An Analysis of Innovative Learning Media Development Needs Based on Realistic Mathematics Education

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ABSTRAK

Kesulitan pemahaman dalam pembelajaran matematika adalah siswa menggunakan video pembelajaran terutama dalam situasi pandemi. Tujuan penelitian ini adalah untuk menganalisis pengembangan inovasi video pembelajaran berbasis pendidikan matematika realistik serta analisis faktor-faktor penghambat dan faktor pendukung kebutuhan pengembangan video pembelajaran inovatif berbasis pendidikan matematika realistik. Metode yang digunakan dalam penelitian ini adalah metode penelitian deskriptif kualitatif. Instrumen penelitian menggunakan angket dan pedoman wawancara. Statistik deskriptif adalah statistik yang digunakan untuk menganalisis data dengan cara mendeskripsikan data yang telah dikumpulkan sesuai dengan kenyataan tanpa ada maksud untuk membuat kesimpulan yang umum atau umum. Hasil penelitian ini adalah (1) terdapat 2 guru dalam kategori sangat dibutuhkan (100%), 18 peserta didik dalam kategori sangat dibutuhkan (60%), dan 12 peserta didik dalam kategori membutuhkan (40%). (2) faktor kendala yang dialami guru adalah keterampilan membuat video bocor dan keterbatasan waktu yang dimiliki. Namun kendala yang dihadapi siswa adalah keterbatasan jaringan internet dan munculnya kebosanan. (3) faktor pendukung dari guru adalah ketersediaan alat untuk membuat dan menayangkan video serta akses internet. Dari siswa, tersedianya sarana untuk menerima video pembelajaran dan akses internet yang memadai. Kesimpulannya, bahwa guru putus asa dan sebagian peserta didik putus asa dan sebagian perlu dengan pengembangan media matematika berbasis pendidikan matematika realistik.

ABSTRACT

The difficulty of understanding in learning mathematics is that students use learning videos, especially in a pandemic situation. The aim of this research is to analyze the development of innovative learning videos based on realistic mathematics education as well as analysis of inhibiting and supporting factors for the need to develop innovative learning videos based on realistic mathematics education. The method used in this research is a qualitative descriptive research method. The research instrument used a questionnaire and interview guide. Descriptive statistics are statistics used to analyze data by describing the data that has been collected according to reality without any intention of making general or general conclusions. The results of this research are (1) there are 2 teachers in the really needed category (100%), 18 students in the really needed category (60%), and 12 students in the really needed category (40%). (2) the obstacle factors experienced by teachers are the skills in making leaked videos and the limited time they have. However, the obstacles faced by students are limited internet networks and the emergence of boredom. (3) supporting factors for teachers are the availability of tools to create and display videos and internet access. For students, there are facilities to receive learning videos and adequate internet access.

1. INTRODUCTION

The growth of technology is a potential for increase quality of educators. Ministerial Regulation National Education number 16 of 2007 on teacher qualifications and competence said that teachers must have the ability to utilize technology, information and communication (Albantani & Madkur, 2016; Arifa & Prayitno, 2019). However, in reality there are still less educators who still feel less proficient in their current technology, therefore, the learning process is still not optimal (Fatimah & Santiana, 2017; Potter, 2018).

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The good educational process should use of the technology which is most important in mathematics education. Mathematics is the knowledge that deals with the Numbers, symbols, and other commonplace devices we use wherever we are in daily life (Abidin et al., 2020a; Khasanah et al., 2021). In any activity the learners in their daily lives must be associated with the mathematics. Through mathematics, learners should be able to equip learners with logical, annalistic, systematic, critical and creative expertise (Abidin et al., 2020b; Prahmana & D'Ambrosio, 2020). The proficiency of mathematics as embodied in national study is sourced to the constitution of the Republic Indonesia 1945 is to improve skills and shape the character and civilization of a dignified nation in the context of educating the nation's life. It is in line with Ministerial Regulation National Education number 22-year 2006 to teach mathematics in schools so that learners may have the following skills among them. (1) students can master mathematical concepts, draw links between concepts and apply concepts, flexible, accurate, effective, and fit in problem solving, (2) using logical thinking on patterns and temperaments, implement mathematical manipulations in generalizations, formulate the facts, or weave mathematical ideas and statement, (3) deconstructing problems that include mastering expertise, designing mathematical models, complete the model and interpret the solutions gained, (4) communicating ideas with symbols, tables, diagrams, or other media to clarify condition or problem, and (5) to have a behavior appreciating the mathematical value of life, is to have a sense of curiosity, interest, and interest in dealing with mathematics, and confident behavior in solving the problem. Math study has several purposes (Utami & Wutsqa, 2017; Winandari et al., 2022).

Mathematics is a subject taught throughout the course of education, especially in the middle school (junior high). In mathematics education, where the subject is more abstract so that some learners find it difficult to understand. This kind of matter should get more special attention from those of a teacher, a school ward, a guardian of learners, or a ward outside the school because mathematics is a subject that is required to be studied throughout the entire learning process (Hidayat et al., 2020; Ng et al., 2020). By difficulties as the educator, the ability to take advantage of the wider media education in the time of this pandemic was one of the study videos. Teachers must always be creative and innovation in using media and learning methods, which is make the learners more enthusiastic in learning, not bored with monotone learning (Valverde-Berrocoso et al., 2021; Yefimenko et al., 2021). The use of media in transmitting learning messages is intended to make learners more interested and easier to master messages from materials that are informed by educators in learning.

One of the mathematics teachers at SMP N 4 Abiansemal stated that most students still find it difficult to understand the material presented, students still do not understand the basics of mathematics even in the ninth grade there are still those who do not fully recognize integers. From these obstacles, the teacher said that it needed real learning media in learning. Based on the results of these observations, there is a need for thorough research regarding the need for developing learning media that focuses on innovative learning video media based on RME (Realistic Mathematical Education) in learning mathematics.

According to previous study Indonesia's realistic math education is a mathematical approach that reveals experiences and events that close to learners as a means of solving math problems (Sipayung et al., 2021). Supported by previous study that states that one philosophy underlying a realistic approach is mathematics is not a set of rules or attributes which already full learners must learn (Afriansyah, 2022). The teachers should innovate in online learning, such as innovating in developing a learning video in which is an education approach, so that learners are accustomed to solving the real issues of life. Learning video media based on realistic mathematic education is a video that is used to convey material or messages to students by relating math problems to real life or everyday life so that it is easier for students to understand the material presented (Saputro et al., 2018; Van et al., 2021).

In recent years the study of video-based media has been conducted by some researchers. Research by previous study conduct study for media development needs based on video tutorials (Wahyuni et al., 2021). The results show that students need learning media that can guide them to learn for themselves by revisiting the when and wherever lessons in a tutorial video. Research that conduct study in mathematical learning video needs analysis in pandemic covid-19 (Muna et al., 2017). Studies show that learners need learning videos at the covid-19 pandemic. Base on those explanation this study aims to analyze the development of innovative learning videos based on realistic mathematics education as well as analysis of inhibiting and supporting factors for the need to develop innovative learning videos based on realistic mathematics education.

2. METHOD

In this study, researcher used a qualitative type of research with descriptive research design. Qualitative research is a method of study based on post-positivisms philosophy, used to study the natural state of objects (as opposed to experiments) in which researchers are key instruments (Sugiyono, 2015).

Descriptive research is the research intended to investigate the conditions or other matters mentioned, the results being described as a research report (Huberman & Miles, 2012). This study was conducted during the odd semesters in Academic year 2021/2022 of the seventh-grade students of SMPN 4 Abiansemal located in Bongmesh, Abiansemal district. The subject of this study is the seventh-grade students and mathematices teacher.

The instruments of the study used questionnaires and interview guidelines. Instruments is used to learn the needs of mathematicians and teachers for mathematics education on media development of the mathematics education based on realistic mathematic education on math in SMPN 4 Abiansemal. The teacher's questionnaire contains 16 statements and the learner's questionnaire contains 15 statements. The researcher used credibility test before the questionnaire used for research. Credibility of data is conducted with tests of validity and reliability. On the teacher's questionnaire, from the 33 statements after the trial to the 15 statements while the learner's questionnaire, from 30 statements to 16 statements. The interview guidelines are used to identify constraints and contributing factors in developing a thematic education-based teaching media at SMPN 4 Abiansemal.

After the responders fill out the questionnaire, the questionnaire's results will be analyzed using a descriptive analysis. Descriptive statistics are those used to analyze data by describe the data that has been collected in accordance with reality without any intent of making common or generalized conclusions. The formula used in this research data analysis is to add up the score of each statement of the questionnaire on each of the respondents. Then, categorize the group, to categorize the group, namely the maximum score divided by the minimum score. The result of dividing the maximum score divided by the minimum score is the multiplication of the minimum score where each interval will increase by one.

3. RESULT AND DISCUSSION

Result

To find out the needs of the seventh-grade students and mathematics teachers, the researcher used a questionnaire that had filled by the respondents. From the researcher data, obtained the need for innovative learning video development based on advanced mathematics education is categorized to 4 categories: desperately need, need, do not need, and do not need. The result of teacher questionare analysis is show in Table 1.

Table 1. Results of Teacher Questionnaire Data Analysis

Interval	Freguency	Percentage	Categori
48 < T ≤ 64	2	100%	Desperately need
32 < T ≤ 48	0	0%	Need
16 < T ≤ 32	0	0%	Needn't
T ≤ 16	0	0%	Definitely not need
Total	**2**	**100%**	

Base on Table 1, there are two teachers (100%) in the desperately needed category. With scores between 48 and 64. Results of student questionnaire is show in Table 2.

Table 2. Results of Student Questionnaire Data Analysis

Interval	Freguency	Percentage	Categori
45 < T ≤ 60	18	60%	Desperately need
30 < T ≤ 45	12	40%	Need
15 < T ≤ 30	0	0%	Needn't
T ≤ 15	0	0%	Definitely not need
Total	**30**	**100%**	

According to Table 2, 18 trainees fall into the desperately needed category with a score between 45 and 60. 12 trainees (40%) enter the need with score between 30 and 45. After fill in the questionnaire, researchers continue to study with respondents through interviews to learn about problem factors and contributing factors in the development of innovative learning media.

S1 (Respondent) feels in online learning participants are enthusiastic especially in the task gathering but it is very difficult to track whether learners have truly understood the material. With limited face-to-face learning, S1 observes there are still fewer active learners in the learning process. The solution is to guide learners to do the basics of mathematics because if learners cannot do the basics of mathematics,

it is more difficult to capture the material that is presented. In the S1 learning process aided by the medium of learning.

In the S1 learning process, using the media of learning that is sent online to learners and at the time that face-to-face learning is limited to reviewing material that is presented online. During face-to-face study will review material that has been distributed during online study, based on which S1 requires a learning medium that can connect the teaching material to real life or everyday life in one of these videos. S1 is in high need of innovative learning videos based on realistic mathematics education. S1 states it is essential because it makes it easier for students to understand the material however, it is lacking in developing.

Since S1 is still lacking in IT, it makes it difficult to develop innovative learning videos based on realistic mathematics education. The first-ever video used during teaching is taken from Youtube and sent to the students who still had a problem downloading. Despite obstacles, there are contributing factors in developing innovative learning videos that link teaching materials with everyday life. The infrastructure that is used in creating and showing learning videos such as mobile phones, laptop and projector is very supportive but not completely complete, and the school Internet access is also very supportive. From S17, as part of the media study teachers use as the whatsapp and Google classroom. Using that medium s17 still feels a lack of understanding of the material being presented. By using the Whatsapps and Google classroom the students feel inadequate to the materials provided, based on what I have learned that teachers need to use the innovative learning media based on realistic mathematics education, the master can do even better.

By the interview that S17 became better acquainted with material through the media of innovative learning videos based on realistic mathematics education. According to the innovative learning video based on realistic mathematics education, S17 feels better about the material being given. Aside from the need S17 for the learning video there is an obstacle from S17. Since the S17 is students who get bored easily, if the study video takes too long it makes S17 even more bored to watch it. So, if teachers develop innovative learning media platforms based on advanced mathematics education should be able to create videos that are as interesting as possible. There are also obstacles that contribute to the problem.

Discussion

Based on the result's data, teachers' need for innovative learning videos based on realistic mathematics education is urgently needed. The desperately needed category acquired in this study based on the results and the prescribed category table. The two teachers are desperate to develop the media of innovative learning video based on realistic mathematics education because it makes it easier for students to grasp the material to be given. The media with a video based on realistic mathematics education is clearly more likely to remember and understand the lesson by not using just one sense. Mell Silberman: studies with visual learning can increase memory 14% to 38%. While learners' need for innovative learning media videos based on advanced mathematics education is critically needed. The desperately needed category acquired in this study based on the results and the prescribed category table. The learners are particularly interested in innovative learning media based on realistic mathematics education because some learners are more likely to understand the material being presented (Ekowati et al., 2021; Yuanita et al., 2018). This corresponds with previous study who says that videos can give an acceptable message more equitable to learners and a very good video to explain a process (Huertas-Abril, 2021). 12 learners are on the need and not really needed category because some students understand the material presented if the teacher explains. The 12 students need to work with the development of innovative learning videos based on realistic mathematics education but whether the teacher can provide a direct explanation.

The teachers particularly desperate at the development of based realistic mathematics education teaching videos, there are limits to developing the video, ranging from the teacher's lack of knowledge of it to a roadblock to video production primarily in its editing. Moreover, it is not possible to make learning videos because it takes considerable time to make learning videos. This conforms to previous opinion that some teachers who are anchored only to help provide learning media when the learning media can be designed from different sources of different forms according to the need and characteristics of the teaching materials to be taught (Lampropoulos et al., 2019).

There is also a contributing factor in developing the learning video which is adequate equipment to use such as mobile phones to record and Internet access. School video presentations also provided projection arises with adequate equipment. This corresponds with the other study which states that supporting material on a video requires a projection device to perform it (Rohmah & Bukhori, 2020). The challenge of learning participants in receiving learning videos is that Internet access to one of the learners is so little difficult to access videos sent by teachers and there are increasingly bored learners who watch videos that, if too long duration, make learning more difficult to understand the material being presented. It is consistent with other finding state which is a factor against the use of visual media in online learning, one of which is the unstable Internet network (Rajendran & Shah, 2020). There is also a contributing factor

in receiving learning videos that most learners have good Internet access and that makes it easier for learners to access videos sent by teachers. In addition to laptops, cells with memory are sufficient, so the Internet also makes it easier for learners to download videos sent by teachers with adequate memory capacity. It is consistent with other study which is a contributing factor in using visual media in online learning one of the online learning facilities provided by parents is supportive and complete (Jaakkola et al., 2022; Supriatna, 2013).

This research can help improve the quality of mathematics learning by identifying the need for developing innovative learning media. The results of this research can be used by educators and curriculum developers to create more effective learning tools. In addition, this research can support the use of the RME approach in mathematics learning by providing a better understanding of the types of learning media that are suitable for this approach. This can help teachers design more authentic and relevant learning experiences for students. This research also has limitations, the results of this research may only apply to certain contexts or populations. Conclusions drawn from this study may not be widely generalizable to various educational settings. Moreover, this research may not be able to fully overcome all limitations or challenges that may be faced in implementing the Realistic Mathematics Education approach. Several factors such as individual student differences and class dynamics also need to be considered.

4. CONCLUSION

Based on this research, it can be summed up as follows: 1) Teachers' need on developing media innovative learning videos based on realistic mathematics education in math study falls into the desperately needed category of 2 teachers. Judging from learners, the need for media development of innovative learning videos based on realistic mathematics education in the category requires a high level of 18 learners and a need of 12 learners. 2) Factors that are a challenge to the development of the innovative learning media based on realistic mathematics education in mathematics education are limited to the teacher's ability to make videos as well as to the teacher's time limit. Based on the student constraints it encounters are the limitations of Internet networks and the emergence of boredom. 3) Factors that contribute to the development of innovative learning media tools based on realistic mathematics education in mathematical studies include the availability of tools for video presentations, the availability of tools for teachers to make videos and the Internet that support them. The impact of this research is that teachers can make more use of existing media.

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