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Practicality of Fluid Physics E-Module Oriented Problem Authentic Wetland Use Contextual Teaching and Learning Approach



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ABSTRACT: Electronic teaching materials that are related to everyday life and in accordance with the environment around students, namely the wetland environment are still not available in schools. The purpose of this research and development is to produce an fluid physics electronic module (E-Modul) oriented of wetland that is suitable for use in learning. The specific purpose of this article is to describe the practicality of the E-Module. This research and development use the ADDIE (Analyze, Design, Develop, Implement, Evaluate) model. The e-module that has been developed has been tested at Insan Madani Islam High School Banjarmasin. Practicality data was obtained through a questionnaire instrument for student responses. Data were analyzed descriptively qualitatively and quantitatively. The results of data analysis indicate that the E-Module is practical because the results of the student responses meet the practical category. It was concluded that the wetland-oriented E-Module of Fluid Physics has been practical for use in learning.

KEYWORDS: e-module physics, fluid physics, wetlands, contextual teaching and learning.

I. INTRODUCTION

South Kalimantan Indonesia is famous for the potential of its swamps and wetlands that are still untouched and fully utilized. In simple terms, the topography of wetlands has been indirectly functioning as a catchment for rainwater and runoff from upstream areas. Wetland is meant here is ecosystem swamp, including swamp peat affected by fresh water nor brackish.

Basically, every area has characteristics or wisdom local that can be lifted in the learning process in class, good as source study, as well as object problems that can increase motivation study student caused existence relevance. Among the material they learn with environment daily them. Integration problem wetland in the learning process will also add outlook wisdom local students to environment wetland all around them. In the eyes lesson physics especially high school there are Theory fluid that can be linked with condition wetland in South Kalimantan. On learning physics Theory fluid utilization wetland could be utilized. Becomes object problem. Integrating fluid material and wetland problems such as the concept of hydrostatic pressure can be related to the natural pressure of the process of building houses using *galam wood*, the lifting force of the search substance on the concept of the event of a boat floating in the river and various other events that exist in wetlands can be raised in the learning process. This thing of course just will be more interesting and more good if compared with give the nature of the problem textual in the book. _

CTL approach (*Contextual Teaching and Learning*) is a learning concept that helps teachers relate the material being taught to students' real world situations and encourages students to make connections between their knowledge and its application in their daily lives. Based on think constructivism, that is that knowledge built by student a little for the sake of a little, the result expanded through limited context (narrow). Knowledge not a set of facts, concepts, or ready rule for taken and remembered by student however knowledge must be constructed and give meaning through real experience. Because that, look that use relevant CTL approach in link learning physics topics fluid with problem wetland. Use CTL approach is also a form learning authentic for participant educate.

Loaded CTL approach authentic could be applied to e-module development Physics. Utilization technology computer in the learning process like use of e- module will more help smoothness activity study teach. Use of e- module in learning physics will give variation presentation material and can increase motivation and interest study participant educate if compared only use source study print.

Maintenance learning required existence interaction Among educators and participants educate for the learning process. Safputri *et al.* (2016) state the learning process said ok, if participant educate experience change behavior as results from learning that. Today's educators have get access for use various technology to improve effectiveness learning. The technology used today with high mobility that is phone mobile or device.

1. Wetland

Term wetland appears after Convention about Wetland important International in the city of Ramsar, Iran on February 2, 1971. Due to the name city the convention this is known large as Ramsar Convention. Wetland defined in article 1 paragraph 1 of the Ramsar convention, the definition by complete is, "land "wet includes areas of brackish, swamp, peat, or water, ok experience nor artificial, permanent or meanwhile, with running water or silent (pooled), tasteless, brackish, or salty; including areas with sea water whose depth at low tide (low tide) is not exceed six meters"(Soendjoto, 2016).

Wetland is a strategic area for Indonesia. Wetland is meant here is ecosystem swamp, including swamp peat affected by fresh water nor brackish. Wetland is a land area that is inundated with water or have high water content, good permanent nor seasonal. The ecosystem covers swamp, lake, river, mangrove forest, forest peat, forest flood, runoff floods, coasts, rice fields, to reef coral. Land this can is in the water fresh, brackish nor salty, the process of formation can experience nor artificial.

Based on definition the so could concluded that part The large area of South Kalimantan Province is part from wetland. Wetland is an area that has level diversity high life compared with ecosystem other. Man get various benefit from wetland, ok by economics, ecology, and culture. because of that, part big people in the world live in area wetland or close with wetland. Many cities were built in the area wetland, one of them is the city of Banjarmasin which is located on the banks of the Barito River. South Kalimantan Province which has almost all variety wetland this of course give opportunity for teachers who want develop device customized learning with environment wetland (Adawiyah, 2013).

Wetland have role important in life people human. The ecosystem provide clean water, diversity biological, food, various materials, controlling flood, save groundwater reserves, and mitigation change climate. Land type It is also the habitat of a number of big plants and animals, relative more many compared to type other ecosystems, conditions the more getting worse from day to day. This is what makes The United Nations Educational, Scientific and Cultural Organization (UNESCO) initiated a known convention Ramsar Convention.

Each wetland arranged on amount component physical, chemical, and biological, such as water, soil, species plants and animals, as well as nutrients. Related features with component physical, chemical and biological no same Among wetland one with others. Something land could called wetland if fulfill one or more from three condition. First, by periodic there is aquatic plants. Second, it is a sufficient area wet in period long time. Third, by permanent in state saturated. one land function wet in prevent clean water crisis is carry out the process of cleaning waste water. Subtraction process ingredient pollutant from waste water if reviewed by physical, chemical and biological conducted through filtering ingredient suspensions and colloids present in water, assimilation ingredient pollutant to in network roots and leaves plant life, binding or exchange ingredient pollutant with soil wetland, material plant life, material plant dead and live algae.

2. Characteristics Physics

Physics as part of science (IPA) can seen as a method think (*a way of thinking*) for understand nature, as method investigation (*a way of investigation*), and a the knowledge already formed (*a body of established knowledge*). Physics is wrong one IPA branch which is on basic aim learn and give understanding quantitative to various symptom or process nature and nature substance and energy as well as its application. Approach used is blend results analysis mathematical (*deductive*) and results experimental (*inductive*).

On physics base there is study fluid, fluid is substances that can flow. Fluid Words covers substance car, water and gas because second substance this could flow, on the other hand stones and things hard or whole substance congested no classified into the fluid because no can flow. Fluid is one important aspect in life every day. Every day man inhale it, drink it, float or drown in it. Every day aircraft the air flies through it and the ship sea float on it. Likewise the ship dive could float or float in it. The water you drink and the air you breathe also circulate inside body man every moment though often no realized. Fluid this could our for Becomes two part that is fluid static and fluid dynamic.

Static fluid is the fluid that is in phase no move (still) or fluid in state move but not there is difference speed between particle fluid the or can said that particles fluid the move with speed uniform so that no have style slide. Example phenomenon static fluid can shared to be simple static and not simple. Example fluid at rest simple is the water in the tub that doesn't charged style by style anything, like style wind, heat, and others that cause the water move.

Fluid dynamic is fluid (can in the form of substance liquid, gas) in motion. For make it easy in study, fluid here considered steady (has constant speed to time), no compressed (no experience volume change), no thick, no turbulent (no experience rounds).

3. E-Module

E-Modules are digital media that are effective, efficient, and prioritize the independence of students in carrying out learning activities that contain one unit of teaching materials to help students solve problems in their own way (Fauzih, 2014). Electronic modules or commonly called e-modules are the latest innovations from print modules. here these e-modules can be accessed with the help of a computer that has been integrated with software that supports its access. The electronic module is a form of presenting self-study materials that are systematically arranged into the smallest learning units to achieve certain learning objectives, which are presented in an electronic format (Adiputra, Sugihartini, Wahyuni, & Sunarya, 2014).

1 Practicality of E-Physics Fluid Module Oriented Problem Authentic Wetland

8 E-module is a form of presenting self-study materi that are arranged systematically into the smallest learning units presented in electronic format. Based on the understanding of the electronic module, it is known that there is no difference in the principle of development between the conventional (print) module and the electronic module. The difference is only in the physical presentation format, while the components that make up the module have no difference. The electronic module adapts the components contained in the print module in general.

Prastowo in Tjiptiany, As'ari, & Muksar (2016) disclose that learning using e- module aim to : help participant educate for could study by independent or with help educator minimal maybe, role educator in the learning process no dominate in help participant educate for understand something material, practice honesty to participants leamer, participant educate could study with fast and deep learning participant educate could measure level mastery Theory alone.

7 4. Contextual Teaching and Learning

The CTL (*Contextual Teaching and Learning*) approach is draft learning that helps teachers relate Among the material being taught with real world situation students and encourage student make connection Among the knowledge he has with implementation in life they everyday (Trianto, 2009: 104).

Application of CTL in class enough easy. Broadly speaking, the steps is following this (a) Develop thinking that child will study more mean with method work themselves, and construct alone knowledge and skills new; (b) Implement so far possible activity inquiry for all topic; (c) Develop nature want to know student with ask; (d) Creating a community learn (learn in groups); (e) Presenting the model as example learning; (f) Do reflection at the end meeting; (g) Do true appraisal with various way.

CTL approach has seven component main must applied in learning (Trianto, 2009: 107). Seventh component the that is *constructivism, inquiry, questioning, earning community, modeling, reflection, authentic aassessment*.

II. METHOD STUDY

Method research and development is method scientific for research, design, manufacture and test validity products that have been generated (Sugiyono, 2016). Produced product in development no always shaped object or *hardware*, for example books, modules, LKPD, but the resulting product can also in the form of learning models, applications computer, evaluation, and more. explain that research and development or often called "development" is strategy or method enough research appropriate for repair practice study teach (Tegeh *et al.*, 2014).

Research and development this using the ADDIE model, design based learning approach system. ADDIE consist from **1** *Analyze, Design, Develop, Implement, and Evaluate*. On the article this restricted for assessing e-module practitioners physics fluid oriented problem authentic wetland use contextual teaching and learning approach.

Practicality, is the level of convenience of electronic modules to be applied in the learning and teaching process, which is measured using a student response questionnaire. Stated in the very practical, practical, enough practical, less practical, and very not practical categories. Electronic modules are said to be practical if they are categorized as enough practical minimum. Implementation electronic module as research data collection held in odd semesters year 2022/2023 teaching in September 2022 at Insan Madani Islami High School Banjarmasin, South Kalimantan, Indonesia.

Score of practicality test obtained from results score a questionnaire filled out by participants which one to teach questionnaire the loaded in module developed electronics such as convenience, economy time, benefits, and advantages from electronic module that. Assessment results the then averaged then customized with category validity in Table 2.1.

$$\text{Practicality} = (X / X_{max}) \times 100 \quad 2.1$$

Description:

X : Total score results practicality

X_{max} : Total score maximum

Table 2.1 Criteria practicality electronic module

| No. | Score | Category |
|-----|-------------|--------------------|
| 1 | 80.01 – 100 | Very practical |
| 2 | 60.01-80.00 | Practical |
| 3 | 40.01-60.00 | Enough practical |
| 4 | 20.01-40.00 | Less practical |
| 5 | 01.00-20.00 | Very not practical |

(Akbar, 2016)

III. RESULTS AND DISCUSSION

Practical results electronic module on the material static fluid in context wetland obtained from questionnaire shared response student of Insan Madani Islam High School Banjarmasin which includes aspect benefits, efficiency, convenience, and literacy science. Following results practicality electronics module.

Table 3.1 Practicality of electronic modules

| No. | Indicator | Score | Category |
|---------|------------------------------|-------|----------------|
| 1 | Aspect benefit | 83.0 | Very practical |
| 2 | Aspect efficiency | 72.0 | Practical |
| 3 | Aspect convenience | 79.5 | Practical |
| 4 | Literacy science for wetland | 73.0 | Practical |
| Average | | 76.1 | Practical |

Based on result data questionnaire the practicality in Table 3.1 is known that every indicator have category practical except for the aspect benefit that is very practical. So that, by whole calculation obtained that electronic module enter in category practical with value 76.1.

Practicality electronics module that reviewed from questionnaire response play a role in Thing efficiency, benefits, and convenience obtained access participant educate during and after use electronics module. Questionnaire response the shared to 10 participants educate who becomes subject study with type statement positive and negative. Practical results enter in very practical category. This thing because fulfill characteristic practical module according to Matondang (2019), namely no too demand a lot of equipment, provide freedom to participants educate, and there are instruction use that makes it easy for others to carry out. This thing means electronics module on Theory static fluid gives benefit for participant learner seen from results evaluation participant educate. Electronic module this get 50% statement agree and 40% strongly agree for make atmosphere learning Becomes more fun and not boring, thing this Becomes factor in build participation and motivation study participant educate (Susak, 2016). Based on results analysis need to do before use electronics module in learning, participants educate confess fast bored and troubled in learning physics because the teacher only based on the book given school and summary Theory in the form of given word *file* through *whatsapp* group. So, this is something good repair for the learning process. Besides increase atmosphere in learning, electronic module this also makes Theory physics presented Becomes easy understood seen from results percentage, i.e. 80% stated agree and 20% strongly agree because electronic module be equipped with videos and links for add information from something material presented. So based on aspect benefit electronic module could be one source enhancing learning atmosphere learning and understanding participant educate in Century online learning. This thing in line with Puspitasari (2019) states that seen from side utilization electronic module will make the learning process Becomes more interesting and interactive with support videos and materials supporters who can accessible that can be motivate participant educate for increase results study.

Practicality electronic module This is also supported by the factor another, namely efficiency. Fauzan (2002) revealed that in test practicality a teaching materials must consider is product interesting and can used. Based on definition opinion expert so indicator practicality used is convenience usage, power drag and efficiency. Efficiency in developed modules this because convenience electronics module that provide feature *hyperlink* in the table of contents so that make it easy participant educate for move page and access *google forms* as the place collection task. The *hyperlink feature* is also possible electronic module connected with various content *websites* and videos *youtube* by simultaneously. 80 % of participants educate state no agree and less agree that learning Becomes longer with use electronic module this compared with book print, meaning they agree with use electronic module this learning Becomes more efficient. Aspect efficient from electronics module on Theory static fluid in context wetland enter in category practical. This thing means that electronic module this character efficient.

Aspect convenience module developed electronics enter in category practical. This thing show that electronic module results development this make it easy participant educate in access and learn material. This thing in line with Mahardika (2021) who stated published modules through page *website* make it easy user for access module the through variety devices, such as *smartphones*, *iPhones*, *Tabs*, to laptops and computers. Publication on the website can be support the learning process and interesting interest study participant educate. From result questionnaire response participant educate obtained results 90% of participants educate state electronic module this easy accessed where only, when only and with various internet network. Electronic module this can also accessed with various network (*wifi*, *3G*, nor *4G*). Though have good percentage in access electronic module with various network, but a number of participant educate disclose that they sometimes difficulty in run video or open the link provided in electronics module. Indicator next is use language, type letter as well as size must letter give convenience for participants educate for reading, 90% of participants educate state that type and size letter in electronic module this no troublesome they in the learning process. Besides it, electronic module could said good if use easy language understood by participants educate or reader, obtained by 90% of participants educate state language used in electronic module this make it easy in understand Theory learning. Besides convenience in access electronics module, usage language, type letter as well as size letters also make it easier for read. one electronics module said good is electronic module with use easy language understood by participants educate or the reader.

Aspect last support practicality electronic module this that is indicator literacy science. With existence development electronic module this, 80% of the participants educate state agree that they could knowing historical from a knowledge knowledge. Besides that, 60% of participants educate stated strongly agree and 40 % of the participants educate state agree that through electronic module this they could knowing various type phenomena that can explained with physics. Process of training literacy

science on research this use method learning invention (*discovery learning*) that is in line with one destination train literacy science, that is participant educate have ability use knowledge science (good in the form of concept, knowledge procedural, writing, and vocabulary) supported by curiosity know for identify question and interesting conclusion based on evidence in the form of incident or problems in life real. Steps *discovery learning* implemented in the learning process has in accordance with Cintia (2018), namely (a) *stimulation*; (b) *problem statements*; (c) *data collection*; (d) *data processing* (data processing); (e) *verification*; and (f) *generalization*. Practicality from ari aspect literacy science enter in category practical. This, shows that electronic module results development this could train literacy science participant educate.

CONCLUSION

The product developed in this research is an electronic module based on wetlands on static fluid materials. The development of this electronic module contains teaching materials, sample questions with their solutions, practice questions, and experimental activities. Based on the results of the development and testing carried out, it was concluded that an electronic module of wetland-based static fluid material that was practically used in the physics learning process had been produced.

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