Integration of Various Technologies in Biology Learning

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Abstract. Current technological developments require teachers to be able to create effective and efficient learning by integrating technology into teaching. The purpose of this study was to identify the type of technology used by teachers in biology teaching. This research uses descriptive method through observation and a semi-structured interview. Participants involved in this research are three teachers of X class biology from different Senior High School in Indonesia. The findings of the study were analyzed using the rubric of technology integration in the implementation of the use of technology in learning and teaching developed by Britten & Casady. The results of the study revealed that the various technologies used in the biological material of Animalia biology included in the technology that supports learning by using conventional methods or lectures on the material Kingdom Animalia. Teacher's consideration in using technology on biology learning is limited facilities, the limited ability of teachers, complex content, and learning method used. The number of teachers' considerations in integrating technology suggests that teachers in Indonesia need the development of the ability to integrate different types of technology in the lessons learned.

1. Introduction

The development of information technology today requires teachers to have various competencies in implementing effective and efficient learning. Through the various technologies developed today, teacher and students must be able to use technology in learning [1]. In order for teachers to plan and implement effective and efficient learning, teachers should have good knowledge of pedagogical technology and knowledge in addition to having good conceptual mastery [2]. Integration of technological knowledge, pedagogy, and content is conceived within the TPACK conceptual framework developed from the conceptual framework of PCK Lee Shulman [3]. Technology, Pedagogical, content knowledge (TPACK) is a framework built on the interaction of three basic knowledge of technology, pedagogy, and content to produce effective learning by integrating technology [4].

TPACK concept has seven components consisting of 1) technological knowledge, 2) pedagogical knowledge, 3) content knowledge, 4) knowledge of technology content, 5) pedagogical content knowledge, 6) pedagogical knowledge of technology, 7) pedagogical technology Knowledge of content. However, the results show that teachers who have followed the TPACK development program consider technology integration and discipline an important aspect in TPACK development [5]. This research is supported by the results of other studies which say that the components that most influence TPACK teachers are elements of technology knowledge (TK). Kindergarten is the ability of teacher's knowledge and technique in using technology that significantly contributes to TPACK [6].

Effective learning requires the use of efficient technology [7]. In this situation, teachers are
expected to keep up with the latest technological developments, so that teachers can learn by using technology that suits the needs of students to become effective and efficient learning. Obstacles in Indonesia, unequal technological facilities require teachers to utilize technology following conditions around the school or residence. Local technology is the equipment used to achieve individual goals in specific situations or environments. The material in question is the equipment used to support the learning process of Biology in Senior High School in Indonesia. Thus the purpose of this study was to identify the type of technology used by teachers in biology learning.

2. Experimental Method
This research is a descriptive study that describes the kind of TPACK technology teachers used in biology learning on the concept of Kingdom Animalia. Participants recruited for the study were high school / MA biology teachers in rural (rural) schools are communities that behave in the same way as the environment and the livelihoods of farmers and traders. The selected research subjects were biology teacher of X class of science as many as three teachers from three different schools in Malangbong district. Subjects have been chosen based on the location of the school and the willingness of teachers to become participants.

The research data was collected through an observation sheet of instructional learning adapted from Harris, grandgenett, and Hofer research [8] and followed by semi-structured interviews. Data collection was done three times in a row. Also, data were also collected from semi-structured interviews with each biology teacher. The collected data were then analyzed using a Rating Technologies (TIAI) analysis developed by Britten & Casady [9].

3. Result and Discussion
The findings of the field described in Table 1. as a whole in district Malangbong biology teacher already using the technology in the form of a whiteboard and the Internet via mobile phones (HP). As for the other technologies are used, adapted to the conditions of the existing facilities and infrastructure in each school teachers. Use of the Internet through HP utilized teachers as the source and means of learning still using the traditional lecture method. Selection of HP as a learning support tool because almost every student's HP that can be used to search for information on the internet. However, the use of HP by teachers themselves in learning is not used but only assigned to students. Results of interviews about the use of HP by the teacher mentioned that HP used by teachers only for personal communication purposes if related to the search and preparation of teaching materials teachers prefer to use a computer-based technology owned by each teacher. Observations indicate the use of HP's learning by students is used for Resourcing and Searching. Resourcing the aim of learning as a teaching resource or information repository for information and data relating to the learning materials, while Searching is a search process to complete the learning resource materials that will be delivered to students. In the course of searching the information sought is information that is not yet known, so the search for information using search engines, which is one of the facilities provided in an application to search for the information we want. Application search engines of the popular used today by people of Indonesia is Google, but many other applications are offered specific sites such as Yahoo, Alta Vista, and others [10]. According to teachers, the use of the internet via mobile phones intended to allow students more actively seek various sources of material for learning activities. In line with the opinion of the research results Sistriyani [11] states that the Internet as a medium on the material kingdom Animalia may help to understand the material and increase the activity and motivation of students so that students do not feel bored in learning activities.
Table 1. Various technologies used by teachers in learning as much as three times meeting on the concept of Kingdom Animalia

| Participants       | Technology Used                        |
|--------------------|----------------------------------------|
| Participant 1      | Mobile phone (HP)                      |
|                    | Whiteboard & marker                    |
|                    | Textbooks                              |
|                    | Whiteboard and markers                 |
| Participant 2      | HP / internet                          |
|                    | HVS Paper                              |
|                    | coloring apparatus                     |
|                    | Whiteboard and markers                 |
| Participant 3      | Projector Infocus                      |
|                    | Internet / HP                          |
|                    | Textbooks                              |

The second technology is used by a biology teacher at the school was a whiteboard. Whiteboard is a device (hardware) called media or messaging/materials to be presented together with a software [12]. Other equipment used by the teacher is projector and laptops. Just like a whiteboard, the projector used as a vehicle for channeling messages or information learned. Another benefit of media or means of directing messages in learning can provide a thorough experience of something concrete to abstract and can arouse students' motivation to learn.

Based on the results of the analysis of the use of various learning technologies using the rubric of technology integration assessment (TIAI) in the implementation of the use of technology in learning and teaching developed by Britten & Cassady [9] showed that the use of learning technology in the district of Malangbong enter the category of technology components to support the implementation of learning. Technology facilitates biology learning, but learning objectives can be achieved without the use of technology. Observations show that the technology used by teachers in the form of HP, projector, and whiteboard used for presenting the material using lecture method. The lecture method is a conventional method of teaching, the teacher just tells just by the book or slide shown through projector infocus [13]. According to the teachers of the interview to mention the limited facilities available in the school made the teacher cannot use technology at all times. Another obstacle is found in the use of technology is the lack of teachers' skills in using technologies such as application usage search in the search for of materials and installation of technological devices such as projector infocus to spend a lot of time in learning that requires a lot of time to prepare lessons.

Lack of knowledge and skills of teachers in the use of computer-based technology or HP is one of the cause’s maximal integration of technology in learning. Results 3 of 4 teacher interview mentions that skills in using computer-based technology can only use Microsoft Word, Excel, PowerPoint, and use search google apps, but it is used for personal purposes. While the HP-based technologies used by teachers for communication via messenger or social media that does not include the sake of learning. Lack of knowledge because teachers have not been trained on technology in learning at the school and district levels.

The Role of instructional media is the role of technology in learning that can simplify and accelerate the work of the students, as well as fun students for interacting with colors, images, sound, video, and instant something. The use of technology becomes a very important factor for effective learning because it can evoke positive emotions during the learning process [5][14]. The role of a variety of technologies depends on the content material that will be taught by the teacher. The material consists of a kingdom Animalia phyla classified in invertebrates and vertebrates. According to teachers important concept that should be known the student of the material kingdom Animalia is the common characteristics of each phylum, basic grouping of Animalia, animal examples, as well as the role of animals in the world. By using technology in the form of the projector, whiteboard, and HP in Animalia concept, teachers feel that the lesson has not been effective yet using technology, but the teacher has not been able to develop media based on tools/technology. The variety of media
technology as developed by several researchers in materials such as kingdom Animalia handouts illustrated with a map of the concept [15]; E-book interactive multimedia flash-based [16]; Cue Identification Card of Animalia[17]; and media books pop-up[18]. The result of the development of the media can help students understand the concept of Kingdom Animalia, increase motivation and student activity during learning, and improve students’ verbal-linguistic intelligence after being given media books pop-up on the concept of crustaceans.

4. Conclusion
Various technologies used by biology teachers in Malangbong Regency Garut Regency including technology that supports learning. The type of technology used consists of Whiteboard, HP, projector & laptop, as well as technology / other tools tailored to the learning needs of the implemented and facilities that can be used. However, the integration of the technology still encounters many obstacles such as access to the use of limited technology, complicated material delivered, difficult to apply learning strategies, and lack of knowledge and skills of teachers in using and developing technology as media and biology learning resources. Therefore, the researchers conclude the need for the development of teacher competence in Malangbong district to develop technology as media and learning resources tailored to the existing technology in the school environment.

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