Proceeding International Conference on Religion, Science and Education (2022) **1**, 39-43

Atlas of Frog and Toad Diversity in Paliyan Gunungkidul Wildlife Sanctuary the Android Based as a Biological Learning Media

Faris Choirudin[1], Sulistiyawati[2]
[1,2]Biology Education Department, Faculty of Tarbiyah and Education, Islamic State University of Sunan Kalijaga
Jl. Marsda Adisucipto No 1 Yogyakarta 55281, Indonesia. Tel. +62-274-540971, Fax. +62-274-519739.

Corresponding author
[1]fariischdn@gmail.com

Abstract: Ordo Anura (frogs and toads) is one of the orders in the amphibious class, which rarely gets attention. Still the lack of supporting references to learning about frogs and toads causes the learning process to be focused only on books and teacher's explanation, thus resulting in a lack of knowledge about the diversity of frogs and toads around it. This research aims to find out what types of frogs and toads, as well as find out the index of diversity of frogs and toads that spread in the Paliyan Gunungkidul Wildlife Reserve Area, find out the results of the identification of the Paliyan Gunungkidul Wildlife Reserve, and develope an android based atlas/application of frog and frog diversity (order anura) in the Paliyan Gunungkidul Wildlife Reserve as a biological learning. This research consists of two stages, there are the study of frogs and frogs in the Paliyan Gunungkidul Wildlife Sanctuary using exploratory descriptive methods and combined with Visual Encounter Survey (VES) and pacth medode to determine sampling point and development stage of frog and frog diversity atlas with R&D development method according to Borg and Gall. Frog and frog diversity research resulted in 7 species divided into 5 families with at three stations in the Paliyan Gunungkidul Wildlife Reserve area. Atlas/application is assessed by 1 material expert, 1 media expert, and 1 biology teacher. Product quality assessment data obtained from the sheet in the form of questionnaires. The results of the material expert assessment said it falls into a very decent category with an average percentage of 89.58%, assessments from media experts are included in the decent category with a percentage of 82.91%, assessments by biology teachers fall into the category of very decent with an average percentage of 90.4%, and assessments from students obtain an average percentage of 86.55% which shows the category is very feasible. Based on this assessment, it can be noted that atlas based android/application frogs and frogs is worth using as a medium of biological learning.

Keywords: Android, atlas, diversity, exploration, frogs, toads, Visual Encounter Survey (VES).

Introduction

Frogs and toads are amphibians that are taxonomically included in the class Amphibia, frogs and toads are commonly encountered by humans. Frogs and toads can be one of the good or bad bioindicators of an environment. Frogs and toads naturally like moist habitats, bushes, standing water and canopies. Frog skin is thin and slimy, making frogs unable to live in hot and dry places, because hot and dry temperatures will cause dehydration to cause death. In Java, especially in the Special Region of Yogyakarta, there are six member families, namely: Bufonidae, Ranidae, Dicroglossidae, Rhacophoridae, Microhylidae and Megophryidae (Iskandar, 1998).

Atlas learning media is the right pictorial media to help students absorb material without having to observe it directly. The use of atlas provides a livelier and precise meaning of learning compared to words so as to stimulate the participants' thinking skills for a detailed description of the material. In addition, atlas can improve understanding of concepts in identifying a learning theme (Tutut, 2016). Atlas of diversity of frogs and toads which contains a collection of pictures of the types of frogs and toads accompanied by a description of the species. In addition, the atlas is a

ISSN 2829-3355 | EISSN 2828-8467

guide for studying the animal world, especially frogs and toads. The use of this teaching material makes students not only learn about the description of each type of animal but also with pictures of species that are easy to find in the student's environment as representatives of their classification with The goal is to make it easier for students to understand (Laras, 2015).

The android-based learning application contains easy-to-understand teaching materials which can be in the form of learning videos, written materials, and supporting pictures. Android learning applications can be practical, effective, and efficient learning media. revealed that the reasons for the need to develop learning applications based on android/mobile learning are: a) able to be used anytime and anywhere; b) can use commercial networks; c) integration with existing systems in particular being able to integrate with e-learning, integrate with education delivery systems (academic information systems), and integrate with systems (Hermawan, 2016). According to Surahman & Surjono (2017) the development of good mobile learning can fulfills the principle of personalizes learning, namely being able to adapt to the characteristics of students. One of the characteristics of students is the difference in initial abilities, speed of mastery of the material, and learning styles.

Materials and Methods

The type of research carried out is a Visual Encounter Survey (VES) research, which is conducting direct observations at each research location that has been determined to obtain data or information about the characteristics of amphibian species combined with the patch method (Mistar Kamsi, 2017). The exploration method is carried out to cover a large area, especially in the observation area, (along the river flow, tributaries and surrounding land), this method is commonly used by researchers in short studies in a location. The researcher used a random exploration method which consisted of two stages, namely pre-study and main research. At the pre-research stage or preliminary survey, starting from the survey where the data was collected, namely determining the point of sampling location, the sampling method to be used. Primary research looks for diversity of frogs and toads. In the end, the results of this research were used as an android-based atlas development.

Data collection was carried out on the spot, namely at the Paliyan Wildlife Sanctuary, located in Gunungkidul. Observation of the diversity of frogs and toads was carried out directly, in two stages, there are:

1. Survey stage to be held in February 2021
2. The data collection stage will be held in June 2021

The tools and materials used in collecting this data include, digital camera, stationary, small net, identification book, observation sheet, headlamp/flashlight, gloves, soil tester, air thermometer, gps, plastic, hygrometer, samples of frogs and toads.

The parameters seen in this study are as:

1. The number of species and the number of individuals of each Anura species found in the Paliyan Wildlife Sanctuary.
2. Environmental physico-chemical factors include air temperature, humidity, soil moisture, soil pH, and coordinate points.
3. Test the feasibility of an Android-based atlas to support student learning in schools.

Data collection

1. Observation Stage

At this observation stage, before doing research in the field, make an observation permit and ask for help from the manager of the Wildlife Sanctuary, because the Wildlife Sanctuary is under supervision by the Yogyakarta Environment Agency. At the observation stage of literature studies and gathering information from the surrounding community in the research area through surveys.

2. Sampling Stage

The study was conducted for four days from June 26-June 30, 2021. The research location is located inside the Paliyan Wildlife Reserve, Gunungkidul. The method used is the Visual Encounter Survey (VES) method combined with the patch method. Data collection on the diversity of frogs and toads was carried out in all 3 (three) stations of the

Paliyan Wildlife Sanctuary, consisting of Stations 01, 02, and 03. Station 01 represents an area with high living activity, and around the Paliyan Wildlife Sanctuary resort office. Station 02 is a forest area with dense trees. Station 03 represents an area with low activity of living things, in the form of low plants and the presence of puddles or lakes, which are potential habitats for the presence of frogs and toads. (Jaeger, 1994).

3. Identification Stage

Then the sample will go through an identification process to determine the identity of the sample taken. Sample identification includes several stages, including sample identification using the Batang Toru Amphibian and Reptile Field Guidebook (Mistar Kamsi, 2017), South Sumatra Amphibians and Reptiles (Mirza D. Kusrini, 2008), Field Guide for Herpetofauna (amphibians and reptiles) Alas Purwo National Park (Fakhrikin, 2012), Getting to know frogs in Gunung Gede Pangrango National Park (Ace, 2015), and other supporting references to determine the characteristics of amphibians in the Paliyan Wildlife Sanctuary.

4. Data Analysis

The results of observing data in the field for specimens of frogs and toads (anura) that have been collected in the Paliyan Wildlife Sanctuary are compared based on the following data analysis.

a. Shannon-Wiener diversity index (Waite, 2000)
   The Shannon-Wiener diversity index is used to determine the diversity of species present so that it is easier to analyze physical conditions and environmental parameters on the presence of species in an area. The formula is as follows.
   Description:
   H' = Shannon diversity index;
   pi = relative population of type I; pi = (ni/N);
   ni = abundance of the i-th type;
   N = total number of individuals

Based on Insafitri (2010), the criteria for the diversity index are grouped as follows.

H' < 1 : low species diversity
1 < H' < 3: Medium species diversity
H' > 3: High species diversity

Development of the Diversity Atlas of Frogs and Toads (Anura) Based on Android Applications

The type of research used in this research is the research and development method (Recearch & Development/R&D). The purpose of using the R&D method in this research is to develop and validate Android-based learning media products on the Development of the Diversity Atlas of Frogs and Toads Based on Android Applications.

This study uses a development procedure that produces a final product design in the form of an Atlas learning media based on an Android application. The development procedure used by the researcher is based on the development steps developed by Borg and Gall in Sugiyono (2015).

Result and Discussion

Identification results of frogs and toads in the Paliyan Gunungkidul Wildlife Reserve

The results of the study on the identification of frogs and toads (order anura) in the Paliyan Gunungkidul Wildlife Reserve Area found frogs and toads that have various types. The types of these species found in the study were 7 species divided into 5 families, including Bufonidae, Ranidae, Dicrogossidae Rhacophoridae, and Microhylidae. Diversity index of each species could seen in Table 1.

Table 1. Diversity index of each species.

No.	Famili	Scientific Name	Regional Name	∑	Ĥ
1	Bufonidae	*Duttaphrynus melanostictus*	Kodok Buduk	15	0,231
2	Bufonidae	*Ingerophrynus biporcatus*	Kodok puru hutan	17	0,248
3	Ranidae	*Occidozyga lima*	bencet hijau	23	0,288
4	Dicrogossidae	*Fejervarya cancrivora*	Katak sawah	25	0,300
5	Dicrogossidae	*Fejervarya limnocharis*	Katak Tengalan	43	0,359
6	Rhacophoridae	*Polypedates leucomystax*	katak pohon bergaris	16	0,240
7	Microhylidae	*Kaloula baleata*	Kodok Belentuk	10	0,181

Development of Android-based Atlas

The results of the study on the Diversity of Frogs and Toads in the Paliyan Gunungkidul Wildlife Sanctuary were used as a biologi learning media to support learning of the Order of Anura in schools in the form of an Android-based Atlas. This atlas serves as an information reference that can be used by students and the general public to help obtain information. This atlas contains the types of frogs and toads in the Paliyan Wildlife Sanctuary area. Theoretically, the Atlas of the Order of Anura is not yet fully known to students. The author does something useful in terms of theory in the form of an Android-based Atlas. The author hopes to provide additional references in learning, especially in the Anura Order material. Diversity index of each station could seen in Table 2.

Table 2. Diversity index of each station.

		Total				149		
		Diversity index						1,846
No.	Scientific Name	Regional Name	Stasiun 1		Stasiun 2		Stasiun 3	
			∑	Ĥ	∑	Ĥ	∑	Ĥ
1	*Duttaphrynus melanostictus*	Kodok Buduk	3	0,299	2	0,366	10	0,213
2	*Ingerophrynus biporcatus*	Kodok puru hutan	2	0,244	-	-	15	0,267
3	*Occidozyga lima*	bencet hijau	2	0,244	-	-	21	0,312
4	*Fejervarya cancrivora*	Katak sawah	-	-	-	-	25	0,333
5	*Fejervarya limnocharis*	Katak Tengalan	3	0,299	-	-	40	0,367
6	*Polypedates leucomystax*	katak pohon bergaris	7	0,367	-	-	9	0,200
7	*Kaloula baleata*	Kodok Belentuk	1	0,161	4	0,270	5	0,137
	Total		18		6		114	
	Diversity index			1,613		0,637		1,830

This development research resulted in a product in the form of an Android-based Anura Diversity Atlas/Application at the Paliyan Gunungkidul Wildlife Sanctuary. Atlas Anura is based on Android/Application designed for class X science students to help understand biology subjects, especially Animalia. The product is designed according to needs, based on interviews with students that the desired biology learning media is interesting, lots of pictures, and concrete.

In response to this, researchers are encouraged to develop interesting biology learning media in the form of Android/Application-based Atlas Anura. The product is considered capable of encouraging students' interest in learning in class X MIPA SMA Negeri 1 Banguntapan Bantul. This can be reinforced by the opinion of Arsyad (2002) that the Android Atlas is a learning medium with the main purpose of functioning in facilitating the process of delivering information to students or the audience. With this, the Android-based Atlas is designed using simple and clear language so that it is easily understood by students. Android-based Atlas designed using Corel Draw 2021 and Construct 3 applications.

Conclusion

Based on the results of research on "Atlas of Diversity of Frogs and Toads in the Paliyan Gunungkidul Wildlife Sanctuary Based on Android as a Biology Learning Media" it can be concluded as follows: The families found at three stations in the Paliyan Wildlife Reserve in Gunungkidul included 5 families, including Bufonidae, Ranidae, Dicrogossidae, Rhacophoridae, and Microhylidae. The results of the study on the diversity of frogs and toads in the Paliyan Wildlife Reserve, Gunungkidul, found 7 species of frogs and toads, including Duttaphrynus melanostictus (15), Ingerophrynus biporcatus (17), Occidozyga lima (23), Fejervarya cancrivora (25), Fejervarya limnocharis (43), Polypedates leucomystax (16), and Kaloula baleta (10). And get a diversity index of=1.846, which means that the

condition of diversity in the Paliyan Wildlife Reserve with frogs and toads is included on the medium scale. Atlas of diversity of frogs and toads in the Paliyan Gunungkidul Wildlife Sanctuary Based on Android seen based on a feasibility test by material experts is included in the very feasible category with an average percentage of 89.58%, the assessment from media experts is included in the appropriate category with an assessment percentage of as much as 82.91%, the assessment by the biology teacher is included in the very appropriate category with an average percentage of 91%, and the assessment from students obtains an average percentage of 86.55% which indicates the category is very feasible. Therefore, the android/application-based atlas can be said to be very suitable to be used as a biology learning media.

References

Hernawan, H. (2016). Penggunaan Aplikasi Mobile Learning Berbasis HTML 5 Untuk Meningkatkan Pemahaman Mahasiswa Pada Mata Kuliah Mikrobiologi dalam Jurnal Ilmu Pendidikan, 2 (1), 645-652.

Iskandar, D.T. 1998. Amfibi Jawa dan Bali – Seri Panduan Lapangan. Bogor: Puslitbang LIPI. Fitri, A., Kusrini, M.D., Priyono, A. 2003. Keanekaragaman Jenis Amfibi di Kebun Raya Bogor. Bogor: Prosiding Seminar Hasil Penelitian Konservasi Amfibi dan Reptil di Indonesia.

Laras Dwi Wulansari, Pengembangan. 2016. Atlas Keanekaragaman Tumbuhan: Euphorbales, Myrtales, dan Solaneles sebagai Sarana Identifikasi Berkala Ilmiah Pendidikan Biologi.

Mirza D. Kusrini, 2008, Pedoman Penelitian dan Survei Amfibi di Alam, Bogor: Fakultas Kehutanan IPB Waite, 2000.

Mistar Kamsi, Siska Handayani, Akhmad Junaedi Siregar, Gabriella Fredriksson. 2017. Amfibi Reptil Batang Toru. Herpetologer Mania Publishing. Yayasan Ekosistem Lestari. Edisi 1, Medan.

Mohammad Farikhin, 2011, Duttaphrynus melanostictus,http://kodok budukbufomelanostictus.html, diakses pada tanggal 12 November 2021.

Surahman, E. & Herman D.S. (2017). Pengembangan Adaptive Mobile Learning pada Mata Pelajaran Biologi SMA sebagai Upaya Mendukung Proses Blended Learning. Jurnal Inovasi Teknologi Pendidikan, 4 (1), 26-37.