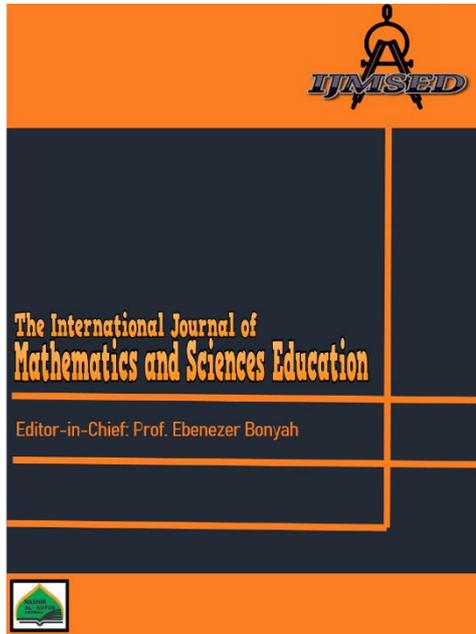




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Development of Biawak Island digital encyclopedia for conservation biology lecture

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Abstract

Conservation Biology is an interdisciplinary science whose purpose is to encourage the development of theory and application in conservation areas. Biawak Island is one of the leading conservation areas in the Indramayu district, therefore conservation biology learning should be done directly on Biawak Island. In practice, studying conservation biology directly on Biawak Island is difficult because of the long distance and expensive access to this place. Based on these problems, a digital encyclopedia of conservation on Biawak Island is needed to solve the problem of needing media that can become a medium for studying conservation in this hard-to-reach area. The method in this research is quantitative, and the research design is development research using the ADDIE development model (Analysis, Design, Development, Implementation, Evaluation), but does not include implementation and evaluation phases. The name given to the encyclopedia is PULBIN PEDIA, which was created using the PHP programming language. The content includes a profile of Biawak Island and conservation on Biawak Island, which contains multimedia narrative text, images, and videos. The digital encyclopedia has a control device that allows users to explore the encyclopedia's contents independently and can be updated at any time by the administrator. The validation expert results show that the PULBIN PEDIA encyclopedia is very valid as a learning medium for students and college students.

Keywords: conservation biology, digital encyclopedia, Biawak Island

1. Introduction

Conservation Biology is an interdisciplinary science whose purpose is to encourage the development of theory and application in the design and management of nature reserves to maximize habitat and species diversity and minimize interference from human habitation, agriculture, industry, and recreation (Dubynin, 2021). Indonesia has many conservation areas, one of which is Biawak Island. Biawak Island is one of the leading conservation areas in the Indramayu district with coral reefs and water lizards (*Varanus salvator*) as the main attraction (Solihudin et al., 2020; Hanjar et al., 2016; Salsabiela et al., 2017). Therefore, based on these facts, conservation biology learning should be done directly on Biawak Island.

In practice, studying conservation biology directly on Biawak Island is difficult because of the long distance and expensive access to this place. Transportation and accessibility to Biawak Island is complicated due to the lack of



crossing facilities and the travel time is more than 4 hours (Nurlaela & Warlina, 2018). Biawak Island is located off the Java Sea coast and 50 km north of Indramayu beach (Rahmadeni et al., 2017). Based on these problems, a solution is needed so that students can still learn about conservation biology on Biawak Island without traveling there.

One alternative learning resource that can be made for biology conservation learning is a digital encyclopedia. The digital encyclopedia is dictionary information is structured, in-depth information and equipped with visual information (Sari et al., 2019). The difference between encyclopedias and other learning resources is pictures or illustrations accompany that information according to the topics discussed. The information can be found easily because they have been arranged alphabetically (Audriansyah et al., 2022). According to Aulia et al. (2021) encyclopedias can be used as learning resources with accurate and up-to-date information and can broaden their readers' horizons.

Based on these problems, a digital encyclopedia of conservation on Biawak Island is needed to solve the problem of needing media that can become a medium for studying conservation in this hard-to-reach area. Therefore, this research will develop a digital encyclopedia that provides accurate and up-to-date information about ongoing protection on Biawak Island, presented in a structured, in-depth manner and accompanied by visual and audiovisual communication.

2. Methods

The method in this research is a quantitative method, and the research design is development research using ADDIE development model (Analysis, Design, Development, Implementation, Evaluation) (Muruganantham, 2015). Its phase consists of an analysis of student learning difficulties, design of things to be loaded in the digital encyclopedia based on the learning outcome of study and facts in the field, digital encyclopedia making, and expert judgement. This research does not include implementation and evaluation phases.

The analysis stage includes determining needs and front-end analysis. Determining needs focuses on determining the current situation. The current situation is the need for media that can overcome the difficulties of learning directly in the field in conservation biology lectures. Front-end analysis then determines how to solve the problem with an outcome-based solution.

The design stage is the planning stage for creating a digital encyclopedia. Things that are designed include the type of programming language that will be chosen, the name of the digital encyclopedia, the content that will be included, and the external layout of the encyclopedia. The result of this stage is a "design document" that contains a narrative description of the programming language, the narrative name of the digital encyclopedia, the description content to be included, and the external layout of the encyclopedia.

The development stage is the stage where the encyclopedia is created and validated. Making digital encyclopedias is carried out by experts (programmers). Researchers submitted data such as "design documents" as well as photos and videos about Biawak Island's conservation to experts to be then used to create a "digital encyclopedia of Biawak Island". Development then continued with media

and material expert validation, which aims to provide information and evaluate and provide suggestions on the results of the digital encyclopedia that has been created.

3. Findings and Discussion

Analysis Phase

One of the mandatory teaching materials that must be included in conservation biology courses is "knowledge about conservation that occurs in a specific area." The closest conservation area suitable for teaching material is "Conservation on the Biawak Island". In practice, studying conservation biology directly on Biawak Island is difficult because of the long distance and expensive access to this place. Based on these problems, a solution is needed so that students can still learn about conservation biology on Biawak Island without traveling there. Front-end analysis determines how to solve the problem through a digital encyclopedia. The digital encyclopedia is an alternative solution so that students can learn about conservation on Biawak Island without having to travel there because all the information about the preservation of Biawak Island will be written there, and students can learn actively independently through exploring the encyclopedia.

Design Phase

The programming language used to create digital encyclopedias is PHP (Hypertext Preprocessor). PHP is an open-source programming language generally used to build dynamic and interactive web applications. PHP was chosen because the digital encyclopedia that will be created has dynamic and interactive characteristics. Active means that the content in the encyclopedia can be updated regularly, while interactive means that the encyclopedia contains many elements (text, visuals, audiovisuals) equipped with control devices (click or arrow buttons) that allow users to choose the following process actively. The digital encyclopedia will be named PULBIN PEDIA, an acronym for Biawak Island Indramayu encyclopedia. This name was chosen because it could represent the name of the place, the name of the district, and the name of the media being created (encyclopedia). The content included in PULBIN PEDIA is a profile of Biawak Island and conservation at Biawak Island with details of sub-content and multimedia elements.

Table 1

The Content that will be included in PULBIN PEDIA

No	Content	Sub-Content	Multimedia Element
1	Profile of Biawak island	The origin of the name Biawak Island	Video, photo, text narrative
		Biawak Island Administrator	Video, photo, text narrative
2	Conservation at biawak island	Geographical conditions and general description of Biawak Island	Video, photo, text narrative
		Biawak Island conservation area (abiotic component, dominance of flora and fauna)	Video, photo, text narrative
		Conservation activities at Biawak Island (in the past in the past and ongoing)	Video, photo, text narrative
		Endemic flora and fauna in Biawak Island	Video, photo, text narrative

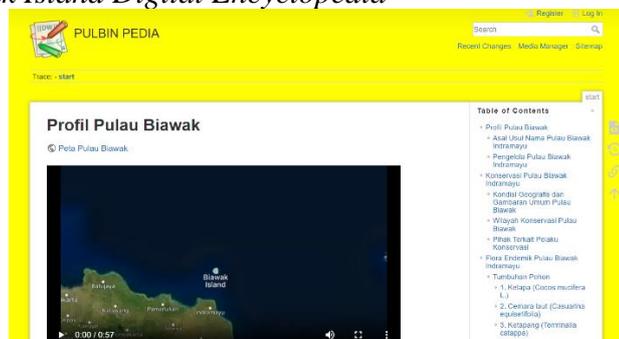


Development Phase

This section will discuss the digital encyclopedia and the result of media validation. The digital encyclopedia has been created and can be accessed at the link: <https://publinpedia.vilabio.my.id/go/doku.php?id=start> . The layout of the digital encyclopedia is shown in the following image.

Figure 1

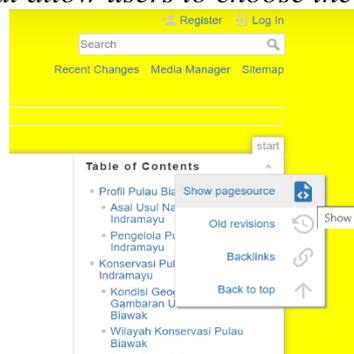
Layout of Biawak Island Digital Encyclopedia



Here is a control device that allows users to explore the encyclopedia's contents independently.

Figure 2

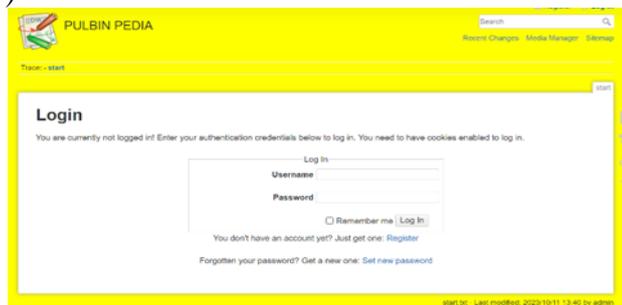
View of Control devices that allow users to choose the next process actively



The administrator can update the digital encyclopedia by clicking the log-in button (fill in username and password) and then editing the desired data.

Figure 3

Content in the encyclopedia can be updated regularly by the Administrator (log in as administrator)



Media validation results. Two validators validated media as media experts and material experts. The result of validation is shown in Table 2.

Table 2

Media Validation Result

Validator	Validation Criteria
Media Experts	90.00 %
Materials Experts	92.00 %

The results of the digital encyclopedia validation test conducted by two validators obtained the value of validation criteria was very high with an average percentage of 91.00 %. Hence, the digital encyclopedia is very valid.

Discussion

Conservation biology learning contains teaching material that requires students to take field trips to conservation areas. Biawak Island is one of the leading conservation areas in the Indramayu district, with coral reefs and water lizards (*Varanus salvator*) as the main attraction (Solihudin et al., 2020; Hanjar et al., 2016; Salsabiela et al., 2014). In practice, studying conservation biology directly on Biawak Island is difficult because of the long distance and expensive access to this place. Therefore, alternative learning sources are needed to provide complete information regarding conservation activities and biodiversity on Biawak Island. One of the alternative learning sources that can be applied is digital media. Digital media can be in the form of websites, images, digital video or digital audio (Earnshaw, 2017). These digital media can be collected in one media called a digital encyclopedia.

The characteristics of environmental science and conservation biology teaching materials generally consist of a factual knowledge dimension (Frick et al. 2004). The size of real knowledge includes everything that is reality and truth, including the names of objects, events, symbols, places, people, and terms of parts or components of an object (Anderson & Krathwohl, 2001). The factual dimension can be taught through technology that displays interactive teaching materials, which contain information in the form of text narratives combined with visual (photo) and audiovisual (video) multimedia (Tuma, 2021). Based on these characteristics, digital encyclopedias are very suitable for learning conservation biology because they can present factual knowledge accurately, structured, in-depth, and accurate because they are equipped with technology that provides interactive text and multimedia (photos and videos).

Another characteristic of environmental science and conservation biology teaching materials is that they are dynamic (change over time), because conservation activities and biodiversity in a particular area will usually constantly change over time (Nahdi, 2008; Irni et al., 2017; Tefarani et al., 2019). For example, the diversity of the Lepidoptera population in the Gunung Leuser National Park area constantly changes every month (Irni et al., 2017). The characteristics of material whose information content is continually changing need to be accommodated by media whose settings can be changed or updated by the current situation (Tatroe & MacIntyre., 2020). Based on these characteristics, digital



encyclopedias are learning media suitable for learning conservation biology because they provide access for admins to change the encyclopedia's content based on the latest data so that it is dynamic.

Digital learning media, such as digital encyclopedias, has various advantages because of its dynamic and interactive characteristics. The advantage of dynamic and interactive digital learning media is that it is easy to use (Tatroe & MacIntyre, 2020). Another advantage is that users will be comfortable using the application without remembering the flow they need to do by memorizing the layers (Prasetio, 2016). Apart from that, digital media, which is dynamic and interactive, can make it easier for students and teachers to carry out the learning process at any time without limits, as provided by the school (Putra, 2019).

The result of the digital encyclopedia validation test conducted by two validators obtained the value of validation criteria was very high with an average percentage of 91.00 %. So, the digital encyclopedia is very valid. This means that PULBIN PEDIA digital encyclopedia can be very valuable as a learning medium for students and college students.

4. Conclusion

An encyclopedia has been produced called PULBIN PEDIA, which was created using the PHP programming language. The content includes a profile of Biawak Island and conservation on Biawak Island, which contains multimedia narrative text, images, and videos. The digital encyclopedia has a control device that allows users to explore the encyclopedia's contents independently and can be updated at any time by the administrator. The validation expert results show that the PULBIN PEDIA encyclopedia is very valid as a learning medium for students and college students.

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