International Journal of Educational Sciences and Development
Vol.1, No.1, 2023
Pp. 1-7
e-ISSN: 2830-3245

doi.org/10.54099/ijesd.v1i1.538

Comic-Based E-Worksheets on The Human Digestive System Material

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ARTICLE INFO

Research Paper

Article history:
Received: 13 March 2023
Revised: !3 April 2023
Accepted: 5 June 2023

Keywords: e-worksheets, comic, validaton, collaboration skills

ABSTRACT

The purpose of this study is to investigate the validity of a comic based e-worksheets on human digestive system material. The research method used is development research, sometimes known as R&D. The ADDIE development model is applied, and it consists of five stages: analyze, design, development, implementation, and evaluation. Which of the five phases is used to test the validity of comic based e-worksheets is limited to three stages or up to the stage development. A validation questionnaire sent to three validation experts served as the study tool. Based on the validation data, we received an average score of 84% with a valid category.

INTRODUCTION

Learning in the twenty-first century is a step up from earlier learning. Nowadays, understanding in mastering subject matter will not be sufficient to ensure student success. Success indicators are based more on their capacity to communicate, think creatively, exchange ideas to solve issues, and use technology to develop new knowledge (Septikasariet al., 2018). 4 C are the abilities required by students to deal with the ongoing development of science and technology, as well as globalization. Students are expected to be able to acquire talents in either hard skill or soft skill using the 4 C's. These skills are divided into four categories: (1) creative thinking (creativity thinking); (2) critical thinking (critical thinking); (3) cooperation skills (collaboration skill); and (4) communication skills (communication skill) (Pramusinta *et al*., 2022).

Collaboration skills are learned abilities that are defined by a propensity to help and work intentionally with one another. This competence is not concerned with the outcome of a task or product. But, developing empathy, working in groups, respecting, and being accountable (Yuniawatika *et al*., 2021). Collaboration skills are essential because they can compensate for group deficiencies, simplify problem solving, facilitate communication, improve performance, save time, and build a positive environment (Suhardjono *et al*., 2022). According to Ulhusna (2020) collaborative skills are critical for students since they serve as a link between theoretical and practical components of students, such as practicum, field activities, and activities outside the field. However, students' collaboration skills remain low, particularly in science learning.

The low level of student collaboration skills in science learning is demonstrated by research conducted by Octaviana et al (2022), who discovered that collaboration skills of students at Junior High School 1 Wuluhan were still relatively low, owing to the absence of group activities carried out together due to the pandemic. This was supported by the findings of interviews with science teachers at Junior High

School 2 Ajung, which revealed that the level of student collaboration skills remained low, particularly among students in grades VII and VIII. Low collaboration skills are caused by a lack of confidence and courage to communicate. The results of other interviews stated that the reason for the low collaboration skills was due to the ineffective use of interesting teaching materials for students. Less effective teaching materials make students bored and not interested in the subject matter. This will lead to ineffective learning. Therefore we need a valid teaching material so that students are interested in learning and train students to collaborate in teams.

Teaching materials are objects that can be used by both teachers and students to aid in the learning process (Kosasih, 2021). The e-worksheets is a development teaching material based on the worksheets print version. Students can use this teaching material on smartphones, computers, and laptops that are connected to the internet network (Miqro *et al*., 2021). E-woksheets has been widely used as a science teaching resource. The use of comic-based e-worksheets in improving student collaboration skills, on the other hand, has yet to be implemented. The e-worksheets has the same goal as the printed version of the worksheets: to increase understanding in science learning and to train students' skills. The goal of this study was to look into the efficacy of comic-based e-worksheets on the material. The purpose of this study was to examine the validity of comic-based e-worksheets on the material of the human digestive system to improve the collaboration skills of grade VIII junior high school students.

LITERATURE REVIEW

Validity of Teaching Materials

According to Nieveen (1999), there are two factors that explain the validity of product development: (1) learning tools have a relevant and strong theoretical basis; and (2) consistent interrelationships between components. Validation is a procedure that includes testing the suitability of a teaching material with regard to needs (Kosasih, 2021). The product validity test is the test used to determine the validity of a product. This test is designed to assess how carefully the measuring instruments are prepared to measure what will be measured (Darma, 2021). The following elements must be present in order for teaching materials to be valid: (1) legibility of teaching materals; (2) graphic teaching materials; and (3) feasibility of teaching material content (Mahardika, 2012). A validation expert is someone who tests and evaluates a researcher's validity. Material validation experts test the material feasibility of teaching materials, while teaching material validation experts test the media feasibility of teaching materials (Fallensky *et al*., 2021).

The readability of teaching materials is comprised of three assessment indicators that must be:

a. Correct word choice and sentence structure.
b. Language compatibility with student age.
c. The language used is consistent with the General Spelling Language (Khotimah, 2021).

Graphic teaching materials must meet four assessment indicators:

a. Font, type, and size.
b. Design of the layout.
c. Illustrations, drawings, and photographs.
d. Display layout (Mahardika, 2012).

The content feasibility of teaching materials is comprised of five assessment indicators that must be met, namely:

a. Presentation of learning objectives.
b. Decomposition regularity.
c. Students' interest and attention.
d. Understandability.
e. Fill in the blanks with relevant material and practice questions (Mahardika, 2012).

Comic-based E-Worksheets

According to Mahardika (2012) teaching materials are tools, information, and texts that teachers, lecturers, and instructors use to plan and implement learning. There are two types of teaching materials: printed and non-printed. Books, modules, student worksheets, brochures, pictures, and photos are examples of printed teaching materials; non-printed teaching materials include learning videos, audio, and electronic media such as laptops, smartphones, and computers (Nana, 2019). According to Prastowo (2014) worksheets are printed teaching materials in the form of sheets of paper that contain subject matter, practice questions, and learning instructions that students will follow. The goal of using this teaching material is to increase student activity, facilitate student understanding of the material, summarize learning material, and facilitate learning implementation.
Comic-based e-worksheets is a collaborative teaching material created by e-worksheets and comics. The comic-based e-worksheets structure includes a cover page, table of contents, instructions for using the e-worksheets, character introduction, KD, learning objectives, introduction, learning instructions, let's discuss activities, let's practice activities, closing, and bibliography (Indriani *et al*., 2022). The comic-based e-worksheets was created with the Canva app and edited on the Liveworksheets website so that students could use it online. The comic chosen is a one-page comic strip with scene/conversation boxes. The goal of worksheets is to improve students' collaboration skills through discussion activities, train students to think, get students used to their reading culture, and provide new learning experiences (Laili *et al*., 2022).

]METHOD

The type of research chosen is development research, also known as R&D. This study's development design is ADDIE, which stands for analyze, design, development, implementation, and evaluation (Branch, 2009). The research was conducted at the University of Jember's Science Education Laboratory, and the product development will be implemented at Junior High School 2 Ajung, with the research subject being class VIII B of 24 students. The research will be conducted during the odd semester of the 2022/2023 school year. Interviews, observations, and questionnaires were used to collect data for this study. The research instrument used to determine validity was an expert validation questionnaire sent to three validation experts. It can be used after obtaining validity data. After obtaining validity data, it can be analyzed using the formula below.

$$V = \frac{Tse}{Tsm} \text{ x } 100\%$$

Information :
V = number of rating levels
Tse = the total empirical score obtained
Tsm = maximum total score

The criteria for evaluating the validity of teaching materials, according to Haking (2019), are shown in Table 1 below.

Table 1. Category Validity of Teaching Materials

Validity Value Criteria (%)	Validity Category

76 < V ≤ 100	Valid
51 < V ≤ 75	Quite Valid
26 < V ≤ 50	Less Valid
0 < V ≤ 25	Invalid

RESULT AND DISCUSSION

This study's findings are comic-based e-worksheets that are valid and can be used to improve students' collaboration skills on human digestive system material. Validation procedures from validation experts were used to develop a valid comic-based e-worksheets. The following is a summary of the results of the comic-based e-worksheets validity analysis.
Several scientists were needed to test the validity. As validation, the researcher chose three lecturers. Rusdianto, S.Pd., M.Kes., Ulin Nuha, S.Pd., M.Pd., and Rizka Elan Fadilah, S.Pd., M.Pd., are the validation experts. A validation questionnaire is used to assess the readability of teaching materials, the graphics of teaching materials, and the appropriateness of the content of teaching materials. The three validation experts filled out this questionnaire by checking the score. The researcher then calculated the value of validity using a formula to calculate the validity of teaching materials. The results of these calculations are as follows:

Table 2. Comic-Based E-Worksheets Validation Results

Interval Score (%)			
Assessment Aspect	**Average**	**Percentage (%)**	**Validity Category**
Legibility of teaching materals	2,99	74,99	Quite valid
Graphic teaching materials	3,49	87,49	Valid
Feasibility of teaching material content	3,53	88,3	Valid
Average Percentage		84	Valid

Validaty Results
The results of the analysis of teaching materials validation questionnaires revealed the validity of the comic-based e-worksheets. Three criteria are used to determine whether a teaching material is valid or not. These aspects are the legibility of the teaching materials, the graphics of the teaching materials, and the feasibility of the teaching materials' contents (Mahardika, 2012). The readability aspect seeks to determine whether the teaching material can be read clearly and understood by students (Fauzi, 2021). According to Elisa (2020), the graphical aspect is related to the feasibility of using graphics, particularly for teaching materials that include pictures, graphs, diagrams, and the like. According to Salirawati (2018), the content feasibility aspect relates to the range of material contained in teaching materials; if the material presented is in accordance with competence, the teaching material can be declared valid.
According to Table 3, which contains validation experts' analysis of the validity of the e-worksheets, the validation value is 84% in the valid category. E-worksheets is said to be valid if it meets the standard numbers in the valid category on the likert scale (Banjarani et al., 2020). These results are obtained by calculating the scores assigned by each validation expert using the validity formula. According to the Badan Standar Nasional Pendidikan (2014), the eligibility of worksheets is determined by the validity of the aspects of content, language, presentation, and graphics. If the validation score meets the standard, the worksheets can be declared feasible. According to Azmi (2017), worksheets that are

suitable for use must include Competency Standards and Basic Competency, have an appealing presentation, language that is appropriate for the age of the students, and have appealing illustrations.

The validation of the readability aspect of the e-worksheets yielded a 75% success rate. This value falls into the category of being perfectly valid. E-worksheets is prepared by paying attention to language that is appropriate for the age of the students, the use of words that do not have multiple meanings, and the clarity of delivery. According to Suparno (2005), the readability of a teaching material is adjusted to the age of students, clarity in words and sentences, and does not make it difficult for students to understand what they read. The results of the graphical aspect validation are 87.5% with the valid category. The preparation of graphs in the e-worksheets has been adapted to the Ministry of National Education (2008), where worksheet graphics must pay attention to font, type, and size; layout design; appropriate illustrations, drawings, and photos; and an appealing display design. According to Toto (2009), graphics in teaching materials related to illustration and design play an important role in clarifying information and increasing student motivation in learning. As a result, graphics must be created in accordance with existing national standards. The validation of the content feasibility aspect yielded 88.33% with the valid category. Several factors were considered in the preparation of the e-worksheets contents, including the presentation of learning objectives, the regularity of material breakdown, content that attracts students' attention, ease of understanding, and the inclusion of relevant material and questions. According to Prastowo (2014), the feasibility of the worksheets contents can be seen from the presence or absence of presentation of learning objectives, the regularity of the content, the evaluation or practice of questions, and following the stages of preparing the worksheets.

The overall results of the comic-based e-worksheets validation are classified as valid. The results of this valid e-worksheets validation show that the e-worksheets has met the standard components of a good e-worksheets and is ready to be used in learning, provided that it follows the advice of validation experts. After receiving suggestions, the researcher can revise the errors discovered by the validation expert (Siahaya, 2021). The goal is to correct errors in teaching materials so that students can use them without confusion (Arsanti, 2018). e-worksheets revisions are carried out after validation or before the research is carried out. The validation expert corrects the e-worksheets in sections. This is consistent with Guswari's (2019) viewpoint, which states that revisions are carried out by summarizing expert corrections, which are then revised in accordance with expert instructions.

CONCLUSION

Valid teaching materials are those that meet the validity standards for teaching materials. According to the results of the validity of the comic-based e-worksheets on human digestive system material by 84% and has fulfilled the valid category. The average value of three aspects of validity, namely legibility, language, and graphics, was used to produce these results. As a result, it is possible to conclude that comic-based e-worksheets can be used as teaching material in science class VIII.

Suggestion

The researcher suggests that comic-based e-worksheets be presented in printed form so that it can be used as a source of reading material on the human digestive system by students in class learning without using smartphone. The researcher suggests that comic-based e-worksheets be added with learning audio features and other features on the Liveworksheets page to make teaching materials more interesting. The researcher suggests that comic-based e-worksheets be added with a QR code feature so students can access it without using a link.

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