Feasibility of Flash Flipbook Media of Fungi Classification Based on the Fungi Inventory in Mount Pemangkat

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ABSTRACT

This study aims to find out the feasibility of flash flipbook media based on the results of macroscopic fungi inventory found in the Mount Pemangkat Protected Forest, Sambas Regency. The form of research used is quantitative descriptive methods. The creation of flash flipbook media is enriched with the richness of local fungi found in the Protected Forest of Mount Pemangkat, Sambas Regency. Flash flipbook media is validated by five validators, including two lecturers of Biology Education Tanjungpura University and three high school teachers who were determined using purposive sampling techniques. Flipbook flash media validation sheets are assessed using the Likert scale and data analysis based on the Lawshe Formula (1975). Validation of flash flipbook media obtained a CVI (Content Validity Index) value of 0.94, so it is declared feasible and can then be used as a learning medium in the fungi classification sub-material and provide additional information about the diversity of mushrooms in the surrounding environment for students of class X high school.

1. Introduction

The development of the 2013 curriculum leads to a learning process that focuses more on the balance between cognitive, psychomotor, and affective aspects, as well as the formation of learners' character. Biology is one of the subjects that cannot be separated from the curriculum. The teacher as an educator must be able to draw up a learning implementation plan that contains character values and relates to phenomena that occur in everyday life. This can be achieved with the help of ICT-based learning media (Information and communication technology) (Gusti, 2017; Maya, Huzaifah, & Madang, 2017; Suharno, 2014).

ICT-based learning media (Information and communication technology) is one of the media in the form of hardware and software that in the process of making it begins with several stages, namely search, collection, and then processed, stored, then disseminated, and finally presented in the form of information with the help of computers or other communication devices to access the media called ICT-based learning media. ICT-based learning media has several benefits in learning, namely can attract the attention of learners, learning becomes fun, learning becomes easier, provides more knowledge to learners, and facilitates communication (Puspitasari, 2015; Suryani 2016).

Learning media has the main function as an intermediary for teachers to convey information to learners so that planned learning goals can be achieved. The use of ICT-based media in the learning process is indispensable to improving the quality of education. This is because information technology can store unlimited information that can be used for educational purposes (Arsyad , 2017; Daryanto, 2013; Susilana & Riyana, 2009).

Based on an interview with biology teachers at High school in Pemangkat conducted on November 22, 2019, obtained information that for learning activities, especially in the classification of

fungi, teachers only use learning media in the form of PowerPoints and some fungi images to display the characteristics and general structure of fungi, and carry the object directly if the type of fungi is easy to obtain, and charts if it is still possible to use. So that learners still have difficulty when conducting exploration and observation about the structure of fungi and distinguishing examples from each fungal phylum.

The results of the interview showed that a learning medium is needed that can overcome the difficulties faced by teachers and learners and in accordance with the needs of teachers who use the discovery learning model in conveying the fungi classification sub-material, as well as an innovation for schools about learning media that will be used in the learning process, namely flash flipbook media. The use of flash flipbook media in learning activities is expected to help teachers to develop an active way of learning in learners so that they can find and investigate for themselves a problem that is happening.

The selection of flash flipbook as a learning medium is based on the attractive media display and emphasizes more on the important points of teaching material so that learners are easier to understand the material. Flipbook flash media can also add video or audio if needed as additional material. In addition, this medium is easy to use because it is enough to move the cursor if you want to replace the page on the device and easy to distribute to many teachers so that the cost of production becomes much cheaper. According to Nugroho (2016), flash flipbook media is a multimedia-based learning medium that resembles a flipbook whose operation is quite easy to move the cursor on the device button if you want to replace the page. This is in line with Nuruliah's research (2017) which states that flash flipbook is a type of classic animation that resembles a tome and on each page is described a process about something that later looks moving or animated.

Flipbook flash media is audiovisual because it can be equipped with text, sound and video images, colorful animations to make it more interesting to see, and can also be enlarged so that each page can be seen. In addition, flash flipbook media also has the advantage of saving costs, messages from the information conveyed can be easily understood, and can create learning variations so as not to cause boredom to learners. According to Hardiansyah & Sumbawati (2016), the use of flash flipbook media can provide convenience in understanding learning materials. Evident from the learning results of students of class X TKJ 2 SMK Negeri 7 Surabaya which increased after the use of flash flipbook-based learning media in computer assembly learning. Flash flipbook media can also be used for learning fungi material in which it can discuss classification in fungi.

Fungi or fungi are eukaryotic organisms that have a true cell nucleus so it is classified in a group of true fungi whose cell walls are composed of chitin substances and do not have chlorophyll. The body of the fungi is composed of upright parts called stems and hoods that have a flat and rounded shape, and mycelium which is a collection of many hyphae (Achmad et al. 2013; Yunida et al. 2014).

According to Anis (2016) fungi generally live in habitats with air humidity levels that range from 80-90% and for the optimum pH of fungi to grow between 6-7. While according to Arif et al. (2007) the optimum temperature required by each species of fungi is different but generally found in the temperature range of 22 ° C and 35 ° C.

The results of macroscopic fungi findings in the Mount Pemangkat Protected Forest, Sambas Regency is further made into a learning medium, namely flash flipbook media, in hopes of increasing learning interest in learners and overcoming difficulties when conducting exploration and observation of the classification of fungi sub-material. In addition, this media can increase the knowledge of teachers and learners about the type of macroscopic fungi and their role in the Mount Pemangkat Protected Forest, Sambas Regency.

2. Method

This form of research is quantitative research used to examine the validation or feasibility results of flash flipbook media that have been created by researchers. The method used in this study is a descriptive method that can present data under the facts and phenomena that occur during the study

(Sugiyono, 2017). The purpose of this descriptive research is to provide a systematic, factual, and accurate picture of the facts and traits of a particular population or area.

Identification data of fungi found in the Forest Protected Mount Pemangkat can then be implemented in the form of learning media one of which is flash flipbook media for fungi classification sub-material. The data identified about the wealth of local fungi in the Protected Forest of Mount Pemangkat is discussed in a separate journal. Information that can be added in the media includes core competencies, basic competencies, indicators, objectives, introductions, fungi classification materials that can also be equipped with images and videos about fungi classification sub-matter, examples of macroscopic fungi types found in the Protected Forest of Mount Pemangkat, Sambas Regency, and bibliography. The flow of making flash flipbook media includes 1. Installation (installation) of applications on laptops, 2. Program flow creation, 3. The storyboard is arranged in a table, 4. The collection of necessary ingredients is photos/images and various types of fungi found in this study, 5. Programming level, 6. The completion stage is to re-examine and test the readability of the media.

In this study, flash flipbook media cannot be directly used as a medium of learning in schools but must be validated first by validators conducted with purposive sampling techniques. Validation carried out includes two stages, namely: 1. Validation of instruments used to assess flash flipbook media validation sheets along with their indicators and carried out by 2 lecturers of Biology Education FKIP Untan. Once the instrument is validated and declared fit for use, then the instrument can then be used to validate the flash flipbook media. 2. Validation of media used to assess flash flipbook media and conducted by 5 validators which include 2 lecturers of Biology Education FKIP Untan, a biology teacher at High school in Pemangkat, High school in Semparuk, and High school in Tebas. The aspect contained in the flash flipbook media validation sheet refers to the development aspect of Anshori (2013) which consists of 4 aspects namely Format Aspect, Operationality, Content, and Language with 15 criteria.

Flash flipbook media that has been validated by the five validators, then analyzed using Content Validity Ratio (CVR) analysis according to Lawshe (1975) with the following formula:

$$CVR = \frac{Ne - \frac{N}{2}}{\frac{N}{2}}$$

Information:
CVR   = Content Validity Ratio
Ne   = the number of panelists/validators who approve the validity of the learning media (deemed to agree if the value of each criterion reaches 3.00 - 4.00. If < 3.00 then it is considered disapproving of the validity of the learning media)
N   = total number of panelists/validators

After calculating the CVR value of each criterion then calculated the value of CVI (Content Validity Index) or the average value of CVR as a whole.

$$CVI = \frac{\sum CVR}{\text{Number of sub-criteria}}$$

If at the end of the calculation the CVR and CVI scores meet the minimum limit value of Lawshe (1975), then the flash flipbook is declared valid and feasible for use as a learning medium of fungi classification sub-matter.

3. Results and Discussions

The contents of the flash flipbook media created by researchers contain about the richness of local fungi found in the Protected Forest in Mount Pemangkat, Sambas Regency. After the data of macroscopic fungi identification is obtained, it is then implemented into a learning medium that is a flash flipbook for class X SMA fungi classification sub-material. Flash flipbook itself is a multimedia-based learning medium adopted from flipbook learning media. According to Susilana & Riyana (2009), a flipbook is a learning medium in the form of sheets of paper resembling an album or calendar with a size of 21 x 28 cm arranged systematically and tied to the top. While flash flipbook media according to Nugroho (2016) is a multimedia-based learning media that resembles a flipbook and its operation is quite easy, namely just by moving the cursor on the device button if you want to replace the page.

The flash flipbook created by the researchers contains a sub-matter of fungi classification that is equipped with information about the results of the study accompanied by images, classifications, descriptions, and benefits of various types of macroscopic fungi found in the Mount Pemangkat Protected Forest, Sambas Regency. The creation of flipbook flash media is done using the Flip PDF Professional application with various variations such as the use of color combinations, the use of several types of fonts of various sizes and colors, as well as variations of supporting images, especially macroscopic fungi images. Here are shown (Figure 1) the results of the creation of flash flipbook media for fungi classification sub-matter.
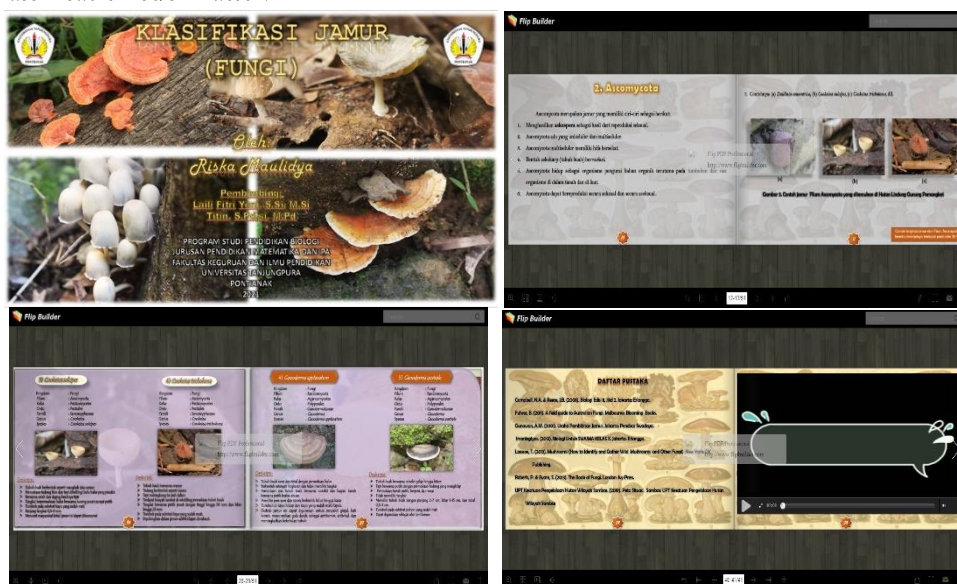

Figure 1. Display of Flash Flipbook of Fungi Classification

Flash flipbook media that has been made, then validated by five validators which include 2 lecturers of Biology Education Tanjungpura University, Biology teacher at High school Pemangkat, Biology teacher High at school Semparuk, Biology teacher High school at Tebas. The results of flipbook flash media validation can be seen in Table 1. Flipbook flash media is validated using instruments that have been validated first. Instrument validation sheets are assessed using the Guttman scale i.e. Yes (Y) and No (T) against the criteria used to assess the feasibility of Flash Flipbook sub-matter classification of Class X SMA fungi so that the results are obtained that the instrument is "feasible to use" (LD), " feasible to use and improve" (LDP), and "impractical" (TLD) (Sugiyono, 2015).

Table 1. Flash Flipbook Media Analysis Data Fungi Classification Sub-matter of Class X of Senior High School

Aspect	Criterion	Validator to-					CVR	Category
		1	2	3	4	5		
Format	1. Flash flipbook media is arranged systematically according to reference.	4	4	4	4	4	0,99	Valid
	2. Creative and innovative media display.	3	3	4	4	3	0,99	Valid
	3. The appearance of letters, images, and writing that is clear and easy to understand.	3	2	3	3	3	0,6	Invalid
Operationality	4. Effectiveness of flash flipbook media to achieve the desired goals/ objectives.	3	3	4	3	3	0,99	Valid
	5. The efficiency of flash flipbook media in achieving the desired goals/ objectives.	4	3	4	3	4	0,99	Valid
	6. Flipbook flash media compatibility as it can be installed in various hardware and software specifications available on laptops and smartphones.	4	3	4	4	4	0,99	Valid
Content	7. Suitability between the material in flash flipbook media with core competencies, basic competencies, indicators, and learning goals to be achieved.	3	3	4	4	4	0,99	Valid
	8. The suitability of the flow of material contained in the flash flipbook media with the Fungi material specified in the syllabus.	3	4	4	4	3	0,99	Valid
	9. The clarity and suitability of images and videos displayed in the flash flipbook medium with the material presented.	3	3	4	3	4	0,99	Valid
	10. Completeness of fungi material presented in flash flipbook media.	3	4	3	3	3	0,99	Valid
	11. Simplicity and clarity of exposure to fungi material.	3	3	4	4	4	0,99	Valid
	12. The ability of flash flipbook media in communicating the message of the specified Fungi material.	3	2	4	4	4	0,6	Invalid
Language	13. The text narrative used in flipbook flash media is easy to understand.	3	3	4	4	3	0,99	Valid
	14. Clarity of meaning in the narrative of the text.	3	4	4	4	3	0,99	Valid
	15. Use of words following the Indonesian Spelling General Guidelines (PUEBI).	3	4	4	4	4	0,99	Valid
	CVI						0,94	Valid

[a]Information:

CVR= Content Validation Ratio Index

CVI= Average CVR

Fungi identification data found in the Protected Forest of Mount Pemangkat can then be implemented in the form of learning media, one of which is flash flipbook media for fungi classification sub-matter. This media selection is based on the development of the 2013 curriculum through a scientific approach that can be achieved with the help of ICT-based learning media (Information and communication technology). The display of flash flipbook media that has a variety of images, writing, and colors can provide attractiveness and learning motivation for learners so that it can generate interest in learning about a teaching material. Flash flipbook as a learning medium has advantages on the appearance of interesting media and more emphasis on the important points of teaching material so that learners are easier to understand the material. Flipbook flash media can also add video or audio if needed as additional material.

The flash flipbook media that has been completed is further validated by 5 validators consisting of 2 lecturers of Biology Education Tanjungpura University and 3 biology teachers in class X high school.

The validation sheet has 4 aspects with 15 criteria used to determine the feasibility of flash flipbook media as a learning medium of fungi classification sub-matter in the teaching and learning process in the classroom.

As for the 1st criterion, namely flash flipbook media arranged systematically according to reference. Based on the validation results on this criterion, 5 validators gave a score of 4 (very good) with a CVR value of 0.99, so it was declared valid/feasible and did not need improvement. The format in flash flipbook media is presented systematically under the references, namely starting from the cover, table of contents, KI and KD, indicators and learning objectives, introductions, classification of fungi sub-matter, examples of types of fungi found in the Forest of Mount Pemangkat Protected, and bibliography. The presentation is made systematically to make it easier for learners to learn the content of the material contained in the flash flipbook media regularly and clearly.

The 2nd criterion is the display of creative and innovative media. Based on the validation results on this criterion, 2 validators gave a score of 4 (very good) and 3 validators gave a score of 3 (good) with a CVR value of 0.99, so it was declared valid/feasible. But improvements are needed to be made to the text display in the flash flipbook to make it as short as possible and display more core points of the material only. In this medium, the concept of fungi classification sub-matter is presented with an attractive, unique, and innovative media display intended to provide new variations in learning. This media is expected to provide attractiveness and motivation to learn for learners so that they can generate curiosity and interest in learning the material. The use of flash flipbooks as a learning medium can help learners build and develop creativity and innovation by creating new works. Talakua & Aloatuan (2021) mentioned that the use of interesting, unique, and innovative learning media can generate motivation and learning interests for learners, and can also help improve understanding in learners. In addition, according to Chaerunisa (2019), every student must have a creative and innovative nature. If developed through the right learning media, it will have an influence on the orientation of experiences and lessons that learners can for themselves.

The 3rd criterion, namely the appearance of letters, images, and writing that is clear and easy to understand. Based on the validation results on this criterion, 4 validators each gave a score of 3 (good) and 1 validator gave a score of 2 (less good) with a CVR value of 0.6, so it was declared invalid/impractical. Validation of flash flipbook media on the 3rd criterion is declared invalid because the media created by researchers has weaknesses in the quality and size of images, and the appearance of letters in this medium is also not uniform. Therefore, it needs to be improved on these components and more adapted to the background flash flipbook media. Writing in this media researchers use letters that are easy to read by the reader, as well as the color of the letters that contrast with the background. According to Mukti & Nurcahyo (2017), the use of appropriate colors gives the impression of contrast between objects with their background, to clarify vision in capturing the object presented. In addition, the image used is clear and the size is adjusted to the space available within the media. The images of the fungi used are selected with a good level of clarity and contrast of images making it easier for learners to observe them. This is under Daryanto's opinion (2013), that using the shape and size of letters that are easy to read can provide effective learning.

The 4th criterion, namely the effectiveness of flash flipbook media to achieve the desired goal. Based on the validation results on this criterion, 1 validator gave a score of 4 (very good) and 4 validators gave a score of 3 (good) with a CVR value of 0.99, so it was declared valid/feasible. However, researchers need to improve the flash flipbook media so that the explanation is made more systematic in hopes of helping learners achieve the learning goals that have been set, namely explaining the basis of fungi grouping, distinguishing various groups of fungi, and making written reports of observations of fungi types. This is following the opinion of Isnaeni (2020) that in the process of learning to teach in media classes made must be able to streamline the learning situation and provide appropriate direction to achieve the desired goals that students know and understand about the reasons for learning and can understand about the material delivered. According to Ariyanto, et al (2018) to realize effective

learning requires good planning in terms of choosing learning media to be used because the media can provide a better picture of the material than just by explaining it.

The 5th criterion, namely the efficiency of flash flipbook media in achieving the desired goals. Based on the validation results on this criterion, 3 validators gave a score of 4 (very good) and 2 validators gave a score of 3 (good) with a CVR value of 0.99, so it was declared valid/feasible. However, improvements need to be made to be better adapted to the purpose of learning to help learners in identifying fungi and become more efficient in terms of use because it includes all learning goals and teaching materials set for one meeting so that they do not require other media or props in explaining the sub-matter of fungi classification. According to Nurrita's opinion (2018), the media used must be efficient to fit the learning objectives to be achieved and learning is done sequentially. Utama, Kentjananingsih, and Rahayu (2014) mentioned that the learning media has a very important contribution in the learning process, one of which is the time of learning implementation that can be shortened so that it can be more efficient time.

The 6th criterion, namely compatibility of flash flipbook media because it can be installed in various hardware and software specifications available in laptops and smartphones. Based on the validation results on this criterion, 4 validators give a score of 4 (very good) and 1 validator gives a score of 3 (good) with a CVR value of 0.99, so it is declared valid/feasible and no more improvements need to be made. In this learning media researchers create media with a format (.exe) that can be accessed and run in various hardware specifications and some software, especially on laptops, while for access using a smartphone can be done but uploaded first online on the internet. Hence, when the user wants to access it, the smartphone must be connected to the internet network. With the variety of formats used in storing this media, it will make it easier for teachers and learners to access this flash flipbook media. This is in accordance with the opinion of Isnaeni (2020) that in choosing media, teachers as educators should be able to choose media that can be used in various conditions, easy to carry everywhere, can be used in the long term, can save costs and not dangerous when used in the classroom.

The 7th criterion, namely the conformity between the material in flash flipbook media with core competencies, basic competencies, indicators, and learning goals to be achieved. Based on the validation results on this criterion, 3 validators gave a score of 4 (very good) and 2 validators gave a score of 3 (good) with a CVR value of 0.99, so it was declared valid/feasible. However, more improvements are needed to be added to add practical guidance in distinguishing macroscopic fungi groups so that they are in accordance with Core Competencies (KI), Basic Competencies (KD), Indicators, and Learning Objectives in the 2013 Curriculum syllabus for fungi classification sub-matter. The inclusion of practical guidelines is expected to help learners in observing and distinguishing macroscopic fungi groups. This is in accordance with the opinion of Churri & Agung (2013) that the material displayed in the media must be able to meet the achievement of learning objectives and under the basic competency and competency standards set out in the syllabus.

The 8th criterion, namely the suitability of the flow of material contained in flash flipbook media with the sub-matter classification of fungi specified in the syllabus. Based on the validation results on this criterion, 3 validators gave a score of 4 (very good) and 2 validators gave a score of 3 (good) with a CVR value of 0.99, so it was declared valid/feasible and no further improvements were needed. The suitability of the flow of material in the media made by researchers is that the material in flash flipbook media is adjusted to the demands of the material in the syllabus and can be used for the learning of fungal classification sub-materials. To provide convenience to teachers in delivering material to learners because the flow of material is under what is in the syllabus.

The 9th criterion, namely clarity, and conformity of images and videos displayed in flash flipbook media with the material presented. Based on the validation results on this criterion, 2 validators gave a score of 4 (very good) and 3 validators gave a score of 3 (good) with a CVR value of 0.99, so it was declared valid/feasible. However, improvements need to be made, especially in the quality of images that must be sharpened and given a clearer description and closely related to the material presented.

This is done so as not to give a confusing impression on learners of the images presented in the media. According to Prastowo (2015) in the medium of learning the images used must be appropriate, contrast, clear, and easily observed so it can support and clarify the content of the material displayed on the media. Hence, it can reduce the boredom of learners in learning. The video displayed on the last slide is intended to provide additional knowledge to learners about the identification of fungi to facilitate them when observing fungi in the environment. According to Sari et al. (2014) that the use of video in learning media will make learners more interested to facilitate understanding of the material from what they see and hear.

The 10th criterion, namely the completeness of the fungi classification sub-matter presented in the flash flipbook media. Based on the validation results on this criterion, 1 validator gave a score of 4 (very good) and 4 validators gave a score of 3 (good) with a CVR value of 0.99, so it was declared valid/feasible. Improvements need to be made so that the material parts of the structure and reproduction of fungi are more equipped. The sub-matter of fungi classification presented by researchers in the flash flipbook media contains morphological characteristics, body structure, mode of reproduction, images from examples of phylum fungi Zygomycota, Ascomycota, Basidiomycota, and Deutromycota, as well as images of examples of fungi types from inventory in the Mount Pemangkat Protected Forest, Sambas Regency. This is adjusted to the material in the teaching book to provide learning variations so as not to cause boredom.

The 11th criterion, namely the simplicity and clarity of exposure to the sub-matter classification of fungi. Based on the validation results on this criterion, 3 validators gave a score of 4 (very good) and 2 validators gave a score of 3 (good) with a CVR value of 0.99, so it was declared valid/feasible. In this medium, researchers display visualizations (images and animations) that are not complicated, clear, and easy to remember and in accordance with the concept of classification of fungi specified in the syllabus. So that it can help clarify the material and make it easier for learners to understand the information contained in the media. According to Falahudin (2014), the media used must be made as simple as possible, clear, and uncomplicated so that it can activate learners and the material can be easily understood.

The 12th criterion, namely the ability of flash flipbook media in communicating messages of the specified classification of fungi. Based on the validation results on this criterion, 3 validators gave a score of 4 (very good), 1 validator gave a score of 3 (good), and 1 validator gave a score of 2 (less good) with a CVR score of 0.6, so it was declared invalid / not feasible. Validation of flash flipbook media on the 12th criterion is declared invalid because the media created by researchers has the disadvantage of too much material and does not highlight the core of the material, and focuses less on the process of classification of fungi groups. It needs to be repaired to these components. The creation of flash flipbook media is expected to communicate messages about the fungi classification. According to Mustika (2015),the media should be designed to make it easier for teachers to communicate the messages contained in the material so as not to be too verbal. So that it is easily accepted and digested by learners and does not confuse when learning.

The 13th criterion, which is text narration used in flash flipbook media is easy to understand. Based on the validation results on this criterion, 2 validators gave a score of 4 (very good) and 3 validators gave a score of 3 (good) with a CVR value of 0.99, so it was declared valid/feasible. It is necessary to improve the grammar in several sentences to be clearer and easier to understand, namely by using straightforward and formal language in everyday life and vocabulary that is adjusted again to the level of the vocabulary of the target.

The 14th criterion is clarity of meaning in the narrative of the text. Based on the validation results on this criterion, 3 validators gave a score of 4 (very good) and 2 validators gave a score of 3 (good) with a CVR value of 0.99, so it was declared valid/feasible and no further improvements were needed. The use of sentences contained in flash flipbook media is made as clear as possible so as not to cause double interpretation and misunderstanding. According to Sanjaya (2008), to make it easier for

learners to learn, teaching materials should be presented in a way that does not use many compound sentences, communicative language, and is easy to understand.

The 15th criterion, namely the use of words under the Indonesian Spelling General Guidelines (PUEBI). Based on the validation results on this criterion, 4 validators give a score of 4 (very good) and 1 validator gives a score of 3 (good) with a CVR value of 0.99, so it is declared valid/feasible and no more improvements need to be made. The use of words in this medium is adapted to the Indonesian Spelling General Guidelines (PUEBI) with criteria that use capital letters at the beginning of sentences, use proper punctuation, use italics to indicate foreign words or scientific words, and standard words because a good language is a language that is adapted to the ability of the reader and following the rules of language.

Based on the results of the calculation of CVI values from 15 criteria by 5 validators, a value of 0.94 is obtained with a valid category. The development product that has been declared valid or feasible then the development product can be used in the field (A. A. Nugroho & Subiyantoro, 2017; Wati, Wiharti, & Nugroho, 2019). That is, overall flash flipbook media made is declared valid or feasible for use as a learning medium in the sub-matter classification of fungi in class X of Senior High School.

4. Conclusion

Based on the results of research on the feasibility of flash media flipbook classification of fungi class X High school, obtained CVR and CVI values of 0.94. Thus, it can be concluded that the flash flipbook media made as a form of implementation of macroscopic fungi inventory research results in Protected Forests in Mount Pemangkat Sambas Regency is valid or feasible to be used as a learning medium in the sub-matter classification of fungi and provide additional information about the diversity of mushrooms in the surrounding environment for students of class X high school. However, it should be emphasized to make improvements, especially on invalid criteria regarding the quality and size of the image, the appearance of letters, the contents of the material that further accentuate the core part of the material and focus on the process of classification of fungi groups. Then tests were conducted in the field regarding the response of learners and the effectiveness of flash flipbook classification of this fungi as a medium of learning Biology class X in High School.

Reference

Achmad, Mugiono, Arlianti, T., & Azmi, C. (2013). Panduan Lengkap Jamur. *Jakarta: Penebar Swadaya.*

Anis, N. (2016). Untung Berlimpah dari Budidaya Jamur Tiram. *Depok: Villam Media.*

Anshori, M. S. Z. (2013). Rancang Bangun Virtual Laboratory Experimentation Fisika dalam Pokok Bahasan Induksi Magnet Dan Elektromagnet. *Skripsi.*

Arif, A. ., Muin, M. ., Kuswinanti, T., & Harfiani, V. (2007). Isolasi Dan Identifikasi Jamur Kayu Dari Hutan Pendidikan Dan Latihan Tabo Tabo Kecamatan Bungoro Kabupaten Pangkep. *Jurnal Perennial* , *3*(2), 49–54.

Ariyanto, A., Priyayi, D. ., & Dewi, L. . (2018). PENGGUNAAN MEDIA PEMBELAJARAN BIOLOGI DI SEKOLAH MENENGAH ATAS (SMA) SWASTA SALATIGA. *Jurnal Bioedukasi* , *9*(1), 56.

Arsyad, A. (2017). Media Pembelajaran. *Jakarta: Rajawali Press.*

Churri, M. . A. ., & Agung, Y. . A. (2013). Pengembangan Materi dan Media Pembelajaran Mata Pelajaran Dasar Kompetensi Kejuruan Teknik Audio Video untuk SMK Negeri 7 Surabaya. *Jurnal Pendidikan Teknik Elektro* , *2*(2), 803–809.

Daryanto. (2013). Menyusun Modul Bahan Ajar untuk Persiapan Guru dalam Mengajar. *Yogyakarta: Gava Media.*

Dwi Chaerunisa, F. (2019). MEMBANGUN KREATIFITAS DAN INOVATIF PESERTA DIDIK MELALUI INTERNET SEBAGAI MEDIA PEMBELAJARAN. *Prosiding Seminar Nasional Pendidikan FKIP, 2*(1), 678–687.

Falahudin, I. (2014). *Pemanfaatan Media dalam Pembelajaran.*

Gusti, S. . (2017). *Analisis Hasil Implementasi Kurikulum 2013 dalam Aspek Sikap, Pengetahuan, dan Keterampilan pada Mata Pelajaran Biologi SMA di Kabupaten Sleman Yogyakarta. Jurnal Prodi Pendidikan Biologi* (Vol. 6).

Hardiansyah, D., & Sumbawati, M. . (2016). *Pengembangan Media Flash Flipbook PENGEMBANGAN MEDIA FLASH FLIPBOOK DALAM PEMBELAJARAN PERAKITAN KOMPUTER UNTUK MENINGKATKAN HASIL BELAJAR SISWA KELAS X TKJ SMK NEGERI 7 SURABAYA Dimas Hardiansyah.*

Isnaeni, N. (2020). Media Pembelajaran dalam Pembentukan Interaksi Belajar Siswa. *Jurnal Syntax Transformation , 1*(5), 2721–2769.

Lawshe, C. H. (1975). a Quantitative Approach To Content Validity. *Personnel Psychology, 28*(4), 563–575. https://doi.org/10.1111/j.1744-6570.1975.tb01393.x

Maya, A. E., Huzaifah, S., & Madang, K. (2017). *IMPLEMENTASI NILAI PENDIDIKAN KARAKTER PADA PEMBELAJARAN BIOLOGI DI SEKOLAH MENENGAH ATAS.*

Mukti, I. N. C., & Nurcahyo, H. (2017). Pengembangan media pembelajaran biologi berbantuan komputer untuk meningkatkan hasil belajar peserta didik. *Jurnal Inovasi Pendidikan IPA, 3*(2), 137. https://doi.org/10.21831/jipi.v3i2.7644

Mustika, Z., & Pd, M. (2015). *URGENITAS MEDIA DALAM MENDUKUNG PROSES PEMBELAJARAN YANG KONDUSIF. Jurnal Ilmiah CIRCUIT* (Vol. 1).

Nugroho, A. A., & Subiyantoro, S. (2017). Pengembangan Modul Sistematika Tumbuhan Tinggi Berbasis Guided Discovery untuk Mengembangkan Kemampuan Berpikir Kritis Mahasiswa Pendidikan Biologi. *Bio-Pedagogi: Jurnal Pembelajaran Biologi, 6*(2). Retrieved from https://jurnal.uns.ac.id/pdg/article/view/20696

Nugroho, H., & Syamswisna, Y. (2016). *KELAYAKAN MEDIA FLASH FLIPBOOK PADA SUBMATERI MANFAAT KEANEKARAGAMAN HAYATI UNTUK KELAS X SMA.*

Nurrita, T. (2018). *PENGEMBANGAN MEDIA PEMBELAJARAN UNTUK MENINGKATKAN HASIL BELAJAR SISWA* (Vol. 3).

Nuruliah, W., Syamswisna, & Yokhebed. (2017). *KELAYAKAN MEDIA FLASH FLIPBOOK PADA MATERI KEANEKARAGAMAN HAYATI KELAS X SMA.*

Prastowo, A. (2015). *Panduan Kreatif Membuat Bahan Ajar.* Yogyakarta: DIVA Pres.

Puspa Sari, M., Huzaifah, S., Lucia Maria Santoso, dan, Raya Palembang-Inderalaya Km, J., & Ogan Ilir Sumatera Selatan, I. (2014). *PENGARUH PENGGUNAAN MEDIA VIDEO TERHADAP HASIL BELAJAR IPA BIOLOGI SISWA KELAS VIII DI SMP NEGERI 9 PALEMBANG.*

Sanjaya, W. (2008). Strategi Pembelajaran Berorientasi Standar Proses Pendidikan. *Jakarta: Kencana Prenada Media Grouf.*

Septiana Dwi Puspita Sari, O. (2015). *Pengembangan ICT dalam Pembelajaran MANFAAT MEDIA PEMBELAJARAN BERBASIS ICT (INFORMATION AND COMMUNICATION*

TECHNOLOGY) DALAM PEMBELAJARAN BAHASA INDONESIA.

Sugiyono. (2017). Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, dan R&D). *Bandung: Alfabeta.*

Suryani, N. (2016). *PENGEMBANGAN MEDIA PEMBELAJARAN SEJARAH BERBASIS IT.*

Susilana, R., & Riyana, C. (2009). media pembelajaran. *Bandung: Wacana Prima.*

Talakua, C., & Aloatuan, F. (2021). Pengaruh Penggunaan Media Pembelajaran Flipchart terhadap Hasil Belajar Kognitif Siswa Kelas X SMA Negeri 24 Maluku Tengah. *BIODIK*, *7*(1), 95–101. https://doi.org/10.22437/bio.v7i01.12228

Utama, C., Kentjananingsih, S., & Rahayu, Y. S. (2014). PENERAPAN MEDIA PEMBELAJARAN BIOLOGI SMA DENGAN MENGGUNAKAN MODEL DIRECT INSTRUCTION UNTUK MENINGKATKAN HASIL BELAJAR SISWA. *Jurnal Pena Sains*, *1*(1).

Wati, A. C. A., Wiharti, T., & Nugroho, A. A. (2019). PENGEMBANGAN MODUL BRYOPHYTA BERBASIS HASIL PENELITIAN DI TAHURA NGARGOYOSO KARANGANYAR UNTUK SISWA KELAS X SMA. *Florea : Jurnal Biologi Dan Pembelajarannya*, *6*(2), 54. https://doi.org/10.25273/florea.v6i2.5083

Yunida, N., Syamswisna, L., Fitri, Y., Program, S., Pendidikan, B., & Fkip, U. (2014). *INVENTARISASI JAMUR DI GUNUNG SENUJUH KABUPATEN SAMBAS DAN IMPLEMENTASINYA DALAM PEMBUATAN FLASH CARD.*