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Development of Teaching Materials in The Form of Comics Based on Local Wisdom Wave Material

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Abstract

This study aims to develop teaching materials of comics based on local wisdom of Sriwijaya country on wave material in class VIII SMPN 15 Palembang. The research method used was Research and Development (R&D) with the ADDIE model. The study was only until the stage of Analysis, Design, and Development (ADD). The subject of this research was conducted at SMPN 15 Palembang by involving 11 students of class VIII. This research consists of 3 stages, namely the analysis stage, the design stage, and the development stage. The implementation and evaluation stages were not carried out due to limited research time. Data analysis of student needs was measured through observation activities. The questionnaire was used to determine the feasibility of teaching material products based on expert validation and student responses. This prototype was then validated by construct and content experts from Raden Fatah State Islamic University Palembang and PGRI Palembang University. The results showed that the teaching material product was feasible based on expert validation with the category (80% - 89%) valid and supported by student responses with the category (75.1% - 100%) very practical. Due to time constraints, the problem of productive teaching materials for the implementation and evaluation stages was not carried out. Therefore, this research can be developed or continued in further research that has been studied on the limitation of the problem. It is hoped that researchers can develop this research according to the study of the ADDIE research model until the implementation and evaluation stages are completed.

Keywords: Development; Local Wisdom; Teaching Materials

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INTRODUCTION

The student natural science learning process uses scientific methods that will fully engage students actively in learning. Natural science learning is learning that prioritizes research and problem solving (Wisudawati & Sulistyowati, 2014). Research on education conducted by every researcher will always reveal the events of problems in the learning process. However, until now, in 2020, the learning has not been appropriately achieved. One of the factors of the low literacy ability of learners is the selection of methods, models, teaching by teachers (Rahayuni, 2016). One of them is in the selection of media for learning using less valid and practical teaching materials. Teaching materials

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are a guideline medium for educators and students that have been arranged and arranged in such a way by experts in the field. Matsun et al. (2018) said that teaching materials packaged in books follow the times. Teaching materials will also be provided in the form of electronic teaching materials or *mobile* teaching materials. However, the development and advancement of technology will also impact the increasing needs of students. As a result, decreased reading activities and learning independence activities are reduced due to mistakes in the use of technology.

Based on the results of the initial data collection (through questionnaire) as an initial observation in SMP N 15 Palembang, researchers observed the results of the questionnaire collected that there were two indicators taken, namely, 1) Student activity, 2) Student expectations. In the results in the daily activities of students in learning using the media of teaching materials students more towards the individual in learning means that students are 83% less likely to have IPA books or teaching materials for them to study at home; they only read books in learning hours only, and researchers observed questionnaires that have been given from 17 students in 24 hours wasted time 45% just playing gadgets or smartphones. In this observation, researchers are worried about the decline in learning processes and learning outcomes caused by reading books.

Previous research began in the form of comic teaching materials found through "Development of natural science teaching materials in educational comics on the subject of natural science objects and observations in junior high school" (Tyas et al., 2015). The world of children's education is growing faster with children's technology for the application of learning, resulting in comics as an approach to creating new learning strategies. Recent research "Developing physics comics as a medium of physics learning in class VIII MTSN 1 Lubuk Basung" (Aswirna, 2017).

Learning motivation for students using local wisdom will create an effective learning achievement for concept learning and student learning outcomes. The advantage is that "Local wisdom is used as a science learning model to create contextual learning so that the learning process becomes meaningful and easy for students to obtain" (Sari et al., 2019). The effectiveness of student needs in SMPN 15 Palembang shows that students love to read comics. Comics can be an effective educational tool at various levels of education (Sari et al., 2020). For that comic, one of the solutions in learning teaching materials is to be renewable. Daryanto (2016) stated in his book that "So rampant comics in society and so high fondness for comics it inspired to make comics as a medium of learning". Considering that from previous studies, no one has done the development of teaching materials in the form of local wisdom comics based on the state of Srivijaya to increase reading interest in learning that has been outlined above, teaching materials are an essential means for students and educators to improve learning skills. Saparini et al. (2021) wrote in their research on "local wisdom that students need teaching materials related to local wisdom, especially local wisdom around their place of residence". In this case, this research aims to develop comic-shaped teaching materials based on local wisdom of Sriwijaya wave material in class viii SMPN 15 Palembang, which is valid and practical. The researcher agrees with Nikmah et al.'s (2017) research "Comic books with interesting comic narrative elements are as effective in conveying information as traditional textbooks used". In developing teaching materials in the form of comics,

researchers have not found wave material (mechanical) as the basis for teaching materials used in previous studies. Therefore, it needs to be developed because this newness will have a huge impact on the education science of the digital technology industry.

METHOD

This research uses Research and Development (R&D) research with the modified ADDIE (Analysis, Design, Development, Implementation, Evaluation) research model according to Tegeh & Kirna (2013). In this study, also researchers limit the scope of problems with valid and practical teaching materials to three stages, namely (Analysis, Design, Development). It is because research gets insufficient time constraints. The research procedure carried out by researchers to develop a teaching material can be seen in Figure 1.

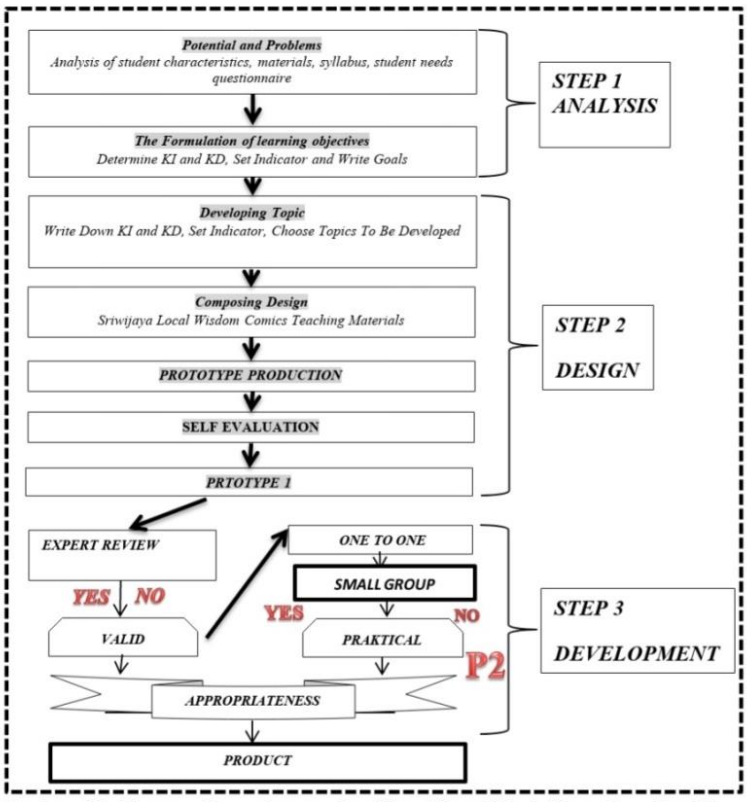

Figure 1 Research Procedures Modify the Results Research Thinking Framework (Lefudin: 2018).

The required data in qualitative and quantitative data as the feasibility of teaching materials is reviewed from expert validation and student response. The data analysis technique used is a continuously interactive qualitative descriptive analysis that goes through two stages: reducing validation data and product practicality data. Expert validation data is processed based on the equation of criteria for calculating the validity of Table 1 (Purwanto, M., 2010).

Table 1 Validity Criteria

Validity Value	Criterion
90 %– 100%	Highly Valid
80% – 89%	Valid
60% – 79%	Valid Enough
0% – 59%	Invalid

Research trial site at SMPN 15 Palembang Province of South Sumatra on Ahmad Yani 8 Street ulu 1 (30252). The first test was conducted a one-to-one test on students, not SMPN 15 Palembang initials MNK class VIII, for the second small group test was conducted on students of SMPN 15 Palembang. The test results are then analyzed based on the product practicality equation with calculation criteria such as Table 2 (Sutrisno, 2018).

Table 2 Product Practicality

Learning Media Eligibility Score	Criterion
0% – 25%	Less Practical
25,1% – 50%	Quite Practical
50,1% – 75%	Practical
75,1% – 100%	Very Practical

RESULTS AND DISCUSSIONS

The research was conducted at SMPN 15 Palembang. The development of modules is carried out based on the ADDIE stage research model, namely, analysis, design, development, implementation, and evaluation. However, this research is limited to the development or development stage because there are not enough time limitations to be done following the restrictions on the scope of the problem. In all, all three stages can be written as follows.

Analysis

The analysis needs are obtained by developing teaching materials in the form of comics based on local wisdom of Sriwijaya wave material in SMPN 15 Palembang using observation as a reference for writing. The observations can be known with the results of questionnaires distributed by researchers in need of teaching materials products to students. Students also want teaching materials full of images, colors, and comic forms so that what they read is not boring. For the value of the results obtained at the school by 77% and 80%, the activities of students with student expectations are needed. The purpose of the spread of questionnaire as the initial needs of students in meeting the ability of the learning goal process in SMPN 15 Palembang school will impact the research taken by researchers. Especially in the subjects of physics (waves) with comic forms based on local wisdom Srivijaya. For the suitability or suitability of comics based on local wisdom, Sriwijaya wave material on teaching materials developed will impact educators in creating new learning strategies and models in achieving learning goals following the school curriculum.

Design

The design stages carried out with the ADDIE model stage are used by researchers in SMPN 15 Palembang. Researchers produce several steps to develop topics, draw up designs, *prototype* production, self-evaluation, and get to step one prototype to structure these stages. At this stage, the researcher takes a long time to design, and this stage is the hardest stage for the researcher. Then that if the Core Competencies and Basic Competencies do not meet the needs of teaching materials, then the results obtained will not be appropriate and will not run if the teaching material in the form of comics is based on local wisdom Sriwijaya country is not competent.

The conclusion at the design stage to develop the topic and arrange the design into the production of prototype activities (design) four steps have been developed, namely, as follows:

Core Competencies, Basic Competencies, and Indicators

Based on the Curriculum 13 used in SMPN 15 Palembang in class VIII, semester II. Core Competencies are focused about waves according to Basic Competence Curriculum 13 in the

school. For this step, researchers developed Core Competencies Curriculum Core and Basic Competencies Basic in syllabuses related to wave material. The syllabus instrument that has been given by the school and declared not to be validated because the source is from the Ministry of Education and Culture of the Republic of Indonesia Curriculum 13, the revision year 2018. After establishing Core Competencies and Basic Competencies, researchers conduct indicator development research following the teaching material products made and designed in the Learning Implementation Plan. The indicator obtains Basic Competencies by developing the ability of material purpose in learning using the medium of wave material teaching materials.

Comics Based on Local Wisdom of Srivijaya State

The design of teaching materials was based on the local wisdom of Srivijaya country with Core Competencies, Basic Competencies, Indicators, Syllabuses, and Lesson Plan. At the design stage, in the form of teaching materials, there is material, the story of local wisdom of Srivijaya in the form of comics. Researchers produce designs using CorelDRAW X7 software to design a variety of wave material with Srivijaya country stories. Researchers took the development of the Srivijaya state story in the journal Kabib Sholeh lecturer of PGRI Palembang University on the page (11), which concluded that the Sriwijaya country was the ruler of the ruler trade transit ports in the 7th century visited by Chinese and Indian traders. Researchers developed the results of the story in a comic form consisting of several names of characters that developed can be seen in figure 2 below:

Figure 2 Character of Comic-Shaped Teaching Material

The characters taken for the comics follow the story of the Sriwijaya country from which these characters (Kiagus Fatah, Talari Warngono, Alif Rakiagus, Jamaludin Jarkiagus, Wulan Rahayu, Rupiah) are natives of Sriwijaya. They are closest to the international trade transit ports of China and India. For traders from China, namely, (Hanyun Pinyin) and (Raam sanambi) came from Indian traders. Researchers in determining the characters' names and characters analyzed life in the era of the Sriwijaya kingdom in the 7th century, known as the triumph of the Sriwijaya country's trade economy in the Kabib Sholeh journal in 2019. In detail, the design of the storyline diagram (storyboard) can be seen in the appendix- attachment.

In this study, the design focuses on interactive visual media made from print in comics with wave material (physics). This stage design can provide changes in the learning system that will form new learning by reading comics, so students also read wave material. So that the learning objectives with Basic

Competence are achieved, namely, analyzing the concept of waves in everyday life.

Wave Material

The development of wave material teaching materials is determined after the stage of analysis in the needs of students obtained by researchers. The material taken is a subject from the natural science book class VIII even semester. After developing comics of local wisdom, Srivijaya researchers determine the material according to the story, mentioned in the steps of the local wisdom comics of Srivijaya country that Competencies Basic analyzes the concept of waves in everyday life correspond to the material taken. The conformity of the material with the story of local wisdom of Srivijaya can be seen in Competencies Basic, which has been developed in the above steps on the page (2). The results of the development step of the determination of wave material can be concluded effectiveness in teaching materials producing wave material in the form of local wisdom comic of Srivijaya.

Teaching Material Validation Instrument Design

The design of teaching material validation instruments aims to achieve the level of feasibility of the instrument as a tool for data retrieval following the objectives of competence that have been formulated. The instrument validation process was carried out from May 19 to June 16, 2020, with a lecturer in Physics Education, PGRI Palembang University. Expert validation sheets for research instruments to retrieve research data are considered very important in applying the spread of questionnaires before one-to-one tests and small group tests. The results of the data obtained follow the criteria in teaching materials. This validation was done online through the WhatsApp application, but we could not meet in person because of the coronavirus outbreak that hit every corner that required staying at home in that month. From the results of expert validation, the suitability of indicators on the developed instrument states that it has been appropriate and does not provide suggestions for improvement so that no improvement is made at this stage step.

Development

Based on the ADDIE development system model used in this study, based on explaining the research procedure in chapter three, this stage is carried out with expert validation, one-to-one, and small groups. The result of the development stage that researchers have done is the quality of the feasibility of teaching materials in the form of comics based on local wisdom of Srivijaya country that is valid and practical. The results of this stage can be described in the following steps:

Expert Validation Results

The teaching materials were in the form of comics based on the local wisdom of Srivijaya as the prototype that researchers have evaluated and further validated by physics lecturers of PGRI Palembang University and UIN lecturer Raden Fatah Palembang to assess aspects of the material, language, and design. This stage aims to get a very valid product. The first validation was conducted with a learning design expert on April 21, 2020 and completed on May 8, 2020. The second design with learning, material, and language design experts was conducted on June 10, 2020. Both validators, after being validated researchers were given suggestions and comments on teaching materials in the form of comics based on the local wisdom of Srivijaya to be worthy of trial on one-to-one tests and small group tests. The names and positions of the validators can be seen in Table 3.

Table 3 Validator of Teaching Materials Products

No.	Name	Position	Aspects assessed
1.	A	Lecturer of Faculty of Teacher Training and Education Physics Education Study Program, PGRI Palembang University	Learning design aspects
2.	B	Lecturer of FKIP Physics Education Study Program of Raden Fatah Palembang State Islamic University.	Material aspects Language aspects Learning design aspects

Based on the validation sheets analyzed quantitatively, the average number of assessments of each indicator was assessed using a scale of 1 to 4 (Likert scale). The manual calculation method can determine the number and average of assessments because the data is obtained according to the needs of the percentage interval in the unit description. The first and second validators have special skills in a particular field that produces design forms, materials, languages that suit their needs. The calculation of data there are two data from the assessment of expert validators on teaching materials in the form of comics based on local wisdom of Srivijaya, namely as follows: (a) *Data of Expert Validator Assessment of Products Based on Learning Design Aspects.* After being considered, data obtained by researchers are several statements following the material in the form of comics based on the local wisdom of Srivijaya. It can be concluded that the media teaching materials in the aspects of the design gained an average value of 82.1% validated **valid** for use in learning. In the results of the criteria for the capability of teaching materials in the form of comics based on local wisdom of the Srivijaya state on the design aspect, there is data showing the product's advantages and disadvantages. Several things have valid criteria and are valid from validators; namely, the front cover and back cover have met the design that suits the theme and material. For the content of teaching materials, images, colors, comics, and prefaces get the criteria valid enough (good enough) because the products of teaching materials that have been made still need to be self-evaluated by researchers to be developed; (b) *Data of Expert Validator Assessment of Products Based on Aspects (Materials, Language, and Learning Design).* The validation results obtained show some improvements in comments and suggestions regarding teaching materials in the form of comics based on the local wisdom of Srivijaya wave material. Among them, the teaching materials developed are not suitable for the material taught material taken because teaching materials have one reference. For this reason, researchers respond directly and evaluate themselves as improvements in the validation results of teaching material products. Therefore, the improvements made by researchers can be seen in Figure 3.

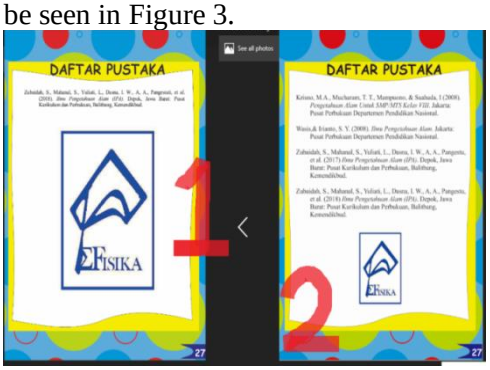

Figure 3 Prototype Before and After Revision

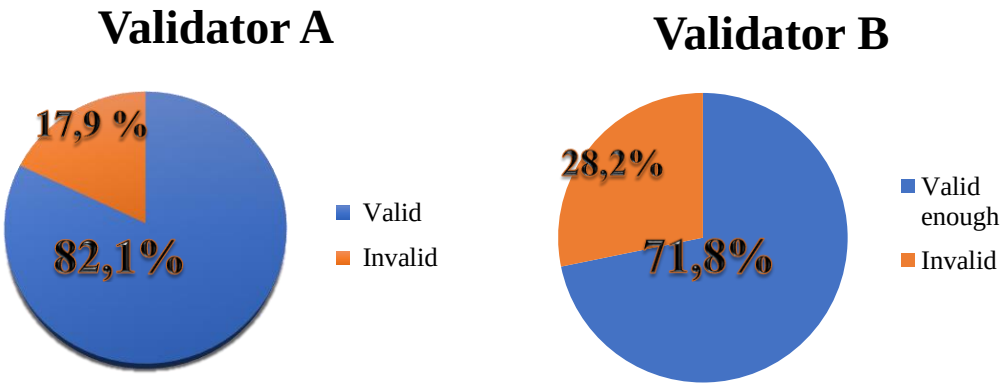

Figure 4 Validator Percentage Graph Results

The responses obtained will affect the quality of teaching material results in this study. The figure below is an image of a 4-percentage graph of the percentage rate of validity between two validators as Figure 4. It is claimed that the average validator assessment of teaching material products in the form of comics based on local wisdom of Srivijaya developed an average of 71.8% is declared valid enough.

One to One Test Results

Individual trials or one to one test on teaching materials in the form of comics based on local wisdom Srivijaya country piloted in junior high school students named M. Noval Kurniawan, the response obtained from the one to one test on the student there are several opinions obtained with the conclusion on the material of teaching in the form of comics based on local wisdom of the country of Srivijaya that the product is declared practical with a value obtained 72%. The value of 28% of 100% ability will greatly impact the teaching materials developed. The response graph can be seen in Figure 5.

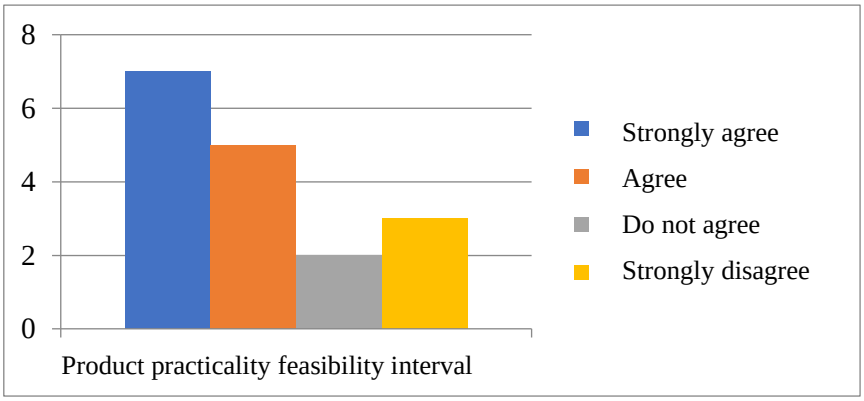

Figure 5 Graph of One-to-One Test Results

Researchers can do this weakness by conducting self-evaluation of teaching materials in the form of comics of local wisdom of Srivijaya. The effectiveness of development at the stage of the one-to-one test step can be concluded. The product of teaching materials developed has values of content feasibility as valuable teaching materials with a value

of 72% following the criteria of development durability expectations.

Small-Group Results

Based on the results of the one-to-one test on the prototype, a revision of the prototype design was carried out called the second prototype. Then, this second prototype is carried out at the small group stage to see the practicality of teaching material products. The percentage of small group student results is 87.8%. If referring to a 3.5-page table (34), then the percentage of 87.8% there is an interval of 75.1% > 100%, which means it meets a very practical category. The results obtained at the small group test step stage are satisfactory for researchers because these results have gone through several stages and development steps with the ADDIE research model. The small group response graph can be seen in the Figure 6.

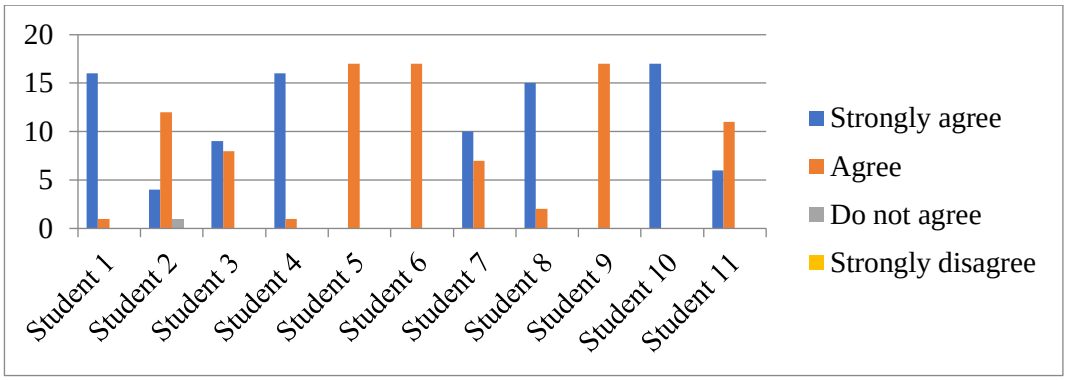

Figure 6 Small-Group Test Graph

So, it can be concluded that 87.8% of students expressed great agreement with the product of teaching materials in the form of comics based on local wisdom of Srivijaya and stated to be very good and very practical to use.

For that, the results obtained by researchers are satisfactory at this stage, but it is expected that later there will be researchers who apply the implementation stage and evaluation stage. Because with the application of teaching material products in comics based on local wisdom, Srivijaya country will be much better than before. Below are Figure 7 teaching materials in the form of comics based on local wisdom of Srivijaya State, wave materials that have been developed by researchers as follows:

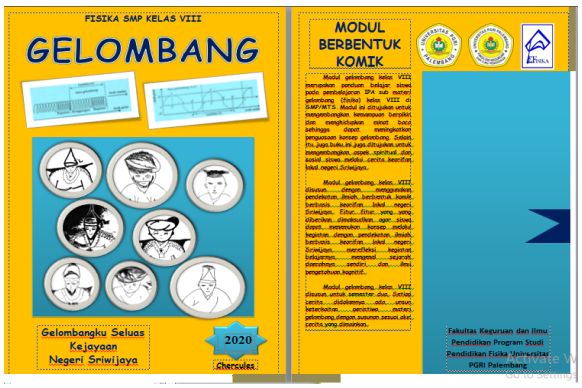

Figure 7 Products of Teaching Materials in the Form of Comics Based on Local Wisdom Srivijaya Wave Material

The development that has been done will result in learning progress to create new strategies by educators by proving the ability to learn goal competence. Therefore, this product is declared valid and practical. Dissemination and application have been declared feasible to be expanded by an educator in learning activities using interactive learning media in the classroom and outside the classroom. These results are the same as relevant research (Aswirna, 2017). The development of comics teaching materials or comic media as learning obtained valid and practical categories in their research. Valid is the result of an instrument made by researchers for product validity. Putri et al. (2013) stated that validity aims to obtain a valid test instrument following the curriculum.

Similarly, the practicality of the product, that the content or body is an important part of the word practical, is an instrument made from several aspects to produce teaching materials in the form of comics worthy of trial in the learning process. The results of relavant research regarding the feasibility of vibration and wave comics were validated by three validators of various aspects with a high score of very feasible criteria (Addaafi & Nurita, 2020). For the second stage of development, namely the product's practicality by distributing various aspects to be assessed by students. Lesmono et al. (2012) explained that the development stage of expert validation and student development test results are used as the basis for revision to produce products in the form of physics teaching materials. In this study, the average value of the validity and practicality of the product tested was expert validation. The practicality of the product (student test) was 80% and 93.03% suitable for testing in wave material learning.

CONCLUSION

This research has produced a product of teaching materials wave natural science (Physics) subjects in the form of teaching materials in the form of comics based on local wisdom of Srivijaya developed in this study categorized as valid. Valid results through design, materials, and language averaged 71.8% and 82.1% of the two tester validators. The average total validity of teaching materials from these three aspects is 80% > 89%, which means entering the valid category. In the opinion of students, teaching materials in the form of comics based on local wisdom Srivijaya wave material in students' class VIII SMPN 15 Palembang is very practical. It is evidenced by the results of the percentage of *small group* students with a score of 87.8%, which is found at intervals of 75.1% > 100%, which means meeting the category is very practical. Teaching material in comics based on the local wisdom of Srivijaya country is worth using as a companion package book in school. As for suggestions from researchers, it is hoped that this research will achieve a fully productive development if further developed to implementation and evaluation.

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