



## ARTHROPODA COLLECTION ALBUM: DEVELOPMENT OF A VALID, PRACTICAL, AND EFFECTIVE MEDIA

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### ABSTRACT

The population of arthropods, which is abundant on the UIN Alauddin Makassar campus, can be utilized in the learning process, especially for invertebrates. This study evaluated arthropod collection albums' validity, practicality, and effectiveness. The research method used was Research and Development (R&D) with the type of ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The sampling technique was a purposive sampling technique with 12 biology education students. Validity data was obtained through a validation sheet, practicality data through a questionnaire, and effectiveness data through a learning outcome test. The results showed that 1) expert validation was very valid, with a percentage level of 90.8%. 2) The level of practicality was very high, with 95.6% for students' responses and 97% for lecturers' responses. 3) The results of the small group test are categorized as effective with a 100% completeness percentage. In other words, the arthropod collection album created was valid, practical, and effective. Besides the media being simple and easy to use, the results also implied that the product could increase interest and learning outcomes and help educators deliver complex material in class.

**Keywords:** Arthropods; learning media

### 1. INTRODUCTION

Based on various studies, the development of Indonesian education is far behind compared to other nations (Supardan, 2008). A survey conducted by PISA (Program for International Student Assessment) in 2015 on math, reading, and science skills showed that Indonesia was ranked 69th out of 76 countries (Fendrik, 2017). One action that can overcome these problems is education. Education is a deliberate and organized attempt to establish favorable and productive learning environments, thus enabling students to actively develop spirituality, independence, discipline, wisdom, morality, and expertise towards themselves, society, and the country (Sanjaya, 2009). All

these things are obtained through the learning process. Learning is essentially a reciprocal activity between educators and students to develop new cognitive (knowledge), psychomotor (skills), or affective (attitudes) in students. Learning media can be optimized for effective communication during learning activities through media (Perrin et al., 2015).

Learning media is used to disseminate knowledge and stimulate students' ideas, opinions, and willingness to support the learning process in a deliberate and controlled way. It is necessary to match the use of learning media to the learning objectives (Nurbaiti et al., 2017). As in the invertebrate zoology course, especially the arthropod material, students must learn about arthropod morphology, physiology, and role (Ismail et al., 2020). Arthropods or segmented animals make up the majority of all animals on Earth. All types of arthropods have various structures and functions (Kimball & Tjitrosomo, 1999). During evolution, the protrusions on their bodies have specialized into various morphological forms, each of which has a function (Campbell et al., 2012).

Based on the findings of interviews with biology education students, it can be concluded that the material on the arthropod phylum, particularly in the morphology section, is difficult for students to comprehend or memorize because the morphological structure of arthropods varies from species to species. The less appealing books have few color illustrations, making it difficult for students to distinguish between different arthropod species' morphologies. Interviews were also conducted with Mrs. Ainul Ayuni Taufik, a lecturer in invertebrate courses. According to her, learning about arthropods requires a variety of media and learning materials, not just for classroom instruction but also for learning in the lab and field. This source or media is important because the number and types of species of arthropods are numerous among the various invertebrate phyla. So, it required media that could help students identify arthropods in their environment. This study was carried out on the UIN Alauddin Makassar campus, taking advantage of the abundance of nearby arthropods.

The selection of arthropod collection sites on the campus of UIN Alauddin Makassar is related to the abundance of the arthropod population. A previous study showed that UIN Alauddin Makassar has many arthropods in the arachnid class (Hasyimuddin et al., 2019). Another study by Wahidah, 2013, found a lot of medicinal plants at UIN Alauddin Makassar. It implies that an abundance of plants means an abundance of insects. Amrullah, 2019 said that almost half of all

insects eat plants, so more than 400,000 species of insects (herbivores) live side by side with plants and eat them.

This development focused on creating arthropod media that display photos of arthropod species, their morphological designations, and explanations, as well as information on the characteristics of each species and their classifications. The media development is related to the previous research conducted by Andrian, 2018 who studied learning media in the form of photo albums of Fern Spore Morphology (Pteridophyta) as additional material for Plant Taxonomy Courses. Because it is possible to bring in artifacts that are hard to find, media in the form of photographs could be used as educational resources. A photo is something that was taken or photographed. Photos are an effective visual medium because they enable more accurate, concrete, and realistic object visualization. This study developed a valid, practical, and effective arthropod collection album.

## **2) METHODS**

The type of research used was Research and Development (R&D), which aims to create a product from existing problems or theories, through a series of stages and testing (Sugiyono, 2017). The products developed in this research were the Arthropoda Collection album that adopts the ADDIE development model (Analysis, Design, Development, Implementation, and Evaluation). The study had carried out from August 7 to December 27, 2021. The location for the development research was Alauddin State Islamic University Makassar. Arthropod sampling was done on campus at Alauddin State Islamic University in Makassar. The product trial test was carried out in the Biology Education study program, Faculty of Tarbiyah and Universitas Islam Negeri Alauddin Makassar. About 12 biology education students were tested for media performance. Due to the COVID-19 pandemic, the number of students was restricted to 50%. Therefore, only 12 students attended the test. Students were chosen intentionally to serve as the trial sample. The selection of the students took into account their learning ability, from the grades to the results of the preliminary task response in invertebrate zoology. The media development process refers to the ADDIE development model. The process has five stages (analysis, design, development, implementation, and evaluation). The data were analyzed by learning media validation, practicality, and effectiveness.

### 3) RESULTS AND DISCUSSION

#### Analysis of the level of validity of the Arthropoda Collection Album

Level data of validity was obtained by validating the arthropod collection album through the validator. They gave suggestions and revisions to the media for further assessment.

Table 1. Results of validation of Arthropoda collection album

No.	Name	Score
1.	Validator 1	53
2.	Validator 2	56
<b>Total score</b>		109
<b>Percentage Validity</b>		90,8%
<b>Validity Criteria</b>		Very Valid

Based on table 1 above, the validation score by validator 1 is 53, and validator 2 is 56, so the total score is 109. The results of the validation analysis of arthropod collection albums are 90.8%, so they are in the very valid category.

#### Analysis of the Practicality Level of Arthropoda Collection Albums

The results of student and lecturer responses to the practical aspects of arthropod collection albums are presented in table 2:

Table 2. Practical results of Arthropoda collection albums

No.	Respondents	Total Score	Percentage Practicality	Criteria Practicality
1.	Student Response	918	95,6%	Very Practical
2.	Lecturer Response	66	97%	Very Practical

Table 2 above shows that the students' arthropod collection albums' practicality level is 95.6%. (very practical). The lecturer's reaction revealed a 97% practicality percentage (very practical). In light of this, it can be said that the media is efficient and ready to be used as an alternate teaching tool for arthropods

## Analysis of the Effectiveness Level of Arthropoda Collection Albums

The results of the students' cognitive tests can be seen in table 3.

Table 3. Percentage of completeness of student learning outcomes

No	S	Category	Frequency	Percentage (%)
1	0 – 74	Incomplete	0	0%
2	75 – 100	Completed	12	100%
<b>Total</b>				100
<b>Average</b>				98,7

Students are said to be successful (completed) if they get a value greater than or equal to the KKM score (75). At least 80% of students achieve a KKM score, allowing us to conclude that the learning is successful. Based on table 4.5 above, 12 students scored above the KKM score with a percentage of 100%, or very good category with an average of 98.7. Based on this data, the arthropod collection album has met the effective criteria.

## The Validity of the Arthropoda Collection Album

In the validation of the arthropod collection album, six aspects were assessed: appearance, content, technical quality, size, language, and the suitability of terms. During the validation stage, the researcher received a lot of input and suggestions regarding the contents of the arthropod collection album. The recommendations were inappropriate terms, and the cover's appearance needed to be adjusted to provide an ideal and appropriate media for the next stage. According to Riduwan and Warisman (2008), the media is valid if the valid percentage reach is 61% to 80%, while 81% to 100% is said to be very valid. Based on the results of the validation analysis, the arthropod collection album gets a percentage of 90.8% in the "very valid" category. In light of this, the next stage can involve testing the arthropod collection album. Arthropod collection albums fall under the category of very valid and receive a high percentage of validity because of their attractive appearance, vivid photos, and ease of use.

It can be stated that the level of validity of this learning media has a validity percentage of 90.8%. This arthropod collection album is higher than the previous album by Andrian of Photo Albums on the Morphology of Fern Spores (*Pteridophyta*) with a validity percentage of 88.33%.

### **Practicality of Arthropoda Collection Album**

The percentage level of practicality among the students was 95.6%. For the lecturer, it was 97%, all very practical meaning to say that the arthropod collection album can be an alternative learning media for arthropods. According to Riduwan and Warsiman (2008), media is said to be practical if the achievement of practical presentations is 61% to 80%, which can be said to be practical, while 81% to 100% is said to be very practical. If 50% of students respond favorably to some aspects of the questions, the media is considered practical. Three aspects were: attractiveness, ease of use, and achievement of learning objectives. The arthropod collection album has an attractive cover, an interesting title, and pictures as maintained by the material and displayed interestingly. In terms of convenience, it found that the respondents easily understand the subject matter, have increased learning motivation, and the presentation of the material is related to each other. This album also makes respondents learn independently and systematically. The previous studies showed arthropod collection albums have a practicality percentage of 95.6% (very practical), while the previous study by Saparuddin, 2017 of Photo Album Media has a practicality percentage level of 91.0%.

### **The Effectiveness of Arthropoda the Collection Album**

An assessment of student learning was used to determine the effectiveness of the arthropod collection album. The tests were taken at the end of the lesson. As supported by a theory, students are said to be successful if they get a value greater than or equal to the KKM score (Widyoko, 2013). The percentage of student learning outcomes shows that all students achieve a complete score with an average score of 98.75. This indicates that the learning media for arthropod collection albums is very effective.

Arthropod collection albums are effective in helping students achieve complete grades because the media adapted to arthropod material. Ismail et al., 2020 stated that the students must master concepts, principles, and procedures that include systematics, classification, identification, morphology, physiology, and role structures. This followed the characteristics of the arthropod collection album, which displayed photos of arthropods realistically. The arthropod morphology seemed detailed in the photographs, which were taken using macro photography techniques and exhibited specific information for each species referred to the characteristics, uniqueness, taxonomy,

and role. So the arthropod collection album helps students learn, can improve student learning outcomes, and helps educators convey learning about arthropods

According to Hatcher (2012), teaching using photos can involve students who do not always respond to written material. Photos can reinforce the material and objects, connect students with the environment, create a direct sensory connection between the learner and the subject, and can generate new levels of interest and attention. Teaching by using photos also creates students with a higher level of ability towards visual literacy.

## CONCLUSION

Based on the results, it can be seen that: 1) the revision increased the learning medium for arthropod collection albums to a level of validity that, with a percentage of 90.8%, met the highly valid category, making it appropriate for usage. 2) The practicality of media as measured by student responses, was 95.6%, while that of lecturers was 97%. All fell into the convenient category, and 3) the arthropod collection album's learning media's level of effectiveness fell into the "positive" category with a percentage score of 100% and an average student learning outcome of 98.7. This research has two theoretical implications: 1) the need to use exciting media to increase students' interest and learning outcomes, and 2) that arthropod collection photo albums may create a fun learning atmosphere and develop student motivation. For practical implications, arthropod collection photo albums as learning resources can facilitate students' learning to understand arthropods. However, there are limitations experienced in this study, so it can be used as information for further research to improve. Some of the limitations of this study are: 1) Only 12 students responded, which is insufficient to reflect reality. 2) There are still not enough recognized arthropod samples because of time constraints. 3) Because a broader test was not conducted, the conclusion was made using data from a small group of participants.

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