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Development of a Social Sciences E-Module Based on Local Wisdom with a Problem Solving Approach to Improve Students' Critical Thinking Ability

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ABSTRACT

This research aims to meet the needs of teachers and participants by presenting teaching materials in the form of social sciences e-modules based on local wisdom with a feasible and effective problem solving approach to improve students' critical thinking skills. This type of research is R&D which has been developed by Borg & Gall. Initial product development validated by media experts and material experts, initial field tests assessed from the responses of 2 teachers and 16 students, initial product revisions, main product tests assessed from the responses of 2 teachers and 27 students people, revision of the main product, operational field testing by giving pretests and posttests to 32 students, revision of the final product, and dissemination in junior high schools throughout Central Mamuju Regency. This research produced a social sciences e-module product based on local wisdom with a problem solving approach which was declared feasible and effective enough to improve students' critical thinking skills. The results of the independent t-test analysis show a sig. value (2-tailed) < 0.05, so the conclusion is that there is a difference in students' critical thinking abilities between the experimental class that uses the product and the control class that does not use the product.

1. Introduction

The corona virus 19 pandemic has hit many countries in the world, including Indonesia. This situation has an impact on all lines of social and economic life, including education. Education in the 21st century encourages all parties to make strategic and critical decisions in maintaining balance, especially in organizing learning (Kahar et al., 2021). Facing a situation like now requires critical thinking

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skills (van Peppen et al., 2021). The 21st century also requires students to be able to master a variety of skills, including: (1) ICT and media skills; (2) critical thinking skills; (3) problem solving skills; (4) communication skills; and (5) collaboration skills (Yatmi et al., 2019). Students' critical thinking abilities can be seen in facing and overcoming various challenges in learning during the pandemic (Riegel et al., 2021).

Various challenges faced by teachers and students. This situation encourages teachers to be more active and active in developing students' skills. The ability expected from each student is to think critically in responding to the information they obtain using a constructivist approach, which then gives rise to changes and transformation of knowledge (Cevik & Senturk, 2019). Students are stimulated to study all the information they obtain and to practice making decisions, because they have to study online which requires communication tools such as laptops/smartphones which are used to facilitate communication between teachers and fellow students (Sa'diyah et al., 2021).

In connection with the use of technology, critical thinking skills are important so that students do not easily believe all the information disseminated via social media. They are trained to analyze all information with reasoning abilities critically (Khanina et al., 2021). Applicatively, according to Husein et al. (2017) critical thinking skills make students tend to be passive if learning is only informative. Therefore, a problem solving approach is needed because it is considered to be able to help students develop general cognitive abilities, creative thinking, hone students' critical thinking skills and can motivate students to learn (Hartati et al., 2023; Herdianto et al., 2021).

In Vocational High Schools in the field of tourism expertise, chemistry subjects are not studied directly as subjects, but are integrated into applied science subjects stay as reported by Afinda (2023). Independent learning can be done by students by utilizing learning media so as to provide students with an understanding of the subjects that will be discussed in class at the next meeting. The characteristics of independent learning media include self-instructional (learning independently), self-contained (one unit of competency in preparing the material), stand alone (stand alone, the material is prepared and developed independently), adaptive (adjustment to science and technology) and user friendly (friendly and friendly in making media) (Kemendikbud, 2017).

The opportunities for implementing e-learning are very large along with the rapid development of ICT, especially the internet. Purwaningsih & Pujianto (2009) argue that the need for e-learning in LPTK is very urgent to communicate information and prepare prospective teachers for the use of technology in teaching. Nurchaili (2010) also stated that the use of computers in the classroom can provide students with extensive learning opportunities, increase their level of willingness to learn, and help them build information technology skills. The ability to use information technology and computers can be useful in the future, both at work and in everyday life. Cognitive qualities alone are often not enough to become a professional teacher, additional skills such as information technology

and computers are also needed. Apart from that, there are still few teachers who are competent in using computers for learning (Asmuni, 2020; Hanum, 2023). Therefore, one of the learning media with interactive and effective technology in fostering students' enthusiasm for learning is e-modules. E-modules can help in developing human resources in the field of technology besides being cheaper than printed modules, especially if the learning process is carried out online (Sinarwati, 2015). Similar to that described by Imran (2022) that interactive e-modules can also be used by students to overcome distance learning obstacles while making it easier to access learning. A problem-based learning model that is integrated with technology is of course a very important support in realizing learning effectiveness (Imran et al., 2022). It is also hoped that modules developed based on problem solving abilities can help and train students to learn more deeply (Christiyoda et al., 2016).

Based on a preliminary study conducted by researchers through observations in all junior high schools in Central Mamuju Regency during the implementation of online learning, there were 77.1% of the 24 students who did not like the implementation of online learning because the teacher's role was still dominant. The lecture method in education is one of the various methods that teachers usually use to help students learn. Teachers usually ask students questions to gauge their understanding of the content after explaining it to them. The result was that 75.7% of students experienced problems completing various practice questions given by the teacher. The focus of this research is junior high school students in Central Mamuju Regency because the level of ability in critical thinking there is relatively low.

This is shown by students' daily test scores which score below the KKM standard. According to the KKM score standards, 44 out of 72 students scored below 72. Apart from that, many students had difficulty answering the teacher's questions using their own thinking because the teaching methodology used did not provide opportunities for students to practice more critical thinking. As a result, many students are unable to answer questions from the teacher. The results of the curriculum review in KD in social sciences subjects in class VII are the community's efforts to meet needs. This learning goal will be achieved more quickly if it is combined with problem solving or handling problems systematically, because it is done by giving students problems with human efforts in meeting needs as the beginning of the learning process. This has also been explained in general by Wulandari (2020) who said that determining appropriate social sciences subject matter in a lesson when the learning models and media used can develop the knowledge of junior high school students, especially in improving their critical thinking skills.

Based on the problems and data collected from the observations mentioned above, research is needed as well as developing a product that is considered to stimulate the critical thinking abilities of junior high school students in Central Mamuju Regency. Of course, this research aims to produce a product in the form of a social sciences e-module based on local wisdom which emphasizes problem

solving to help critical thinking skills and find out how effective its use is for students.

2. Methodology

This type of research is development-oriented (Research and Development). The model that will be used for this research is Research and Development (R&D) created by Borg & Gall (1983: 775), an image of this research and development procedure can be seen in Figure 1.

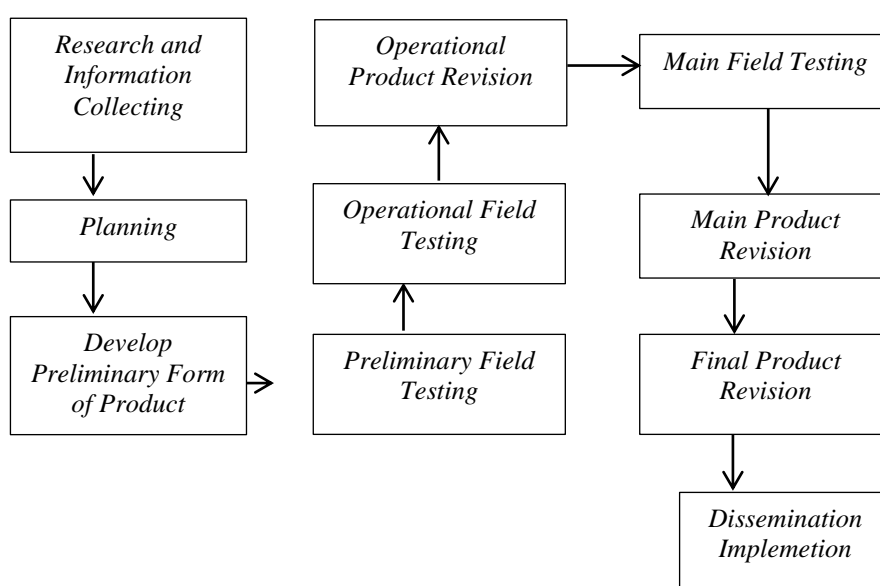


Figure 1. Development Stages

This model has 10 development phases, including: 1) Research and Information Collecting, 2) Planning, 3) Develop Preliminary Form of Product, 4) Preliminary Field Testing, 5) Operational Field Testing, 6) Operational Product Revision, 7) Main Field Testing, 8) Main Product Revision, 9) Final Product Revision, and 10) Dissemination Implemetion. To strengthen students' critical thinking skills, this research will attempt to build a social sciences e-module with a problem solving approach.

In this research, tests and non-tests were used to collect data. When using the social sciences e-module with a problem solving approach, a non-test technique is used which uses a questionnaire sheet to obtain information regarding validation of material and media experts, teacher and student responses. To measure students' critical thinking abilities, a test technique with descriptive questions will be used. The data that will be used in this research is qualitative and quantitative data. This data comes from needs analysis, media and material expert advice, teacher and student responses to questionnaires, media validator suggestions, as well as product validation recommendations are sources of qualitative data. Pretest and posttest findings, teacher survey data, media expert validators, material experts, and product validation data are sources of quantitative data.

Before starting research, researchers should test the assessment instrument in question. This is done with the aim of finding out whether the variable's temporary validity is met. If the instrument has been tested for validity then it is said to be valid. Student scores on the questions and total scores were compared in validity testing using the Karl Pearson product moment correlation technique. The formula used is from Jihad & Haris (2012: 179). The tools that will be used in this research must not only be valid but also trustworthy. Something is said to be reliable when it shows accuracy or thoroughness. If a test is carried out and then obtains reliable results, it can be said to have a high level of trust Arikunto (2006: 86).

Learning is a process of interaction between teachers and students. Learning can also be interpreted as a process of interaction between students and educators and learning resources in a learning environment (Bella, 2023). Analyzing critical thinking skills is necessary in order to determine where they can be improved. A normalized gain approach was used to perform this investigation. The Gain formula must be applied to determine the normalized Gain score (Hake, 1999: 1).

The impact of using the Social Sciences e-module on students' critical thinking skills is evaluated using prerequisite tests, in this case the normality and homogeneity tests to evaluate the requirements for the Social Sciences e-module. Next, students' critical thinking abilities were compared using the Independent Sample Test between students who used the Social Sciences e-module with a problem solving approach and students who did not use the Social Sciences e-module with a problem solving approach. The following is the hypothesis of this research:

H_0 = There is no difference in critical thinking abilities between students who use and do not use social sciences e-modules based on local wisdom with a problem solving approach

H_a = There are differences in critical thinking abilities between students who use and do not use social sciences e-modules based on local wisdom with a problem solving approach.

By using significance conditions, the decision making for the independent sample t-test hypothesis is stated as follows: if $\alpha > 0.05$ then H_0 is accepted, whereas if $\alpha < 0.05$ then H_a is accepted.

3. Results and Discussion

Research Result

The result of this development is a Social Sciences e-module based on Local Wisdom. Product development is carried out using the Borg and Gall development model. The results of this development are to show the feasibility and effectiveness of the IPS e-module in order to improve students' critical thinking skills, especially on the local wisdom material of the Sandeq boat. In

developing this IPS e-module, there are a number of stages that will be passed, namely: preliminary study stage, planning, initial product development, initial and main field trials, operational field trials, revisions based on suggestions and input, and product distribution.

At this initial stage, researchers carry out the process of collecting information through needs analysis. All information deemed relevant and supporting this research is used to develop products. The information obtained is related to fundamental problems which are then used as background in developing social science e-modules based on local wisdom. The information contained at this stage includes literature studies and field studies. Literature studies are carried out by collecting various information regarding library or reference materials that can support research and product development, such as studying books, national and international journals, and research reports that discuss related to this research such as: e-modules in learning, problem solving, a number of materials related to local wisdom, especially regarding sandeq boats, and theories of critical thinking skills. Meanwhile, field studies were carried out by analyzing each teacher's and students' needs and problems in carrying out the local wisdom-based social sciences learning process, especially learning which has so far been carried out online or remotely. Field needs obtained from observations of students and interviews with social sciences teachers in junior high schools throughout Central Mamuju Regency.

The next stage is planning, where this stage is carried out by formulating research objectives, analyzing the curriculum learning process in schools, and creating a draft design for a social sciences e-module based on local wisdom. The product design can be seen in figure 2.

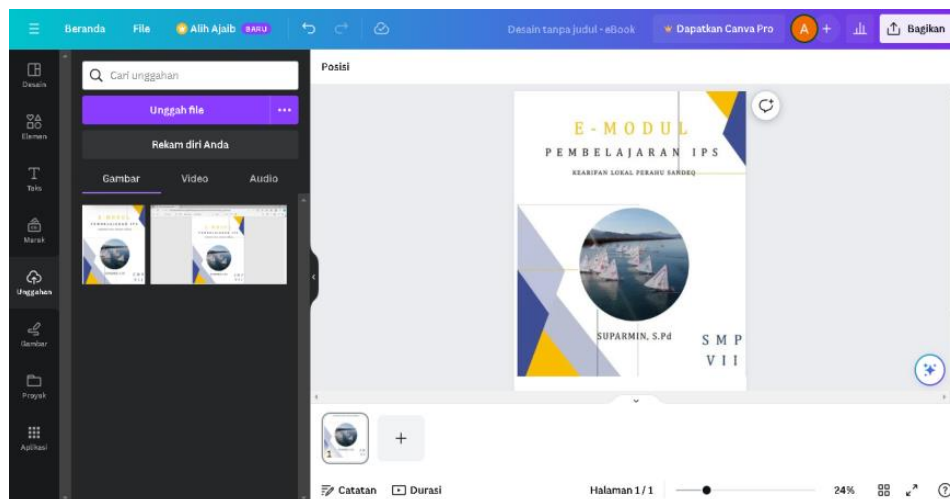


Figure 2. E-module Display

Figure 2 shows the initial product development design which was prepared based on the results of preliminary studies and research planning. The lesson material developed in the e-module is the local wisdom of the Sandeq boat. The development of the Social Sciences e-module was developed based on the

implementation process standards in the 2013 curriculum (Graduate Competency Standards, Core Competencies, Basic Competencies, and Learning Indicators), characteristics of class VII SMP students, and indicators of critical thinking abilities.

The assessment of the social sciences e-module based on local wisdom with a problem solving approach was carried out to determine the feasibility of the product from the assessment aspect of media experts and material experts. Therefore, before field product trials are carried out, product validation must first be carried out by media experts and material experts. The assessment results that have been validated by experts are calculated for the score for each aspect and the total score for each aspect, then converted into an assessment of the feasibility of a social sciences e-module based on local wisdom with a problem solving approach from media and material aspects. The following is a figure of the product assessment results by media experts (Figure 3).

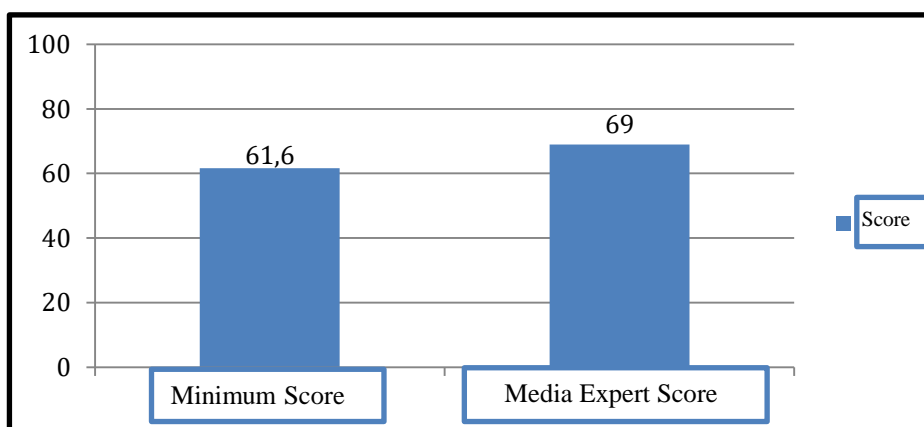


Figure 3. Product Assessment Results by Media Experts

Based on Figure 3 above, it can be seen that the media expert's assessment score is above the minimum score of 69 and includes a B grade in the “good” category. Furthermore, figure of the product assessment results by material experts can be seen in figure 4.

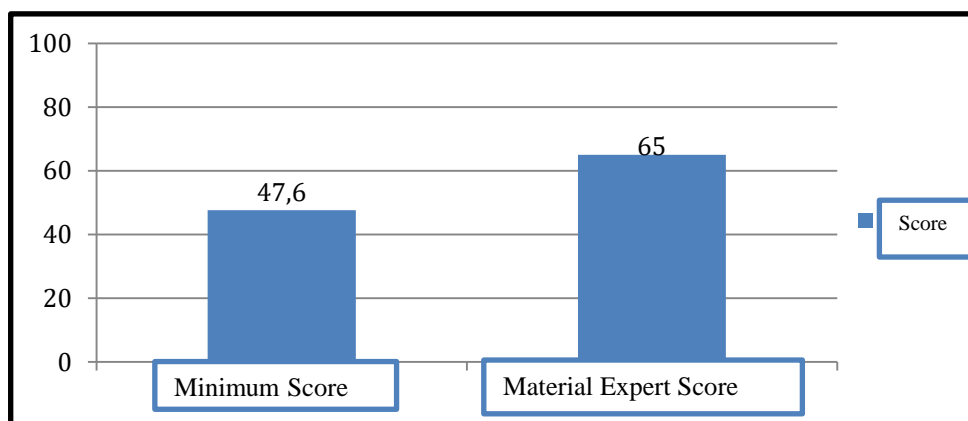


Figure 4. Product Assessment Results by Material Experts

Based on Figure 4 above, it can be seen that the material expert's assessment score exceeds the minimum score of 65, including an A grade in the “very good” category.

The next stage is initial and main field trials. The initial field trial stage is the first stage of product testing in the field after receiving validation from media and material experts. Respondents in this initial trial consisted of 2 social sciences teachers and 16 students. The following figure of the test results can be seen figure 5.

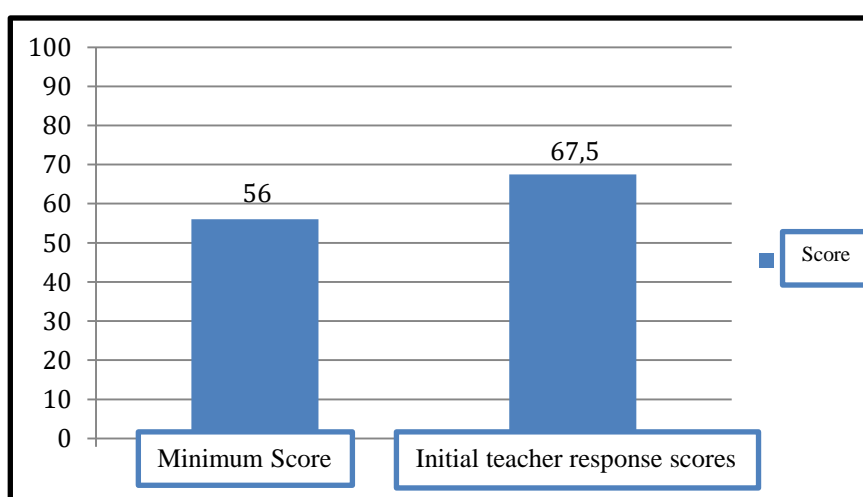


Figure 5. Initial Field Test Teacher Response Assessment Results

Figure 5 above shows that the teacher's assessment score is above the minimum score of 67.5 and includes a B grade in the “good” category. The figure of the initial field test student response assessment results can be seen in figure 6.

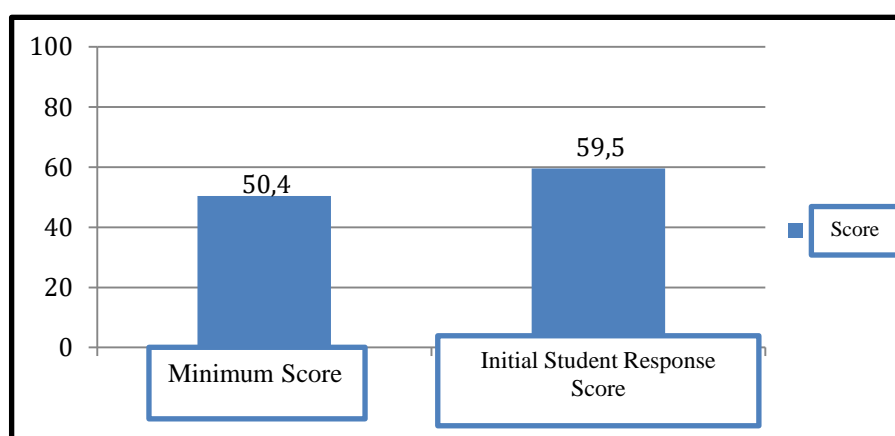


Figure 6. Initial Field Test Student Response Assessment Results

Figure 6 above shows that the student response assessment score is above the minimum score of 59.5 and includes a B grade in the “good” category.

Next, the main field test was carried out on teachers and students in class VIII with the same teacher but with more students. Respondents in this main field trial consisted of 27 students, 16 from class VIII A and 11 from class VIII B (Figure 7).

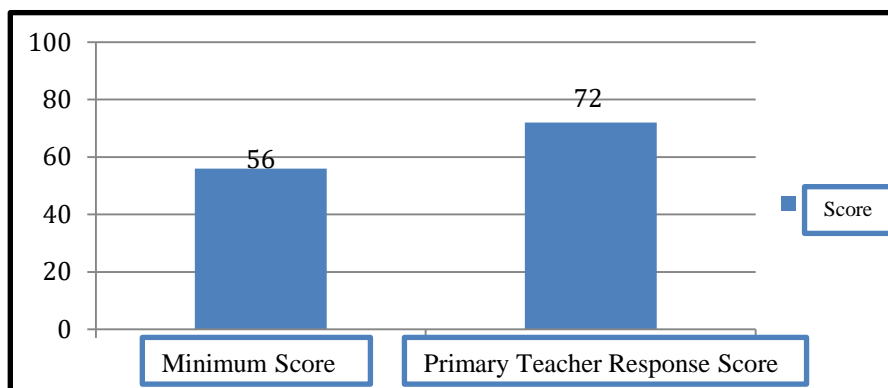


Figure 7. Main Field Test Teacher Response Assessment Results

Figure 7 above shows that the teacher's assessment score is above the minimum score of 72 which can also be interpreted as a score of more than 68 so that it includes an A grade in the “very good” category (Figure 8).

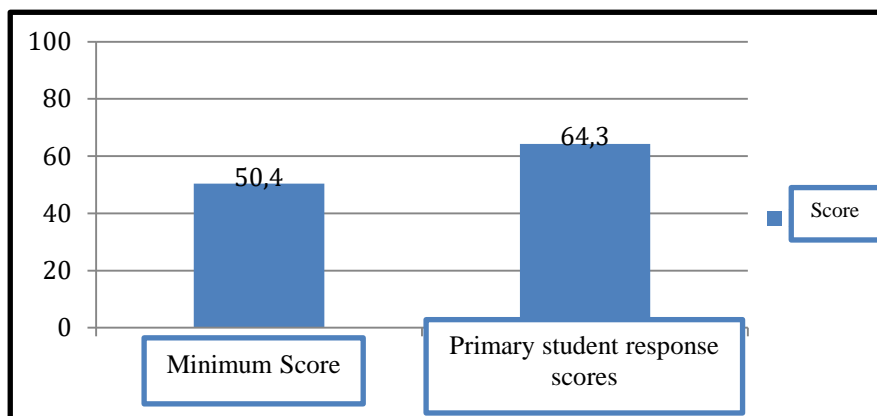


Figure 8. Results of Primary Field Test Student Response Assessment

Figure 8 above shows that the student response assessment score is above the minimum score, namely 64.3, which means the score is also more than 61.2, so it includes an A grade in the “very good” category. Data obtained from this main field trial is used as input and suggestions for products that will be operationalized widely.

The next stage is operational field testing. Operational trials are the final stage in testing the product being developed. Research at this stage uses one experimental class and one control class. The number of students in the two classes was 32 people, from the experimental class there were 16 people and the control class also 16 people. The aim of this operational trial is to see and determine the effectiveness of the social sciences e-module based on local wisdom with a

problem solving approach for class VII SMP students. Table 1 below summarizes the data on the pretest and posttest scores for the critical thinking ability of students in the experimental class and control class.

Table 1. Summary of Critical Thinking Pretest and Posttest Score Data

Class	Average Value		Average Gain Value	Criteria
	Pretest	Posttest		
Experiment	54.12	80.62	58.32	Effective enough
Control	35.12	59	35.58	Ineffective

Table 1 above reveals that the average pretest score for critical thinking skills in the experimental class was 54.12, while the control class was 35.12. After taking the second test or posttest, both classes showed an increase as seen from the results of the table, namely the experimental class which was given treatment and action got a score of 80.62, while the control class which was not given treatment got a score of 59. Based on the data provided revealed above, the average gain value for each class shows quite a big difference, where the experimental class gain value is 58.32 and this value is included in the “quite effective” category, while the control class gain value is 35.38 and this value included in the “ineffective” category.

The results of this operational field test will then be analyzed using an independent sample t-test, because the prerequisite test states that the data is normally distributed by looking at the pretest score for critical thinking skills in the experimental and control classes of 0.200. The posttest value of critical thinking skills in the experimental class had a significance value of 0.055 and in the control class the significance value was 0.200. However, the data are not homogeneous. Even though the homogeneity requirements are not met, hypothesis testing can still be carried out, because the data results are normally distributed and the homogeneity test results are also not absolute.

The test was carried out using an independent t-test to find out whether there was a difference in terms of critical thinking ability variables between the experimental class which was given treatment using a social sciences e-module based on local wisdom with a problem solving approach and the control class which did not given treatment or not using social sciences e-modules based on local wisdom with a problem solving approach. In table 2 below you can see data from the results of the independent t-test for the critical thinking ability variable.

Table 2. Independent t-test results of critical thinking abilities

Description		t	df	Sig. (2-tailed)
Critical Thinking Skills	Equal variances assumed	5.181	30	.000
	Equal variances not assumed	5.181	21.329	.000

Table 2 above reveals the calculation data which obtained a sig value. (2-tailed) < 0.05 , which means H_0 is rejected and H_a is accepted, so the conclusion is that there is a difference in students' critical thinking abilities between the experimental class which uses social science e-modules based on local wisdom with a problem solving approach and the control class which does not uses social science e-module based on local wisdom with a problem solving approach.

The final stage is of course disseminating the product that has been tested. Dissemination was carried out by providing guidance on how to use social sciences e-modules based on local wisdom with a problem solving approach to state junior high school teachers throughout Central Mamuju Regency. This social sciences e-module based on local wisdom with a problem solving approach was distributed to the school and can be accessed by students via the link provided.

Discussion

The IPS e-module product based on local wisdom with a problem solving approach in this research is a development study of a book presented in a form such as an e-book (electronic book) which can be accessed online or offline via the flipped book and Canva applications by students. The product developed contains one of the main materials in the social sciences subject, namely the local wisdom of the sandeq boat which is equipped with practice questions with a problem solving or problem solving approach. This material is also presented audiovisually to stimulate students' interest in learning, especially encouraging students' critical thinking abilities to increase. Based on the analysis and assessment produced by experts as well as the responses of teachers and students to the social sciences e-module product based on local wisdom with the problem solving approach above, the conclusion that can be drawn is that the product is declared suitable for use in social science learning.

Based on the results of the previous product feasibility test, the next stage arrives at the operational field test, where this stage really determines the results of the product's effectiveness, because by going through this operational field test stage, the results of the effectiveness of the IPS e-module product are based on local wisdom with a local wisdom approach. problem solving in an effort to improve students' critical thinking skills can be identified. After going through this stage, the analysis resulting from improving students' critical thinking skills stated that the social sciences e-module based on local wisdom with a problem solving approach was proven to be effective in improving students' critical thinking skills.

This is characterized by a critical thinking ability test which produces higher average scores and pretest and posttest gain scores in the experimental class than in the control class. It is known that the experimental class got a posttest average score higher than the pretest average score of $80.62 > 54.12$ with a gain score of 58.32 which was included in the "quite effective" category, while the control class got an average score The posttest was also higher than the average pretest score of $59 > 35.12$ but with a gain score of 35.58 which was included in the "ineffective" category.

The use of social science e-modules based on local wisdom with a problem solving approach in experimental classes contributes significantly to students' critical thinking abilities. This symptom can be seen when students get quite low scores when working on pretest questions, but after receiving treatment or learning. If you use the product, the score you get after doing the posttest questions will increase. The problem solving approach is a stimulant for students to encourage their critical thinking skills, this has also been explained by Nengsih et al. (2019) that with problem solving, students are required to develop their critical thinking skills in searching for and finding solutions to every problem they face.

Automatically, students who have been passive in class will certainly be encouraged to be more actively involved. Improving students' critical thinking skills in online or distance learning conditions is actually not relatively easy and short. The most important thing needed is space and time to interact directly, but due to limited circumstances, students need more flexible time to get used to critical thinking. Even though the pretest and posttest are given online or remotely, the intensity of learning for a month using social science e-module products based on local wisdom with a problem solving approach can still be carried out effectively.

Social sciences researchers and teachers emphasize that these products are not only studied during class hours, but can still be studied whenever and wherever students are, because these products can also be easily accessed by students via Google Drive software which is available on computers, laptops, notebooks and smartphones, so that students do not find it difficult to learn the material. Apart from that, during the learning process, students are also seen actively identifying, analyzing, asking the teacher, and trying to solve problems at the end of each meeting, so that students are stimulated to hone their reasoning and critical thinking skills.

4. Conclusion

Based on the results of research that has been carried out by applying the problem based learning model with the help of video on material on the digestive system in humans in class. Student learning outcomes in the cognitive domain in the application of the problem based learning model with the help of video media have increased, as evidenced by the average test scores in cycle I and cycle II. The application of the problem based learning model in cycle I was not optimal, but in cycle II there was an increase in student learning outcomes. After implementing the problem based learning model with the help of video media, student learning outcomes in the affective domain of students increased with the average score of students in cycle I still in the poor category and in cycle II obtained in the very good category.

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