The importance of multimedia learning modules (MLMs) based on local wisdom as an instructional media of 21st century physics learning

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Abstract. This research used survey reasearch which is analyzing the needs of teachers and students. Analyzing the needs of teaches and students is done to obtain learning media that are appropriate to the needs of teachers and students. This research used 100 learners grade X which selected randomly and 3 teachers of physics subject in the Senior High School Number 01 OKU (SMAN 01 OKU) using questionnaires and observations. The result obtained i.e all learners are interested learning integrated with technology, 82% of learners desire a contextual learning in the form of local wisdom. The way of learner learning about 25% learners easier learning through audio, 30% through visuals, and 45% through audio-visual. Characteristic of MLMs based on local wisdom can completed the needs teachers and students for teaching and learning activities. MLMs provide a variety of media in the form of audio, visual and narrative and also physics contents associated with local wisdom which is packaged into a unity that related each other. MLMs based on local wisdom suits the needs for teachers and learners.

1. Introduction
Nowadays, learners live in technology era especially information technology. Technology has an important role in their everyday life. Learners spend their time using technology such as smartphones, tablets, computers, and other forms. But the use of that technology in learning is still not widely available for learners. The use of technology is often only used as a medium of entertainment for learners. They also often use their gadgets not in the right time, so their attention when learning is often sidetracked. Therefore it is necessary to create a learning environment that can maximize the use of technology through their gadget.

To create a fun learning environment, teachers can choose an instructional media that fits the needs of learners. Instructional media can be through by audio, visual, or a combination of both. Forms of media that will be used will have different impact on the learner because each learner has different learning styles. Since the invention of computer and internet technology, the learning process will be influenced by the use of instructional media[1]. Media can be interpreted as a tool that can be used to forward messages and information. Learning media integrated with technology (e-Learning) is proven to be effective in helping teachers and learners to improve the learning process [2][3]. E-learning can also answer the demands of the delivery-method of 21st century learning that expects enhancement of hard-skills and soft-skills of learners. In addition, the use of e-learning to learners is also a form in
achievement of the purpose of the 2013 curriculum (revision edition) i.e preparing learners to be aware and understand the technology [4]. Therefore, it is very important to use e-learning on learning in the school.

Physics learning is part of science learning that investigates the events of the universe[5]. The process of delivering learning in the classroom conducted of the teacher has different impact to the ability and reciption capacity by the learners[6]. For success teaching and acceptance better of learners, we needed media as the tools to help on it[7]. Through an instructional media is able to forward of materials, concepts and theories on the physics learning that is quite abstract enough to be more easily understood. So the process of building new knowledge and connecting them will happens continously. Besides that, other obstacles faced by learners that learners feel the difficulty in understanding of the physics learning because of the lack of contextual examples. Providing contextual examples on physics learning can be done by using local wisdom. Local wisdom is a form of habit that is undertaken or followed by a particular community or wide community[8][9]. Learners need a way of learning that is close to their lives. One effort that can be done is to integrate local wisdom in the classroom learning. Based on that background, physics subject required a technology in the learning, the form of technology can be realized in an instructional media. To find out suitability an instructional media, it is necessary to survey the needs of learners and teachers.

a. Teacher’s and Learners’s Need

The quality of education obtained by learners is a pillar to improve the quality of human resources in the future. It is important for teachers to improve the classroom learning conditions. Through interest, curiosity and motivation in learners will be able to make the involvement of learners actively in the classroom that will affect the ability of learners's understanding of the subject matter. Learning is the need of each individual concerning cognitive, affective and psychomotor aspects. In the learning process, learners need to understand how best to learn. This is called learning style [10].Learning styles are often also called Intellectual styles [11]. Learning style is a combination of how to obtain, manage and store information used by each individual for maximum results. Each individual has different abilities in the learning process and feels the ease of learning in different ways. Interest in learning is divided into three ways, through audio, visual and combined both. Learners leaning through the audio will more easily understand when learning in the form of voice, speech and conversation. While through the visual, learners will more easily understand when learning includes text, graphics, images and animation. Knowing the learning style information of learners will help learners to improve their learning.

Creating an active learning environment in the learning process is the most important thing to do. To achieve the learning process effectively and efficiently the teacher must make learning interesting, so that the attention of learners can develop, there are the following things to increase learners’s attention : 1) Every child has natural desires, drives and instincts; 2) Learners’s interest change according to the development of age; 3) To make the educational process is interesting to learners, the general goals and the specific objectives of learning should be clear to them; 4) To maintain of learners’s interest, teachers are required to develop new knowledge based on their prior knowledge and experience; 5) Teachers are required to create interesting instructional media with various approaches and varies. 6) It should also be presented audio-visual as aids tools, which make interesting and relevant to learning [12].

The use of technology in learners leads them to get higher interest than other activities. Technology brings new motivations and environments to learners [13]. In addition, the rapid development of ICT in the 21st century, giving demands to learners in order to acquire digital skills in the future [14]. One form of digital expertise (digital literacy) is competent to take a control use of digital applications as the facility to complete cognitive tasks [15]. Learning integrated technology is a form of digital applications. Through technology can evoke interest in learners [16]. When integrating technology in the classroom learning, teachers should consider the culture and characteristics of learners[17]. Consideration of the culture and characteristics of these learners can be done by linking
the topic of learning with the everyday life of learners [16]. When teachers apply real-life problems to learners, it will bring learners to a high level of science [18]. If there is a good relation between teachers, learners and learning support tools, then it can be an active learning. Active learning can improve learners' learning outcomes [19].

Learners are often scary on physics learning because that is identical with difficult equations and fairly abstract theories [8]. In order to minimize the difficulties experienced by learners, teachers may involve the use of technology in the classroom so that the delivery of materials can be further elaborated. To produce appropriate instructional media that need to conduct activities to find out the needs of the object (teachers and students) as an alternative in learning [20]. Reducing misperception by learners will provide a better understanding of theories and physics equations. This is one of the advantages of physics learning that integrates technology. Teachers need to know the needs of learners in classroom learning.

b. Multimedia Learning Modules (MLMs) used on Local Wisdom

Instructional media is a tool used to assist and complement activities for learning. Multimedia learning modules is an instructional media that is packaged in the form of multimedia modules. The use of ICT and multimedia has been more than 25 years in the education field [21]. Through multimedia learning, teachers can deliver lessons better and more efficiently and produce higher performance levels than non-multimedia learning [22]. An integrated learning module with proven technology brings a positive effect of enhancing learners' learning [23][24][25]. Multimedia can also help explain difficult even abstract concepts [26], can explain better than textbooks and powerpoint [27], and provide better insight [28][29][30][31][32]. MLMs is an interactive multimedia modules. [33][34] An interactive multimedia is a multimedia equipped with user-operated controls or facilities, so the user can choose what is required to continue the next process in learning. Meaningful learning through multimedia involves learners into five cognitive processes: 1) processing in verbal memory, 2) processing in visual memory, 3) organizing text into verbal models, 4) organizing images into visual models and 5) integrating between verbal and visual models [34]. This leads to better multimedia learning.

MLMs also provide many dynamic representations to explain the physical phenomena with form of graphical, animation, video, narration and audio that are interconnected [35][36] and supported by examples problems and exercises by a certain duration in each of their instructions [37][38]. MLMs can be used by learners independently as a prelecture so can provide prior knowledges for learner to classroom learning [35][37][38]. MLMs also pinned local wisdom. Local wisdom is given to learners a contextual example of physics learning. Because one of the obstacles of learners on physics learning that learners feel that physics learning is very far from their daily life. Emphasizing local wisdom in learning can help to direct the learning process that is related to the real life of learners. Local wisdom also enhance the cognitive abilities of learners [4][39][40]. It is also a form of support to the 2013 curriculum for developing basic science competencies based on local wisdom.
Table 1. Characteristics of MLMs Based on Local Wisdom

| Characteristics of MLMs Based on Local Wisdom will be Development |
|---------------------------------------------------------------|
| 1. Used before learning activities and can be applied in learning |
| 2. Displayed via audio and visual which consists of several features of narration, flash animation, and learning video |
| 3. There is a play button, pause and accelerate for each instruction activity |
| 4. Accessible through smartphone and computer |
| 5. Displaying various representations |
| 6. Material presented using local wisdom |
| 7. There are examples of problems and exercises based on local wisdom |

2. Research Methodology
This study is a survey research which conducted on 100 students of X grade taken with purposive random sampling which has normally distribution data and 3 teachers of physics subject in the senior high school number 01 (SMA N 01) OKU – South Sumatera. Data collection techniques with questionnaires and interviews to determine the needs of learners in physics subject. Interviews and questionnaires for teachers to know the teaching techniques in the classroom. Students were given are 14-items of questionnaire and several of them who selected randomly were interviewed. After that, made clarification in order to reduce misperception. Through the blueprint below we can investigation the needs of learners can be known.

Table 2. Blueprint of Learners’ and Teacher’ Need

| Point Review of Learners | Questionnaires |
|--------------------------|----------------|
| Nu | Aspect | Sub – Aspect | Item |
| 1. | Learners’ styles learning | | 1,2,3 |
| 2. | Learners’ interest of technology | a. The type of gadget you have | 4 |
| | | b. Duration of gadget usage | 5 |
| | | c. The purpose of using gadgets | 6 |
| | | d. Response to the use of technology in learning | 7,8 |
| 3. | Learners’ knowledges of local wisdom | a. The kinds of local wisdom which is known | 9,10,11 |
| | | b. Response to the use of local wisdom in learning | 12 |
Point Review of Learners

| Nu | Aspect                                 | Sub – Aspect | Item  |
|----|----------------------------------------|--------------|-------|
| 4  | Physics Learning                       | a. Learner’s obstacles in the physics learning | 13, 14 |

Point Review of Teacher

| Nu | Aspect                                 | Sub – Aspect | Item  |
|----|----------------------------------------|--------------|-------|
| 1  | Teaching and learning activities       | a. Teaching techniques used | 1     |
| 2  | Technology interesting                 | a. The type of gadget you have | 2     |
|    |                                        | b. Duration of gadget usage | 3     |
|    |                                        | c. The purpose of using gadgets | 4     |
|    |                                        | d. Response to the use of technology in learning | 5     |

Questionnaire filling is done after classical physics learning. Interview activities conducted during school activities. Data analysis techniques used percentage from questionnaire given and interview data were analyzed descriptively.

3. Findings

The Finding of interviews and questionnaires from teachers and students to obtain information. Result from the interviews and questionnaires of physics subjects teachers in SMA N 01 OKU obtained that they still using conventional teaching techniques. Teacher feels that the current teaching technique is an effective way to teach physics because the wide of material physics subject and needs much time. The other side that the teacher realizes today’s learners are highly dependent on technology. Teachers also have familiar and know how to use gadgets such as mobile phones (smartphones) and laptops. But teachers didn’t know how to apply the technology in learning because of limited skills possessed. On the other hand, teacher feels that applying technology in the classroom will make the students become less controlled so that the class time of learning becomes much wasted. Next, review from the results of questionnaires and interviews based on the needs of learners can be seen on Table 3.

| Nu | Review | Result |
|----|--------|--------|
| 1  | Learning styles | Learners are more dominant in learning styles that combine audio and visual than visual or audio (figure 2). This is because learners feel that learning media which is combine audio and visual display will be able to maximize their vision and hearing sensors. In addition through a combination of audio-visuals display create a new atmosphere in the class so it will be increasing attract the attention of learners and decreasing saturation in learning. |
| Nu | Review                                      | Result                                                                                                                                                                                                 |
|----|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2. | Learners’ Interest of technology           | Learners use smartphones in their everyday life, about 56% of the total sample not only use smartphones but also laptop and the other kinds of gadgets (Figure 3.a). But in reality the use of gadgets is only done for entertainment activities. The average of learner intense use of gadgets (figure 3.b) as many as 87% of learners use gadgets everytime in their spare time, 10% use gadgets almost of the whole time, and 3% only use 2-3 hours when they have been completed from school activities learning. 100% of learners need and are very interested if there is an instructional media that use of their gadgets for their learning. |
| 3. | Knowledge of local wisdom                  | All learners know the existence of local wisdom in their environment. 68% understand and have done it and 32% only know without doing. Based on figure 4 about 85% learners interest if the learning physics using local wisdom in it, because through the local wisdom of learners easier in imagining and remembering                                    |
| 4. | Obstacles in physics learning              | Learners feel that physics learning is one of the most difficult subjects in the school. They feel a heavy burden when studying physics such as the necessity of theoretical understanding, determining the selection and use of physics equations then relating theory to equations. This causes the lack of learners’s interesting to physics learning in the school. |
4. Discussion

The results obtained from the learning style points in Table 3, that the trend of learners' learning styles was vary. This tendency will affect learning outcomes. Therefore it is necessary for the teacher to know the trend of this learning style. Media that will be developed should consider the needs of students in...
terms of the trend of learning styles. One of strategies that can be done is to combine audio and visual into a single unit in a media, so that individuals can maximize their knowledge acquisition.

Further based on Table 3 it has been proven that learners have been influenced by the digital era. Student dependence on technology has not provided maximum results in learning activities. This happens because as far as so rarely an instructional media available that able to collaborate their technology into learning activities in class. So the use of technology in their life is only used as a medium of entertainment. They realize that it will be very interested and fun if there is an instructional media that available collaborate the technology in the classroom learning.

The result from the point of view in physics learning (Table 3), generally learners feel that physics learning is difficult. This difficulty is due to physics which generally describes something abstract, the difficulty of imagining makes physics even more difficult. Besides the contextual example is still very less given. Some suggestions [39][40] to use local wisdom as a contextual example in learning. The survey finds that almost all learners understand the local wisdom in their environment. One of the local wisdom form is the traditional games. Learners understand the local wisdom the form of a game in their environment and played. According to the results of the survey, learn believes that it would be fun when the learning of physics is explained through the traditional game (local wisdom). A fairly abstract physics lesson can be more easily imagined and remembered when explained through local wisdom. In other hand, the result find that teachers feels that applying technology in the classroom will make the students become less controlled so that the class time of learning becomes much wasted. Futhermore applying technology in learning will provide an effective learning environment, fun, and challenging for learners[41].

We know that producing the appropriate media, we need to do some process activities to find out the needs of the object as an alternative in the learning[20]. Having known the needs of learners and the suitability of developing instructional media then it can be decided whether an instructional media is needed or not in the learning. Overall based on survey results obtained that characteristics of MLMs based on local wisdom can be developed because of the match and suits with the needs of learners and teachers.

The survey research had been done by analyze the needs of teachers and students of an instructional media. From the result we got the information about learning styles of learners, learner’ interest of technology, learner’ knowledge of local wisdom and the obstacles student in physics learning so that the researchers offered an instructional media in the form of MLMs based on local wisdom to use by teachers and students. MLMs based on local wisdom is an instructional media that suitable to the needs of teachers and learners, because: 1) MLMs based on local wisdom provide students opportunities to use their gadgets to access of learning material, 2) provide audio and visual display on MLMs that’s can support the vary of learners’ learning styles, 3) pinning the local wisdom in the learning to convey contextual example of physics learning. That is why MLMs based on local wisdom suits the needs of teachers and learners as instructional media of 21st century physics learning.

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