

Website-Based Module Design on Virus Materials for Class X High School

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Abstrak

This study aims to produce a website-based module on Virus material for class X high school students. This research was conducted at Universitas PGRI Sumatera Barat, Padang, West Sumatra, Indonesia in the 2022/2023 academic year. The method used in this research is ADDIE, where the stages of this ADDIE consist of analysis, design, development, implementation, and evaluation. However, considering the limited time in this research process, the researchers conducted research only up to the design stage. The instrument used in data collection used a student analysis questionnaire. Data analysis techniques in this study are descriptive data and qualitative data. Based on the results of the analysis of the teaching materials used in the learning process in the form of high school biology textbooks, it shows that the books analyzed still have several shortcomings that do not describe one of the core competencies and basic competencies. Based on the results of the analysis of students, it was found that students still have difficulty in understanding biology learning resources, especially on virus material because the material is abstract and cannot be observed directly, that many terms are not understood by students and the most. The main reason is the lack of availability of good learning resources. Thus, it is necessary to develop modules so that students better understand virus learning.

Keywords: module, ADDIE, website, virus material

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Introduction

Education is a very decisive aspect of the progress of a country, a country with an advanced education system will also affect the progress of the country (Muhamad Parhan et al., 2020). For this reason, education needs to keep up with various changes, changes in the

global world order need to be accompanied by changes in the skills needed (Faiz & Purwati, 2021). Currently, the development of learning media is increasingly being carried out starting from the use of digital books and website portals that present the field of science. Industry 4.0 requires that all work can be done using internet technology as a medium of connectivity and a forum to facilitate activities in the form of an automated system (Ismawan et al., 2020).

The use of technology in teaching and learning activities has changed the system in learning media from conventional patterns to more modern patterns. One form of change is computer media which produces electronic learning (Bakri et al., 2018). Electronic learning in general has been applied by educators in the learning process in schools. However, it still requires the creation of an educator in utilizing the technology that already exists at this time to support a creative and innovative learning process. Therefore, educators should not be fixated on face-to-face learning models in the classroom, but must also be able to use media that make it easier for them to deliver learning materials. For this reason, the availability of teaching materials plays an important role in the sustainability of learning activities in schools.

Based on the results of the analysis of teaching materials used in the learning process in the form of high school biology textbooks, shows that the books analyzed can be used in the learning process. However, in these teaching materials, there are still some shortcomings that must be followed up by the indicators of achievement of KI & KD such as deficiencies in the aspect of material suitability, in terms of presenting images that are not clear to facilitate students' understanding of the material they are studying. Therefore, additional teaching materials are needed to complement the existing deficiencies in these teaching materials that are by the core competencies and basic competencies set.

Based on the results of observations and interviews in the field, several problems were found, among others, there were still many students who did not have handbooks during the learning process. In this condition, teaching materials for students are needed to help students learn independently, both at home and at school. The number of teaching materials provided is still lacking, so not a few of the students do not have handbooks due to the limitations of books provided by the school. The teaching materials used are still manual, whereas students still use printed books. In addition, educators and students have never used a website-based module in the biology learning process.

Biology is a science whose study is very broad because it discusses all living things on the entire surface of the earth (Roni, 2018). Biology is part of the Natural Sciences (IPA) which includes the sciences or knowledge related to life in this universe. This knowledge can be in the form of facts, concepts, theories, or generalizations that explain the symptoms of life (Suryaningsih, 2017). Viruses are one of the materials contained in biology learning. This material is addressed to senior high school students of class X odd semester with KD (Basic Competence) 3.4, namely analyzing the structure, replication, and role of viruses in life; and 4.4, namely conducting a campaign about the dangers of viruses in life, especially the dangers of AIDS based on their virulence level. Based on these basic competencies, students are expected to be able to gain knowledge about the characteristics of viruses, the structure of the virus body, how to replicate viruses, and the beneficial or detrimental role of viruses in everyday life. In the virus material, there are many uses of language, Latin terms, and images that are difficult for students to understand. Thus, most students have difficulty in distinguishing viruses and bacteria along with the names and diseases they cause.

To overcome these problems, a website-based module learning media is needed that can support the learning process. This website-based module, can help students in carrying out the learning process independently at home and school. In other words, through this website-based module, students can access it anytime and anywhere. As we know, students, in general, are already using smartphones at home and school. In addition, the school has also

allowed students to bring smartphones to school and given facilities in the form of WiFi to be used during the learning process. In this case, it can make it easier for students to access the website-based module.

The module is a self-study package that includes a series of learning experiences that are planned and systematically designed to help students achieve learning goals (Mulyasa, 2004). A module is a small unit of learning that can operate on its own. That is, the implementation of learning can run without the direct presence of educators (Yaumi, 2018). A website is a system that provides support for users who will interact with a web-based interface and can be accessed by a browser (Santosa & Ismaya, 2021). The website includes a series of several pages on the internet that have interrelated topics to present information (Sitinjak Daniel Dido Jantce TJ & Suwita, 2020). It can be concluded that the website is a collection of digital pages that contain information in the form of text, animation, images, sound, and video or a combination of everything connected by the internet so that it can be seen by all who are connected to the internet network (Sari et al., 2019).

Online-based learning media by utilizing the website, in its application where students already know and learn the material first, so that when face-to-face in the learning process becomes more effective and efficient, which means there is reciprocity between teachers and students. The use of website-based learning media can connect learning between educators and students in an online learning room. The material presented using this website-based media makes it easier for students to be able to learn the material first and students are required to study independently which will help them to better understand the material taught by teachers at school.

One of the learning media that can accommodate the learning process is to use the media website. The advantage of this website is that it makes it easier for students to get learning tools that are already available on the website, wherever they are they can get practical learning tools. In addition, with this website-based module, educators no longer have difficulty in explaining the material in class, and educators are no longer bothered if there are students who lack teaching materials, due to the site-based module so the learning process is expected to be more effective and attract students' interest. Based on the explanation above, the researchers are interested in conducting research under the title "Website-Based Module Design on Virus Materials for Class X High Schools"

Methodology

The type of research conducted is development research using the ADDIE model developed by Lee & Owens (2004). The ADDIE model consists of five stages, namely 1) analysis, 2) design, 3) development, 4) implementation and 5) evaluation. However, considering the limited time in this research process, the researchers conducted research only up to the design stage (Figure 1).



Figure 1. ADDIE development model drawing (Sugiyono, 2015)

In the validity analysis, the validation of the assessed aspects is presented in the form of a validation table and suggestions for improvement. The assessment sheet that has been filled out by the validator is then analyzed to determine the quality of the instrument data quality, language, and media expert validation.

- a) Giving a score for each criterion based on a Likert scale modified from (Riduwan, 2013) as follows:
 - SS = Strongly Agree (weight 5)
 - S = Agree (weight 4)
 - KS = Disagree (weight 3)
 - TS = Disagree (weight 2)
 - STS = Strongly Disagree (weight 1)
- b) Determine the highest score, by:
 - Highest score = number of validators × number of indicators × maximum score
- c) Determine the total score of each validator, by adding up all the scores obtained from each question item.
- d) Determine the score obtained by adding up the scores from each validator.
- e) Determination of the value of validity, by means (Riduwan, 2013) as follows:

$$\text{Validation Value} = \frac{\text{Total score obtained}}{\text{Maximum score}} \times 100\%$$

- f) Provide a validity assessment, with criteria modified from (Riduwan, 2013) as follows:
 - 81%-100% = very valid
 - 61%-80% = valid
 - 41%-60% = quite valid
 - 21%-40% = less valid
 - 0%-20% = very less valid

In the practical analysis, the results of the validation of the assessed aspects are presented in the form of a table. Practical test data on the use of website-based modules is carried out with a percentage (%), using the following formula (Riduwan, 2013):

$$\text{Practical Value} = \frac{\text{Total score obtained}}{\text{Maximum score}} \times 100\%$$

After the percentage is obtained, then the grouping is carried out according to the criteria modified from (Riduwan, 2013) as follows:

- 81%-100% = very practical
- 61%-80% = practical
- 41%-60% = quite practical
- 21%-40% = less practical
- 0%-20% = very impractical

Result

1) Analysis

The needs analysis stage is carried out to find out the need for the development of website-based module learning tools. At this stage, preliminary research was conducted, namely observation of the condition of learning facilities, teachers, and students. With this preliminary research, it is expected to obtain several aspects of needs analysis, namely:

- a. The book analysis, based on the results of the analysis of the teaching materials used in the learning process in the form of high school biology textbooks, shows that the books being analyzed still have several shortcomings that do not describe one of the core competencies and basic competencies. In addition, based on the results of interviews conducted in the field, it was found that the school had never used website-based teaching materials.
- b. Material analysis, based on the results of the material analysis, showed that the viral material presented in the learning resource was by the learning objectives. The learning resources are equipped with pictures that can help students understand the virus material.
- c. Analysis of learning objectives, based on the results of the analysis of learning objectives, shows the suitability of the material from the teaching materials presented with the learning objectives presented by the teacher.
- d. Analysis of the needs of teaching materials, based on the results of the analysis of the needs of teaching materials, it was found that both teachers and students need the development of teaching materials, especially in the modules that will be developed based on websites that can support the learning process.
- e. Analysis of students, based on the results of the analysis of students, it was found that the way in studying virus material in general, students preferred how to read, see and observe. Students have difficulty in studying viral material because the material is abstract and cannot be observed directly, many terms are not understood by students, and most importantly the lack of availability of good learning resources. lack of learning resources they have. Students need learning resources about virus material that can be understood independently. Good learning resources according to students are readings accompanied by pictures; use of language that is easy to understand; the material presented is complete, concise, concise, and clear; there is additional external information relating to the material, and there are explanations for difficult-to-understand terms.

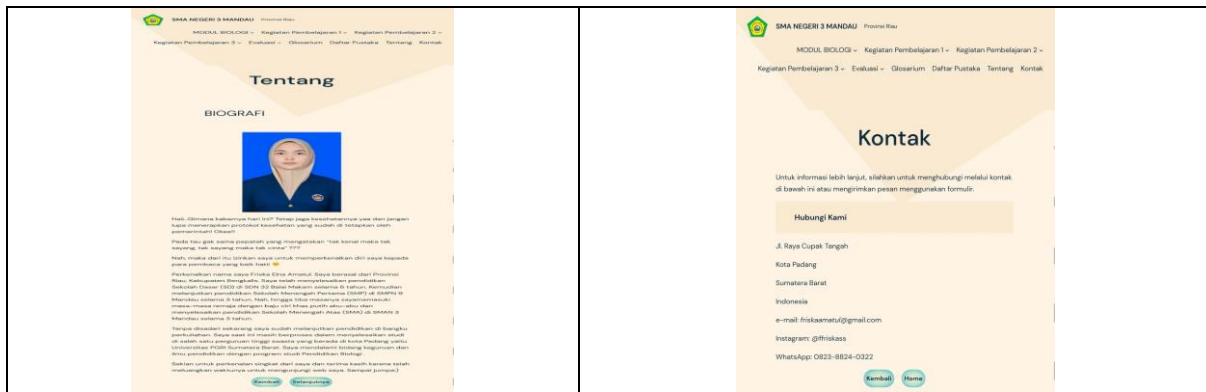
2) Design

After carrying out the need analysis stage, and collecting information related to research, it is obtained an overview of the website-based biology module will be developed. The next stage is to develop a website-based biology module design. The following are the results of the designs that have been developed:

Table 1. Results of website-based module design/design

Appearance		
		

<p>SMA NEGERI 3 MANDAU Provinsi Riau</p> <p>MODUL BIOLOGI - Kegiatan Pembelajaran 1 - Kegiatan Pembelajaran 2 - Kegiatan Pembelajaran 3 - Evaluasi - Glosarium Daftar Pustaka Tentang Kontak</p> <h3>Peta Konsep</h3> <p>Kembali Selanjutnya</p>	<p>SMA NEGERI 3 MANDAU Provinsi Riau</p> <p>MODUL BIOLOGI - Kegiatan Pembelajaran 1 - Kegiatan Pembelajaran 2 - Kegiatan Pembelajaran 3 - Evaluasi - Glosarium Daftar Pustaka Tentang Kontak</p> <h3>Petunjuk Penggunaan Modul</h3> <p>Seperti anda ketahui mencapai kompetensi dalam mempelajari modul ini maka anda perlu petunjuk berikut:</p> <ol style="list-style-type: none">1. Bacalah modul ini secara berurutan dan pahami isinya.2. Anda dapat mempelajari keseluruhan modul ini dengan cara yang berurutan. Jangan memisahkan diri sebelum benar-benar menguasai bagian demi bagian dalam modul ini, karena masing-masing saling berkaitan.3. Laksanakan semua tugas-tugas yang ada dalam modul ini agar kompetensi anda berkembang sesuai kompetensi yang diharapkan.4. Setelah mempelajari materi anda harus mulai dan menguji penguasaan penguasaan (tesan materi) menggunakan tugas-tugas, dan mengerjakan soal latihan. <p>Kembali Selanjutnya</p>																										
<p>SMA NEGERI 3 MANDAU Provinsi Riau</p> <p>MODUL BIOLOGI - Kegiatan Pembelajaran 1 - Kegiatan Pembelajaran 2 - Kegiatan Pembelajaran 3 - Evaluasi - Glosarium Daftar Pustaka Tentang Kontak</p> <h3>Kegiatan Pembelajaran 1</h3> <p>Wendell Meredith Stanley</p> <p>Gambar Wendell Meredith Stanley (Sumber: Dwi Hartono, 2014)</p> <p>Pada tahun 1935, Wendell Meredith Stanley, seorang ilmuwan Amerika berhasil mengidentifikasi partikel penyebab penyakit pada tanaman tembakau. Penyakit ini kemudian dikenal dengan nama Tobacco Mosaic Virus (TMV) (Imaningtyas, 2014).</p> <p>Untuk lebih memahami mengenai sejarah penemuan virus, silahkan anda klik dan pahami video dibawah ini:</p> <p>Kembali Selanjutnya</p>	<p>SMA NEGERI 3 MANDAU Provinsi Riau</p> <p>MODUL BIOLOGI - Kegiatan Pembelajaran 1 - Kegiatan Pembelajaran 2 - Kegiatan Pembelajaran 3 - Evaluasi - Glosarium Daftar Pustaka Tentang Kontak</p> <h3>Kegiatan Pembelajaran 2</h3> <p>Replikasi Virus</p> <p>Kembali Selanjutnya</p>																										
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Asam Nucleat	Makromolekul biologis yang kompleks, berstruktur, stabil, dan merupakan elemen utama substansi yang mengandung informasi genetik.																										
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Discussion

The first stage carried out in this research is to analyze the potential and existing problems to be solved with the right solution. At this stage, the researchers conducted an analysis of environmental conditions, the learning process, student understanding, learning support facilities, materials, and subject syllabus. Furthermore, the researchers analyzed the existing problems from these aspects to be overcome. To overcome the existing problems, researchers developed a media trainer as a practical learning medium to solve existing problems.

The product design stage is carried out by designing the basic form of a three-phase electric motor load trainer and designing a user manual. Product designs are made considering the needs of students. At this stage, it begins with designing the product to be developed. At this stage, a website-based module will be designed according to KI, KD, material achievement indicators, and learning objectives. The steps taken at this stage, namely 1) Create a product design in the form of a website-based module, the thing to do is make the initial display and the main menu in the form of writing and editing the product; 2) The selection of the website-based module format is adjusted to the required format and the format available on the website that will be used and by the characteristics possessed by students. Then the choice of color on the website background, the researcher uses beige which is categorized as a neutral color that symbolizes calm and relaxation. The writing color used in the website-based module is to use black so that it can be seen clearly by the reader. After that, make media content whose structure has also been adjusted to the media structure at the design stage, namely titles, instructions for use, core competencies, basic competencies, indicators, learning objectives, subject matter, practice questions, evaluations, answer keys, and a glossary.

As we know, every student has different characteristics. According to Piaget (in Masganti, 2012) Junior High School and Senior High School or Vocational High School students who are generally aged 15-17 years have different developmental characteristics from students aged 5-6 years, so it is necessary to select the appropriate module format. with the characteristics possessed by students. Generally, students aged 15-17 years have more characteristics in learning styles in the form of visual styles. Visual learning styles are included in the best learning styles, where information is presented containing pictures, tables, maps, or diagrams with activities that are more directed to viewing and reading activities. Through this learning style, the researchers gave designs with the addition of pictures that support the content of the material in the module accompanied by videos that can help students to increase their understanding of the material.

Conclusion

Based on the results of the analysis of the teaching materials used in the learning process in the form of high school biology textbooks, it shows that the books analyzed still have several shortcomings that do not describe one of the core competencies and basic competencies. Based on the results of the analysis of students, it was found that students still have difficulty in understanding biological learning resources, especially on virus material. Students find it difficult to study virus material because the material is abstract and cannot be observed directly, many terms are poorly understood by students, and most importantly the lack of availability of good learning resources. Based on the results of the needs analysis, it was found that they had never used a print-based or online module, so it was necessary to develop a module so that students better understand virus learning.

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