaluation of the problem variable instrument in the media for students in this study was carried out by testing two research constructs, namely 1) the accuracy of the variable and 2) the Effectiveness of the variable. As well as the results of testing the validity and reliability indicate that the data validity of the evaluation instrument meets the valid criteria. This research shows that the developed instrument meets the requirements for use in media development in the form of an e-module.

Keywords: E-Module; Evaluation; Reliability; SSCS.

INTRODUCTION

The era of globalization, which is filled with challenges, is an inevitable period. One of the 21st-century skills is critical thinking (Ketut Sudarsana et al., 2020). Supporting the importance of critical thinking, there is a spirit that perceives problems and solutions within the framework of individual professionalism, assessing technical knowledge and intellectual thinking, and skills in implementing strategies. According to (Ritonga et al., 2021), life requires problem-solving techniques, making the application of critical thinking in learning techniques important. It is supported by the explanation by (Diawati et al., 2017) that critical thinking builds high-level logical abilities that enhance students' logical skills.

Modules are one example of educational material development. Learning modules are constructed based on module development principles, which include needs analysis, module design development, implementation, evaluation, assessment, and quality assurance (Oktarina et al., 2018). With the assistance of modules, students learn more systematically, enabling them to control their skills in the learning process. These modules encompass systematically designed material, methods, limitations, and assessment methods to assist students in learning the subject matter and achieving the expected and targeted competencies (Muslim et al., 2018).

Learning materials originally in print have evolved into electronic form over time, allowing modules to be presented in electronic format, known as e-modules (Reza et al., 2018). Electronic modules are self-contained, systematically structured, and interactive learning materials that can be used as a self-learning source without a teacher as the primary source of information.

They can assist students in improving their skills or understanding and can be used anywhere for practical purposes (Mayasari et al., 2018).

SSCS aims to help students expand their knowledge independently through inquiry-based learning, assist teachers in moving away from lecture-based teaching methods, and help students develop critical thinking and creative skills, as well as problem-solving abilities (Tay et al., 2018).

Character education promotes exemplary behavior in children, not only in their behavior towards parents but also as responsible citizens and in their interactions and communication with others (Rusijono & Khotimah, 2018). Character education is crucial as it can enhance the quality of school leadership and educational outcomes, demonstrating the realization of elementary school students' character and the cultivation of noble morals in a holistic and integrated manner (Benawa et al., 2018; Damayanti et al., 2017).

Emphasizing certain values through role modeling, responsibility, honesty, empathy, and fairness, and helping students understand, pay attention to, and apply those values in their lives (Arbi et al., 2018). Demonstrating noble character, tolerance, resilience, and good behavior (Manassero-Mas et al., 2022). Critical thinking is expressing what is in one's mind; learning critical thinking means learning to question things, asking the right questions, knowing when to ask, how to reason, when to use proper reasoning, and which methods of reasoning to employ (Ismail et al., 2018).

Causes of global warming include forest fires, peatland burning, industrial emissions, vehicle emissions, and burning fossil fuels such as coal (Liliawati et al., 2018). If the atmosphere continues to be filled with greenhouse gases, it will contribute to global warming and harm humanity worldwide (Sukmana Rs et al., 2019). The consequences of global warming include melting polar ice, extinction of various animal and plant species, water crisis, outbreaks of diseases, rising sea levels, damage to coral reefs, increased surface temperatures, and more (Lestari & Setyarsih, 2021).

Considering the importance of using e-modules as an educational medium, appropriate assessment instruments are needed to evaluate and improve their usage (Oktarina et al., 2018). Therefore, the objectives of this study are: 1) to develop a non-test instrument or questionnaire to measure the evaluation of e-module usage among junior high school students and 2) to obtain the validity and reliability of the instrument (Arbi et al., 2018).

RESEARCH METHODS

This development study focuses on developing a module based on Problem-Based Learning using the ADDIE model (Ganefri et al., 2020). ADDIE is a commonly used approach in instructional design for developing effective training programs. The acronym ADDIE stands for five phases in the process: Analysis, Design, Development, Implementation, and Evaluation. Here is a further explanation of each phase in the ADDIE process (Marzal et al., 2020).

This research was conducted with teachers, utilizing synchronous sessions and providing resources to enhance students' knowledge of the subject matter. The approach used in this case has the advantage of having a systematic stage. Assessment and revisions are carried out in each phase, ensuring that the resulting product is more valid (Rizal et al., 2021).

The development example mentioned can lead to students' enthusiasm for learning and can enhance their thinking skills and learning motivation. This type of research is

a development study, and the research mechanism used in this example is based on the ADDIE model. As the name suggests, this example consists of five main phases or stages: Analysis, Design, Development, Implementation, and Evaluation (Reza et al., 2018).

The respondents in this research consisted of 32 students from UIN Sultan Syarif Kasim Riau, including students from the first, third, and fifth semesters. The selected students were active students on campus, and one of the criteria for selecting them was that they had internet access. Here is the demographic information of the respondents.

Table 1. Respondent' Data

Variable	Category	Frequent	Percentage
Gender	Male	9	28,1%
	Female	23	78,9%
Have observed the e-module	Already Seen	31	96,9%
	Not Yet	1	3,1%
Gadget	Handphone	31	96,9%
	Laptop	1	3,1%
Institution	UIN SUSKA Riau	32	100%

Instrument

This research utilized an online questionnaire in the form of a Google Form as its measurement tool. The questionnaire was designed to measure the evaluation of e-module usage based on four aspects: ease of use, presentation, readability, and the role of e-modules. The questionnaire in this study consisted of 18 items with a Likert scale provided, ranging from 1 (strongly disagree) to 5 (strongly agree). The distribution of the questionnaire in this research is presented in Table 2. The reliability index of this questionnaire was analyzed using Cronbach's alpha, which yielded a value of 0.839. This value indicates that the questionnaire is reliable and suitable for use in actual research (Kristanto et al., 2018).

Table 2. The demographic information of the research

Construct	Number of Items
Ease of use	3
Presentation	5
Readability	4
Function of e-module	6

Data Collection Techniques

This research is a product development study that utilizes a questionnaire in the form of a Google Form as a measurement tool to evaluate the usage of e-modules among university students and junior high school students (Jalinus & Nabawi, 2018). The respondents were informed that their answers were crucial for the data in this research, and they were requested to provide their opinions honestly. As an introduction, the researcher provided a brief overview of e-modules and their usefulness in learning. E-modules represent one form of technology integration in education (Boleng et al., 2017).

The e-modules were uploaded within the practicality of the Google form questionnaire in the form of a link. The respondents were asked to open the provided link to evaluate and provide their feedback on the e-modules created by the researcher (Hakim et al., 2021). Finding the developed e-modules through the given link allowed the researcher to collect data easily without physically visiting the research location. All data collection procedures were conducted using Internet facilities and email. The data obtained from the online questionnaire distribution were then analyzed descriptively using the SPSS program version 29.0.0.0 for Windows (Sulistyo & Dwidayati, 2021).

RESULTS AND DISCUSSION
Results

The respondents evaluated the e-modules based on four aspects: ease of use, presentation, readability, and the role of e-modules. Detailed information on each construct's average scores is presented in Table 3.

Table 3. The average score of four evaluation aspects

Construct	Mean	Standard Deviation
Ease of use	12.50	.839
Presentation	21.13	.777
Readability	17.06	.829
Function of e-module	25.69	.802
Average	19,095	0,027945

From the table above, it can be seen to what extent the use of e-modules, according to the respondents, is rated very good. Therefore, it can be concluded that the respondents have an average perception score of 19.095, categorized as very good.

Discussion

E-modules as learning media have been widely used from elementary to university. E-modules as learning media can reduce boredom in learning because traditional teaching methods often involve delivering materials through lectures, which can make students bored with the subject matter (Miaz et al., 2019). Using e-modules in several schools has been proven to improve average test scores. The research findings indicate that the respondents responded well to each aspect evaluated in using e-modules. Further details will be discussed in this section (Setiawan et al., 2018).

Regarding the ease-of-use aspect, the research findings indicate that the use of e-modules has fulfilled the criterion of ease of use. The e-module is easy to use and can be accessed through mobile phones. This finding is supported by the opinions of previous researchers, stating that e-modules are very user-friendly as they can be accessed through gadgets without the need for physical copies, and their usage is easily understood by everyone (Arnellis et al., 2018). The ease of using e-modules is also supported by technological advancements, such as the availability of Google Lens to facilitate accessing barcodes in e-modules (Oktarina et al., 2018). The mean score for this aspect is 12.50, with a standard deviation of 0.839.

Regarding the presentation aspect, the research findings indicate that the presentation of the e-module meets the criteria for a good e-module presentation. The mean score for this aspect is 21.13, with a standard deviation of 0.777. A good e-module presentation includes various elements such as text, images, barcodes, and engaging content (Sulistyo & Dwidayati, 2021). This e-module also presents various attractive images, barcodes containing video explanations of the material, PBL-based quizzes, and expert insights related to the presented content (Muhtarom & Danuri, 2019).

Regarding the readability aspect, the research findings indicate that the e-module has achieved good readability criteria. It is supported by a mean score of 17.06 with a standard deviation of 0.829. The text in the e-module is presented with proper spelling and grammar, making it easy to understand for the respondents (Mayasari et al., 2018). The sentences in the e-module are well-structured, avoiding typographical errors and using clear and easily understandable language choices (Ismail et al., 2018).

Regarding the role of the e-module, the research findings indicate that the e-module plays a significant role for students.

It is supported by a mean score of 25.69 with a standard deviation of 0.802. The e-module developed the researcher has various roles, including improving students' motivation to learn, learning outcomes, digital literacy, scientific literacy, insights, creative thinking skills, and comprehension. A quality product serves multiple roles or benefits for others (Arbi et al., 2018).

Overall, this product meets the criteria for a good product, as evidenced by a mean score of 19.095 with a standard deviation of 0.027945. The research results indicate that the respondents are interested in the product developed by the researcher. Based on the evaluation results, it can be concluded that the product meets the criteria for being good (Sulistyo & Dwidayati, 2021).

CONCLUSION

In this research, several conclusions can be drawn. First, using the learning module media with the Phet Simulations application, following good behavioral procedures has proven effective as a learning media for junior high school students. Implementing this media shows a significant improvement in the student's learning outcomes. It is evident through the conducted tests, which demonstrate a significant difference between the student's performance before and after using the module and the high interest of students in learning that utilizes the SSCS-based module.

Furthermore, this research also concludes that the evaluation instrument for the use of media by students meets good criteria for validity and reliability, with obtained reliability coefficients reaching satisfactory levels.

REFERENCES

Arbi, Y. R., Sumarmin, R., & Putri, D. H. (2018). Development Module Oriented Science Technology Society Indue Science Literacy Assessment for 7th-Grade Junior High School Students in 2nd -Semester. *IOP Conference Series: Materials Science and Engineering*, *335*(1). https://doi.org/10.1088/1757-899X/335/1/012089

Arnellis, A., Jamaan, E. Z., & Amalita, N. (2018). Efforts to Improve Mathematics Teacher Competency Through Training Program on Design Olympiad Mathematics Problems Based on Higher Order Thinking Skills in the Junior High School. *IOP Conference Series: Materials Science and Engineering*, *335*(1).

Benawa, A., Peter, R., & Makmun, S. (2018). The Effectiveness of Full Day School System for Students' Character Building. *IOP Conference Series: Materials Science and Engineering*, *288*(1). https://doi.org/10.1088/1757-899X/288/1/012160

Boleng, D. T., Lumowa, S. V. T., Palenewen, E., & Corebima, A. D. (2017). The effect of learning models on biology critical thinking skills of multiethnic students at senior high schools in Indonesia. *Problems of Education in the 21st Century*, *75*(2), 136–143. https://doi.org/10.33225/pec/17.75.136

Damayanti, C., Rusilowati, A., & Linuwih, S. (2017). Pengembangan Model Pembelajaran IPA Terintegrasi Etnosains. *Journal of Innovative Science Education*, *6*(1), 116–128.

Diawati, C., Liliasari, Setiabudi, A., & Buchari. (2017). Students' construction of a simple steam distillation apparatus and development of creative thinking skills: A project-based learning. *AIP Conference Proceedings*, *1848*. https://doi.org/10.1063/1.4983934

Ganefri, M. A., Zakir, S., Jama, J., Wahyuni, T. S., & Adri, M. (2020). Using

ADDIE instructional model to design blended project-based learning based on production approach. *International Journal of Advanced Science and Technology*, *29*(6), 1899–1909. https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85084998505&origin=inward%0Ahttp://sersc.org/journals/index.php/IJAST/article/view/12894

Hakim, A. R., Wadu, L. B., Chrisyarani, D. D., Safitri, D., & Hudha, M. N. (2021). "Plants and their functions" e-module based on flip book. *IOP Conference Series: Materials Science and Engineering*, *1098*(3), 032029. https://doi.org/10.1088/1757-899x/1098/3/032029

Ismail, Suwarsono, S., & Lukito, A. (2018). Critical Thinking Skills of Junior High School Female Students with High Mathematical Skills in Solving Contextual and Formal Mathematical Problems. *Journal of Physics: Conference Series*, *953*(1). https://doi.org/10.1088/1742-6596/953/1/012205

Jalinus, N., & Nabawi, R. A. (2018). The instructional media development of welding practice course based on PjBL model: enhancing student engagement and student competences. *International Journal of Innovation and Learning*, *24*(4), 383. https://doi.org/10.1504/ijil.2018.10015937

Ketut Sudarsana, I., Asli, N. L., Selasih, N. N., & Nyoman Temon Astawa, I. (2020). The existence of education and culture in globalization era. *Journal of Advanced Research in Dynamical and Control Systems*, *12*(6), 731–739. https://doi.org/10.5373/JARDCS/V12I6/S20201087

Kristanto, A., Mustaji, Mariono, A., Sulistiowati, & Nuryati, D. W. (2018). Developing Media Module Proposed to Editor in Editorial Division. *Journal of Physics: Conference Series*, *947*(1). https://doi.org/10.1088/1742-

6596/947/1/012054

Lestari, D., & Setyarsih, W. (2021). Analysis of Students' Scientific Literacy Skills and the Relationship with Critical Thinking Skills on Global Warming Materials. *Journal of Physics: Conference Series*, *1805*(1). https://doi.org/10.1088/1742-6596/1805/1/012040

Liliawati, W., Purwanto, Zulfikar, A., & Kamal, R. N. (2018). The Effectiveness of learning materials based on multiple intelligence on the understanding of global warming. *Journal of Physics: Conference Series*, *1013*(1). https://doi.org/10.1088/1742-6596/1013/1/012049

Manassero-Mas, M. A., Moreno-Salvo, A., & Vázquez-Alonso, Á. (2022). Development of an instrument to assess young people's attitudes toward critical thinking. *Thinking Skills and Creativity*, 13. https://doi.org/10.1016/j.tsc.2022.101100

Marzal, J., Saputra, E., Suratno, T., Mauladi, Saharudin, & Elisa, E. (2020). The use of ADDIE model to re-create academic information systems to improve user satisfaction. *Journal of Physics: Conference Series*, *1567*(3). https://doi.org/10.1088/1742-6596/1567/3/032033

Mayasari, F., Raharjo, & Supardi, Z. A. I. (2018). The Development of Inquiry Learning Materials to Complete Content Life System Organization in Junior High School Students. *Journal of Physics: Conference Series*, *947*(1). https://doi.org/10.1088/1742-6596/947/1/012034

Miaz, Y., Erwin, R., Helsa, Y., Syahniar, S., & Ifdil, I. (2019). Interactive multimedia-based map media development. *Journal of Physics: Conference Series*, *1318*(1). https://doi.org/10.1088/1742-6596/1318/1/012032

Muhtarom, T., & Danuri. (2019). The urgency of Interactive Animated Learning Media Development for Facilitating Literate Skills for the Student of Primary School. *Journal of Physics: Conference Series*, *1254*(1). https://doi.org/10.1088/1742-6596/1254/1/012034

Muslim, S., Suprianto, B., & Putra Gitama, N. (2018). Development Module (Lab Report) As a Media of Learning in Vocational Education Viewed by Gender. *IOP Conference Series: Materials Science and Engineering*, *336*(1). https://doi.org/10.1088/1757-899X/336/1/012035

Oktarina, K., Lufri, L., & Chatri, M. (2018). Validity of Learning Module Natural Sciences Oriented Constructivism with the Contain of Character Education for Students of Class VIII at Yunior Hight School. *IOP Conference Series: Materials Science and Engineering*, *335*(1). https://doi.org/10.1088/1757-899X/335/1/012091

Reza, M., Ibrahim, M., & Rahayu, Y. S. (2018). Development of Problem-Based Learning Oriented Teaching Learning Materials to Facilitate Students' Mastery of Concept and Critical Thinking Skill. *Journal of Physics: Conference Series*, *947*(1), 0–6. https://doi.org/10.1088/1742-6596/947/1/012062

Ritonga, M., Widodo, H., Lahmi, A., Budiarti, M., Annova, F., & Zubaidah. (2021). Arabic Learning Orientation in Mahad and Islamic Boarding Schools, and its Relevance to the Need for Human Resources with Language Skills in the Globalization Era. *International Journal of Early Childhood Special Education*, *13*(2), 375–384. https://doi.org/10.9756/INT-JECSE/V13I2.211074

Rizal, R., Rusdiana, D., Setiawan, W., & Siahaan, P. (2021). Development of a problem-based learning management system-supported smartphone (PBLMS3) application using the ADDIE model to improve digital literacy. *International Journal of Learning, Teaching and Educational Research*, *20*(11), 115–131. https://doi.org/10.26803/ijlter.20.11.7

Rusijono, & Khotimah, K. (2018). The implementation of assessment model based on character building to improve students' discipline and achievement. *IOP Conference Series: Materials Science and Engineering*, *296*(1). https://doi.org/10.1088/1757-899X/296/1/012040

Setiawan, A., Malik, A., Suhandi, A., & Permanasari, A. (2018). Effect of Higher Order Thinking Laboratory on the Improvement of Critical and Creative Thinking Skills. *IOP Conference Series: Materials Science and Engineering*, *306*(1). https://doi.org/10.1088/1757-899X/306/1/012008

Sukmana Rs, C., Hamzah, B., & Rahim, D. (2019). An application of the bicycle lane on the complete street concept in efforts reducing global warming impact. *IOP Conference Series: Earth and Environmental Science*, *235*(1). https://doi.org/10.1088/1755-1315/235/1/012091

Sulistyo, L., & Dwidayati, N. K. (2021). Active Learning with SPSS Assisted Guided Discovery Learning Method to Improve Student's Statistical Learning Achievement. *IOP Conference Series: Earth and Environmental Science*, *1808*(1). https://doi.org/10.1088/1742-6596/1808/1/012042

Tay, S. I., Lee, T. C., Hamid, N. Z. A., & Ahmad, A. N. A. (2018). An overview of industry 4.0: Definition, components, and government initiatives. *Journal of Advanced Research in Dynamical and Control Systems*, *10*(14), 1379–1387.