



Analysing Instructional Videos on Arithmetic Operations on Fractions in Elementary School Students

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Abstract

This research was conducted based on the rapidly advancing technology and the importance of using instructional media to stimulate students' understanding. This study aims to analyze the instructional videos for fifth grade Elementary School. The method used in this research was qualitative descriptive. The data studied were instructional videos about fractional arithmetic operations that were available on the YouTube and ruangguru applications. The data were analyzed based on the characteristics of the audio-visual instructional media, including: 1) Video clarity; 2) Stand-alone aspect; 3) User friendly; 4) Content representation; 5) Visualization with media; 6) Using high resolution quality and 7) Can be used individually or classically. The results of this study indicated that: The content of each video was quite easy to understand and remember. Videos must be accompanied by worksheets so that students take an active role, not just watching. The language used in each video was simple, easy to understand and used common language. The material presented was quite representative and the video contained stimulation regarding arithmetic operations on fractional numbers. The material contained in the video was equipped with the voice of the presenter which was quite clear and there was also text on the video, but there was no animation. Each video used a resolution high enough to produce a clear image and this video could be used on any computer. Videos can be used individually or classically and videos can be viewed anywhere and anytime. Thus, it can be concluded that the five learning videos have almost fulfilled the characteristics of audio-visual instructional media, it's just that additional animations and worksheets are needed so that the videos can be more interesting and students can play an active role.

Keywords: Learning Media; Videos; Arithmetic Operations on Fraction.

Abstrak

Penelitian ini dilakukan berdasarkan kemajuan teknologi yang semakin pesat dan pentingnya penggunaan media pembelajaran untuk merangsang pemahaman siswa. Penelitian ini bertujuan untuk menganalisis video pembelajaran kelas V Sekolah Dasar. Metode yang digunakan dalam penelitian ini adalah deskriptif kualitatif. Data yang diteliti adalah video pembelajaran mengenai operasi hitung bilangan pecahan yang berada di aplikasi YouTube dan ruangguru. Data dianalisis berdasarkan karakteristik media pembelajaran audio visual, diantaranya: 1) Kejelasan video; 2) Stand alone (berdiri sendiri); 3) User friendly (bersahabat/akrab dengan penggunanya); 4) Representasi isi; 5) Visualisasi dengan media; 6) Menggunakan kualitas resolusi yang tinggi dan 7) Dapat digunakan secara individu atau klasikal. Hasil penelitian ini menunjukkan bahwa: Konten dari setiap video cukup mudah dipahami dan diingat. Video harus didampingi dengan LKS agar siswa ikut berperan aktif, tidak hanya menonton saja. Bahasa yang digunakan pada setiap video sederhana, mudah dipahami dan menggunakan bahasa yang umum. Materi yang disampaikan sudah cukup representatif dan video berisikan stimulasi mengenai operasi hitung pada bilangan pecahan. Materi yang terdapat pada video dilengkapi dengan suara dari pemateri yang cukup jelas dan juga terdapat teks pada video hanya saja tidak ada animasi. Setiap video menggunakan resolusi yang cukup tinggi sehingga menghasilkan gambar yang jelas dan video ini dapat digunakan pada semua komputer. Video dapat digunakan secara individu ataupun klasikal serta video dapat dilihat dimanapun dan kapanpun. Dengan demikian dapat disimpulkan bahwa kelima video pembelajaran sudah hampir memenuhi karakteristik dari media pembelajaran audio visual, hanya saja perlu adanya tambahan berupa animasi dan LKS agar video lebih menarik dan siswa berperan aktif.

Kata Kunci: Media Pembelajaran; Video; Operasi Hitung Bilangan Pecahan.

INTRODUCTION

The development of the world of education is currently facing the challenge of adapting to an increasingly rapidly changing environment due to technological

developments (Sholihin, Sari, Yuniarti, & Ilyana, 2020). We can feel that education in the past with education today has progress and change. Development and progress in the world of education must be improved in terms

of quality. Because with education, humans can gain broad insight, increase knowledge, and of course have benefits for others and themselves.

Education is a conscious and planned activity that lasts throughout life and has become a necessity for every human being. The success of education can be seen from the achievement of educational goals. Realizing the ideals of this educational goal, a teacher must have a breakthrough that can bring students to a better direction as in learning, especially in this case learning mathematics. Mathematics is a language of symbols, the science of regular patterns, deductive science, and organized structures, starting from undefined elements to defined elements and finally to propositions.(Heruman, 2009). Mathematics is a branch of science that tries, reason, and creates(Kemendikbud, 2013).

One of the fields of mathematics is fractions. According to(Badaruddin, Kadir, & Mustamine, 2016)Fractional numbers are assumed to be numbers that consist of two parts of numbers, namely numbers as numerators and numbers as divisors where the two parts of this number are separated by the symbol for. One of the material on fractions in elementary school is about counting fractions in class V.

Teaching mathematics teachers must understand that the ability of each student is different, not all students like mathematics. Anxiety and stress triggered by previous failures in learning mathematics are considered as one of the reasons why students do not like mathematics(Hwang, Wang, & Lai, 2021). According to(Hidayati, 2017)argued that elementary school students are students who have high curiosity and still need great attention. In his theory, Piaget explained that elementary school-aged children who are generally around 7 to 11 years old are in the third stage of cognitive development, namely the concrete operational stage. At this stage, the child is judged to have been able to do logical reasoning on everything that is concrete, but the child has not been able to reason for things that are abstract. For this reason, as a teacher, he should be able to build a concrete learning

atmosphere for students to make it easier for students to think logically and be able to solve problems(Khaulani, S, & Pure, 2020). One way is to use interesting and appropriate media. So with the use of media the learning process will be more varied and students can feel motivated. Motivation is an important part and has a positive influence on student psychology so that if motivation is embedded in students, they will have enthusiasm in learning(Gable & Dreisbach, 2021).

According to Miarso(in Indriyani, 2019)argues that "Learning media are everything that is used to channel messages and can stimulate the thoughts, feelings, attention and willingness of students to learn so that it can encourage a deliberate, purposeful, and controlled learning process. So that the use of media must be in accordance with the function of the media itself, namely to make students think more and can stimulate the lessons taught by educators. The use of learning media can also stimulate children to ask questions and at least give a positive response to the learning process carried out by the teacher in the classroom.(Supriyono, 2018).

Jaelani, Darsikin, & Saehana (2018) menjelaskan bahwa salah satu media pembelajaran yang bisa merangsang pemahaman siswa adalah video pembelajaran hal ini disebabkan karena siswa akan terfokus pada materi yang terdapat pada video serta akan memutar ulang video tersebut sampai siswa dirasa sudah memahaminya.

Saat ini sudah banyak perusahaan rintisan di bidang pendidikan dengan berbasis digital di Indonesia yang memunculkan sebuah inovasi berupa website atau aplikasi yang memberikan pelayanan melalui video belajar salah satunya yaitu pada berbagai channel yang tersedia di YouTube, Zenius, ruangguru, Quipper dan lain-lain. Veletsianos (dalam Balakrishnan & Gan, 2016) mengatakan bahwa website untuk tujuan pembelajaran yakni sebagai sarana untuk melengkapi dan memperkaya kegiatan pembelajaran siswa karena unsur pendukung kegiatan belajarnya dapat memberikan pengalaman belajar.

Based on the results of problem identification, it can be concluded that

learning videos have a positive impact that can be felt by students, one of which is learning through videos, students can play repeatedly until they understand the material delivered via video. physically impossible to bring into the classroom, and video viewing can be slowed or speeded up (Agustiningih, 2015). This certainly makes it easier for students in the learning process.

Therefore, researchers are interested in analyzing the learning videos for counting fractions on Youtube and Ruangguru. This study aims to analyze the learning video for fractional arithmetic operations, so that it is hoped that it can be used as a reference in making effective learning media in order to support the achievement of the desired learning objectives.

METHOD

The method in this study used a qualitative descriptive research method. According to Best (in Sukardi, 2019) mentions that the descriptive method is a research method that seeks to describe and interpret an object according to what it is. The purpose of descriptive research is to make a systematic, accurate and factual description or description relating to the facts, characteristics and relationships between the phenomena being investigated. Meanwhile, according to (Sudaryono, 2019) argues that descriptive research is research on problems in the form of current facts from a population consisting of activities assessing attitudes or opinions towards an individual, organization, situation, or procedure.

The data sources in this study are learning videos that are on the YouTube application (available on the Great Mathematics channel, Min Demangan, Nita Cahyo, Bimbel Smart) and Ruangguru. Researchers use the youtube and Ruangguru applications because YouTube can present something that can be seen and heard and can motivate students to learn and provide learning experiences while Ruangguru is an application with the best ratings and has more than 4 million users and 27,000 teachers. (Iwantara, Sadia, & Suma, 2014; Rahadian, Rahayu, & Oktavia, 2019). The techniques used as data collection in this

study include observation and documentation which aims not only to explore data but to reveal the meaning contained in a study. Observation or observation is a technique in collecting data through conducting observations of ongoing activities (Sudaryono, 2019). Meanwhile, documentation is intended to obtain data directly from the research site which includes relevant books, activity reports, regulations, documentary films, photographs or data relevant to the research.

The data analysis technique used is the Miles and Huberman model (Ahmad Rijali, 2018). The data analysis process includes data collection, data reduction, data presentation, and drawing conclusions.

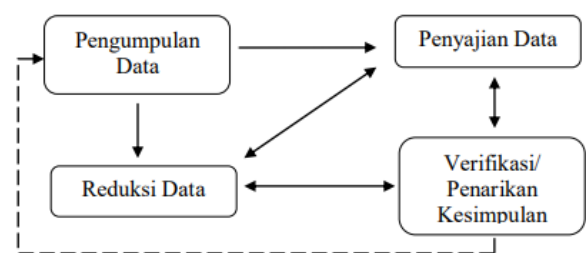


Figure 1

Data Analysis Steps

The data were analyzed based on the characteristics of the audio-visual learning media. These characteristics include: 1) Video clarity; 2) Stand alone (stand alone); 3) User friendly (friendly/familiar with users); 4) Content representation; 5) Visualization with media; 6) Using high resolution quality and 7) Can be used individually or classical (Cheppy & Riyana, 2007).

RESULTS AND DISCUSSION

Based on the research that has been carried out, the results that will be presented are about the analysis of five videos of learning arithmetic operations on fractions available on the youtube application and also Ruangguru. The five videos were selected based on the duration between 6-15 minutes, have been watched by more than 5000 viewers and are in the top ten in the search field.

First Video: “Easy Ways to Add and Subtract Common Fractions in Two Ways” On YouTube App

1. Video clarity

This video shows some questions and discusses how to solve them. At the beginning of the video, we explain how to add fractions first with a cross and then simplify. The second way is to find the LCM (Least Common Multiple) of the two denominators. Furthermore, the problem of subtracting fractions, the way to solve the problem is the same as adding fractions. In this video, learning is only focused on the presenter, meaning that the audience is not included in doing the questions, even though there is a scene from the presenter who provides a stimulus to the audience. The ways of solving problems are only explained in one delivery, this does not rule out the possibility of making the audience forget the ways of solving them. (Purwanti, 2015) that with video media, lessons tend to be easy to remember and understand because they do not only use one type of sense. Mell Silberman: the results of research using visual learning can increase memory from 14% to 38%. Thus video media can make students remember more about the material.

2. Stand alone(stand-alone)

Video in general can be used independently, meaning that it does not have to be accompanied by other teaching materials or does not have to be used simultaneously with other learning media. However, because there are no questions in this video for the audience to work on, it would be better if this video was accompanied by a book or LKS (Student Worksheet). This is in line with research conducted by (Ilsa, F, & Aaron, 2020) that the learning video is not only limited to being able to be heard and seen but also invites students to be actively involved while the learning video is broadcast.

3. User friendly(friendly/familiar with users)

The language used is simple, easy to understand and uses common language. The information presented is helpful and can be used properly by the audience. Yuanta (2019) states that video is an electronic media that combines audio and visual simultaneously, through these two elements it is expected that students can receive, understand and remember learning material.

So that the video not only makes students aware of a material, but students understand and remember the learning material.

4. Content representation

The material presented is quite representative and the video contains stimulation on how to solve addition and subtraction problems on fractional numbers. In line with (Busyaeri, Udin, & Zaenuddin, 2016) who stated that in the psychomotor aspect, videos have advantages in explaining things such as in demonstrating how to arrange flowers, make origami, and so on. All of it will feel easy and can be repeated.

5. Visualization with media

The material contained in the video is equipped with the voice of the presenter and is clearly audible. In addition to the speaker's voice, the video contains learning text but the writing on number eight is not clear, so it is feared that the audience will misperceive even though it is accompanied by a fairly clear voice. It's just a shame there is no animation on the video. According to (Surjono, 2017:15) Learning material that raises dynamic elements will be easy to understand if it is realized in the form of animation. This convenience is quite important in the learning process because in conveying messages it must be easily understood by students.

6. Using high resolution quality

This video uses an image resolution that is high enough to produce a fairly clear image, although this video has a fairly high resolution, it still supports every computer system spec or can be used on all computers. This is in line with (Bakhtiar, 2015) which says that students prefer things related to visuals. If the pictures used are clear enough then this helps students to increase their interest in learning.

7. Can be used individually or classical

This video can be used individually or even in groups and viewers can see this video anywhere and anytime so no special time or special place is needed to view the video. This is in line with Munadi in (Fadillah & Bilda, 2019) who said that one of the characteristics of video media is to overcome the limitations of distance and time. This means that video media can be used not only at school or in the

morning but can be done anywhere and anytime.

Second Video: “Addition of Fractions” on the Ruangguru Application

1. Video clarity

At the beginning of this video, a question is asked to the audience about how to add fractions. This is certainly enough to attract the audience to focus more on listening to the video, besides that the presenters in the video introduce themselves. In line with (Sari, Aryani, & Sinring, 2019) The video must make students interested and focused in following the learning process so that students will get a learning experience. The presenter conveys the material through writing on paper. The existence of questions posed from the presenters to the audience makes learning meaningful because there is a stimulus given from the presenters to the audience. The material presented is easy to understand, not complicated and the ways to solve the questions are easy to remember because it is added with text. The use of questions in the video also varies, if the first question uses smaller numbers such as units, then the second question uses larger numbers such as tens.

2. Stand alone(stand-alone)

Video in general can be used independently, meaning that it does not have to be accompanied by other teaching materials or does not have to be used simultaneously with other learning media. However, because there are no questions in this video for the audience to work on, it would be better if this video was accompanied by a book or LKS (Student Worksheet).

3. User friendly(friendly/familiar with users

The language used is simple, easy to understand and uses common language, although there are non-standard words such as "yah", "nah", "wah". The information presented is helpful and can be used properly by the audience.

4. Content representation

The material presented is quite representative and the video contains stimulation on how to solve addition

problems in fractions. However, for how to subtract fractions, there is a different video.

5. Visualization with media

The text presented is quite clear and the use of markers is also very diverse, there are black, blue and red colors. The material contained in the video is equipped with the voice of the presenter and sounds very clear. Niess & Walker (2010) said that watching videos that match the learning material will expand students' visualization skills. In addition to visualization, students can hone listening skills and get information through videos.

6. Using high resolution quality

This video uses an image resolution that is high enough to produce a fairly clear image, although this video has a fairly high resolution, this video can only be accessed by viewers who have the Ruangguru application and this video can only be downloaded by users who subscribe to Ruangguru.

7. Can be used individually or classical

This video can be used individually or even in groups and viewers can see this video anywhere and anytime so no special time or special place is needed to view the video.

Third Video: “Addition and Subtraction of Fractions” On Youtube App

1. Video clarity

This video contains greetings and introductions from the presenters. The presenter explained related to the addition of fractions, after which an example was given along with how to solve it and was also given three practice questions so that the audience could participate in doing it. Not only giving questions, the presenters also explain and write down the steps in solving the problem. However, it would be better when giving practice questions then given time first so that the audience can work on the questions before discussing the answers. While subtraction on fractional numbers the steps in solving it are the same as addition on fractional numbers, there is only one way to solve it, namely by finding the LCM of the denominator. In conveying the material and the completion steps only focus on the presenter, meaning that there is no stimulus given by the presenter to the audience. The material

presented is easy to understand and the completion steps are easy to remember because explaining it is done repeatedly not just once. This is in line with research conducted by (Khairani, Sutisna, & Suyanto, 2019) through video media students will find it helpful in the learning process to understand the material provided, especially in solving problems. So that the existence of learning videos can minimize student boredom in learning.

2. Stand alone(stand-alone)

Video in general can be used independently, meaning that it does not have to be accompanied by other teaching materials or does not have to be used simultaneously with other learning media.

3. User friendly(friendly/familiar with users)

The language used is simple, easy to understand and uses common language, although there are non-standard words such as "nah". The information presented is helpful and can be used properly by the audience.

4. Content representation

The material presented is quite representative with a duration of about 14 minutes, the explanation given is quite clear and the video contains stimulation on how to solve addition and subtraction problems on fractional numbers.

5. Visualization with media

The material contained in the video is equipped with the voice of the presenter and also text. The voice of the presenter is clear because it is not accompanied by any sound effects so that the audio only focuses on the voice of the presenter. The text on the video is too small so it's better to increase the size of the text because according to (Suryansah & Suwarjo, 2016) video is one source that can provide knowledge to students and video also provides information that can be observed directly so that the text used must be legible and visible in order to provide clear information.

6. Using high resolution quality

This video uses an image resolution that is high enough to produce a fairly clear image, even though this video has a fairly high resolution but still supports every computer

system spec or can be used on all computers and also this video can be downloaded if you want to play it back later on. without using a fee.

7. Can be used individually or classical

This video can be used individually or even in groups and viewers can see this video anywhere and anytime so no special time or special place is needed to view the video.

Fourth Video: "Adding and Subtracting Common Fractions" On Youtube Aplikasi

1. Video clarity

At the beginning of the video, the presenter gave an apperception of the problems that are often encountered in everyday life. In this video, the speaker presents himself as a teacher who is explaining. Examples of questions are directly discussed along with ways to do them. In this video, there are two ways that can be done for addition and subtraction, namely the first by finding the LCM of the two denominators and the second way using the beautiful butterfly technique or almost similar to the cross times. When the speaker explained about addition and subtraction in fractions, there was no interaction with the audience because the speaker focused on what he was saying.

2. Stand alone(stand-alone)

This video can be used independently, meaning that it does not have to be accompanied by other teaching materials or does not have to be used simultaneously with other learning media. This video also contains a quiz that can be done by the audience and has been accompanied by a discussion.

3. Userfriendly (friendly / familiar with the user)

The language used is simple, easy to understand and uses common language, although there are non-standard words such as "nah" and "here" But besides that, the information presented is helpful and can be used well by the audience.

4. Content representation

The material presented is quite representative and the explanation given is clear enough. Moreover, coupled with the existence of quite interesting and unique techniques in solving addition and subtraction problems on fractional numbers, namely the

butterfly technique and videos containing stimulation of how to solve addition and subtraction problems on fractional numbers. Tegeh, Simamora, & Dwipayana (2019) said that videos can attract students' attention so as to motivate students to get better learning outcomes than before.

5. Visualization with media

The text on the video is clear and the size is appropriate. The presenters also appear in this video so that it makes the audience feel as if they are looking at the teacher who is teaching but the presenters appear only at the beginning and end of the video so that they do not bore the audience. The voice of the presenters is clear and does not use dubbing techniques. Besides, this video will be interesting if it is included with animation.

6. Using high resolution quality

This video uses an image resolution that is high enough to produce a fairly clear image, although this video has a fairly high resolution, it still supports every computer system spec or can be used on all computers. This agrees with (Haryoko, 2009) that by utilizing computer technology it is hoped that video media can be used in delivering interesting learning materials including visualization of learning materials. This video can be downloaded if you want to play it again at a later date without using a fee.

7. Can be used individually or classical

This video can be used individually or even in groups and viewers can see this video anywhere and anytime so no special time or special place is needed to view the video.

Fifth Video: "Quick Ways to Calculate Addition and Subtraction" on the Youtube Application

1. Video clarity

The beginning of this video immediately discusses several questions. The method used in working on the addition of fractions is using cross times. The speaker said that "if the numerator is greater than the denominator then it is changed to a mixed number, namely by continuous division". This of course can help clarify the material for arithmetic operations on fractional numbers. In this video, the presenter does not provide a stimulus to the audience so that the audience

only listens to the video without any participation in working on the questions. The material presented is easy to remember because it only uses one method in explaining the problem, but because the speaker's voice is too fast in explaining it does not rule out the possibility that there are some viewers who do not understand the steps for doing the questions.

2. Stand alone(stand-alone)

In general, video can be used independently, meaning that it does not have to be accompanied by other teaching materials or does not have to be used simultaneously with other learning media. However, because there are no questions in this video for the audience to work on, it would be better if this video was accompanied by a book or LKS (Student Worksheet).

3. User friendly(friendly/familiar with users)

The language used is simple, easy to understand and uses common language, although there are non-standard words such as "yah" but in addition the information presented is helpful and can be used well by the audience.

4. Content representation

The material presented is not balanced because the example in adding fractions consists of two examples while subtracting fractions is only one example. This video contains stimulation on how to solve fractional arithmetic operations.

5. Visualization with media

The material in the video is presented with clear and large enough text besides the voice of the presenter is quite clear but it is unfortunate that there are noisy sounds that are heard when the presenter explains. This is very unfortunate because it can interfere with the listener's focus, it would be nice if the noisy voices were replaced with background music that could attract attention because according to (Cheppy & Riyana, 2007) By adding music to the video media, it can attract students' attention to listen to the lesson.

6. Using high resolution quality

This video uses an image resolution that is high enough to produce a fairly clear image, even though this video has a fairly high

resolution but still supports every computer system spec or can be used on all computers and also this video can be downloaded if you want to play it back later on. without using a fee.

7. Can be used individually or classical

This video can be used individually or even in groups and viewers can see this video anywhere and anytime so no special time or special place is needed to view the video.

CONCLUSION

Based on the results of the analysis that has been carried out, it can be concluded that first, the clarity of the content of each video is quite easy to understand and remember, the methods of solving it are almost the same, namely by finding the LCM of the two denominators and the cross times. The questions used are also very diverse, none of them are the same, but in each video there is one example question, two sample questions and three sample questions. Second, stand alone videos can be used independently without having to be accompanied by other teaching materials, although there are some videos that must be accompanied by books or worksheets in addition to working on the questions. It does not have to be used simultaneously with other learning media. Third, user friendly (friendly / familiar with the user) The language used in each video is simple, easy to understand and use common language even though there are words that are not standard. Fourth, the content of the material presented is quite representative and the video contains stimulation regarding arithmetic operations on fractional numbers. Fifth, visualization with media, the material contained in the video is equipped with the voice of the presenter which is quite clear and there is also text on the video but there is no animation. Sixth, using high-quality resolution, each video must use a resolution that is high enough to produce a clear enough image and this video can be used on all computers and seventh, can be used classically or individually. can view videos anywhere and anytime. Fourth, the content of the material presented is quite representative and the video contains stimulation regarding

arithmetic operations on fractional numbers. Fifth, visualization with media, the material contained in the video is equipped with the voice of the presenter which is quite clear and there is also text on the video but there is no animation. Sixth, using high-quality resolution, each video must use a resolution that is high enough to produce a clear enough image and this video can be used on all computers and seventh, can be used classically or individually. can view videos anywhere and anytime. Fourth, the content of the material presented is quite representative and the video contains stimulation regarding arithmetic operations on fractional numbers. Fifth, visualization with media, the material contained in the video is equipped with the voice of the presenter which is quite clear and there is also text on the video but there is no animation. Sixth, using high-quality resolution, each video must use a resolution that is high enough to produce a clear enough image and this video can be used on all computers and seventh, can be used classically or individually. can view videos anywhere and anytime. representative content of the material presented is quite representative and the video contains stimulation regarding arithmetic operations on fractional numbers. Fifth, visualization with media, the material contained in the video is equipped with the voice of the presenter which is quite clear and there is also text on the video but there is no animation. Sixth, using high-quality resolution, each video must use a resolution that is high enough to produce a clear enough image and this video can be used on all computers and seventh, can be used classically or individually. can view videos anywhere and anytime. representative content of the material presented is quite representative and the video contains stimulation regarding arithmetic operations on fractional numbers. Fifth, visualization with media, the material contained in the video is equipped with the voice of the presenter which is quite clear and there is also text on the video but there is no animation. Sixth, using high-quality resolution, each video must use a resolution that is high enough to produce a clear enough image and this video

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