Jurnal Pendidikan Biologi 11 (2) (2022) 78 - 89
Jurnal Pendidikan Biologi
Journal of Biology Education
http://jurnal.unimed.ac.id/2012/index.php/JPB
eISSN: 2502-3810 pISSN: 2086-2245

The Validity of Youtube-Based Biology Practicum Tutorial Videos in Supporting Online Learning During the Covid-19 Pandemic

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INFO ARTIKEL

Histori Artikel
Received 11-02-2022
Revised 06-06-2022
Accepted 11-06-2022
Published 08-09-2022

Keywords:
Covid-19 Pandemic, Online Learning, Practical Instructions, Validity, Youtube

ABSTRACT

April 2020, the World Health Organization (WHO) officially announced the state of the Covid-19 disease pandemic caused by SARS-CoV-2. This situation makes the human population in the world limit activities, including learning activities are carried out online. In this condition, practicum activities in Biology learning need to be assisted by media that are easy to understand and accessible to be carried out at home. The media is in the form of videos that can help explain concepts to students by utilizing the YouTube platform to access tutorial videos for practical activities. Based on these interests, it is necessary to research with the aim of 1) Designing a valid Youtube-based biology practicum video tutorial; 2) Describing the validity of the YouTube-based biology practicum video tutorial that was designed. The research method uses a development model adapted from Borg and Gall. This research is only limited to validity testing by validators covering the following aspects: material/content; Systematics; language; graphics; and evaluation. The results of the assessment by the validator showed that the YouTube-based biology practicum tutorial video obtained a score of 4.3 from the average overall assessment aspect. Based on the validity criteria, it shows that the video tutorial is very valid. Thus, it can be concluded that the YouTube-based biology practicum video tutorial designed as an online medium has met the validity criteria. Furthermore, the results of this study can be an alternative learning media in the form of Youtube-Based Biology Practical Tutorial Videos for 7th-grade students of SMP/MTs.

How to Cite
Rahmawati, D.A.M., Cintamulya, I. (2022). The Validity of Youtube-Based Biology Practicum Tutorial Videos in Supporting Online Learning During the Covid-19 Pandemic. *Jurnal Pendidikan Biologi, 11*(2), 78-89.

INTRODUCTION

The International Committee on Taxonomy of Viruses on February 11, 2020 announced Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) as the name of a newly emerging virus. As of April 2020, around 93% of the global population (approximately 7.2 billion people) living in various countries have implemented some form of movement restriction (Fitzgerald *et al.*, 2020; Gh *et al.*, 2020; Nghiem *et al.*, 2020). In the (*Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19)*, 2020) The World Health Organization (WHO) has officially named the new coronavirus disease

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DOI: https://doi.org/10.24114/jpb.v11i2.32836

"Covid-19". The disease has caused a global pandemic with major changes in all aspects of human life. The pace of growth in various fields of life has been hampered by the pandemic, such as economy (Gaudig *et al.,* 2020), society (Nghiem *et al.,* 2020), and certainly education (Handayaningsih, 2020; Jariyah & Tyastirin, 2020), with the implementation of physical distancing (Ortega-García *et al*., 2020) as an effort to stop the spread of Covid-19 carried out by governments in all countries in the world, including Indonesia (Gh *et al.,* 2020).

One of the major changes in education is the government's decision to close schools. The teaching and learning process at school become home-based through an online learning process (online) (Mustakim, 2020; Setiawan, 2020). Therefore, educational institutions to deal with this pandemic condition are required to make various innovations in the learning process (Atsani, 2020; Gunawan *et al*., 2020). This is especially true for science learning the topic of Biology, where the learning process must be able to provide a variety of learning experiences to help students understand concepts and processes (Iwantara *et al*., 2014; Suryaningsih, 2017). However, in Biology learning, the ability of educators to utilize technology is not yet optimal (Abdillah, 2017; Suratun *et al*., 2018), especially the making of science practicum learning videos for the topic of Biology (Abdulloh *et al*., 2019), even though practicum learning videos can provide an understanding of concepts and guidelines in practicum activities (Yuliana & Hastiana, 2019).

Previous research conducted by Syarifah (2018) regarding the development of video tutorials on the role of plants in the economic field for practicum, the results showed that 81.8% of students who were tested on a limited basis had an interest in video tutorials. Furthermore, research conducted by Iqbal *et al* (2019) regarding the development of a YouTube channel video blog (vlog) with a stem approach as an alternative media for online learning, the results show that the YouTube channel is one application that can be used in developing learning videos as an alternative to online learning. This condition is reinforced by YouTube's statistics on the widespread use of online videos, where around 4 billion hours of video are watched every month and 72 hours of video are uploaded every minute (Development, 2014; Sari & Margana, 2019). Thus, learning the Science Practicum on Biology topics can be included in practical video tutorials that are useful for training students to understand concepts. The practicum tutorial video is a guide that is covered and broadcast by the teacher during practicum activities, in the form of a series of live pictures that aim to help students' practicum activities (Putri & Kustini, 2018).

Based on this explanation, it can be said that the use of video allows it to be applied in the learning process in the classroom (Liao *et al*., 2019) and online learning (daring) (Iqbal *et al*., 2019). Thus, the development of video tutorials on the Youtube Channel has the potential to help students to independently carry out biology practicum activities at home. Therefore, it is necessary to conduct research with the following objectives: 1) designing a YouTube-based biology practicum tutorial video to support valid online learning during the Covid-19 pandemic; 2) describe the validity of the design results from YouTube-based biology practicum tutorial videos in supporting online learning during the Covid-19 pandemic.

METHOD

Types of Research

This study uses the type of Research and Development research which refers to

Sugiyono (2016) which aims to produce a valid Biology practicum video tutorial to support online learning during the Covid-19 pandemic. The development model used is Gall *et al.* (2013) whose stages include: 1) information gathering /needs analysis; 2) planning; 3) media design; 4) media validation; 5) media revision; 6) media testing; 7) second stage media revision; 8) field trials; 9) media revision; and 10) mass production (Iqbal et al., 2019). By referring to quality development assessment in terms of validity, effectiveness, and practicality (Nieveen, 1999). This research is limited to the fifth stage, the next stage will be discussed in another article.

Research Time and Place

The research was carried out from April to June 2020. The making of practical video tutorials took place in the laboratory Biology, Biology Education Study Program, Faculty of Teacher Training and Education, PGRI Ronggolawe Tuban University.

Instruments and Data Collection Techniques

The research instrument to obtain validity data is in the form of a modified validation sheet from Cintamulya & Mawartiningsih (2018). Data was collected by distributing validation sheets to four Expert Validators. The validation sheet contains five aspects of the assessment which include: 1) material; 2) systematic presentation; 3) language; 4) graphic; and 5) evaluation. Each aspect is described in the form of indicators, all of which amount to 17 indicators. Scores for validity using a 5 scale rating as follows: very valid (5); valid (4); quite valid (3); less valid (2); and invalid (1). Along with some suggestions written in the suggestions column by the Validator.

Development Research Procedure

Development research is carried out as shown in Figure 1.

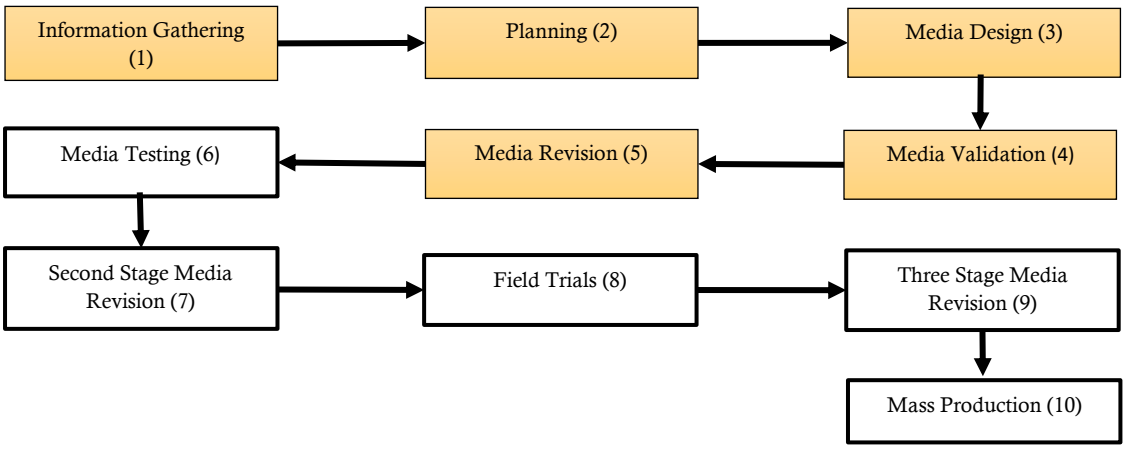

Figure 1. Video Tutorial Development Research Flow

Data Analysis

The quantitative data obtained are then averaged for each aspect, calculated using the formula Widoyoko (2009) :

$$\bar{x} = \frac{xi}{n}$$

Description :
$\bar{x}$: mean score
x_i : score on assessment items
n : many points of assessment

The results of the mean are used to determine the category of validity by matching the mean ($\bar{x}$) with the category of validity as shown in Table 1. While the formula for determining the category of intervals is as follows:

$$\text{Interval} = \frac{maximum\ score - minimum\ score}{many\ aspects}$$
$$= \frac{5-1}{5} = 0{,}8$$

Table 1. Product Validity Category

Score Interval	Validity Category
$1 \leq \bar{x} \leq 1{,}8$	Invalid
$1{,}8 \leq \bar{x} \leq 2{,}6$	Less Valid
$2{,}6 \leq \bar{x} \leq 3{,}4$	Quite Valid
$3{,}4 \leq \bar{x} \leq 4{,}2$	Valid
$4{,}2 \leq \bar{x} \leq 5$	Very Valid

Source: (Widoyoko, 2009)

RESULTS AND DISCUSSION

The steps in the development of the practical video tutorial refer to the steps of the development model described by Gall *et al.,* (2013) which only reached the fifth stage. While the data obtained from this study include: 1) the results of the YouTube-based biology lab tutorial video design and 2) the validity results of the youtube-based biology lab tutorial video design. Each research result will be discussed as follows.

The Result of Youtube-Based Biology Practicum Tutorial Video Design

The YouTube-based biology practicum video tutorial is designed in accordance with the 7 class science textbook for SMP/MTs Biology topics based on Inquiry Learning. In summary, the material in the video is divided into 11 parts, namely: 1) the first contains an explanation of the cell biology practical instructions for 7 class where the steps are inquiry-based; 2) practicum preparation, at this stage the teacher/model explains the tools and materials prepared for practicum activities; 3) explanation of basic competencies and indicators of inquiry-based cell biology practicum activities; 4) explanation of the purpose of inquiry-based cell biology practicum; 5) an explanation of the steps of cell biology practicum activities that refer to the syntax of the inquiry learning model; 6) explanation of the procedures for inquiry-based cell biology practicum activities; 7) explanation of the tools used in inquiry-based cell biology practicum activities; 8) explanation of the materials used in inquiry-based cell biology practicum activities; 9) demonstration of practical activities on animal cells and plant cells; 10) presenting questions for the post test; 11) video display on Youtube Channel. While the video tutorial design is as presented in Figure 2 -12.

Figure 2. The title of the Biology Practicum Tutorial Video

Figure 3. Brief Explanation of Tools and Materials for Practical Activities

Figure 4. Explanation of Basic Competencies and Indicators of Inquiry-Based Cell Biology Practicum Activities.

Figure 5. Explanation of the Purpose of Inquiry-Based Cell Biology Practicum.

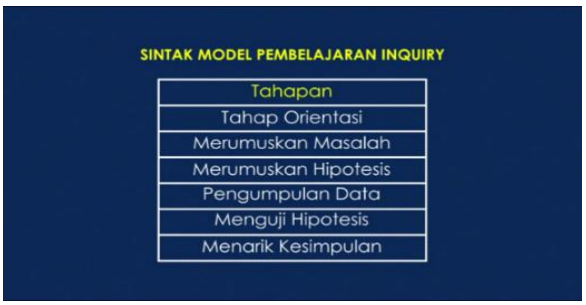

Figure 6. Explanation of the Steps of Cell Biology Practicum Activities Referring to the Syntax of the Inquiry Learning Model.

Figure 7. Explanation of the Rules of Conduct During Practicum Activities

Figure 8. Explanation of the Tools Used in Inquiry-Based Cell Biology Practicum Activities

Figure 9. Explanation of Materials Used in Inqury-Based Cell Biology Practicum.

Figure 10. Demonstration of Practical Activities on Animal Cells and Plant Cells

Figure 11. Questions for the post test

Figure 12. Video Display On Youtube Channel

The explanation of the steps for developing a YouTube-based Biology Practicum Tutorial Video by referring to R&D according to Gall *et al.* (2013) which have been modified as in Figure 1 are as follows:

1. Stage 1 Information Gathering

Information gathering is done by identifying the components needed in making video tutorials.

2. Stage 2 Planning

Planning to make a video tutorial design by referring to modules that have specific functions, especially SMP/MTs textbooks so that they become scripts.

3. Stage 3 Design

Design in (KBBI, n.d.) means to make a design / pattern. So at this design stage, make Video Recordings from scripts using a DSLR camera, and do video editing with Format Factory software with MP4 output format. Then upload it on the Ditri Asma Youtube Channel. The cell practicum video tutorial is designed in accordance with the 7 class science textbook on Biology topics for SMP/MTs based on Inquiry Learning.

Based on Figure 2-12, it can be explained as follows: The cover is designed using a blue theme and pictures that match the discussion. The cover contains Thumbnails and the title of the practicum. The components of the practicum instructions (KD, Indicators, Practical Objectives, and theoretical basis) are explained in the form of text along with information directly from the model. Inquiry-based practicum instructions are carried out by implementing the Inquiry syntax into the work steps in the practical instructions. Practice rules during the practicum which are informed and demonstrated directly by the model. Explanation of tools, materials, and practicum work steps are equipped with audio dubbing (voices) and subtitles (explanatory writing) located at the bottom of the video. Post test is used to measure the level of analysis, understanding of students after practicum using video practicum instructions. The Youtube platform is used as a place to distribute tutorial videos so that they can be easily accessed by students and the public. Accessible via the link https://youtu.be/ajnILoLpMdA.

4. Stage 4 Product Validation

The product validation stage is a process for conducting product design assessments, namely determining conformity with the product category (Denia *et al.*, 2018). The assessment is carried out by the Validator which includes Media Experts, Material Experts, Education Practitioners namely Teachers, and students as potential users.

The Result of the Validity of the Youtube-Based Biology Practicum Video Design Tutorial

The result of the assessment of the validity of the YouTube based biology practicum tutorial video are then averaged to determine the level of validity in each aspect. The results of the validator's assessment are presented in Table 2-7.

Table 2. Results of Practicum Tutorial Video Assessment by Validators Based on Material Aspects

Aspect	Indicator	Validator Score				Total	Average	Category
		1	2	3	4			
Material	Relation of practicum title with content	5	4	4	4	17	4,25	Very Valid
	Clarity of the purpose of the practical instructions	4	4	4	4	16	4	Valid
	Clarity about the prerequisites (watching videos on Youtube) before learning that must be mastered to do practicum	5	4	4	4	17	4,25	Very Valid
	The suitability of learning materials with the purpose of making learning media	4	4	3	3	14	3,5	Valid
Average							4	Valid

Table 3. The results of the Practicum Tutorial Video Assessment by the Validator Based on the Systematic Aspects of Presentation

Aspect	Indicator	Validator Score				Total	Average	Category
		1	2	3	4			
Presentation Systematics	Practical video tutorial according to the 7 class textbook for SMP/MTs Kemendikbud	5	3	4	4	16	4	Valid
	The components of practicum instructions include: basic competencies, indicators, practicum objectives, practicum rules, theoretical basis, mention of tools & materials, work steps, and discussion.	4	3	4	4	15	3,75	Valid
	Coherent mention of tools & materials	5	4	4	4	17	4,25	Very Valid
	Systematic practicum instructions with Inquiry Learning syntax	4	5	5	4	18	4,5	Very Valid
Average							4,1	Valid

Tabel 4. Results of Practicum Tutorial Video Assessments by Validators Based on Language Aspects

Aspect	Indicator	Validator Score				Total	Average	Category
		1	2	3	4			
Language	Does not contain elements of sara	5	5	5	5	20	5	Very Valid
	Conformity with Indonesian language rules	4	3	4	5	16	4	Valid
	Effectiveness and efficiency in the use of Indonesian	4	4	4	5	17	4,25	Very Valid
Average							4,4	Very Valid

Table 5. The results of the Practicum Tutorial Video Assessment by the Validator Based on the Graphical Aspect

Aspect	Indicator	Validator Score				Total	Average	Category
		1	2	3	4			
Graphics	The suitability of the video theme design with the practicum title	5	4	5	5	19	4,75	Very Valid
	The accuracy of the selection of font colors and fonts in the video	4	3	4	4	15	3,75	Valid
	Tidy subtitles and supporting images	4	4	5	5	18	4,5	Very Valid
	Audio clarity in video	5	5	4	5	19	4,75	Very Valid
	Conformity of the narrative with the illustration of the model demonstration in the video	5	5	4	5	19	4,75	Very Valid
Average							4,5	Very Valid

Table 6. Assessment Results Practicum Tutorial Videos by Validators Based on Evaluation Aspects

Aspect	Indicator	Validator Score				Total	Average	Category
		1	2	3	4			
Evaluation	Guiding students to empower critical thinking and analytical skills through the Inquiry Learning approach	5	4	4	5	18	4,5	Very Valid
Average							4,5	Very Valid

Table 7. Recapitulation of Validation Results Scores for Practical Video Tutorials for Each Aspect

No	Aspect	Score	Category
1.	Material	4	Valid
2.	Presentation Systematics	4,1	Very Valid
3.	Language	4,4	Very Valid
4.	Graphics	4,5	Very Valid
5.	Evaluation	4,5	Very Valid
	Total	21,5	
	Average	4,3	Very Valid

The first step in assessing the validity of the biology practicum video tutorial is the material aspect. This assessment aims to obtain information about opinions and suggestions regarding the accuracy and suitability of the learning materials presented in the developed biology practicum video tutorials (Warastuti, 2017). Based on Table 2, the average score of the validator's assessment results is 4, which means that the material aspects in the tutorial video are valid. Thus, the material in the tutorial video is based on indicator assessments on the aspect of the video tutorial material that contains content that is in accordance with the content in the video. These results are in line with research by Syarifah (2018) which states that a valid video tutorial must contain content that is compatible with other media, such as textbooks, modules, and worksheets.

The results of the validator's assessment on the systematic aspect can be seen in Table 3. In terms of systematics, presentation, and video tutorials for science practicum on the topic of Cell Biology, it is a valid category with a score of 4.1. This is because each stage of the practicum activity is explained in sequence and in detail, so that the video tutorial has the potential to help students in the process of practicum activities and understanding concepts. This means that based on the validity of the video tutorial developed, it has fulfilled its role as a learning medium (Junaidi, 2019; Lisiswati *et al*., 2016). In addition, the preparation of practicum activities resulting from the validator's assessment is in accordance with the syntax of the Inquiry Learning model. Thus, video tutorials as learning media have the potential to train science process skills and understanding concepts as well as students' critical thinking skills (Ningsyih *et al*., 2016; Wulandari, 2014). Furthermore, the validation assessment in the language aspect aims to test the completeness of the language in terms of the language used (Hidayah *et al*., 2020) by the Validator.

Based on Table 4, all indicators for the language aspect are valid and very valid. This means that the video tutorial as a learning media has met the criteria of validity in terms of language to be used in learning. According to Wicaksono (2016), language in the learning process can be used as a communication tool to students about systematic design so that students can carry out the learning process to achieve the goals that have been set. In addition, content that uses effective and efficient language without containing elements of speech is required, because the level of freedom in creating content to be uploaded on the YouTube Platform is very high. As stated by Rueda *et al.,* (2017) that social media can teach negative things because it contains advertisements, invitations to play games, or harmful content if watched by children.

Furthermore, the Graphical assessment aspect is as shown in Table 5. The purpose of this validation is to obtain information, criticism, and suggestions so that the developed biology practicum video tutorial is of visual or graphic quality (Sukmanasa *et al*., 2017). The results of the graphic assessment by the validator with indicators that consider the elements of the suitability of the video display with the theme and title of the video show an average score of 4.5 which is classified as very valid. This graphic aspect is influenced by the designer's level of creativity, so an interesting video is needed in accordance with the ongoing trend. Therefore, designing videos for learning should be done by the teacher himself. Nowadays it's easy to make videos using just a cellphone, so anyone can create and design videos (Development, 2014). Video as a learning media will be a determinant of the success of the learning process (Mantasiah, 2016). Therefore, learning media in the form of videos must be designed in an interesting and fun way from a graphic point of view when used in the learning process so that it can help clarify the material (Hardianti & Asri, 2017).

The results of the validation assessment in the Evaluation Aspect by the Validator are presented in Table 6. The results of the evaluation aspect assessment by the valiator produce an average score of 4.5 so it is classified as very valid. This means that the evaluation aspect of empowering students to think critically and analyze through the Inquiry Learning approach contained in the video tutorial has been conveyed in the video tutorial. Referring to Sutama's statement *et al*., (2014), the Inquiry Learning learning model can improve students' critical thinking skills. Likewise, Ningsyih's (2016) research concluded that guided inquiry-based

practicum is able to improve students' critical thinking. This is because Inquiry learning is able to train students to carry out activities independently, look for problems, determine hypotheses, solve problems, to draw their own conclusions (Sundari *et al*., 2017).

The video tutorial validation scores obtained from all aspects of the assessment can be seen in Table 7. Overall, the validity of the cell biology practicum video tutorial scores 4.3 and is classified as very valid. This means that the video tutorial has been designed and meets the criteria for validity for educational needs, and contains appropriate content for online learning needs during the Covid-19 pandemic. This is in accordance with the criteria proposed by Nieveen (1999) that the product developed must meet several criteria, one of which is validity.

Design revision is a product improvement whose validity has been assessed in the form of qualitative data. The qualitative data are suggestions from the validator as material to improve the cell biology practicum video tutorial product. The suggestions include: 1) an explanation of the observed cells does not yet exist; 2) details of work steps; 3) the use of letters in some descriptions is too small and lacks contrast. Based on the validator's input, a redesign of the practicum video tutorial media was carried out.

After redesigning the biology practicum video tutorial, the updates of this learning media can be stated as follows:

1. Inquiry-based cell biology practicum steps are packaged in the form of video tutorials to support online learning. In addition, inquiry-based practicum steps aim to train critical thinking and analysis skills.
2. Biology practicum tutorial videos are uploaded on the Youtube Platform so that it is easy for students to access and enable them to learn anywhere and anytime.
3. The biology practicum video tutorial is equipped with audio dubbing (voice) and subtitles (explanatory writing) as well as the selection of colors and images that are adapted to the topic of discussion so that students are motivated to be more enthusiastic in the learning process.
4. The biology practicum video tutorial is delivered by a model who will help demonstrate and provide information for practicum activities.

CONCLUSION

Based on the results of the validator's assessment, the YouTube-based biology practicum tutorial video in supporting online learning during the Covid-19 pandemic is categorized as very valid. The practical video tutorial utilizes multimedia technology as an alternative so as to make it easier for students to access it and motivates teachers to innovate in the development of learning media, especially in the limitations of teaching during the Covid-19 Pandemic, especially practical activities that should be carried out in the laboratory. In development research that is guided by a quality assessment in terms of validity, practicality, and effectiveness, it is only limited to the assessment of the validity test. So that the YouTube-based biology practicum tutorial video is feasible to use, it is hoped that further research will be carried out to test the practicality and effectiveness of a product that has been developed.

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