

Designing a Global Warming E-learning Module Using Adobe InDesign CS6 for Phase E Students

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Abstract

The design and creation of an e-learning module on global warming using Adobe InDesign CS6 was driven by the need to balance and utilize the flow of digitalization in the world of education. The aim of this study was to: (1) describe the design and creation of a global warming e-learning module for phase E students using Adobe InDesign CS6, and (2) test the feasibility of a global warming e-learning module for phase E students using Adobe InDesign CS6. The global warming e-learning module based on Adobe InDesign CS6 was developed in three stages: preparation through problem identification, fabrication in the InDesign CS6 program, and completion with expert assessments. The validation data is analyzed using descriptive quantitative approaches to verify the module's practicality by comparing the total final scores using standard deviation and ideal mean methods. The analysis findings indicate that the designed global warming e-learning module is feasible in the media aspect with a score of 43, highly feasible in the material aspect with a score of 29, and also highly feasible in the linguistic component with a score of 25. Based on the findings, it is possible to conclude that: (1) an e-learning module with global warming material based on Adobe InDesign CS6 has been successfully created, and (2) the e-learning module on global warming that has been created is suitable for use in learning activities.

Keywords: *Adobe InDesign CS6, Physics, Learning media, Module, Global warming*

1. Introduction

A French philosopher, Immanuel Kant, stated that humans will only become humans after undergoing an educational process (Rasyid, 2019). In essence, education plays a big role in shaping a human's identity and character (Wardhana et al., 2020). This concept shows that the education system must be relevant to the social conditions of society and the development of all aspects of life. The Covid-19 pandemic era has caused the education system and instructional approach patterns in learning to experience significant shifts. The quality of education and effectiveness of learning in Indonesia in this era is experiencing a decline (Tampubolon et al., 2022). The education ecosystem in each region in Indonesia is very diverse, starting from infrastructure, the quality of human resources, also its ability to recover from the pandemic. In order to overcome this diversity, a new policy was initiated in the education system in the form of curriculum reform.

Curriculum changes are always carried out as a form of improvement effort, but this often creates new problems if all components are not ready for implementation. The Industrial Revolution Era 5.0 curriculum or what is known as the Independent Curriculum is closely related to skills in mastering technology, as stated in its implementation objectives. Currently, the integration of technology in learning has not been implemented optimally, it could even be said to be very minimal. This is shown by research by Widodo et al (2023), which shows that the vital problem that causes the low level of technology integration in the world of education lies in the anti-change mindset, where technology is considered to hinder the implementation of learning. It is said that digitalization will create additional obstacles and demands in organizing classes, integrating technology with learning objectives, and aligning with curriculum content. The challenge of mastering software and hardware often becomes an obstacle for practitioners in integrating technology into the instructional learning process. Therefore, all learning components must be able to support technological integration and innovation.

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Learning media is one component that determines the effectiveness of the learning process, so this domain must support digitalization, which can be done in the form of e-learning modules. Modules are one of the media required to condition learning activities so that they run independently, completely and planned (Rahdiyanta, 2016). The digitalization of this module is also based on the use of printed modules which are currently considered less interactive and monotonous (Herawati & Muhtadi, 2018). Conventional learning using printed books is still mostly done using the lecture method, so it is not only uninteresting, it can even be said to be boring. This is shown by the results of preliminary observations on physics learning in some Surakarta high school which show that learning media is not interesting and less interactive if it only relies on books, especially for older educators who only use printed books without any interactive media. Even though several printed books in circulation, one of which is published by Erlangga, are equipped with a scanned QR code which can direct students with an auditory learning style to listen to the material, very few teachers make good use of it. This of course can reduce student's interest in learning and final learning outcomes.

The results of the initial observations also show that the integration of technology in high school learning is limited to the use of search engines such as Google as a general learning resource, but there is no digital media that has been created specifically as a learning tool in the classroom, especially e-learning modules that can provide learning experiences. anywhere and anytime. E-learning modules that can provide image and video visualization are considered to be able to improve the quality of learning. This is in line with the results of research by Islami et al (2021), which states that creating e-learning modules is really needed and can help educators to direct learning, as well as increase student motivation and learning outcomes. The urgency of implementing audiovisual-based e-learning modules in learning has been researched by Mas'udah and Bakar (2021), which shows a percentage of 60% in the important category, so their use is highly recommended.

The preparation of e-learning modules is essentially based on the creator's creativity, but in the process it is necessary to pay attention to the rules and standards for module creation. One software that can be used is Adobe InDesign CS6, where this software has the capability to create designs and page layouts, both for print media and digital media, that are attractive and meet standards (Enterprise, 2019:1). According to Yuliantanti (2008:58), InDesign is one of the most suitable desktop publishing programs for managing page

layouts with complex layouts such as books and magazines that contain many features. The effectiveness and achievement of a learning activity is also influenced by the level of difficulty of the related material. Nowadays, curriculum reform has caused the composition of learning materials to shift. One of the materials that has experienced a significant change in delivery flow is global warming material, which in the previous curriculum was intended for class XI but is currently content for class X or phase E students. Siregar et al (2021) research shows that global warming material has a difficulty level of 73.83% and is included in the category of difficult to learn using an online system. It is important to note that some global warming content which contains phenomena and activities on a global scale such as the process of the greenhouse effect, increasing global temperatures, as well as the process of carbon emissions, is classified as difficult for students to imagine so it would be more optimal if the text and image displays were followed. in reality, where this can be provided with the Adobe Indesign CS6 feature.

Research by Seftianingsih & Supahar (2021), shows that the use of e-learning modules has a contribution of 28.4% in improving the quality of learning in the context of mastering Physics material. This fact is also supported by the research results of Arifah (2022), which stated that after learning using e-learning modules, students' mastery of the material increased with a standard gain of 0.49 which is included in the medium category. The use of Adobe InDesign in creating learning media itself has been implemented by Yamir (2022), who used Adobe InDesign to create e-booklets on excretory system material for class XI Science and this product received a very decent category with an average percentage of 93.2%. This research focuses on delivering material and pays less attention to evaluation aspects to measure student abilities. Adobe InDesign was also used by Syam (2019), to create teaching materials in the form of flash books on particle material and obtained a score of 3.83 in the valid category.

Based on the conditions described above, it is known that there is an urgency to create learning media in the form of e-learning modules on global warming material based on Adobe InDesign CS6 for phase E students. The novelty of this research compared to previous research is the addition of a series of evaluations such as project, posttest, pretest, and remedial so that it is not focused on delivering material. It is hoped that this can also be used as an interactive learning medium that triggers positive feedback from students in learning.

The learning process is understood as a communication system that involves several

components, including the communicant and communicator, the message to be conveyed, feedback, noise, and channels in the form of media (Rohani, 2020). From an educational perspective, media generally includes humans and other living creatures, materials, phenomena and events that can lead students to acquire new knowledge and skills (Arsyad, 2011). At the beginning of its creation, the position of media in the learning system was only as a tool for teachers in teaching material. Along with technological discoveries and developments, audio-visual media is also used to create concrete learning experiences. The influence of using a systematic approach to the learning process also increases the function of the media, where the media is not only used as a tool, but can also act as a messenger in the form of learning materials (Riyana, 2012). Based on this understanding, the learning media chosen must be able to carry out its function, both to support learning and to be used as a means of delivering material.

The development of technology, especially multimedia, presents new breakthroughs in the creation of learning media. Printed modules as a learning medium can be presented systematically with the help of e-learning equipment in the form of e-learning modules (Sugianto & Wijaya, 2018). E-learning modules are a form of teaching material designed for independent and interactive use down to the smallest units such as audio, video and navigation (Imaningtyas et al., 2016). Widodo & Jasmadi (2008:50), require that a good module must fulfill the aspects of self-instruction, self-contained, stand alone, adaptive, and user friendly. Although the structure of e-learning modules and printed modules is almost the same, e-learning modules have several advantages compared with printed modules. This advantage lies in its high flexibility as well as ease of storage and maintenance.

Over the last hundred years, research shows that the earth's temperature has increased by three-quarters of a degree Celsius and this warming is predicted to continue to increase by up to five degrees Celsius by 2100 (Sulkan, 2020:3). This change does not have a significant real impact in a short time, but the melting of ice and glaciers at the poles which has an eternal connotation has provided more than relevant evidence of climate change on earth. This phenomenon defines the term global warming, which is understood as an increase in the average temperature of the earth's surface due to the trapping of solar heat waves and infrared radiation in the atmosphere (Mulyani, 2021). Changes in the state of the atmosphere and its composition can be caused by the activities of living things or natural responses to natural selection (Pratama & Parinduri, 2019). An increase in the earth's temperature may be almost undetectable, but

it has the potential to change the course of life of earth's creatures in all aspects. Therefore, significant and effective steps are needed before it is too late.

Desktop publishing programs are known for their ability to arrange the placement of text and images in the creation of printed and digital products. One of the most widely used layout programs is InDesign made by Adobe Systems (Yulianti, 2008). InDesign is the first program that allows advanced text processing and typography, which can be combined with various layout styles. The output produced by this program varies, including .pdf interactive and EPUB. This format was determined by the International Digital Publishing Forum (IDPF) as a standard format for e-books, e-modules, and other digital publishing materials (Seftianingsih & Supahar, 2021). According to Yanti dan Wulandari (2023), compared to other desktop publishing programs, Adobe InDesign has several advantages, for example providing advanced editing facilities like in Photoshop such as shadow, bevel, and glow, can import and make images appear transparent, can import files with various extensions such as ai, pdf, jpg, doc, dan psd, also provides facilities for creating simple tables and graphs. Based on this fact, it is hoped that Adobe InDesign can help students achieve learning goals through e-learning modules.

2. Method

A descriptive quantitative approach was used as a method in this research. Descriptive quantitative design can provide an objective picture using numbers, as well as providing a description of a situation (Sunarti, 2022). The descriptive approach is useful in describing in detail the procedures for making e-learning module, while the quantitative method aims to provide an approach to the applicable module suitability standards. This research was carried out in three stages, namely the preparation, creation, and completion stages. After the module has been successfully created and tested suitable for implementation in physics learning activities in class, this module is then published with the aim of making it publicly accessible. This research focuses on the problems experienced by several high school teachers and students in Surakarta, specifically in physics learning on global warming content.

Research preparation is carried out to prepare data that is needed in the research process (Hapidz et al., 2019). The data collection process was carried out through interviews with several teachers and high school students in phase E, literature studies, and observations during learning activities. Based on this needs analysis process, an e-learning module was created as a physics learning medium on global warming material. After this

module has been successfully created, a feasibility test of the module is carried out based on predetermined criteria and standards. The assessment of this module is carried out by experts to validate aspects of the media, material, and linguistic structure (Zakiy et al., 2018). According to Azwar (2007), with modifications by Pangestu (2021), data from validation assessments can be calculated by calculating the final score obtained, then using the Ideal Standard Deviation (S_{bi}) and Ideal Mean (M_i) techniques to convert the scores obtained in certain eligibility criteria, which can be determined as detailed below:

Table 1. Expert Assessment Criteria

No.	Score Range	Criteria
1.	$\sum x > M_i + 1,5 S_{bi}$	Very Feasible
2.	$M_i + 1,5 S_{bi} \geq \sum x > M_i + 0,5 S_{bi}$	Feasible
3.	$M_i + 0,5 S_{bi} \geq \sum x > M_i - 0,5 S_{bi}$	Quite feasible
4.	$M_i - 0,5 S_{bi} \geq \sum x > M_i - 1,5 S_{bi}$	Less feasible
5.	$\leq M_i - 1,5 S_{bi}$	Not Feasible

(Pangestu, 2021)

Which :

$M_i = 1/2$ (maximum score + minimum score)

$S_{bi} = 1/6$ (maximum score - minimum score)

$\sum x =$ Total score obtained

Based on the results of this analysis, it can be seen the feasibility of learning media in the form of e-learning module that have been created by the author. This category will also show whether the global warming e-learning module that has been created can be applied in physics learning in the classroom or still needs improvement.

3. Results and Discussion

The e-learning module created is intended for use in the classroom or as an individual learning medium for class X phase E students in accordance with its user friendly characteristics. Module creation is carried out in three stages, namely preparation, creation and completion. In the preparation stage, initial observations are carried out and all the equipment needed to make the module is prepared. The results of initial analysis through observations and interviews show that students need learning media that is up to date and can be integrated with technological developments, so digital learning media is created in the form of module. E-learning module allow students to study material without time limits via personal computers or smartphones (Nisrina et al., 2021). The main thing that

is determined in preparing the module is the program that will be used, where based on research conducted by researchers, it is known that Adobe InDesign CS6 provides complete features for structuring text and images, even advanced layouts such as transparency and blurring (Pusparani et al., 2021). The next preparation is related to learning components that are adjusted to the learning outcomes in the curriculum adopted, namely the Merdeka Curriculum. Next, a structural design and module design was created in storyboard form to make it easier to create this e-learning module.

The creation of e-learning module was carried out in the Adobe InDesign CS6 program. Based on the design in the storyboard, the e-learning module that has been created contains: 1) a cover page containing the title, author, designation and reference curriculum; 2) table of contents page; 3) word page; 4) Pancasila Student Profile page; 5) introductory material page containing objectives and indicators, concept prerequisites, and trigger questions; 6) pretest page; 7) learning activity page which is the core of learning; 8) evaluation; 9) answer key; and 10) bibliography used as a reference for writing the module. In this module, learning activities are divided into three parts. Learning Activity 1 explains the concept of global warming and the natural changes that are its indicators. Learning Activity 2 describes climate change and the natural factors that influence it, where this section continues with a discussion of the greenhouse effect. Learning Activity 3 contains the impacts of global warming along with simple activities that can reduce the effects of global warming. This last section also contains international policies launched to overcome global warming. Each learning activity is followed by enrichment and summary to emphasize the learning concept in the related chapter. The last section contains evaluation which includes Posttest and Remedial. The questions in this activity are written in multiple choice form with four answer options that students can choose. After this page, answer keys for all available evaluations are also presented. The last page contains a list of references used as a reference in writing this module.

The creation of this module ends with the completion stage which is carried out after the module preparation process is complete. This stage focuses on validation from expert validators regarding the feasibility of the module from various aspects. According to Puspitasari et al (2020), the module aspects that need to be assessed are media, material, and linguistic aspects. The media aspect provides an assessment of the suitability of the media that has been created. The content of the material is very important to pay attention to and includes the correctness of the

concept, suitability of the illustration; suitability of the material with indicators of achieving learning objectives, as well as the consistency and depth of the material. Linguistic structure is also very important because it determines readability and the achievement of the purpose of writing. The validation data is then processed using quantitative descriptive analysis based on revisions from the validator. The data obtained from this validation instrument is analyzed quantitatively to provide an approach to the feasibility standards for the module that have been created.

Validation of the module resulting from this research was carried out to determine the suitability of the product, where this assessment was carried out by expert validators from the Physics Education Study Program at Sebelas Maret University. This assessment is based on three aspects, namely module aspects, material aspects, and linguistic aspects. Based on quantitative analysis using the standard deviation (Sbi) technique, the validation results for the three elements in this module are as follows:

Table 2. Analysis of Expert Validation Results on Presentation and Visual Display Aspects

Aspects	Number of Question Items	Validation Results ($\sum x$)	Average Score	Mi	Sbi
Presentation	5	20,00	4,00	15,00	3,34
Visual Display	6	23,00	3,84	18,00	4,00
Total	11	43,00	3,90	33,00	7,34

Based on the quantitative analysis in the table above, it is known that the validation score obtained in the module presentation aspect is 20.00 with an average score of 4.00 for the five question items. In the visual appearance aspect, a score of 23.00 was obtained with an average score of 3.84 for the six question items. In total, this aspect of the e-learning module received a score of 43.00 out of a maximum score of 55.00. The ideal mean in this assessment is 33.00 and the ideal standard deviation is 7.34. In order to determine the appropriateness category for the module on the media aspect in this module, analysis is required based on **Table 3.**

Table 3. Criteria for Determining Module Feasibility in the Presentation and Visual Appearance Aspects

Score Range	Criteria
$44,00 < \sum x$	Very Feasible
$44,00 \geq \sum x > 36,67$	Feasible
$36,67 \geq \sum x > 29,34$	Quite feasible

Score Range	Criteria
$29,34 \geq \sum x > 22,00$	Less feasible
$22,00 \geq \sum x$	Not Feasible

Referring to these criteria, it can be concluded that the total score of 43 belongs to the second criteria and is included in the feasible category. Based on these results, it is known that the global warming e-learning module created with Adobe InDesign CS6 is suitable for use in learning activities, seen from the presentation and appearance aspects.

The next component that has urgency to be assessed in making a module is the material presented in it. This assessment includes the depth and consistency of the material, the correctness of the concepts, and the suitability of the material to the demands of the learning objectives and the Pancasila Student Profile. Based on this assessment instrument, validation was carried out by material experts where the results are shown in **Table 4.**

Table 4. Analysis of Expert Validation Results on Learning Material Aspects

Aspects	Number of Question Items	Validation Results ($\sum x$)	Average Score	Mi	Sbi
Learning Material	7	29,00	4,14	21,00	4,67
Total	7	29,00	4,14	21,00	4,67

The distribution of scores obtained from the validation of the material aspect above shows that in this aspect, the validator needs to provide scores for seven question items with a maximum score of 35.00 and a minimum score of 7.00. The assessment results show a score of 29.00 with an ideal mean of 21.00 and an ideal standard deviation of 4.67. These results can be converted into eligibility criteria based on the following conditions:

Table 5. Criteria for Determining Module Feasibility in Learning Material Aspects

Score Range	Criteria
$28,00 < \sum x$	Very Feasible
$28,00 \geq \sum x > 23,34$	Feasible
$23,34 \geq \sum x > 18,67$	Quite feasible
$18,67 \geq \sum x > 14,00$	Less feasible
$14,00 \geq \sum x$	Not Feasible

Based on the criteria in the table above, it is known that the learning material in the e-learning module that has been created is included in the very feasible category

with a final score of 29.00. This shows that materially, this module can be used in learning activities by paying attention to the appropriateness of other aspects and input from validators.

The e-learning module that has been created will not function properly if the module cannot be read by students. The readability of this module is determined by aspects of communicative and effective language use. Therefore, an assessment of linguistic aspects by a linguist was carried out and the results are displayed in the following **Table 6**.

Table 6. Analysis of Expert Validation Results on Linguistic Structure

Aspects	Number of Question Items	Validation Results ($\sum x$)	Average Score	Mi	Sbi
Linguistic Structure	6	25,00	4,17	18,00	4,00
Total	6	25,00	4,17	18,00	4,00

The results of the linguist's assessment above show a score of 25.00 out of a maximum score of 30.00. The average score for the six question items presented is 4.16 out of a maximum score of 5.00 for each item. The standard deviation of this score is 4.00 and the ideal mean is 18.00. Based on these results, the final score for linguistic aspects can be categorized according to the following criteria:

Table 7. Criteria for Determining Module Feasibility in Learning Material Aspects

Score Range	Criteria
$24,00 < \sum x$	Very Feasible
$24,00 \geq \sum x > 20,00$	Feasible
$20,00 \geq \sum x > 16,00$	Quite feasible
$16,00 \geq \sum x > 12,00$	Less feasible
$12,00 \geq \sum x$	Not Feasible

It is known that the final score obtained from validation by language experts is 25.00, so it is classified in the first category and is considered very feasible. These results show that from its linguistic structure, this global warming e-learning module can be used in learning.

Based on the validation results on the three aspects of the e-learning module that has been created, namely the media, material and linguistic structure, it can be concluded that in terms of media presentation and appearance, this e-learning module is considered feasible. This e-learning module is also considered very feasible in terms of the material presented. Based on its

linguistic structure, this e-learning module is also considered very feasible. Based on these results, it is known that the Global Warming E-learning Module for Phase E student which was created with the help of Adobe InDesign CS6 can be used in learning by paying attention to suggestions and input from expert validators. Some of the added values of this e-learning module include: 1) the e-learning module can be accessed inside or outside the network either via a personal computer or smartphone with a built-in pdf reader program; 2) designed to be used in formal learning in class or individually by students; 3) the combination of text and images in the module will provide a real learning experience for readers; 4) pretest, posttest and remedial evaluation questions are available along with answer keys, making it easier to monitor the development of student's knowledge.

On the other hand, the global warming e-learning module that has been created is considered to still have several shortcomings, including: 1) the global warming e-learning module that has been created has not gone through the testing and implementation stages in direct learning, so several aspects still have room for adjustment; 2) This e-learning module does not provide a database to store student answers for all evaluation instruments.

4. Conclusion

Based on the description written in the previous chapter, the following conclusions can be drawn; 1) the global warming e-learning module for phase E students based on Adobe InDesign CS6 has been created by going through three stages. The first part is the preparation stage, where in this phase the researcher identifies problems, formulates learning objectives, also designing module. At the creation stage, the researcher sets the master page, organizes the text, as well as edits some of the required images and illustrations, and also sets the format of the document as output. The final stage is the completion stage where validation and revisions are carried out for the module. 2) to determine the feasibility of the global warming e-learning module for phase E students which has been created with Adobe InDesign CS6, Validation is carried out by experts on aspects of media, material, and linguistic structure of the module. The results of the analysis show that the media aspect is classified as feasible with a score of 43 out of a maximum score of 55. The material aspect gets a score of 29 out of 35 with a very feasible category, and the linguistic aspect is also rated as very feasible with a score of 25 out of 30. Based on these results, it is known that the e-learning global warming module that has been made suitable for application in learning activities.

Based on the results of research on the creation of e-learning global warming module that have been carried out, there are several suggestions as follows: 1) a database needs to be created to store student's answers to evaluation questions with the help of other software, for example Microsoft Excel and Spreadsheet; 2) further research needs to be carried out on the e-learning module products being made, so that their effectiveness can be tested; 3) the global warming e-learning module that has been created needs to be implemented in physics learning at school.

5. Acknowledgment

We would like to express our thanks to the lecturers from the Physics Education Study Program at Sebelas Maret University who guided the author in carrying out this research. Thank you also to the Faculty of Tarbiyah and Teacher Training at UIN Sulthan Thaha Saifuddin Jambi for giving the author the opportunity to present this paper at 3rd International Conference on Education.

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IJER (Special Edition)
The 3rd International Conference on Education (Icon 2023)
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