Teaching Aids In Learning Communication: The Introduction Of The Animals Concept To Students With Visual Impairment In Biology Lesson

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Abstract. Teaching aids are needed in an effort to explain biology material in order to be able to provide an overview, so students can develop concepts to form a comprehensive understanding. Concepts in biology learning materials are difficult to obtain by students with visual impairments without the support of teaching aids. The purpose of this study was to identify ways to introduce animals as living things to students with visual impairments. The method used in this research is a descriptive case study, with qualitative data types. The introduction of the concept of diversity of animals as living things, to students with visually impairment requires the complete teaching aids which include miniatures, for the introduction of shapes and structures; prototype textures, for the introduction of textures, feathers, scales, muscle tissue; audio, to recognize the distinctive sound of animals; An explanation of the description of the size, nature, character, usefulness in life, and behavior that needs to be developed. Constraints encountered in learning biology by using teaching aids for students with visual impairment, including among others: The unavailability of certain teaching aids that are sold and can be bought in the market; The teaching aids available have not been able to help students get an overall picture; The teaching aids available are not in accordance with the special conditions of students with visual impairments; The complexity of the system in some biology subject matter requires visual experience to understand it; In discussing a particular subject matter, the student with visual impairment requires several teaching aids that are operated simultaneously.

Keywords: Biology lessons, teaching aids, learning technology, learning communication, the student with visual impairment

1. Introduction
In teaching natural science, teaching aids are needed to facilitate students in obtaining an overview of the subject matter. Various subject matter in natural science lessons, including biology, is difficult to convey without the support of visual aids. Teaching aids as learning media in the teaching and learning process can arouse new desires and interests, arouse motivation and stimulation of learning activities, and even bring psychological influence on students [1]. Teaching aids are needed in explaining biology material in order to be able to give a picture, so students can build concepts to form a comprehensive understanding.

For example, in explaining one organism that is animals, it takes some teaching aid related to the skeletal system, muscle tissue, respiratory system, circulatory system, digestive system, to the
reproductive system. In biological material about animals, some material mentioned is relatively difficult to understand, because in addition there are foreign terms that must be recognized, stages that must be remembered, also the basic concepts of the system that must be understood.

For students who do not have special needs, the material is considered having certain challenges and obstacles to learn it. In meanwhile, as for students with visual impairments, the challenges and obstacles to studying biological material will certainly increase. Given that the conditions of visual limitations they have, provide its own obstacles in accelerating understanding of learning material.

People with visual impairments, including students with visual impairments, are individuals who work with information; and are part of the community [2]. They have the right to get the education to understand certain fields of science that will benefit their lives, including biology. Studying biology for students with visual impairment and other visual impairments, is a difficulty in itself, especially when it comes to the life of living things [3]. For one thing, students with visual impairments have limited access to computers, encyclopedias, reference sources and relevant publications [4]. Relevant meant here is the relevance in terms of the content and form of information media that suits their needs. In addition, the student with visual impairment is also relatively rarely involved in work-based work and field visits [4], when compared to non-disabled students. In the end, these factors become obstacles for students with visual impairments in learning biology, for example about living things/organisms.

The examples of obstacles encountered for example in the terms of recognizing the color that distinguishes the body's organs, such as differences in heart color with the color of the lungs. Recognize differences in scale, for example, the size of a calf's trunk, and the size of an elephant's trunk. Recognize the differences in shape, for example, the shape of a goldfish's tail, with the shape of a stingray's tail. This difference will be easily recognized by general students, but for students with visual impairment, the introduction of the concept of differences in color, scale, and shape, becomes a distinctive learning challenge. Therefore, teachers need teaching aids so that students with visual impairment can have and develop concepts about a phenomenon. Unfortunately, the teaching aids needed to help explain the certain subject matter are not yet available. Not available at school, or not yet available on the market. There are times when the existence of teaching aids that are already available cannot be utilized optimally, given the conditions of students who have special needs.

Therefore, the purpose of this manuscript is to describe how to use teaching aids and the constraints faced with teaching aids as supporting learning for students with visual impairments. As for the teaching aids that are highlighted are the teaching aids that are used in the study of natural science, biological material, with sub-subjects of living things, namely animals.

2. Method
The research method used in this research is the descriptive method. With qualitative data obtained based on observations, interviews, and discussions. The topics discussed included effective teaching methods to foster understanding and shape conceptual images that approached reality in cognition for students with visual impairment in SLBN A Wyata Guna Bandung, regarding animals as living things. There are several ways of teaching that have been done by biology teachers to provide an overview of animal concepts so that students are able to have a comprehensive understanding of animals as living things in an ecosystem. There are several alternative ways of learning, and constraints related to teaching aid obtained as data presented in this research.

3. Result and Discussion
The high level of new discoveries in the field of biological sciences; recent advances in aspects of cognitive science, learning research, computing, and informatics; increasing integration of biology and
other natural sciences; and educational requirements for the digital generation have presented many challenges for biology teaching and learning [5]. One of the challenges is related to teaching aids.

Learning technology-based teaching aids is a combination of theory and practice in the design, development, utilization, management and assessment of processes and resources for learning and technology in learning which is a complex and integrated process involving people, procedures, ideas, tools and organizations to analyze problems, find ways to solve, implement, evaluate and manage problem solving [6]. While teaching materials are all forms of material that contain teaching materials used to assist teachers/instructors in carrying out teaching and learning activities in the class [7]. Teaching aids and teaching materials are tools and materials which are needed in the teaching and learning process, including the teaching and learning process in biology lessons.

Students who study science can benefit from visual aids. In biology lessons, visual aids are usually limited to tables, pictures, and PowerPoint presentations [8]. This visual aid is difficult to use by students with visual impairments. Some teaching aids that explain material about animals, most are in the form of visuals. Therefore, different teaching aids and teaching methods are needed for students with visual impairments, as illustrated in Figure 1.

![Flowchart diagram](image)

**Figure 1.** Using a combination of teaching aids in teaching animal material to students with visual impairments

There is a study that discusses the application of skills in the field of science. This study reveals that the difficulties experienced by students in applying skills in the science field due to lack of vision, self-confidence, motivation, etc. [4]. One example is the knowledge about the sustainability of the ecosystem that is obtained by the students in biology subjects taught in class. Apparently, it was not enough to be equipped with their behavior in showing concern for protecting the natural environment. This causes the need for emphasis on information about the material, formally in the classroom, and informally outside the classroom. A research result states that the existence of non-formal education taught by organizations/communities caring for the environment will increase the attitude of caring for the environment in students [9]. The results of this research indicate that formal and no formal education should run synergistically. In Law No. 20 of 2003 concerning National Education System
states that education is a conscious and planned effort to create an atmosphere of learning and learning process so that students actively develop their potential to have the religious-spiritual strength, self-control, personality, intelligence, noble character and skills needed by themselves, the community, nation and state [6]. This means that caring for the environment is an expected outcome to shape students into noble individuals.

The effectiveness of learning communication, supported by the existence of a learning atmosphere that is able to support. Therefore, in order to realize such an atmosphere and learning process, it is necessary to be supported by the learning technology [6]. Learning technology in biology lessons can be represented by several tools found in biology laboratories. The biological laboratory infrastructure observed included furniture, teaching aids, tools, and experimental materials, educational media, consumables and other equipment [10]. However, the completeness of biology learning, remains an obstacle in the learning process for students with visual impairments, as described in table 1.

Table 1. The obstacles in learning biology by using teaching aid for students with visual impairments

| Obstacles in learning biology by using teaching aid for students with visual impairments |
|---------------------------------------------------------------------------------------|
| The unavailability of certain teaching aids that are sold and can be bought in the market |
| The available teaching aid has not been able to help students to get an overall picture |
| The available teaching aid is not in accordance with special conditions for students with visual impairments |
| The complexity of the system in some biology subject matter requires visual experience to understand it |
| In discussing a particular subject matter, students with visual impairments need some teaching aid which can be operated simultaneously |

Based on table 1, it is known that the obstacles in learning biology by using teaching aids for students with visually impairments, include: The unavailability of certain teaching aids that are sold and can be bought in the market; The available teaching aids has not been able to help students to get an overall picture; The available teaching aids are not in accordance with special conditions for students with visual impairments; The complexity of the system in some biology subject matter requires visual experience to understand it; In discussing a particular subject matter, students with visual impairments need some teaching aid which can be operated simultaneously.

There is a good deal of biology teaching aid developments available through digital technology media. Research trends in technology-based learning include virtual learning environments, game-based learning, learning through cellular media, and learning through the communication technology [11]. Through this communication technology, some examples of animal sounds that are being used as the subject of the introduction of animals as living things can be found easily through the search engine menu on Google.

Another alternative learning media that can be implemented is digital comic media. A study states that digital comic media on the immune system material has been successfully developed and obtained an excellent interpretation value [12]. Digital comic media can be accessed by students with visual impairments through the help of a screen reader. The other teaching aids are auditive media. With the results of tests stating that: the audio media "Characteristics of Organism Song Education" (CHOSEN) is a medium that is feasible and effectively applied in the learning of Biological Sciences in the SMPLB-A (visual impairments) [13] There are other learning alternatives that can also be tested, to introduce animals as living things, the Biology Museum. UGM Biology Museum is a special museum for biological education that presents a collection of objects in the form of a variety of preserved flora and fauna. The museum is a study destination for school students and research for college students [14]. Several learning alternatives can be strived to improve the effectiveness of learning, especially to help students with visual impairment in developing concepts that they cannot obtain through the sense of sight.
4. Conclusions

The introduction of concepts about the diversity of animals as living things to students with visually impairments requires the completeness of teaching aid including miniatures, for the introduction of shapes and structures; prototype texture, to recognize the introduction of textures, feathers, scales, muscle tissue; audio, to recognize the distinctive sound of animals; an explanation of the description of size, nature, character, usefulness in life, and behavior that needs to be developed.

Obstacles in learning biology by using teaching aid for students with visual impairments, including: The unavailability of certain teaching aids that are sold and can be bought in the market; The available teaching aids has not been able to help students to get an overall picture; The available teaching aids are not in accordance with special conditions for students with visual impairments; The complexity of the system in some biology subject matter requires visual experience to understand it; In discussing a particular subject matter, students with visual impairments need some teaching aid which can be operated simultaneously.

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