Analysis of the Need of Augmented Reality (AR) Based Learning Media for The Prosedure Text Material

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Abstract. *Learning media is one of the most important aspects that support success in a learning process. In the current 21st century, interesting learning media are technological-based, fit with the life of millennial students, and view the development of 4.0 industrial revolution era. In learning procedure text, the students will be more interested in the media innovation to help generate their ideas in writing. This research aims to analyze the need for technology-based learning media for Bahasa Indonesia teachers and VII grade students of junior high school in the procedure text material in Magelang city. This is a qualitative descriptive research with the data collection techniques carried out include questionnaire and interviews. The data are in the form of curriculum analysis, procedure text material, and the students' characteristics which are analyzed interactively. The results show that: (1) the entire material is in accordance with the competence standards, basis competencies, and indicators of the 2013 Curriculum; (2) the students have difficulty in understanding linguistic material in the form of written texts; (3) the level of creativity gives rise to ideas, and the students' ability to switch ideas into the written form is still low; and (4) the learning media used are still conventional. Therefore, the teachers and the students need the development of technology-based learning media that can help them to be more active and creative in writing procedure texts.*

Keywords: analysis of needs, learning media, procedure text, augmented reality

1. INTRODUCTION

Massive advances in information and communication technology provide significant changes in all aspects of life, including the world of education. In the current 21st century, many challenges and opportunities must be faced by educators and students. The 21st century education aims to realize national objective, that is a prosperous and well-being Indonesian people with respectable and equal position with other nations in the global world, through the formation of a society consisting of independent, willful and capable quality human resources to realize the ideals of the community. Meanwhile, there are challenges to face global competition. The ability to compete is largely determined by quality education. The quality in question is not only able to meet national standards, but to meet international ones, so that Indonesian human resources are able to 'fight' with other countries (Haryanto, 2018).

The 21st century learning paradigm emphasizes the students' ability to think critically, connect the science with the real world, master information communication technology, and collaborate all of those aspects. Achieving these abilities can be achieved by applying appropriate learning methods in terms of mastery of the material and skills. The mastery of communication information technology is something that must be done by all teachers in all subjects (Harli and Widyaiswara, 2013).

The 21st century as an era of openness or globalization makes the learning process must meet the 21st century skills, namely (1) learning and innovation skills include mastering diverse knowledge and skills, learning and innovation, critical thinking and problem solving, communication and collaboration, and creativity and innovation; (2) digital literacy skills include information, media, and ICT literacy, (3) career and life skills include flexibility and adaptability, initiatives, social and cultural interactions, productivity and accountability, and leadership and

responsibility.

Indonesia is aggressively moving forward to a new chapter called the 4.0 industrial revolution which means that everything in its life uses technological sophistication. The people must be familiar with the technology included in all aspects of life to support their daily activities, even at work. The 4.0 industrial era combines automation technology with the cyber one. Therefore, in this era, the industry has begun to touch virtual world, in the form of human, machine, and data connectivity, all of which can be found everywhere, or and all people may has been familiar with the term Internet of Things (IoT). The 4.0 industrial revolution is not only echoed in the business field, but also in the educational world. Therefore, this is a challenge for the educational workers.

In line with the 4.0 industrial era, there is also a specific term in the educational world, 4.0 Education, which means various ways of integrating cyber technology both physically and non-physically into the learning. That is, the human being and machines will work together to improve the existing situation. Dunwill (2016) stated that there would be many changes in the future, and predicted how classroom trends would look in the next 5-7 years, namely (a) major changes in classroom layout, (b) virtual and augmented reality would change the educational landscape, (c) flexible assignments that accommodate many learning styles (preferences), and (d) MOOC and other online learning options will impact secondary education.

The achievement of the implementation of 4.0 education era must be followed by the teachers' ability in implementing the learning in the 21st century leraning. There are four competencies that must be mastered by the teachers (Latip, 2018) in the 4.0 education era, namely: 1) the teachers must be able to conduct comprehensive assessment; 2) the teachers must have 21st century competencies: character, morals, and literacy; 3) the teachers must be able to present modules in accordance with the students' passion, and; 4) the teachers must be able to conduct innovative learning process. They must be able to apply various interesting learning methods, and must have abandoned conventional learning styles. Therefore, the 21st century education era has been echoed by the learning that combines conventional learning (face-to-face) and e-learning or electronic one.

E-learning combined with conventional methods also integrates the use of technology in the learning process that allows the students to be facilitated in both face-to-face and online learning. Therefore, the teachers are required to master the learning using blanded learning technique. Latip (2018) stated that: 1) the teachers must be friends with the technology to be able to give good teaching styles in the 4.0 education era; 2) they must have the nature of cooperation or collaboration between individuals, 3) they must be creative and willing to take risks, 4) they should have good sense of humor, and 5) they should be able to apply holistic teaching method.

In order to support the success of equitable education in the 4.0 education era, the Minister of Education and Culture, Nadhiem Anwar Makarim, in 2019 issued the Four Principles of "Freedom of Education" policy which included the National Standard School Examination (USBN), National Examination (UN), Lesson Plans (RPP), and Zoning Regulations for New Student Enrollment (PPDB). It aims to improve the quality and competencies of human resources (HR). This independence is broadly in favor of et students to learn without any restrictions that make them feel unfair.

While the educational workers are still trying to adjust to the 4.0 industrial revolution era, the world is now being hit by a severe disaster. Covid-19 virus threatens human life in the world that causes the governments in various countries to implement a restriction policy or known as social and physical distancing. This policy causes the education sector to experience obstacles in implementing face-to-face learning. Therefore, the teachers are enforced to conduct distance learning or online classes. For some schools which have been familiar with the blended learning, it is not a serious problem. However, for those which still rely on conventional methods, of course this will lead to new polemic.

Technology-based learning or e-learning at this time must be realized as a real action, because in all conditions, the learning process must continue without any exception. The education process must still be given in every difficult time. Therefore, the education using technology is a solution that can be applied to deliver knowledge to the students. One kind of technology that can be used is augmented reality (AR). The learning media that use AR can improve the students' understanding significantly, because 3D objects, texts, images, videos, and

audio can be displayed clearly.

According to the results of a survey through the Google From Questionnaire, in the 4.0 industrial revolution era, there are still many teachers that use conventional methods in delivering the text material in the form of textbooks or worksheets only during the teaching. It is especially highlighted in Bahasa Indonesia subject for VIII grade students on the Procedure Text topic. As a result, the students are often bored and the learning atmosphere seems monotonous. If the distance learning is conducted using such technique in current condition (Covid-19), the students will not open their textbooks because they feel that is is unattractive at all. In this case, it is required such innovation to attract the students' attention so that the learning does not seem boring and plain. It is an innovation that can provide the students with sufficient understanding without the presence of a teacher in the classroom. Given this situation, distance learning is intensively practiced.

The solution offered to provide the students' understanding in the distance and individual learning is to utilize the technology as the learning media. The technology in question is augmented reality (AR) which can be applied in learning procedure texts. This research aims to analyze the need for technology-based learning media in Bahasa Indonesia subject for VII grade students of junior high school in the procedure text material in Magelang city.

2. LITERATURE REVIEW

2.1 Learning Media

According to Suranto (2005: 18), media is a means to convey messages from a communicator to the communicant. Meanwhile, according to Sutirman (2013: 15), the media is a component of learning resources or physical vehicles containing instructional materials that can stimulate the students to learn effectively. Meanwhile, according to Sukiman (2012: 29), what is meant by the media are everything that can be used to channel messages from the sender to the recipient to stimulate thoughts, feelings, concerns and interests, and willingness in such a way that the learning process occurs in order to achieve the learning objectives effectively. Thus, it can be concluded that the learning media is an intermediary to convey information or materials with the aim of stimulating and supporting the success in a learning process.

The learning media has many functions in supporting the learning process. According to Levie & Lentz in Hujair A.H Sanaky (2013: 7) the functions include:

1) Attention function, which means visual media is a core to attract and direct the students' attention to concentrate on the content of the lessons related to the visual meaning displayed, or the students are not interested in the subject matter. It is one of the subjects that are not favored by them so they do not pay attention to. The images projected through an LCD can calm and direct their attention to the materials they will receive. Thus, the possibility to obtain and memorize the contents is even greater.
2) Affective function; visual media can be seen from the level of students enjoyment during studying or reading pictorial text. The images can arouse their emotions and attitudes, such as information concerning social or racial issues.
3) Cognitive function; visual media can be seen from some research findings which reveal that visualization or pictures and images are able to facilitate understanding and memorizing information or messages contained in the images.
4) Compensatory function; the learning media provide context for understanding the texts and help the students who are weak in reading to organize information in a text and recall it. In other words, the learning media functions to accommodate the students in accepting and understanding the content of the lessons presented verbally or in written form.

Specifically, the advantages of the learning media proposed by Kemp and Dayton (1985) are:

1. The learning materials delivery can be uniformed
   The teacher may have various interpretations about one thing. Through the learning media, these different interpretations can be reduced and conveyed to the students uniformly.
2. The learning process becomes more interesting
   The media can convey information that can be heard (audio) and seen (visual), so that it can describe abstract and incomplete principles, concepts, processes or procedures to be clearer and more complete.

3. The learning process becomes more interesting interactive
   If chosen and designed properly, the media can help the teachers and students to actively engage in two-way communication. Without any media, the teachers might be inclined to talk "one way" to their students.
4. The teaching and learning time can be reduced
   The teachers often spend too much time time explaining teaching material. The time spent doesn't need to be that much, if they use the learning media effectively.
5. Improved students' learning quality
   The use of media does not only makes the learning process more efficient, but also helps the students to understand the teaching materials more deeply and intact.
6. The learning process can be held anywhere and anytime
   The learning media can be designed in such ways so that the students can learn wherever and whenever they want, without depending on the presence of the teachers.
7. The students' positive attitude towards the learning process can be improved
   Using the learning media, the learning process becomes more interesting, and this can increase the students' passion and appreciation for science and the process of seeking for the knowledge.
8. The teachers' role can change into more positive and productive direction
   Using the learning media, the teachers do not need to repeat their material delivery and reduce verbal explanations, so that they can give more attention to aspects of providing motivation, attention, guidance and so on

In the 4.0 industrial revolution era, the technology-based learning media can be an alternative to creating interesting and fun for learning the procedure texts. With the help of technology, it can be easier for the teachers to deliver material without any face-to-face meetings. Effectiveness and efficiency have become an advantage, especially as distance learning is being intensified lately. The learning media must be based on core competencies and basic competencies and indicators adjusted to the students' needs during the learning process.

Magic Book is an interactive book using innovative augmented reality technology, even the most reluctant readers will be happy with this kind of intuitive technology. Augmented reality is a technology that combines dimensional and or three-dimensional virtual objects into a three-dimensional real environment and then projects these virtual objects in real time. Interactive animation stimulates reading, literacy, imagination and education with local wisdom values.

There are procedur text materials, examples of procedure texts based on local wisdom, and some exercises. Using augmented reality technology featured in this Magic Book, the students are able to:

1. Play and learn using the characters provided in the book
2. Color the scenes and images
3. Take pictures and videos

2.2 Augmented Reality

Augmented Reality (AR) is a combined technology between two or three dimensional virtual objects into a real environment and then projecting virtual objects into the real time. The virtual objects function to display information that cannot be accepted by the human directly. This makes augmented reality is useful as a medium to help users' perceptions and interactions with the real world. Information displayed by the virtual objects helps the users to carry out activities in the real world.

According to Azuma's definition, there are three principles of Augmented Reality,: (1) AR is a merging of the real and virtual worlds; and (2) it runs interactively in real time, and there is integration between objects in three dimensions, which are virtual objects integrated in the world real. Furthermore, Azuma stated that simply AR could be defined as the real environment added by virtual objects. Merging of real and virtual objects is possible using appropriate display technology, and interactivity is possible through certain input devices. AR is a variation of Virtual Reality (VR). VR technology makes the users be a unit in a virtual environment in a very cheap way. When incorporated in this environment, the users cannot see the real environment around them. In contrast, AR allows the users to see the real environment, with some objects added or joined to the real environment. Unlike VR which completely replaces the real

environment, AR simply adds or complements the real environment.

Computer Vision

Computer Vision, according to Bradski and Kaehler (2008: 1), is the transformation of image or video data into a decision or new images. The purpose of computer vision is to make useful decisions about real physical objects based on visible images. According to Shapiro (2001), an AR system requires: (1) 3D models of objects to be combined with the real world; (2) correspondence between the real world with 3D models through calibration; (3) tracking is used to determine the user's point of view of the real world; (4) Real-Time Display combined with the original images and also computer graphics created based on the model, and; (5) response time to the movement and accuracy between images and graphics greatly affect the effectiveness of the system. According to Saphiro, Computer Vision is used to look for cards (markers) and uses pattern recognition technique to recognize existing patterns, and identify the meaning of each marker.

BeyondAR

BeyondAR is a framework designed for the developers with an interest in working with geolocation-based Augmented Reality on smart phones. BeyondAR is an open source code (Apache 2.0 license), and currently only supports Android platform. This framework was developed by Joan Puig Sanz, a telecommunications engineer, Master of telecommunication MASTEAM by UPC and Aalborg University.

The development of learning media based on Augmented Reality began to be widely applied in 2000s, but the development research has not been done so much in the educational field. Some of the researches that have been published their works include Adami and Cahyani (2016) who wrote an article entitled "Application of Augmented Reality Technology for Android-Based Digestive System Learning Media" published in the AMIK BSI Computer Engineering Journal with the aim of making learning media more interesting using the Augmented Reality technology on the system learning of the anatomy of the human body's digestive system. The application of AR technology is expected to display objects in the form of human organs in virtual 3D by using images that are used as the markers. The markers detected by the camera on an android smartphone will display 3D objects of the digestive system, so that application users can observe how the digestive system organs in real time. The application making is built using unity and blender software.

The similarity between Adami and this research is that both use AR technology for the learning media, and the difference only lies in the media objects. Adami studied subject the body anatomy, while this paper talks about procedure text material.

Wahyudi (2017) et al, published in a paper entitled “Development of Educational Media Based on Augmented Reality for Interior and Exterior Design", published in Innovative Journal of Curriculum and Educational Technology (IJCET) Vol. 6 No. 2. The purpose of his research is to generate educational products based on augmented reality for learning interior and exterior design for vocational students, describe the characteristics of AR media that can improve the students' abstraction ability, and evaluate its eligibility (valid and practical) and then test the effectiveness of AR media. The method used is the research and development of the Borg & Gall model.

The results showed that AR-based media can improve the students' abstraction power in understanding interior and exterior design learning. AR-based media are also appropriate for use in learning. Based on several stages of the trial, AR-based media are categorized as valid, practical, and effective in for the learning. This research equation is in the form of RnD research and making learning devices based on AR technology, but the difference is in the object of the study. Wahyudi's study concentrates on developing the learning media, while this research develops the textbooks. Although both are AR-based, the research that will be conducted develops exposition textbooks in grade X of high school students, while Wahyudi is targeting vocational students majoring in interior and exterior design.

Next is Hakim (2018), whose paper entitled "Development of Augmented Reality-Based Islamic Education Learning Media" (*Pengembangan Media Pembelajaran PAI Berbasis Augmented Reality”*) was published in the Journal of the Educational Lantern Vol. 20 No.1. To

make it easier for the students to understand the learning material, appropriate media are strongly needed, one of which is Augmented Reality (3D) based media. The purpose of using this technology in the Islamic Education learning model is to help the teachers in the learning process and also to increase the students' interest in following the learning process. The research method used was the Research and Development method designed by Walter Dick and Lou Carey.

The result of the research shows that the Augmented Reality can run well on Android smart phones The equation of this research lies in the research and development methods and AR technology used as a learning base, as well as the AR that can run on Android smart phones. The difference lies in the data object. Hakim's research uses AR technology as a learning medium in Islamic Education subject, and develops prayer steps, while this research develops the textbooks in Exposition Text topic on Bahasa Indonesia subject for grade X high school students.

3. METHODS

The research conducted is a type of descriptive research using qualitative methods. The purpose of this study is to describe or describe the object of research clearly and in accordance with the actual situation. This research is free from quantitative figures and uses more words and sentences to explain the object of research, the object of the research is a document in the form of a 2013 SMP curriculum, Indonesian Language Learning Materials, Procedural Texts, and Characteristics of Grade VIII students of SMP Negeri in Magelang City. The subjects of the study were the teachers of Indonesian Language subject class VIII in state junior high schools in the city of Magelang. The number of state junior high schools in Magelang City is 13 schools, but not all schools are used as data collection places. In this study, researchers used a random sampling technique to select a school that would be used as a research sample which would then be generalized. The selection of random sampling techniques is due to the curriculum that applies in all schools is the same, and the competence of subject teachers has also been the same or balanced, and the textbooks used in learning are the same because they are centered from the region so it does not matter which school will be used as a place of research. Based on this technique, a teacher was chosen at SMP Negeri 11 Magelang, which was made the subject of research for an interview. In addition to teachers, respondents from this study were students of Class VIII Middle Schools scattered throughout SMP in Magelang City. The student selection technique was also carried out by random sampling by researchers distributing online questionnaires to all eighth grade students in the city of Magelang and finding students who filled out a questionnaire of 200 students from various public schools in the city of Magelang. Data collection techniques carried out with literature study, questionnaire techniques, and interviews. Data in the form of curriculum analysis, procedure text material, and student characteristics were processed using interactive data analysis techniques. It means that the data is processed continuously and continuously, which consists of the stages of data reduction, data presentation, and drawing conclusions.

4. RESULT AND DISCUSSION

This The text learning media refers to improving the students' creativity designed based on the needs analysis. The needs analysis starts with curriculum analysis, concept / material analysis, and the students' characteristics analysis. The needs analysis is conducted using descriptive qualitative methods with questionnaire and interview techniques for the data collection. The questionnaire is distributed through Google From to the VII grade junior high school students in all state junior high schools in Magelang city. The data are in the form of curriculum analysis, procedure text material, and the students' characteristics which are then analyzed interactively.

The questionnaire result shows that:

1) 7.74% of teachers more often use textbooks / worksheets to teach the procedure texts.
2) 87.2% of students expect the textbooks to not only contain writings, but also contain 3-dimensional illustrations.
3) 90.8% of students are more interested in learning by utilizing technology.
4) 93% of students expect the learning media that can help generate their ideas in making procedure texts.

5) 92% of students are more eager to learn when using audio-visual media, not only the textbooks containing writings.

Curriculum Analysis

Curriculum analysis is focused on the analysis of Core and Basic Competencies which are listed on the content standards. The curriculum analysis will be a guideline in developing the learning media for VII grade students of junior high school. The results of the analysis Core and Basic Competencies contained in the content standards are translated into indicators of learning achievement. Core Competencies are the translation or operationalization of outcome standards in the form of some qualities that must be possessed by those who have completed education at a particular educational unit or certain level of education. The description of the main competencies is grouped into aspects of attitudes, knowledge, and skills (affective, cognitive, and psychomotor) the learners must own for certain educational level, class and subject.

The Core Competencies must reflect a balanced quality between the achievement of hard and soft skills. Soft skills, according to Berthhall (Diknas, 2008) are "personal and interpersonal behavior that develops and maximizes the human performance (e.g. coaching, team building, decision making, and initiative) and are personal and interpersonal behavior that can develop and maximize human performance (through training, the development of teamwork, initiatives, and other decision making).These soft skills are the basic capital of the students to develop optimally according to each individual characteristics. In other words, soft skills are individuals' invisible behaviors and are personal and interpersonal that can develop and improve one's self-quality.

The term "hard skills" refers to technical knowledge and skills in a particular field related to a process, tool, or technique. They are usually obtained through formal lectures or from books (Sukhoo, 2005). In the learning activities, hard skills are learning outcomes belonging to the cognitive and psychomotor domains obtained from the process of understanding, memorizing and deepening the material from the learning models conducted in class. The students' hard skills can be assessed from the achievement index obtained in each semester. Core Competencies function as the organizing elements of the basic ones.

The Core Competencies are designed in four interrelated groups concerning religious attitudes (core competency 1), social attitudes (competency 2), knowledge (core competency 3), and application (competency 4). The four groups become a reference for the Basic Competencies and must be developed in every learning stage in an integrative way. Basic Competencies are the competencies of each subject for each class derived from the Core Competencies. The Basic Competencies are contents or competencies which consist of attitudes, knowledge, and skills that originate from the core competencies that the students must master. The competencies are developed by paying attention to the students' characteristics, preliminary abilities, and characteristics of a subject.

Indicators are measures, characteristics, and processes that describe the achievement of a basic competence. Indicators are formulated using operational verbs that can be measured, for example: identifying, calculating, differentiating, telling, inferring, practicing, describing, and demonstrating. The teachers can develop each basic competence into two or more indicators of achievement of the learning outcomes according to the width and depth of these basic competencies. Based on interviews with the grade VII Bahasa Indonesia subject teachers, the learning in the classroom have been adjusted to the Core Competencies (KI) and Basic Competencies (KD) of 2013 Curriculum.

The teachers use handbooks and the students use teaching materials in the form of students' handbooks such as textbooks and worksheets. The worksheets are used for exercises that refer to the Basic Competencies to be achieved. Based on the interviews on the field, the learning is still too centered on the teachers and the students still listen more and are mostly passive. Therefore, the learning procedure text material delivery is very boring for them. The students who should be active instead become passive. The teachers who are supposed to play the role of facilitator for their students, in the still become the center of the students' attention. In addition, the learning media used are still conventional so that they are less attractive in the learning activities.

Material Analysis

The material analysis aims to determine the contents and subject matter needed in developing the learning media to increase the students' creativity. Material is everything that the students want to learn and master, in the form of knowledge, skills and attitudes through the learning activities. Learning material is something that is presented by the teachers to be

processed and understood by the students to achieve the learning objectives that have been set. Furthermore, the learning material contains concepts, principles, facts, processes, values, skills, and even there are a number of problems that are related to real life.

1) Concept is an idea or ideas or a general understanding.
2) Principle is a basic truth as a starting point for thinking or is a guide for doing something.
3) Facts are things that have happened or that have been done / experienced.
4) Process is equating change/developmental movements.
5) Value is a pattern, size or is a type or model.
6) Skill is an ability to do something well.

Those aspects should be considerations in determining the learning material and its details. Some predetermined discussions need to be further analyzed on the concepts contained in the topic, what principles need to be conveyed, and so on.

One of the VII grade junior high school subjects is the procedure text. Procedure text is the text in which contains the purpose and steps to do or make something. Through the learning, the students are able to identify the procedure text both from the structure of the text, as well as linguistic characteristics. Besides, they are also expected to write the procedure texts independently. In this research, the needs of learning media are analyzed deeply that related to relatively difficult materials such as writing the procedure texts, where the students have difficulty in understanding linguistic material in the form of text, and their level of creativity to raise ideas and pour them in written form is still low.

Based on the results of some interviews with some students, the issues above occur because of lack of learning media that could be used besides conventional books. The students only know the samples of procedure texts from the book that is clearly only in the form of written text. Therefore, their reference and creativity to come up with ideas is low. This is why Magic Book is intended to make the students to be able to complete and increase their creativity level in writing the procedure texts.

Students' Characteristics Analysis

The students' characteristics analysis is carried out to determine the students' specific characteristics including age, preferences, activities during the learning, and difficulties during the procedure text learning process. The students' characteristics are aspects or qualities of individual students consisting of interests, attitudes, learning motivation, learning styles, thinking skills, and preliminary abilities (Hamzah. B Uno.2007).

Some benefits of the students' characteristics analysis are:

1) The teachers are able to get about the students preliminary abilities as a foundation in providing new and advanced materials.
2) The teachers are able to find out about the extent and types of the students' learning experiences, and this affects the students' understanding of new material to be delivered
3) The teachers are able to know the students' social background and family, including parents' level of education, socioeconomic, emotional, and mental so that they can present materials and methods in more harmonious and efficient ways.
4) The teachers are able to know the students' level of growth and development and aspirations and their basic educational needs.
5) The teachers are able to know the level of mastery that has been obtained by the students before.

According to the students' characteristics analysis, the VII grade students of SMP Negeri Magelang are mostly 13-14 years-old. The questionnaire results show that the student expect that the textbooks should not only contain writings, but also three-dimensional illustrations, so that they will be more interested to learn especially using audio-visual media, and they are more interested in learning to use media by utilizing technology. The students also want the learning

media that can help bring up ideas in making the procedure text. Based on these characteristics, it is necessary to design a learning media that can facilitate the students to be active and creative during learning the procedure texts, even if the learning is held online.

CONCLUSION

Based on the results of the research and discussion above, it can be concluded that: (1) the entire material is in accordance with the Competencies Standards, Basic Competencies, and indicators contained in the 2013 Curriculum; (2) the students have difficulty in understanding linguistic material in the form of texts; (3) the students' level of creativity to generate ideas and pour them into written form is still low; and (4) the learning media used are still conventional. Therefore, teachers and students need to develop the learning media that can help them be more creative in learning the procedure texts.

The results show that the students need a technology-based learning media that does not only contain text in learning the procedure text material. Seeing the development of the industrial revolution 4.0 and responding to challenges in the 21st century, technology-based learning media can be an alternative for creating interesting and fun procedure text learning. With the help of technology, it will be easier for the teachers to deliver the material even without having to meet the students in face-to-face method. Effectiveness and efficiency have become a competitive advantage, especially as the distance learning is being intensified lately. The learning media that will be compiled must be based on the competencies standards, basic competencies, and indicators that are adjusted to the students' needs at school during the learning process.

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REFERENCES

Andi Kristanto, Mustaji, dan Andi Mariono. (2017). The Development of Instructional Materials E-Learning Based On Blanded Learning. *International Education Studies 10 No.7.*

Aziz Hussin, Anealka. (2018). Education 4.0 Made Simple: Ideas For Teaching. *International Journal of Education and Literacy Studies.*

Azuma, Ronald. 1997. A survey of augmented reality. Presence: *Teleoperators and Virtual Environments.* vol. 6, no. 4, pp. 355-385.

BeyondAR. 2015. *Beyond Augmented Reality*. [*Online*]. Tersedia: http://beyondar.com. Diakses pada tanggal 16 Agustus 2019.

Bradski, Gary., Kaehler, Adrian. 2008. *Learning OpenCV*, edisi ke-1. O'Reilly Media, California.

Fernando, Mario. 2013. *Membuat Aplikasi Android AR Menggunakan Vuforia SDK dan Unity*. Buku AR Online, Solo.

Fonda, Aulia dan Suparman. Tt. Analisis Kebutuhan Terhadap Media Pembelajaran Matematika Untuk Siswa SMP Kelas VIII. *Prosiding Seminar Nasional Etnomatnesia ISBN: 978-602-6258-07-6 hlm.428-432.*

Frydenberg, Mark, and Diana Andone. (2011). Learning for 21 St Century Skills. *In IEEE's International Conference on Information Society*. Scientific Research an Academic Publisher, https://www.researchgate.net/publication/261431775_Learning_for_21_st_Century_Skills.

Graham, Charles, and Chuck Dziuban. (2007). Blended Learning Environments. Handbook of Research on Educational Communications and Technology: A Project of the Association for Educational Communications and Technology 2 (2007). https://www.researchgate.net/publication/267774009_Blended_Learning_Environments.

Hakim, Lukman. 2018. "Pengembangan Media Pembelajaran PAI Berbasis *Augmented Reality". Jurnal Lentera Pendidikan Vol. 20 No.1 hlm. 59-72.*

Harli dan Widyaiswara. (2013). *Strategi Pembelajaran Abad 21.* https://lpmpjogja.kemdikbud.go.id/strategi-pembelajaran-abad-21/

Haryanto, Reevi. (2018). *Pembelajaran Abad 21 Melalui Rumah Belajar.* http://pena.belajar.kemdikbud.go.id/2018/10/pembelajaran-abad-21-melalui-rumah-belajar/

Irianto. (2017). Industry 4.0: The Chalenges of Tomorrow. *Seminar Nasional Teknik Industri.*

Jay Lee et a. (2013). Recent Advances and Trends in Predictive Manufacturing Systems in Big Data Environmrnt. *Manufacturing Letters.*

Mario Hermann, Tobias Pentek, & Borris Otto. (2016). Design Principles for Industrie 4.0 Scenarios. *Proceedings of the Annual Hawai International Conference on System Sciences.*

Shapiro. Linda, dan George C. Stockman. 2001. *Computer Vision*. Prentice-Hall. New Jersey. 279-325 hlm.

Wahyudi, Urip Muhayat Wiji, Hari Wibawanto, dan Wahyu Hardyanto. "Pengembangan Media Edukatif Berbasis *Augmented Reality* untuk Desain Interior dan Eksterior". *Innovative Journal of Curriculum and Educational Technology* (IJCET) *Vol. 6 No. 2 hlm. 98-107 ISSN 2252-7125*.

Yeo, Michelle. (2014). Social Media and Social Networking Applications for Teaching and Learning. *European Journal of Science and Mathematics Education.*

Zhu, Kening. (2016). Virtual Reality and Augmented Reality for Education. 1–2. *Association for Computing Machinery (ACM).*