Atmosphere Dynamics E-Module Development Based On Contextual Learning For Geography Learning in High School

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ABSTRACT

The development of the world is so fast marked by the very rapid progress of science and technology, globalization has an impact on all sectors of life, including education. Globalization poses a challenge to the world of education that in the 21st century, 4C competencies (Communication, Collaboration, Critical thinking, and Creativity) are needed so that students in their lives in the future are able to compete and survive in the midst of global competition. The development of 4C competencies in students can be done with various approaches, one of which in this study is the development of contextual learning-based learning e-modules. Through this module, students are presented with factual knowledge that is close to their environment and life so that they can develop critical and creative thinking skills. Communication and collaboration skills are developed with group discussions to complete the exercises in the module. The module was developed using the ADDIE model, based on expert assessments, the atmospheric dynamics learning e-module got a score of mode 4 which was declared feasible to use. Meanwhile, based on the assessment, students got a mode score of 5 on each aspect of the assessment which means very good. Test the effectiveness of the e-module on students with a pretest-post test only design, the score increased from 56.67 to 84.00, which means that the e-module is effective to use.

1. Introduction

Education is the capital of a nation's development. Quality education can print quality human resources so that it can support national development for the progress of the country. In accordance with the mandate of Law no. 20 of 2003 concerning the Education System that education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves and Public.

The success of education cannot be separated from the components that exist in education itself, such as teachers, education staff, education system, curriculum, supporting facilities, and students. Teachers as educators are one of the important components that play a major role in learning. Teachers as implementers in the learning process in the classroom and outside the classroom, so that they understand very well what must be done in learning in relation to strengths, weaknesses, opportunities, and challenges. The teacher will also determine the assessment of the learning outcomes carried out, so that the success of learning is the responsibility of the teacher professionally (Mulyasa, 2006:40).

According to Zaini in Partini (2012), students learn actively which means they dominate learning activities, they actively use their brains, both to find the main idea of the subject matter, solve problems or apply what they have just learned into a problem that exists in real life. . Students are invited to participate in all learning processes, not only mentally but also physically involved. This

kind of learning is called active learning. Active learning is needed to get maximum learning outcomes. In addition, according to Shantia (2021) active learning is very important today because it supports the achievement of 4C competencies in the 21st century. Today's learning paradigm adapts to the challenges of the world of work, requiring critical thinking, creative, communication, and collaboration skills.

Contrary to this, the reality today is that there are still many teachers who play a central role in learning, especially for subjects that are considered theoretical. As in the findings of Mardlyana (2018), learning geography in senior high schools is still dominated by the view that knowledge is a set of facts that must be memorized. The teacher presents the material with lectures so that it causes students to become bored and has an impact on decreasing the ability to absorb the subject matter. In line with this, Istifarida (2017) stated that from the results of interviews with students, Geography subjects were easy and rote subjects so that students found them unattractive. Student learning activities tend to be passive which is reflected by the dominance of one-way learning by the teacher. According to Donert and Gonzales (2014) innovative learning in geography is very important because geography is one of the key subjects in lifelong scientific and social learning.

One of the active learning models that can be used is contextual learning which is often called just CTL. CTL is a learning model with a learning strategy that not only provides written material, but students are required to be able to relate learning material to factual conditions in society (Kadir, 2013). The Contextual Teaching and Learning (CTL) learning model is a holistic learning process that aims to teach students to understand teaching materials in a meaningful (meaningful) way that is associated with real-life contexts both related to the personal, religious, social, economic, cultural, and social environment. so on, so that students acquire knowledge and skills that can be applied and transferred from the context of one problem to another (Suhana, 2014: 67). According to Elaine (2014) CTL is a system that stimulates the brain to compose patterns that embody meaning which is very compatible with the brain that produces meaning by connecting academic content with the context of students' daily lives. Hudson & Whisler (2013) further define "Contextual teaching and learning (CTL) as a way to deliver material using a variety of active learning techniques designed to help students connect what they already know with what they expect to learn, and to build knowledge. the new one. Knowledge as a result of the analysis and synthesis of this learning process. If seen from this definition, it means that in learning students actively construct their new knowledge.

In this study, researchers tried to develop an e-module of geography learning based on contextual learning on the material of Atmospheric Dynamics for class XI. Atmospheric material is a material that is quite close to students' lives, it is hoped that the contextual learning model and presenting real-life examples can help students understand and improve the quality of learning.

2. Method

This research is a development research or R & D (research and development) with a quantitative approach. The development of the module adapts the ADDIE model which consists of five stages, namely analysis, design, development, implications and evaluation of the developed product (Branch, R. M., 2009). The feasibility of the atmospheric dynamics module is seen from the results of expert validation with the following criteria.

Table 1. Score and Assessment Criteria

Score	Criteria
5	Very Good
4	Good
3	Enough
2	Not enough
1	Very less

Source: Mogey in Harvey 1998

The module is declared eligible if it gets a score of 4 or 5 on each research indicator. This research is also pre-experimental because it gives treatment to only one experimental group. Experimental research is validation to test the effect of one or more variables on other variables (Santoso, S., 2015:33). The research design used to see the effectiveness of the module is Pre Test - Post Test Only Design with t-test or t-test analysis techniques (Sugiyono, 2011).

$$t = \frac{x1 - x2}{\sqrt{\frac{(n1-n2)s1^2+(n2-1)s2^2}{n1+n2-2}}\left(\frac{1}{n1} + \frac{1}{n2}\right)}$$

Information:

x1   = the average value of post test
x2   = the average value of the pre test
s12   = post test sample variations
s22   = pre test sample variations
n1   = number of post test respondents
n2   = number of pre-test respondents

The conclusion of the t test with the following conditions: 1) Ha is accepted if tcount > ttable "there is a significant increase in the understanding of atmospheric dynamics material after the use of the atmospheric dynamics e-module"; 2) Ha is rejected if tcount < ttable "there is a significant increase in the understanding of atmospheric dynamics material after the use of the atmospheric dynamics e-module".

The test subjects in this study were students of class X SMAN 1 Jumapolo. Data were obtained using research instruments in the form of questionnaires and test instruments (Sugiyono, 2013).

3. Results and Discussion

The development of the Atmospheric Dynamics E-Module and its Impact on Life goes through 5 stages, according to the development theory adopted by the ADDIE Model, namely analysis, design, development, implications and evaluation. Based on the results of the needs analysis, according to the teacher, an interesting learning module is needed and provides real examples from life so that students can easily understand the material. According to students, they are bored if learning is only lectures, or reading textbooks by themselves without them being able to understand optimally. So the need for the development of the atmospheric dynamics material e-module is quite important to develop.

Based on the results of the needs analysis, an e-module design or design is carried out, concerning the structure of the content of the material and the presentation of examples that are realistic or close to students' lives. In addition, materials and pictures from relevant sources were also collected. After that, the e-module was developed according to the design. E-Modules that have been developed are tested for feasibility by experts. The following are the results of the validation of the learning e-module.

Table 1. Expert Validation Results

No	Aspec	Mode	Information
1.	Eligibility of Learning Module Conten	4	There are 5 criteria included in the expert assessment of the module trial on the feasibility aspect of the learning module content, including the suitability of basic competencies, conformity with student

			development, conformity with information material needs (up to date), the truth of the substance of the material, and the benefits of adding insight modules.
2.	Language in the learning e-Module	4	There are 5 criteria included in the expert assessment in the module trial for the language in the learning module, including the easy-to-read module, clarity of information, the material presented in the module is quite clear, the use of language is in accordance with good and correct Indonesian rules, the language used is effective. and efficient.
3.	Presentation	4	The expert's assessment in the module trial on the presentation of the module contained 5 criteria that were included in the good category including clarity of goals (indicators) to be achieved, material order, motivation and attraction, interaction (response stimulus), and completeness of information.
4.	Graphics	4	Expert judgments on module trials on graphics or module displays, there are 5 criteria that fall into good categories including compatibility and attractiveness of the choice of font, accuracy in choosing font size and writing spacing, accuracy in text layout, suitability for use of illustrations, images, photos, and attractiveness. display design.

Source: Research Primary Data, 2022

For more clarity, the results of expert validation can be presented in the following diagram.
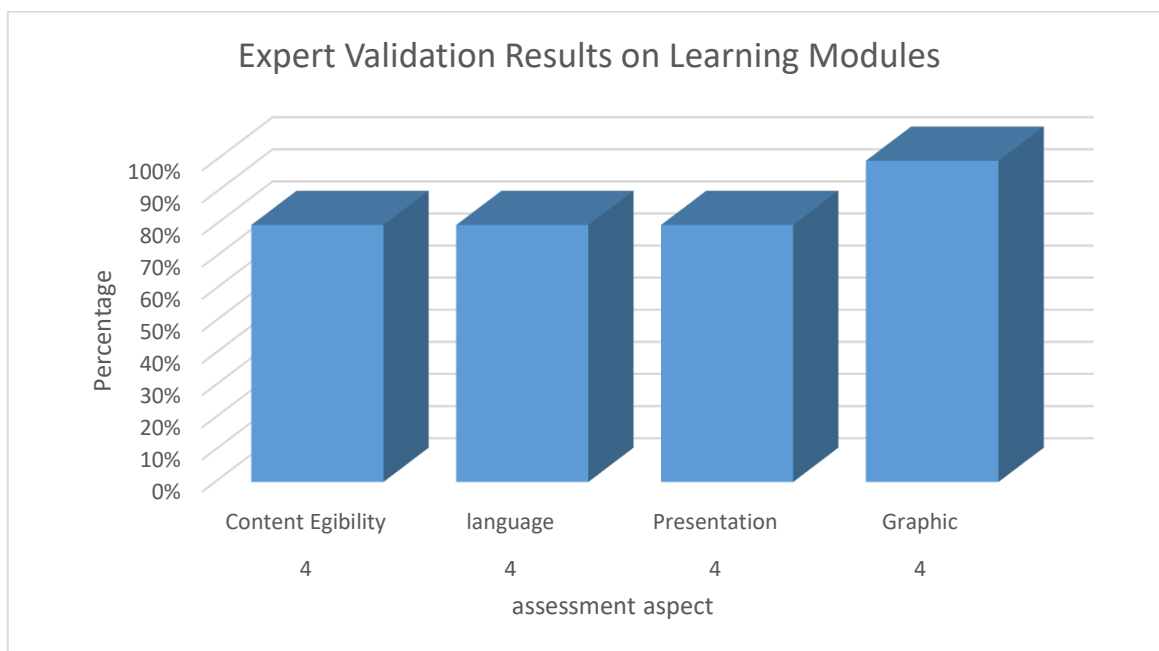

Fig. 1. Diagram of the results of expert validation of the learning module

The results of the assessment of the content feasibility aspect with a mode 4 score of 80% of all content feasibility indicators, the linguistic aspect of the mode 4 score of 80% of all linguistic indicators, the presentation aspect getting a mode 4 score of 80% of all presentation indicators, the graphic aspect getting a score mode 4 amounts to 100% of all graphic aspects. Mode score 4 means good or in other words the learning media is very feasible to use

After the atmosphere dynamics learning module is declared feasible to use, then it is implemented next. The learning module was tested on students at school. The following are the results of testing the learning module in schools.

	Table 2.		Results of Module Testing on Students
No	**Aspek**	**Mode**	**Information**
1.	Ease of learning the content of the module	5	There are 9 criteria for student assessment in the module trial on the aspect of ease of learning content that fall into the very good category including the clarity of the formulation of basic competencies, the clarity of the description of the material for students to study, the accuracy of the order in which the material is presented, the delivery of interesting material for students, the use of texts and supporting language styles. students' understanding of the material, text readability, giving examples to support students' understanding of the material, clarity of practice questions for students to work on, clarity of test items for students to work on, use of pictures, photos and animations to support student learning and understanding of the material
2.	Display Attractiveness	5	There are 5 criteria for student assessment in the module trial on the attractiveness aspect of the display, including the accuracy of the text layout, the compatibility and attractiveness of the choice of typeface, font size, and writing space, the suitability of the background with the color of the letters, the suitability of the use of photos/images, suitability and attractiveness of providing feedback for students
3.	Module Benefits	5	There are 3 criteria for student assessment in the module trial on aspects of the usefulness of the module for students in the very good category, including the use of learning modules to help the learning process of atmospheric dynamics geography, the use of learning modules to provide learning motivation, and the use of learning modules to add insight.

Source: Research Data Processing Results

Based on the results of the module trial on 30 students, it can be seen that a total of 22 students gave a score of 5 on the aspect of the ease of the module to learn, while 8 students gave another score. In the attractiveness aspect of the display, a total of 20 students gave a score of 5, 10 students gave other assessments. In the aspect of the usefulness of the module, 25 students gave a score of 5, while 5 students gave other assessments. For more details can be seen in the following diagram.
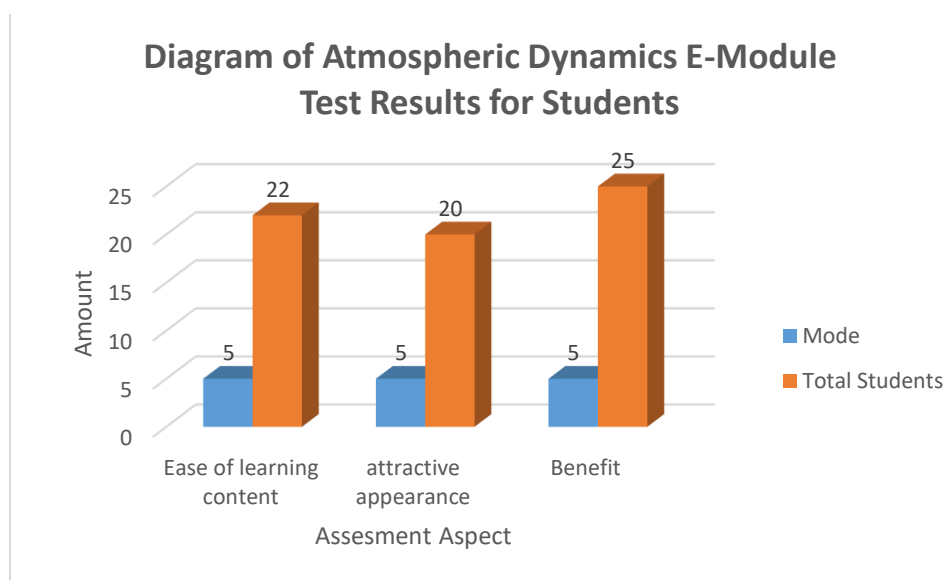
Fig. 2. Test results of the atmospheric dynamics e-module on students

The diagram in Figure 2 shows that the score that often appears in each aspect of the assessment of the 30 students' assessment is 5. A score of 5 means very good, meaning that the atmospheric dynamics learning module is very good and feasible to use.

The atmospheric dynamics module that is feasible to use is assessed for its effectiveness in a simple way with a pre-test post-test only design approach, along with a diagram of the results of student pre-test and post-test assessments.
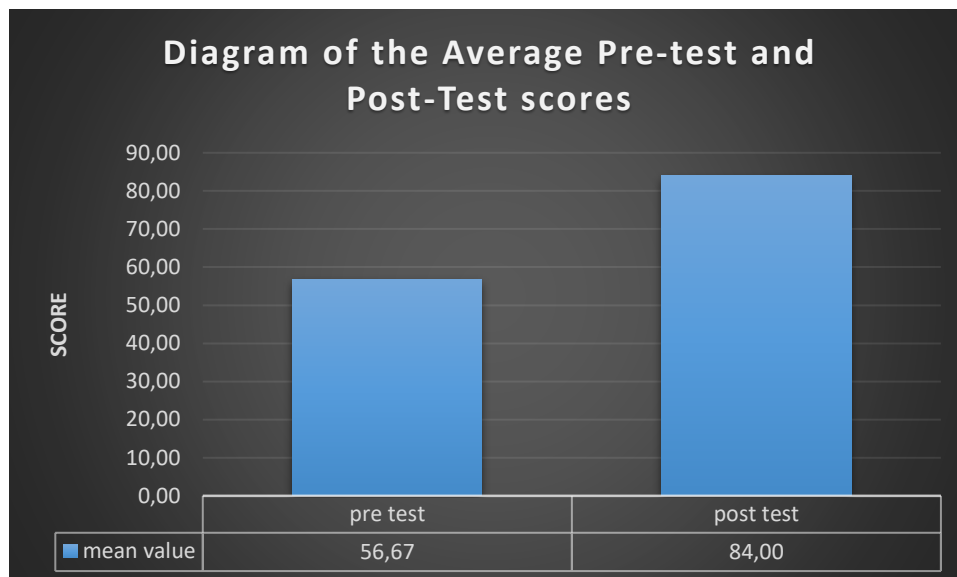
Fig. 3. The average pre-test and post-test scores of students in the use of the atmospheric dynamics learning module

Based on the t-test calculation, it shows that t-count (15.39) > t-table (2.042) means the research hypothesis (Ha) is accepted, which means there is a significant increase in understanding of the material after using the atmospheric dynamics module based on contextual learning. In line with the research results of Arisanty et al. (2017) learning using the contextual learning model also succeeded in increasing the achievement of geography learning. The results of the t-test calculation show t-count = 6.246 and t-table 1.67 of 5% significance.

Through the atmospheric dynamics module based on contextual learning in this study, it can help students understand the material of atmospheric phenomena and their impact on life. As Davtyan (2014) stated, contextual learning can connect learning materials with the real world. Learners know and understand the meaning of learning (Sedana et al., 2013; Wildani et al., 2021; Zulaiha, 2016). Students experiencing new knowledge apply new knowledge to real life, solve problems and shape knowledge into experiences that they will have in the future. According to Rahmawati (2018), CTL also has a positive influence on students' learning motivation in learning. This positive influence can be seen from the increased participation of students due to activities relating the subject matter to the environmental context of students (Ratnasari & Saefudin, 2018; Wildani et al., 2021).

It is quite clear that with this atmospheric dynamics module students not only know, understand the material theoretically but also realistically implement it in the field because the substance of this material is actually very close to everyday life. In accordance with the learning components of contextual learning consisting of 5, namely, relating, experiencing, applying, cooperating, and transferring, through this learning module students can also construct their own understanding concepts. Students connect, analyze and apply what is in theory with the phenomenon of weather deviations that occur. They can see firsthand phenomena of atmospheric dynamics such as drought drift and its impact on their lives. In accordance with Edgar Dale's learning pyramid (Sari, 2021) that students will enter a high level of understanding if through experience.

4. Conclusion

Atmospheric Dynamics E-Module in this study is feasible to use. The results of the pretest and posttest can show the effectiveness of the e-module. There is a significant increase in the value of using the module with the t test obtained t count (15.39) > t-table (2.042) at a significance level of 5%, the average value increased from 56.67 to 87. Critical thinking skills and creativity of students can be honed through experiential learning using the atmospheric dynamics e-module. Suggestions for future researchers can conduct further research to further explore the effectiveness of e-modules in relation to the achievement of 21st century competencies so that the benefits of e-modules become more relevant to the demands of today's needs.

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