

DEVELOPMENT OF PTERINTIFIER (PTERIDOPHYTA IDENTIFIER) BASED ON INSTAGRAM AS A LEARNING SOURCE AND TO TRAIN DIGITAL LITERACY FOR 10TH GRADE IN SENIOR HIGH SCHOOL

Pengembangan Pterintifier (Pteridophyta Identifier) Berbasis Instagram Sebagai Sumber Belajar Untuk Melatihkan Literasi Digital Siswa Kelas X SMA

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Abstract

Digital literacy is a student's ability that must master in the 21st century. One of the efforts to practice digital literacy is to use social media as a learning resource. Pterintifier (Pteridophyta Identifier) uses Instagram as a learning resource with the account name Pterintifier.id, presenting information on ferns. The purpose of this study is to produce a Pterintifier as a learning resource for the diversity of ferns to practice digital literacy that is feasible theoretically, empirically, and effectively. This study uses a 4D model without the stage of being disseminated. The pterintifier eligibility parameters are based on validation results from 3 validator (botanist, education expert, biology teacher), student responses, and user effectiveness. The research instruments are validation assessment instruments, student response questionnaires, and the point of the Pterintifier. The validation assessment includes aspects of content, presentation, learning resources, and digital literacy, while the response questionnaire consists of 20 statement items related to aspects of concept presentation and physical presentation. The data analyzed by descriptively quantitatively. The results showed that the validity of the Pterintifier was 3,69 (very valid). The effectiveness of Pterintifier to train digital literacy based on student success and student responses. Based on the success of using the Pterintifier, the results were 98,3 (very good), and positive student responses were 98,3 (very good). Thus, this development research resulted in the Pterintifier as a theoretical, empirical, and effective learning resource as learning resource for fern diversity to practice digital literacy.

Keywords: Instagram, learning souce, digital literacy, fern diversity.

Abstrak

Literasi digital adalah kemampuan peserta didik yang harus dikuasi di abad ke-21. Salah satu upaya untuk melatih literasi digital yaitu dengan memanfaatkan media sosial sebagai sumber belajar. Pterintifier (Pteridophyta Identifier) menggunakan Instagram sebagai sumber belajar dengan nama akun Pterintifier.id, menyajikan informasi tumbuhan paku meliputi perawakan, batang, rimpang, daun, dan sorus serta nama ilmiah, nama lokal, ciri karakteristik dan manfaat tumbuhan paku. Tujuan penelitian adalah menghasilkan Pterintifier sebagai sumber belajar keanekaragaman tumbuhan paku untuk melatih literasi digital yang layak secara teoretis, empiris, dan efektivitas. Penelitian ini menggunakan model 4D, tanpa tahap disseminate. Parameter kelayakan Pterintifier berdasarkan hasil validasi, respons siswa, dan efektivitas pengguna. Instrumen penelitian berupa instrumen penilaian validasi, angket respons siswa, dan keefektifan Pterintifier. Penilaian validasi mencakup aspek isi, penyajian, sumber belajar dan literasi digital, sedangkan angket respons terdiri dari 20 butir pernyataan terkait aspek penyajian konsep dan penyajian fisik. Data dianalisis secara deskriptif kuantitatif. Hasil penelitian menunjukkan validitas Pterintifier sebesar 3,69 (sangat valid). Keefektifan Pterintifier untuk melatih literasi digital berdasarkan keberhasilan siswa dan respons siswa. Berdasarkan keberhasilan menggunakan Pterintifier menunjukkan hasil sebesar 98,3 (Sangat baik) dan respons positif siswa sebesar 98,3 (sangat layak). Dengan demikian penelitian pengembangan ini menghasilkan Pterintifier sebagai sumber belajar yang layak secara teoretis, empiris, dan efektif sebagai sumber belajar keanekaragaman tumbuhan paku untuk melatih literasi digital.

Kata Kunci: Instagram, sumber belajar, literasi digital, keanekaragaman tumbuhan paku.

INTRODUCTION

Currently, the use of internet technology is increasing very rapidly, especially in the conditions of the Covid-19 pandemic. The Covid-19 pandemic has had a significant impact on various aspects, one of them is education. Still, this situation has not discouraged educators and students from carrying out teaching and learning activities at home by utilizing internet technology, commonly referred to as online learning. Following the 21st-century educational revolution, which is increasingly going digital, information sources are no longer centered on libraries. The development of internet technology, it can facilitate people to find some information by using searching engine (Nurhayati, 2016).

The development of technology and information, especially the internet, can be used by the world of education to make it a means of learning, both outside and in the classroom. Various learning alternatives can be raised from the use of the internet, one of which is social media as a learning resource. Social media is a place to facilitate communication between users and invites anyone interested and looking for the information in participating by giving feedback openly, giving comments, and sharing information in a fast and unlimited time (Jaelani, 2020).

A survey conducted by Irwandani and Juariah (2016) in the city of Lampung shows that 98% of students have social media accounts such as Facebook, Instagram, and Twitter, and 94% of students use the internet to help with homework. One of the most popular social media platforms used by students today is Instagram. A survey of 50 high school students in Mojoagung, Jombang, East Java through a questionnaire showed that 50% of respondents searched for information about ferns via the internet, 80% of respondents took a long time to identify ferns, and 100% of respondents had Instagram.

Instagram is one of the social media applications that can use to take and upload photos or videos. The facilities provided by Instagram are quite diverse such as filters for editing, adding locations, marking features, using hashtags, and sharing features to expand communication with other users (Al-Ali, 2014). The characteristic of Instagram is that it provides images and is very useful for the world of education, which requires visual aids to support student's understanding and interpretation (Smith *et al.*, 2017). The freedom of each user to upload photos or videos raises concerns about ethics and legal policies for uploading sensitive

content and unclear information. Current technological advances provide an advantage for Instagram to identify sensitive content from other user reports (Border *et al.*, 2019).

The use of Instagram in the world of education as a learning resource was carried out by Salsabila (2020), who developed an Instagram-based Biology learning media on Angiospermae material for 10th grade. The press is feasible to be used as a learning resource from the results of the media validation assessment of 3,67 (Very valid). Instagram as a learning resource that can provide a unique, broad-minded, and interesting learning experience can give a monotonous learning solution that makes students bored in learning (Kirst, 2016). In addition, the ease of use of Instagram makes the learning process in study groups easier to follow by other study groups (Jang *et al.*, 2015).

Teaching and learning activities are not enough to provide learning resources following technological developments that utilize digital devices. Strengthening digital literacy for students is important so that the information received is by the needs sought (Riswanto, 2018). Meanwhile, the low level of digital literacy in Indonesia is also shown by data in the 2019 IMD World Digital Competitiveness Ranking. Indonesia is ranked 56th out of 63 countries (Bris and Caballero, 2019).

Digital literacy can be defined as the ability to understand and use information in various formats, including text, images, audio, video, animation, and sources that are presented through electronic devices (Gilster, 1997). In addition, digital literacy can be defined as the use of technology to find information, use that information as input for thinking, and disseminate enriched information through digital platforms (Potter, 2005). The importance of digital literacy needs to be encouraged as a learning mechanism, which is structured in the curriculum or connected to the teaching and learning system (Bawden, 2008).

Digital literacy that students need is a person's skill in using social media, hone children's critical thinking skills, ability to understand emotions and social skills, and instill learning values in everyday life (Seta, 2018). Learning practices that use Instagram provide facilities for students, such as online messaging features, to socialize and hone their teamwork skills (Dewi, 2020).

This study focuses on one of the subject matter of Biology 10th grade in Basic Competence (BC) 3.9: Grouping plants into divisions based on general characteristics and linking their roles in life, it is expected that students will be able to present reports on observations and phenetic and phylogenetic analysis of

plants. Furthermore, its role in life and BC 4.9: Presenting reports on the results of observations and phenetic and phylogenetic analyzes of plants and their roles in life. In these two BCs, students can actively add knowledge and practice literacy skills (Laily & Rachmadiarti, 2019). The two BCs explain that students must understand concepts, not just memorize (Maxtuti, 2013).

Based on this description, an Instagram-assisted Pterintifier (Pteridophyta Identifier) was developed as a learning resource for practicing digital literacy, including photos of ferns with short reports in each image. The advantages of Pterintifier are ease of use, attractive presentation, and more extensive information, such as a detailed picture presentation of each organ, allowing users to understand ferns without having to observe directly and description each picture. Instagram features used in Pterintifier include Story Highlights, main page, tag and hashtag features, and LKS (Student worksheet) links. The advantages of Pterintifier in using features are quite different from other learning resources, Pterintifier uses the hashtag of the scientific name of each species to make it easier for users to dig up information about the fern. The written description can be used to provide information about the benefits of ferns that are still poorly known by the public (Susilawati, 2017). In addition to definitions, the photos presented allow users to receive a variety of visual information, even if not by direct plant observation (Silverman, 2002).

The achievement of learning objectives through the delivery of material by the teacher can be supported by supporting teaching materials. Based on this description, developing an Instagram-assisted Pterintifier (Pteridophyta Identifier) is necessary as a learning resource to practice digital literacy that is easy to use. The benefit of this research is that it helps users to find out information about ferns more easily based on direct observations of ferns or through photos. Thus the purpose of this research is to develop Pterintifier based on Instagram as a learning resource to train digital literacy for high school students in 10th grade in Senior High School that is valid, practical, and effective.

METHOD

The research was conducted from October 2020 to April 2021. This research is research on developing an Instagram-based Pterintifier (Pteridophyta Identifier) as a learning resource to practicing digital literacy. The research model used in this development is a 4D development model (define, design, develop, disseminate) without the dissemination stage.

Define

At the definition stage, an analysis of the curriculum, students, concepts, and tasks is carried out that is customized to the needs of students in learning activities. The topic of fern plants based on the 2013 Curriculum is discussed in Basic Competencies 3.8 and 4.8. Students at the 10th-grade high school level have 15-16 years of age in the formal operational stage with the main characteristics of student's development being able to think abstractly, logically, draw conclusions, interpret, and develop hypotheses (Budiningsih, 2008). Based on this statement, it becomes the basis for the assumption that 10th-grade students have learned the concept of ferns that have a wide range of material and information, especially on understanding the types of ferns and their benefits. The concepts of ferns that high school students learn include: the way of life of ferns, habitat of ferns, characteristics of ferns, reproduction of ferns, the role of ferns, and classification of ferns. Based on Basic Competencies and concepts, the learning objectives are described, and then a task analysis is then carried out, which includes observing, identifying, classifying, and presenting data.

Design

The initial activity of this stage is to outline the content of Instagram-based learning resources, oriented to the identification of ferns based on general characteristics and information about their role. Before designing learning resources, photo documentation of ferns was collected through exploration in Cuban Watu Ondo Malang and Wonosalam, and documentation of 30 species of ferns was obtained. Next, collect material on supporting features and the creation of Instagram products. Instagram features consist of 1) account identity explaining account outlines and providing identification activity worksheet links, 2) story highlight menu containing information about accounts, guides, species lists, quizzes, bibliography, and additional information, 3) the main page presenting plant photos ferns include photos of stature, stems, rhizomes if any, leaves, and sorus followed by scientific name information, local names, and benefits. Instagram is equipped with worksheets on fern identification activities that contain Basic Competencies and Competency Achievement Indicators and the learning objectives used. The worksheets are also accompanied by activity instructions and examples of fern identification tables to assess students' digital literacy skills.

Development

This stage is carried out to determine the feasibility of Instagram products based on the product's validity,

response, and success in training digital literacy. Instagram product reviews and revisions are carried out before the validation assessment. One botanist lecturer, one education expert lecturer, and one Biology teacher carried out the validation assessment. Validation assessment instrument with a 4 point Likert scale: 1 (not good), 2 (poor), 3 (good), 4 (very good). The validation instrument consists of content aspects (3 components), presentation aspects (4 components), learning resources aspects, and digital literacy (4 components). Student responses were obtained from 15 high school students using the Guttman scale: 1 (yes) and 0 (no) consisting of 20 questions. 14 for the digital literacy aspect and 6 for the presentation aspect. Digital literacy was obtained from the percentage score of 15 high school students using media assessed with a score of 10 (true) and 0 (wrong) consisting of 5 questions.

Data analysis

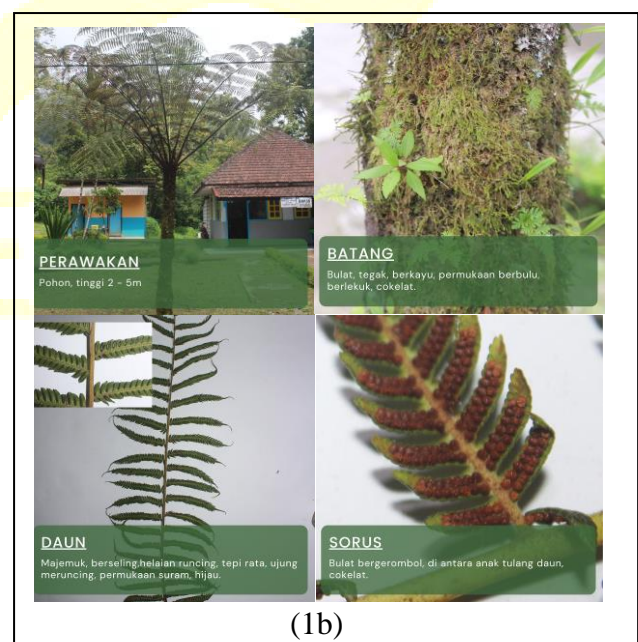
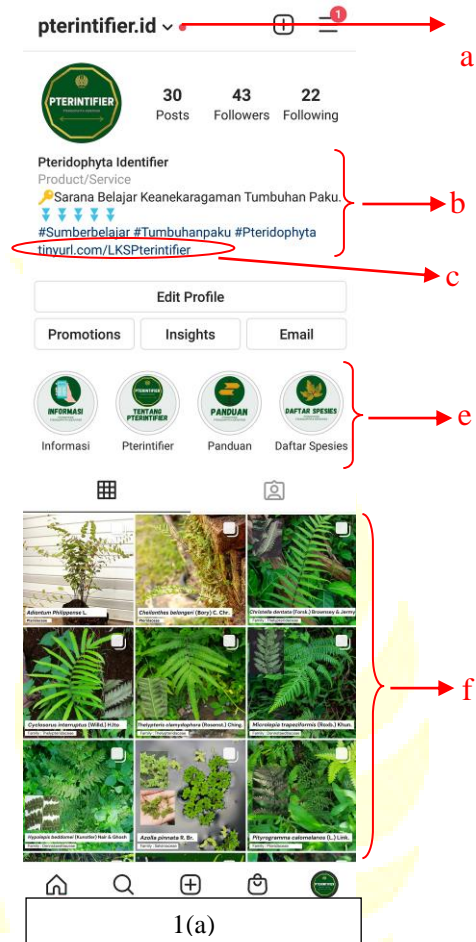
The Instagram-based Pterintifier eligibility parameters are based on validity, student responses, and digital literacy scores. The results of the validation assessment are categorized based on the average score: 0-1,0 (Invalid), 1,01-2,0 (Less Valid), 2,01-3,0 (Valid), and 3,1-4,0 (Very Valid) (Riduwan, 2016). The percentage of positive student responses was calculated and categorized according to Riduwan (2016), namely $81\% \leq P$ 100% (very decent), $61\% \leq P$ 80% (decent), $41\% \leq P$ 60% (pretty decent), $21\% \leq P$ 40% (not feasible), and $0\% \leq P$ 20% (not feasible). Digital literacy percentage is calculated and categorized according to Widoyoko (2014) namely $80 \leq P$ 100 (Very Good), $60 \leq P < 80$ (Good), $40 \leq P < 60$ (Enough), $20 \leq P < 40$ (Poor), $P < 20$ (Very Less).

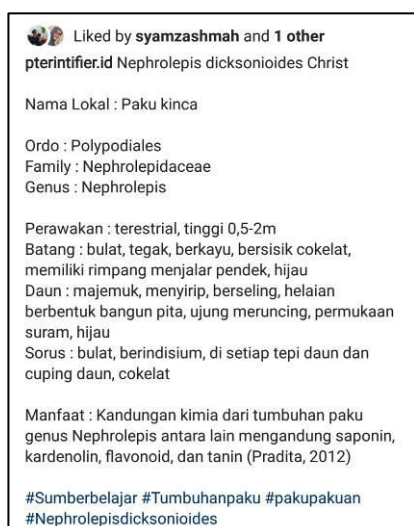
RESULT AND DISCUSSION

Profil Of Pterintifier

This research produces an Instagram-based learning resource for fern diversity with the account name Pterintifier.id to practice digital literacy (Figure 1a (a)). The Pterintifier profile consists of two menus, namely the main page (Figure 1a) and the story highlights. The Pterintifier main page contains information regarding the identification of ferns which are packaged by showing photos of plants including photos of stature, rhizomes, stems, leaves, and sorus (Figure 1b) accompanied by information on scientific names, local names, plant characteristics, benefits for life, and Hashtags to make it easier for users to search for information widely (Figure 1c). In addition, on the main page of Pterintifier's identity, LKS (Student Worksheet) is presented (Figure 1a(c))

which can be used in the identification of ferns to find out how successful the Pterintifier is in training digital literacy. The Instagram features used in Pterintifier are presented in **Figure 1**





1(c)

Figure 1. Pterintifier Profile based on Instagram (1a) Instagram Views, (b) Main Page, (c) Information about each upload.

Theoretical Feasibility of Pterintifier

Theoretical feasibility obtained based on assessments carried out by one botanist, one education expert, and one biology teacher showed that the Pterintifier was very valid to be used as a learning resource to train digital literacy. Assessors assess three aspects, including content feasibility, presentation feasibility, and components of learning resources and digital literacy. The three aspects got an average of 3,69 with a very valid interpretation (Table 2).

Table 2. Pterintifier Validation Recapitulation

No.	Assessment aspect	Score			Average
		P1	P2	P3	
Content eligibility					
1.	Pterintifier contents	4	4	4	4
2.	Pterintifier Photo Explanation	3	2	4	3
3.	Highlight of Pterintifier	4	3	4	3,7
Average				3,56	
Interpretation				Very valid	
Serving eligibility					
5.	Profil of Pterintifier	4	4	4	4
6.	Pterintifier Photo Quality	4	4	4	4
7.	Pterintifier Photo Display	4	3	4	3,7
8.	Pterintifier Font Size and Type Compatibility	3	4	4	3,7
Average				3,85	
Interpretation				Very valid	
Components of Learning Resources and Digital					

Literacy					
9.	Pterintifier as a Learning Resource	3	3	4	3,3
10.	Ferns Diversity Photos	4	3	4	3,7
11.	Digital literacy	4	4	4	4
12.	Language usage	3	4	4	3,7
Average					3,67
Interpretation					Very valid
Overall Aspect Average					3,69
Interpretation					Very valid

Description : P1= Botanist
P2= Education expert
P3= Biology teacher

Table 2 shows that the Pterintifier is considered very valid based on the validation results with an average of 3,56 on the aspect of content feasibility. The pterintifier that is considered to have fulfilled three components includes the content of the pterintifier, explanation of the photo of the pterintifier, and highlights of the pterintifier. The explanation of the photo pterintifier aims to provide information to users regarding the names of ferns presented, including scientific names, local names, characteristics of ferns, benefits, and hashtags.

The assessment of the explanation component of the Pterintifier photo received a score of 3 and received an evaluation of the aspects of the uploaded photo being inconsistent in several uploads, such as only showing photos of leaves, but the descriptions were written in full. The description is adjusted to the indicators contained in the selected Basic Competencies (BC), namely Basic Competencies 3.9 and 4.9, which are then translated into indicators. The indicator used as a reference in the development of the Pterintifier is 3.8.1 Identifying ferns based on visual stature, stems, leaves, and sorus to show the identity of the species and its role in life using Pterintifier.id and Basic Competencies 4.8.1 Reporting the results of observations of ferns. The information written in the description is made the same from one fern to another to make it easier for users to get wider information.

Pterintifier using the story highlights feature presented to ease people to get further information about it. The assessment on the story highlight component received a score of 3,7 and received an evaluation of the information available on the "information" highlight menu. The information presented does not have a broad enough explanation. This is done based on one of the roles of learning resources, namely, enabling a wider presentation of learning by presenting information that can penetrate geographical boundaries (Reigeluth, 1999).

The aspect of assessing the feasibility of presenting the Pterintifier got an average of 3,85, with a very valid interpretation. The assessment on the Pterintifier profile component and the Pterintifier, photo quality component was assessed both based on the results of the validation and student responses that had been received. The assessment on the Pterintifier photo display component got a value of 3,7. This is due to the evaluation results of the nail parts that look non-uniform. The uploaded photo of ferns is the researcher's documentation. Ferns can live both terrestrially and as epiphytes with various forms of stature, such as leaf blades to coconut trees (Efendi & Iswahyudi, 2019). Some ferns do not have stems, such as *Antrophyum callifolium*, and *Loxogramme involuta* have leaf-like stature.

The suitability of the size and type of the letter Pterintifier got a score of 3,7 with a very valid interpretation. One of the evaluators gave input on the type of letter used using simple letters. The readability of the display needs attention, such as the font size used is not too small, and the typeface is simple and easy to read (Soenarto, 2006). Excessive use of font size and type can distract the user's focus on the fern photos presented.

Aspects of assessing the components of learning resources and digital literacy got an average value of 3,67 with a very valid interpretation. The Pterintifier component as a learning resource got a fairly low score of 3,3 and received an evaluation regarding the instructions for observing activities carried out. According to Siregar (2010), learning resources are everything that can provide convenience to students in obtaining several information, knowledge, experience, and skills in the teaching and learning process. Instructions for observing activities are an important component of the successful use of Pterintifier learning resources, the ease of information that can be received by users increases learning motivation.

The fern diversity component got an average value of 3,7 with a very valid interpretation and received an evaluation from one of the assessors because most of the ferns presented live in a terrestrial way or grew on the ground. Only a few epiphytic ferns are shown. Observations of ferns were carried out in natural forest areas. Most of the ferns found living by terrestrial means growing on the ground. Ferns that live by epiphytic or live attached to other plants are commonly found in ornamental ferns found in the community.

The use of the language used in the Pterintifier got a score of 3,7 with a very valid interpretation. Some of the words presented in the Pterintifier contain errors in

typing, such as letter overload and letter shortage. Language is information conveyed in writing, meaningful both in ideas and facts (Siregar, 2010). The digital literacy component is considered good by validation and gets a 4 with a very valid interpretation. The three respondents provided input so that the digital literacy feature could be further developed, such as adding student worksheets via online.

Empirical Pterintifier Eligibility

Practical feasibility was obtained based on the recapitulation of response questionnaires filled out by 15 students of 10th grade majoring in science. Students gave a very good response to the Pterintifier based on two aspects of the assessment, namely the presentation and content of the Pterintifier, with an overall average of 98,3% (very feasible). This shows that the Pterintifier as a learning resource and training digital literacy can be used by students in a practical and very feasible manner (Table 3).

Table 3. Student Response to Pterintifier (n=15)

No.	Question	%	
		Yes	No
Aspects of presenting concepts that are adapted to Digital Literacy			
1.	Pterintifier's information is easy to understand	100	0
2.	Pterintifier features help in making it easier to understand the material	100	0
3.	The purpose of the LKS Pterintifier is easy to understand.	100	0
4.	The activity steps on the LKS Pterintifier are easy to understand	100	0
5.	The task of identifying ferns in the LKS Pterintifier motivates users to collect data/information	100	0
6.	The task of identifying ferns in LKS Pterintifier encourages users to practice digital literacy skills	100	0
7.	The "guide" to Pterintifier story highlights is easy to understand	100	0
8.	The "Species List" in story highlights makes it easy for users to find out the species list that Pterintifier presents	100	0
9.	"Information" in the Pterintifier story highlights provides additional information that is not yet known	93,3	6,7
10.	Quizzes on the Pterinifer story highlight menu train users to process information properly	86,6	13,4
11.	The description on each upload is easy to understand	100	0
12.	Hashtags in Pterinifer make it easier for users to find and expand the information obtained	100	0
13.	Online communication features (email, Direct Message, Comment, Share) encourage users to	100	0

	communicate with other users		
14.	Pterintifier can be used in daily life	100	0
Physical presentation aspect			
1.	Attractive Pterintifier Display	100	0
2.	Pterintifier display motivates users to learn	100	0
3.	Story highlights help use Pterintifier	100	0
4.	The text in the uploaded Pterintifier image is clearly legible	100	0
5.	The image on the Pterintifier is clear	100	0
6.	The LKS Pterintifier link can be accessed easily	100	0
Average		98,3	
Interpretation		Very Worthy	

The results of student responses on the criteria for presenting concepts that are adapted to digital literacy there is one statement that gets the percentage of "Yes" answers of 93,3% and the percentage of "No" answers of 6,7%, meaning that one student gave a negative response to the criteria of "Information". " in the Pterintifier story highlight menu provides additional information that is not yet known. Respondent 13 thought *"There are quite a lot of varieties, the features are quite good, and the information is quite helpful, it's just that the story highlights in the information section do not provide enough information"*. The pterintifier is considered to be lacking in providing additional information other than information about the characteristics and benefits of ferns presented in the "Information" story highlight menu. The main purpose of Pterintifier is to identify ferns to provide information about their benefits. Therefore researchers want to focus more on the main information presented in each upload of ferns. However, researchers will improve and add additional information beyond the main information to expand their knowledge about ferns through Pterintifier learning resources. Learning resources are expected to provide information in order to improve the quality of teaching. If good teaching quality is achieved, good learning outcomes will also be achieved (Lilawati, 2017).

The criteria for the statement "the quiz presented on the Pterinifer story highlight menu trains users to process information correctly" got the results of the percentage of "Yes" answers of 86,6% and "No" answers with a percentage of 13,4%, indicating that there were two respondents who responded negatively for the statement. Respondent 14 thought, *"The Pterintifier is good at providing information that many schools do not know, but the quiz menu in the story highlights cannot attract students' interest in learning because the quiz presented is only two questions and is easy to guess"*. The features used in Pterintifier and the information it

provides are rights that are essential to achieving Pterintifier's development goals. The practicality of the learning modules developed is expected to be easy to use (teachers and students). The learning carried out is meaningful, interesting, fun, and useful for students' lives and can increase their creativity in learning (Alfiriadi & Hutabri, 2017).

Digital Literacy Assessment Based on success using Pterintifier

Digital literacy assessments are reviewed based on the percentage of users' scores in using the Pterintifier. Based on the grades of 15 students of 10th grade assessed through 4 aspects, the Pterintifier is an effective learning resource used. All aspects got a percentage of 98,3% with a very effective interpretation (Table 4).

Table 4. Effectiveness of using Pterintifier (n=15)

No.	Aspect	Effectiveness Percentage (%)	Category
1.	Describe the morphological characteristics of ferns	100	(very good)
2.	Determine the name of the fern family	100	(very good)
3.	Determine the scientific name of ferns	93,3	(very good)
4.	Determine the role of ferns	100	(very good)
Average		98,3	very good

The pterintifier has been declared valid and effective if it can easily be used for 10th grade in Senior High School students. Pterintifier is declared to be very effective and feasible as a source of learning and training in digital literacy based on user success scores. The effectiveness of the Pterintifier is related to the achievement and response of the students after using the Pterintifier during the learning process.

Based on the use by 15 students in using the Pterintifier got a percentage of 98,3% with a very good interpretation. This indicates that, in general, the user has successfully used Pterintifier. The three aspects of the statement to use the Pterintifier got a percentage of 100%, but in the statement determining the scientific name of the fern, the percentage was 93,3%. This is because two species of ferns have similarities in terms of stature and shape of the sorus, namely *Athyrium esculentum* and *Athyrium aperum*. If the user does not examine in detail will choose the wrong answer. The

student with the 11th answer wrote on the fern herbarium (6) with the species name *Athyrium aperum*. In contrast, the correct answer was *Athyrium esculentum* because of the shape and arrangement of the sorus *A. esculentum*; they are separated and arranged at the base of the leaf veins to the edges. Leaves, while *A. aperum* has a more tightly arranged sorus at the base of the leaf veins (Efendi & Iswahyudi, 2019).

Assessment based on student responses shows that Pterintifier is a learning resource that is easy to use and applies to everyday life and the supporting features make it easier for users to understand the material and information provided. The identification of ferns in the Pterintifier LKS trains students to improve their digital literacy skills. The results of the use of 15 students of 10th grade in Senior High School majoring in science showed different results because each individual's understanding of digital literacy was related to thinking skills. Shao & Purpur (2016) argue that information literacy is one of the higher-order thinking skills (HOTS) needed to develop and support academic, professional, and personal success.

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CLOSING

Conclusion

An Instagram-based Pterintifier has been produced as a learning resource for 10th-grade students that is valid, practical, and effective. The pterintifier is theoretically based on the validation results, including aspects of content feasibility, presentation feasibility, and components of learning resources and digital literacy with very valid interpretations. The pterintifier is stated to be very feasible empirically based on students' positive responses with possible interpretations. Pterintifier is very effective for being used as a learning resource in terms of user value using Pterintifier obtained with very effective interpretation.

Suggestion

Pterintifier needs to be added more species so that students know more about ferns. It is necessary to research the development of learning resources such as Pterintifier on other subject matter following the subject's

indicators and syllabus, which is given the positive response given by students to this learning resource.

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