



Web Learning for Pharmacology Courses

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Abstract

The learning and teaching process that uses web-based learning media for distance education must be independent and responsible for the learning process. Web-based learning media can learn anywhere, anytime, as long as the tools are available. The research objective was to analyze web-based learning media for distance education. This study uses a systematic literature review method using Preferred Reporting Items for Systematic Review (PRISMA). The research objective was to identify web-based biology learning media for distance education. The results of the study show that through web-based learning media, students can search for and retrieve information or learning materials based on the syllabus or criteria set by the teacher or education manager. Learners will have a wealth of information and can access information from anywhere related to their learning material. Web-based Biology learning media used for distance education can be improved by using well-designed, professional, attention-grabbing learning materials.

Keywords: learning media, web-based learning, pharmacology

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Introduction

Web-based learning media material besides being easy to understand also facilitates the student learning process without having face-to-face meetings with the teacher. The learning process of students learning biology can be done by utilizing the menus provided in the media independently (Abuhassna et al., 2020). This ease of operation is supported by basic skills in using web-based learning media. The basic skills in question include skills using Microsoft Office Word, the internet, files, e-mail, and attaching documents when sending e-mails (Dhawan, 2020). The basic skills of using web-based learning media have been mastered by students since junior high school (Prayogo,

2022). Web-based learning media is one interactive multimedia (Wijaya, 2019), which is multimedia equipped with a controller that can be operated by the user so that the user can choose what he wants for the next process (Wijaya, 2019). One of the benefits obtained from this web multimedia is that the learning process is more interesting thereby increasing the attractiveness and attention of students (Herianto & Wilujeng, 2021; Abbas et al., 2019); Paul & Jefferson, 2019; Barut Tugtekin & Dursun, 2022).

Students in the use of web-based media in pharmacology learning can clarify the presentation of messages so that they are not too verbal, or abstract, and overcome the limitations of space, time, and sensory power such as objects that are abstract or too small (Brame, 2016). Web-based learning media is said to be a learning media because it is a tool that can help the teaching and learning process to clarify the meaning or message conveyed and is easy to operate so that teaching objectives can be achieved better even without being accompanied by a teacher to support the independent learning process (Iqbal et al., 2021; Darling-Hammond et al., 2020). Web-based learning, in pharmacology lessons, will help teachers make the learning process more effective (Vekli & Çalik, 2023; Lagoudakis et al., 2022). The research objective was to analyze web-based pharmacology learning media for distance education. Through web-based pharmacology learning media, students can access materials, assignments, and quizzes wherever and whenever given by the teacher, both from a short distance or a distance. However, face-to-face learning is still needed, to explain learning materials. This research is the first literature review that analyzes web-based learning media for distance education, especially in the field of pharmacology.

Methodology

This study used Preferred Reporting Items for Systematic Reviews (PRISMA). The stages of systematic literature review are divided into 4 stages, namely planning (designing review questions and planning methods), data collection (searching for keywords, screening of titles and abstracts, filtering & assessment, and data extraction), analysis stage (descriptive and thematic analysis), then ending with synthesis (discussion) and compiling research reports (Moher et al., 2010). A literature search was conducted on articles published in 2015-2023 in the Scopus, Web of Science, and Google Scholar databases. Article searches were carried out using the keywords biology, learning media, web-based learning, distance education, and digital media.

Results and Discussion

Learning in distance education

Distance learning is learning that is carried out using a medium that allows for interaction between students and teachers (Fitzgerald et al., 2023). The interaction in question is the interaction between students and teachers not face to face directly as learning is usually done in the classroom or the same place. However, interactions in distance education are not face-to-face, which means that students and teachers are in different places, even at great distances (Vorlíček et al., 2023). With the implementation of distance learning the presence of students and teachers is not always physically present together in the classroom. Implementation can also take the form of fully using a hybrid system or a mixture or collaboration of distance learning and blended learning (Dunbar-Morris et al., 2023). In its implementation, several important factors must be considered so that the distance education (learning) system can run well, namely the level of attention (concentration) from students and teachers, teacher confidence, experience, creativity in carrying out the learning process, understanding in using the internet or e-learning, and the ability to interact with students. The findings of the current study were incorporated in a 6-article review on learning in distance education (Table 2).

Table 2. Distance education

Sources	Learning in distance education
(Sagita & Khairunnisa, 2020; Dona Fitriawan, 2022; Alfilail et al., 2022; Azriani et al., 2022)	E-learning
(Mohd Basar et al., 2021; Suci et al., 2022)	Online learning

Based on Table 2, six articles related to learning in distance education were obtained. E-learning found 7 articles saying that e-learning is information and communication technology that will help students to learn whenever and wherever. E-learning has a broad concept meaning that the media used in e-learning is not only media that must be connected to the internet/network only (online) but can also use media that is not connected to the internet (offline) (Sagita & Khairunnisa, 2020; Dona Fitriawan, 2022; Alfilail et al., 2022; Azriani et al., 2022). For example, radio, interactive TV, and LCD projectors and articles related to learning in distance education, the second is online learning, two articles obtained, namely (Mohd Basar et al., 2021; Suci et al., 2022) said that online learning is learning that as a whole in the delivery of learning is carried out using the help of the internet and supported by other technologies. Online learning is also part of e-learning which has the meaning of learning using a computer network connected to the internet. The media used in online learning must be connected to the internet (online).

Easy interaction is one of the advantages of learning using a distance system which can be used as a means to develop access to education in the general public because the flexible system is not limited to time, distance, and place (Turan et al., 2022; Joaquin et al., 2020). It can also be utilized by many people from various geographical, social, cultural, and economic backgrounds. Although it has various advantages of distance learning, it also has several drawbacks, namely the quality of technology that is not fully able to meet the needs of all levels of society, the interaction between students and teachers is inadequate and experience in implementing distance learning is still lacking (Lassoued et al., 2020). Learning in the network is divided into 2 namely:

1. E-learning

E-learning is an information and communication technology that will help students to learn anytime and anywhere. E-learning has a broad concept meaning that the media used in e-learning is not only media that must be connected to the internet/network only (online) but can also use media that is not connected to the internet (offline). For example radio, interactive TV, and LCD projector (Sagita & Khairunnisa, 2020; Dona Fitriawan, 2022).

2. Online learning

Online learning is learning that as a whole the delivery of learning is carried out using the help of the internet and supported by other technologies (Mohd Basar et al., 2021). Online learning is also part of e-learning which has the meaning of learning using a computer network connected to the internet. The media used in online learning must be connected to the internet (online) (Suci et al., 2022).

Learning media in education 4.0

Learning media is a form of tool provided by the teacher to stimulate or encourage students to facilitate learning (Cilliers, 2021). The form of this learning tool can be in the form of audio, visual, or audio-visual media (Dziuban et al., 2018) states that the media are various types of components in the student's environment that can stimulate them to learn. Meanwhile (Sung et al., 2016; Cheung & Ng, 2021) argue that media are all physical tools that can present messages and stimulate students to learn. Books, films, tapes, and frame films are examples (Tan, 2018). The Association of Educational Communication Technology (Sutisnawati, 2021) argues that learning media is everything that people

use to convey messages. Based on some of these descriptions, it can be concluded that learning media is a tool used to channel messages or information (learning material) as well as to stimulate students in the teaching and learning process to achieve the learning objectives that have been formulated. There were 8 articles related to various types of learning media which explained that the development of science and technology affected teaching and learning activities in schools (Table 4) so the learning media used had to follow the needs of the learning process. Can be grouped into four groups, namely media resulting from printing technology contained in the article (Mayembe & Nsabata, 2020; Sengkey et al., 2021), the media resulting from audio-visual technology contained in the article (Saputra et al., 2018; Indrayanti et al., 2023), computer-based technology-generated media found in the article, media resulting from a combination of print and computer technology is contained in the article (Aksa, 2017; Utomo et al., 2021).

Table 4. Learning media

Sources	Kinds of Learning Media
(Mayembe & Nsabata, 2020; Sengkey et al., 2021)	Media results of printing technology
(Saputra et al., 2018; Indrayanti et al., 2023)	Media results of audio-visual technology
(Marpanaji et al., 2018b; Schindler et al., 2017)	Computer-based technology media
(Aksa, 2017; Utomo et al., 2021)	Media results from a combination of printing and computer technology

Conclusion

The results of the study show that through web-based learning media, students can search for and retrieve information or learning materials based on the syllabus or criteria set by the teacher or education manager. Learners will have a wealth of information and can access information from anywhere related to their learning material. Web-based Biology learning media used for distance education can be improved by using well-designed, professional, attention-grabbing learning materials.

Conflicts of Interest

The authors declare no conflict of interest

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