Development of learning media in circular motion for Senior High School using ICT based on contextual learning

E Afradisca and Desnita*
Department of Physics, Faculty of Mathematics and Natural Science, Universitas Negeri Padang, Indonesia
*desywaznadil@gmail.com

Abstract. A preliminary study was conducted to find topics of senior high school physics subject whose learning has not been supported by the media and appropriate teaching materials. The media and teaching materials are those that facilitate students to foster attitudes, build knowledge, and train sciences process skills through physics learning. The media and teaching materials should use contextual. For certain topics Information Communication and technology (ICT) assistance is needed, because there needs to be engineering on the duration of time or the size of the object under study. Obtained information that In high school X grade in senior high school, only a quarter of the tasks that apply the contextual approach and implementation of the tasks and responsibilities of the topic X grade Senior High School (SMA) that utilizes ICT appropriately. Based on these results, it is necessary to do research media learning based on contextual learning to use ICT in the manufacture and presentation. In the current study the topic is circular motion.

1. Introduction
Life cannot be separated from the word learning both formal and non formal learning. Formal learning is manifested in the form of learning processes at school. Learning through education in schools is a conscious effort designed to increase human knowledge according to the times. Physics Learning to concern natural phenomena either natural or man-made using technology.

The subject of these physics is closely related to nature and the environment to make learning more contextual. This requires teachers to be more creative in the learning process so that students can understand the learning that is explained in relation to natural events that are the subject of Physics. Physics is never separated from research either research that has been done by previous scientists as well as further studies. Physics is closely related to scientific activities carried out systematically. Physics has three characteristics that are scientific, contextual, and evolve along with technological advances.

Technological advances can help facilitate in the learning process. The learning process can be supported with several learning resources. Learning is an individual activity of students and the environment is specifically conditioned to direct the activities of students [1]. Learning resources can take advantage of emerging technologies in accordance with the times. One that can be utilized is the use of laptop and internet. Learning media can help provide a direct experience and understanding of students of teaching materials that are taught. Media and teaching materials are tools that facilitate
learners to develop attitudes, build knowledge, and train the skills of the science process through physics learning.

The use of media and teaching materials in this lesson involves the teacher's creativity as a facilitator. Teachers are required to master the taught material, as well as the use of media and teaching materials in contextual learning. In reality there are few tasks that apply a contextual approach. Making learning media based on contextual learning to use ICT is expected to be able to increase interest and motivation students, to improve learning outcomes achieved.

2. Research Method
The type of this research is qualitative descriptive research. This research was conducted in June and July 2018. The research data is descriptive and qualitative data. Data collection techniques used in the form of a questionnaire analysis learning physics of senior high school, sources and media of high school physics for teacher subjects physics classes X, XI, and XII for use as research data. The questionnaire sheet is filled to find out how the development of physics learning in schools and media sources are used.

Research requires data obtained from a data collection activity. Correct conclusions can only be obtained from correct data collection [2]. The data was collected by distributing questionnaires in some SMA in West Sumatera province. SMA which become the sample of data collection include SMAN 6 Padang, SMAN 1 Lembah Gumanti, SMA Pembangunan Padang, SMAN 1 Koto, SMAN 1 Lubuk Alung, SMAN 1 Lubuk Basung, SMAN 2 Bukit Tinggi, and SMAN 1 Gunung Talang. Data were analyzed based on the answers of physics teachers and percentage of respondents divided by the largest score multiplied by the number of respondents then multiplied by 100%.

3. Results and discussion
3.1 Results
The development of ICT-based contextual-based media was conducted as a means to overcome the problems encountered during the preliminary study in several schools in West Sumatra. The Physics Study Questionnaire Sheet given to Physic teachers in each school contains about the scientific activities carried out in Physics lesson and the appropriate and contextual use of media in learning. Based on preliminary studies that have been conducted in several high schools in West Sumatra indicate that, in schools generally have been utilizing emerging technologies such as internet usage that can be used by teachers and students in learning. Learners are also familiar in the use of information and communication technology. Most of these schools also provide laboratory computer facilities that can be used by students.

Based on the analysis, learning resources that need to be developed to help the students' understanding in Physics learning is with contextual-based media to be easily found and understood by ICT-assisted students. Analysis shows some results. First, there are only a few contextual implications that bring students understanding to the context of everyday life that is close to the students itself. Secondly, there are some scientific activities that are required by the 2013 curriculum to develop complete competence has not been fully implemented. Thirdly, the media already available in schools has not been utilized in the learning process.

3.2 Discussion
To achieve the objectives of learning, it is necessary some aspects, including teachers, students, learning models, learning methods, learning strategies, learning media, learning resources, teaching materials, and so forth [3]. In accordance with the demands of the curriculum all aspects of learning achievement needs to be considered and always developed to produce better human resources. This study analyzed one of them is the need for learning media used for the achievement of learning objectives.
Hench, Melinda, and Russell [4] state that the media as a means of communication channels. The term media itself comes from the Latin and is the plural of the word “medium” which literally means “intermediary” is the intermediate source of the message (a source) with the receiver of the message (a receiver). Learning involves the teacher as the source of the message and students as the recipient of the message conveyed by the teacher. Submission of messages by teachers to students this means the delivery of explanations of the material being studied. The process of delivering this material will be easier to happen when using an intermediary. Intermediaries used are learning media that previously must be tailored to the characteristics of the material being taught and the potential where the use of a learning medium.

This discussion discusses the results of preliminary studies that have been conducted in several schools in West Sumatra, constraints and limitations, and alternative solutions. Based on the preliminary study that has been done in several schools in West Sumatra through the questionnaire indicates that scientific activities have not been done optimally as the curriculum has demanded. Scientific activities that have not been done optimally is due to damage to some supporting tools on the material taught so that scientific activities cannot be implemented. In addition, the obstacle is not yet optimal scientific activity is the unavailability of supporting tools and also supporting tools that have been available but not utilized by the teacher as an intermediary in the delivery of material in learning.

The availability of media, resources and teaching materials also shows low numbers. This is because some media required but not yet available and some are not yet used in learning. Inadequate learning media is available only in school laboratories, but ideally available and used in learning. In addition, the assignment of contextual implementing also still shows a low figure.

4. Conclusion
Based on preliminary studies conducted in June and July 2018 in several schools in West Sumatera, it was found that the implementation of scientific activities in the lesson of the curriculum has not been optimal and the availability of media, resources and teaching materials that have not been sufficient and optimally used.

References
[1] Deni. 2011. Pembelajaran Terpadu. Bandung: Pustaka Cendekia Utama.
[2] Suastra, I.W. 2006. Buku Ajar Belajar dan Pembelajaran Sains. Jurusan Pendidikan Fisika Universitas Pendidikan Ganesha.
[3] Slameto, Wardani, N., S., dan Kristin, F. (2016). Strategi Belajar Mengajar. Jakarta: Rineka Cipta. Meningkatkan Keterampilan Berpikir Aras Tinggi. Prosiding Konser Karya Ilmiah Nasional Vol.2, Agustus 2016. ISSN:2460-5506
[4] Heinich, Molenda, and Russel. 2001. Instructional Media and Technologies for Learning. New Jersey: Prentice Hall