**The Meaning of Learning based Interactive Media for Mathematics Teachers in Vocational High School**

**Abd. Aziz Bouty1 and Caly Setiawan2**

1Technology and Vocational Education, Yogyakarta State University (Indonesia)

2Faculty of Sport Sciences, Yogyakarta State University (Indonesia)

Corresponding author E-mail: abdaziz.2018@student.uny.ac.id

**Abstract.** This study aims to describe the experience of mathematics teachers using interactive media based on information technology in the learning process. This study uses qualitative research methods with phenomenology approach, with 3 participants were mathematics teacher in Vocational High School. Data was collected by in-depth interview and participation observation, while data analysis uses interactive models from Miles and Huberman. The result of this study show that: 1) participants showed a positive attitude towards the importance of using interactive media based on information technology to support the learning process; 2) students showed a positive attitude towards the use of interactive media based on information technology in the learning process; 3) old-age teachers difficult to motivate themselves to learn about information technology; 4) training using interactive media based on information technology for the teachers to support the learning process is very rarely given.

1. **Introduction**

Mathematics is a lesson that is always identical with numbers and formulas. Learning mathematics is learning about the concepts and structures was found in the material being studied, and looking for the relationships between concepts and structures (Hudojo, 1990:48). Mathematics is used in various disciplines that exist and advance human thinking. Mathematics is very important given to students because it can form the ability to think logically, analytically, systematically, critically, and creatively, and be able to work together. This ability is needed by students to solve problems.

In learning mathematics, each student has a different view of mathematics, both positive and negative perceptions (Uno, 2011). In negative perceptions, the factors that influence students perceptions of mathematics that is difficult to understand, and boring. There are so many findings from existing studies about the lack of motivation and interest from the students in learning mathematics. This can be caused by several things, namely: 1) the teacher uses conventional methods, thus making learning clumsy and less attractive; 2) students find it difficult to understand the material being taught; 3) the use of learning media that is less effective and less atractive.

With the increasing need for understanding and use of mathematics in the daily life and the world of work, then the learning process of mathematics in schools must be carried out creatively and innovatively, one of them by using interactive learning media that can facilitate teachers to delivering learning material. Interactive learning media can motivated students and make them active provide feedback and encourage students in learning (Hamdani, 2011).

By definition, media comes from Latin which means introduction or intermediary. In the context of learning, media can be interpreted as everything that can deliver messages or teaching material from the teacher as a communicator to students as communicants (Gintings, 2008:140).

Definition of interactive learning media is a teaching delivery system that presents video recording material with computer control to students, who not only hears ans sees videos and sounds, but also provides an active response, and that response determines the speed and presentation sequence (Seels & Glasgow, 1990). Seels & Glasgow classifies media based on technological developments, namely media with traditional technology and media with the latest technology. For media with the latest technology include: a) telecommunications-based media, in the form of teleconference, distance learning; b) microprocessor-based media, which consists of CAI (computer assisted instruction), games, hypermedia, CD (compact disk), and web-based learning. The more actual classification of media is put forward by William W. Lee & Diana L. Owen (2004: 55-56) which is with eight types of shipping media namely instructor-led, computer-based, distance broadcast, web-based, performance support systems (PSS), and electronic performance support systems (EPSS).

By utilizing this information technology in the classroom can help students to understand subject matter easily so that students are able to improve their learning outcomes (James, 2014). In a publication in the journal The Turkish Online Journal of Education Technology shows that the successful application of information technology such as the internet into education is highly dependent on teacher attitudes which ultimately determine how they use the technology in the classroom (Erguvan, 2014).

1. **Methods**

This study uses qualitative research methods with phenomenology approach to explore the experience of mathematics teachers in using information technology, especially interactive media to supporting the learning process. The study was conducted in one of the Vocational High Schools in Kulon Progo, Yogyakarta. Data was collected by in-depth interview techniques and participant observation with 3 participants were mathematics teacher in Vocational High School. For data analysis using interactive models from Miles and Huberman with several steps. The first is collecting data. The second is data reduction, data coding, and data categorization. The third is presenting data in the form of a concept map chart, and the fourth is to draw conclusions.

1. **Results**

The results of this study will describe the attitudes of teachers and students towards the use of interactive media based on information technology in the learning process, also described the obstacles and challenges experienced by teachers and students in using interactive media based on information technology.

*3.1. The Attitude of the Teacher towards the use of interactive media in learning process*

The success of applying information and communication technology such as interactive media into the learning process is very dependent on the attitude of the teacher who will apply the use of this technology in the classroom. According to Tearle (2004), the success of the application of information technology involves a complex process consisting of three important categories that affect success, namely the individual, the implementation process, and the organizational context.

A teacher needs to do a variety of learning efforts that can create an active learning environment, and can improve the quality of the learning process by using interactive media based on information technology.

In this study, in-depth interviews were conducted with three participants who were mathematics teachers at the Vocational High School with teaching experience around 10 – 35 years. From the interviews conducted, many information, opinions, and suggestions was obtained from participants who described their attitude regarding the use of interactive media based on information technology in learning process.

Participants recognize that teachers are currently required to know information technology, and teachers must be able to actively create an active and interesting learning environment using interactive media. The interview results show that all participants know and understand the meaning of information technology, especially the use of interactive media for learning process, as quoted from the statement of one participant, Mr. Supardi, that “*Interactive learning is learning where students are more active in discussing, questioning, or now known as the scientific learning model*”. So many interactive media for learning process available, but in general what is often used is Power Point, and several other application based online such as Wolfram Alpha, and Edmodo.

Participants statements that learning with using interactive media greatly facilitated the work of the teacher, more efficient, and motivated to enrich knowledge. We can see this in the next statement from Mr. Supardi, that *“Technically, I made teaching material using Power Point, with one presentation slide it can be used multiple times to be taught in different classes”*.

Among the perceived ease, there are interesting things from some participant statements related to the use of interactive media for mathematics learning, as Mrs. Titik’s statement that “*in learning mathematics, students really need their ability to think, so they still think that it is best to use the traditional method of writing on the board. If students just watch (seeing slides), they will be difficult to be invited to think*”. In addition, with the rapid development of technology, with an age that is no longer young, participants find it difficult to adapt quickly to these changes.

*3.2. The Attitude of the Student towards the use of interactive media in learning process*

In this study, we also tried to study related o student attitudes towards the use of interactive media in the learning process based on the participant’s perspective. Referring to participants statements, students attitudes towards the use of interactive media in the learning process show many positive things such as very enthusiastic about receiving the material, and makes students more relaxed, more interested, and most importantly is students are actively involved in learning. In addition, participants stated that students pay more attention to learning when using e-learning.

*3.3. Constraints and challenges of using interactive media in learning process*

In addition to the many conveniences that can be obtained and felt related to the use of interactive media, there are also many constraints and challenges faced in implementing the use of interactive media in the learning process. Results from this study divided constraints and challenges into three parts, namely the constraints experienced by the teachers, students, and constraints on the media itself.

*3.3.1. Constraints experienced by the Teacher*

It cannot be denied that the use of information technology in all aspects of life has become a mandatory thing to know and do not look at age in its use. Thus with the use of interactive media for learning process, like or dislike teachers must be able to adapt with technological developments. In this study, age is the most influential factor causing constraints in the successful use of information technology, especially interactive media for learning process. It is very difficult to motivate teachers who have ages around 50 and above and also difficult to be guided to use technology especially interactive media. Moreover, related to the learning of mathematics which is must related to formulas, many teachers at this age are more comfortable using the traditional method like a blackboard, because it difficul to writing or finding these formulas when using applications. This was revealed from Mr. Supardi’s statement “*We are old, the understanding of information technology is very limited*”. Likewise with Mrs. Titik’s statement “*If like me who was very little capability for information technology, my teaching method is still traditional*”. For teachers who are under 50 years of age, they are still easy guided and given the motivation to learn to use information technology especially interactive media. Another constraints is the lack of training given to teachers related to the use of information technology, especially the use of interactive media in the learning process.

*3.3.2. Constraints experienced by the Student*

The results of this study found quite a lot of constraints experienced by students related to the use of interactive media in the learning process. Based on interviews with participants, the results showed that the constraints experienced by the students were initiated from the maindset of students who had already negatively affected mathematics, so that students interest in learning mathematics is quite low and it seems that students are forced to take lessons, as quoted from Mrs. Nunik’s statement that “*most of the student are lazy invited to think, to discuss, so they difficult to understand the material through interactive media, and it must be repeated*”.

*3.3.3. Constraints on the media*

For the media, the constraints are in the media supporting facilities themselves, namely the availability of internet network, and the lack of facilities for LCD Projectors. In addition, device specifications (PC, Laptops) which is owned by schools, teachers, and students are still many not supported to the application or interactive media.

1. **Conclusion**

The use of interactive media in the learning process can help teachers and students improve the quality of learning. Teachers more easily and quickly to prepare learning material, and the student feel enthusiastic and interested to following the learning process, and more understanding the material are given. The results of this study can be concluded that: (1) teachers showed a positive attitude towards the importance of using interactive media based on information technology to support the learning process; (2) students showed a positive attitude towards the use of interactive media based on information technology in the learning process; (3) old-age teachers difficult to motivate themselves to learn about information technology; 4) training using interactive media based on information technology for the teachers to support the learning process is very rarely given. Some constraints related to the use of interactive media for the teacher in general is: (1) the lack of motivation to learn and adapt with information technology, this is more due to old age factors; (2) the lack of training programs held related to the use of information technology, especially interactive media that supports the learning process for teachers and also affects the ability of teachers to utilize these interactive media; (3) the lack of support for facilities such as internet network (bandwith), LCD projectors, and specifications of devices (PC, laptops) that are adequate and support the implementation of a quality learning process.

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