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Development Learning Media Based Tutorials Video on Digestive System Practicum at SMAN 1 Ungaran

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Abstract

Implementation of biology practicums could not be carried out optimally. This is because students' skills in practicums are less, time allocation and media are limited, while the use of learning media is very important. Digestive system practicums have 4 food tests and often make students confused, upside down between the chemical testers with one another, even though when the practical test food test material will be re-practiced and assessed as a practical value. For this reason, it is necessary to development of learning media-based tutorial video on the digestive system practicum. The purpose of this research is to analyze the validity and feasibility of a learning media-based tutorial video on the digestive system practicum. The research steps taken using the 4D development model are Define, Design, Development, and Disseminate. The research instruments used were media availability questionnaires, interview sheets, validity sheets, and teacher and student response questionnaire sheets. Analysis of the data used is descriptive quantitative percentage. The results showed tutorial video on the digestive system practicum was classified as very valid by media expert 98%, and material expert 100%. Tutorial video on the digestive system practicum is very feasible 97% according to the teacher and 10 students. In this research, the effectiveness of optimizing the digestive system practicum cannot be carried out due to the COVID-19 pandemic. It is recommended to test the effectiveness of the digestive system practicum tutorial video media in future research so that it can be applied in optimizing practicum in schools.

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INTRODUCTION

Science in the 21st century is constantly evolving and correlating with technological developments. Along with the development of science and technology, there have been various changes so that humans are able to compete must adapt to these changes. The development of education can not be separated from the development of the industrial revolution that occurred, where the learning process in the 21st century has prioritized skills, not only knowledge (Arifin, 2017). In the era of education 4.0, it describes various ways to integrate cyber technology both physically and not into learning. Digital transformation is necessary for the advancement of the world of education in Indonesia. With digital transformation, cost efficiency and productivity, and improving the quality of education will lead to a good system (Harto, 2018). Research in learning such as multimedia learning is a necessity in society in the world of technology literate education, including students.

Ottander and Grelsson (2006) stated that laboratory activities are a very important part of learning biology and science. Learning biology requires an activity that involves students in solving a problem. There are several materials that require observations with practicum, with the aim of students better understanding and providing practical skills on the material. The advantages of practicum learning are that students can practice trial and error, can repeat the same activities or actions until they are truly skilled (Rahayuningsi & Dwiyanto, 2005, p.6).

Based on an interview with a teacher at SMAN 1 Ungaran, Mrs. Tuti Sugiarti, M. Pd. in September 2019, it was found that the tools and materials for practicum in the laboratory were adequate, but the implementation of the biology lab had not been implemented optimally. This can be seen from the lack of skills of students in practicum. The cause of the less than optimal implementation of practicum in biology learning in schools is the time allocation for practicum implementation in the limited digestive system, namely 2x45 minutes. In addition, the limitations of the instructional media used by the teacher make practicum less optimal. Learning that can be applied by teachers in carrying out practicum can be overcome by optimizing learning media.

Based on the questionnaire given to students of SMA Negeri 1 Ungaran in September 2019, 69.44% of students stated that the media used for learning biology was not effective. A guide to provide real examples of practicum implementation activities is needed by students with a percentage of 83.33%. In this case, 88.89% of students strongly agree if the guidelines for implementing the practicum are packaged in the form of media in the form of tutorials video.

The digestive system chapter is regulated based on Permendikbud Number 24 of 2016 attachment number 7 on the basic competencies of Biology Class XI, there are Basic Competencies (KD) knowledge and skills that must be achieved by students through practicum. Basic competency 4.7, which reads to present reports on the results of tests for food substances contained in various types of foodstuffs in relation to the energy needs of each individual as well as food processing technology and food safety. In this digestive system, there are 4 food tests that are practiced and often make children confused, reversed between the chemical testers with each other, even though when the practical exam, this food test material will be practiced again and assessed as practical value. The food tests include the lugol test, the A and B fehling test, the A and B biuret test, and the fat spot test, where the four tests test for the presence of starch, glucose, protein, and fat in food ingredients which will be visualized through the tutorial video.

Susilana and Riyana (2009, p.147) state that instructional video media are media that present audio and visuals that contain good learning messages containing concepts, principles, procedures, theories, applications to help understanding a learning material. Tutorials video are learning media that convey messages to students in the form of audio and visuals in which there is interactive learning material so that students can learn independently. In the condition of the video in cyberspace, namely the lack of presenting the stages, there is no label of the name of the material, there is no information on the important points in the video, there are no positive results in the video, so it does not provide a complete picture to students when they are going to do practicum. The use of good tutorial video media will greatly assist teachers in delivering learning material. Students can pay attention to and listen to the instructions conveyed in the video, so that students can understand and understand the material to be practiced.

Biology learning involves students in solving a problem. Teaching and learning process with practicum which means that students learn an object, analyze, prove, and draw about an object. In the digestive system the time is limited, which is 2x45 minutes and the teacher is less than optimal in using the media. School constraints that are under the teacher in carrying out practicum can be overcome by using learning media. In order to expedite digestive system practicum activities, students need to get a real picture of the procedure to be carried out. There are limitations to school media, there is no practical guideline, so teachers need to explain practicum procedures which result in teachers not having the opportunity to assess students' skills, so it is necessary to develop learning media based tutorial video on the digestive system

practicum. The objective on this research to analyze the validity and feasibility of learning media based tutorial video on the digestive system practicum to provide an overview of students before carrying out the practicum.

RESEARCH METHODS

The research was conducted at SMA Negeri 1 Ungaran and the Biology Laboratory of the State University of Semarang. The research was conducted from September 2019 to May 2020. In the first stage, namely the Define stage, making observations to explore potential problems in September. The second stage is the design of the product making, the third stage of development in the form of validation and revision activities carried out in January-May. The small-scale test in the form of student and teacher responses from the media was carried out online in May 2020 in the academic year of the even semester 2019/2020. The last stage is Disseminate in the form of distributing media to students and teachers. The research subjects were 10 class XI students and teachers. Data on the types of media used by biology teachers and the constraints of practicum implementation were obtained using interview sheet instruments by the teacher and questionnaire sheets by students, the validity of the practical tutorial videos using the validity assessment sheet instrument by media and material experts, the feasibility of the practicum tutorial videos using the teacher response questionnaire instrument and learners. Data analysis in this research is descriptive percentage.

RESULTS AND DISCUSSION

Based on the results of an interview with a biology teacher at SMAN 1 Ungaran in September 2019, it was found that the media used for practicum was limited to only worksheets, sometimes ppt. Based on the questionnaire given to students of SMA Negeri 1 Ungaran, 69.44% of students stated that the media used for learning biology was not effective. A guide to provide real examples of practicum implementation activities is needed by students with a percentage of 83.33%. In this case, 88.89% of students strongly agree if the guidelines for implementing the practicum are packaged in the form of media in the form of tutorials video.

In this study, a tutorials video was developed in the form of a practicum tutorial to solve existing problems. Video research and development activities focus on processes. Research does not produce products while development produces products. Development is the process of engineering a series of elements to make a product. Research and development is a related process carried out according to procedures in order to be time efficient (Purwanti, T., N. A. Habibah., Supriyanto, 2014)

Based on the results of the analysis of the making of digestive system practicum tutorial video media, it is known that the video has a small duration and can describe the practicum skills of students. A tutorial video on the digestive system is presented at the following link: https://drive.google.com/drive/u/0/folders/1Cd-LoDByWoi620u-sbelXgRfkgyTZSuv. The video is 8 minutes 20 seconds long and contains an overview of the practicum for students. The time that is not too long can display practicum skills that students can emulate. The benefits of not being too long make students not get bored quickly. Not only that, the concentration of students is maintained to watch videos from start to finish. In line with Lestari (2017), efficient time will have an effect on learning concentration and absorbing the knowledge taught.

Other characteristics of video products are coherent, logical and systematic according to the material, labeling and detailed descriptions of work steps are very helpful in carrying out practicum. Delivering clear practicum steps so that students directly understand and imitate the work steps of the video. This video can achieve goals in learning media that can optimize practicum. In accordance with Azzahra (2017) that video can be useful as a facilitator in the process of delivering information. Video development is done in order and structure. The results of video development meet the predetermined standards. Even so, there are still improvements in order to increase the feasibility and success of the trial.

Video Validity

Table 1 The criteria for the validity of the media and material on the media display based on the digestive system tutorial video.

Score percentage interval	Criteria
25% < P ≤ 44%	Invalid
45% ≤ P ≤ 63%	Enough valid
64% ≤ P ≤ 81%	Valid
82% ≤ P ≤ 100%	Very valid

Learning media is said to be valid if the results of the analysis are in accordance with predetermined criteria. As explained by Arikunto (2010, p.18), an instrument is said to have validity if the results match the criteria, meaning that they have parallels between the test results and predetermined criteria. In this study, the level of validity is measured using a rating scale where the raw data obtained is in the form of numbers and then interpreted in a qualitative sense.

Media Validity

Based on the results of the analysis of the digestive system tutorial video assessment by media experts, it is known that the digestive system tutorial video is very valid with an average score of 98%. There are 3 aspects in evaluating the validity of video media, namely aspects of software engineering, aspects of audio-visual communication, and aspects of educational design. The software engineering aspect and the educational design aspect each consist of 4 items, and the audio-visual communication aspect consists of 5 items.

The media expert's assessment stated that the digestive system practicum tutorial video was very perfect by obtaining a score of 100% in the software engineering and educational design aspects. In the aspect of video software, maintenance, reusability, compatibility and reusability are achieved. Videos can be managed very easily; it is very simple to operate. In addition, videos in software form are run on various existing electronic devices. The video is formatted into mp4 so that you can immediately view it many times at any time with a computer or laptop. Educational design aspects where the presentation of the video is very interesting and easy to follow. Videos can help students learn independently, and videos are systematic, coherent, clear logic flow, and clear video narrative explanations.

The audio-visual communication aspect obtained a percentage score of 95% from media expert lecturers. This aspect relates to the design of the video. The intended video design is communicative, creative in the idea of casting ideas, simple and attractive, audio and visual. The video includes these elements that support one another. The moving images are then compiled and a sound effect is added. In the audio assessment, it gets a score of 3 which means the voice is clear, the narrative is in accordance with the text/ images presented, the sound effects and the back sound do not interfere with students' understanding.

Aspects in evaluating the validity of video media, namely aspects of software engineering, aspects of audio-visual communication, and aspects of educational design it was found that an average score of 98% was included in the very valid category. Improvements are added sufficiently to increase credibility (Ihsan, 2015). However, there are limitations in the validity test. The validity test is still being carried out by experts from UNNES. Materials for assessing the validity are still limited so that it can still be developed.

Based on the results of the media expert's assessment of the digestive system practicum tutorial video, it is known that the video still needs to be revised. The tutorial video for the digestive system practicum before and after the revision from the advice of media experts is presented in Table 1.

Table 2 The tutorial video for the digestive system practicum before and after the revision from the advice of media experts

No	Before Revision	After Revision
1.		
	No *subtitle*	Added *subtitle*
2.		
	Initial design with the UNNES profile scene	Revised design with the biological laboratory scene
3.	The voice is less clear	The voice is clearer

Based on Table 2, it is known that the advice given by media experts to the digestive system practicum tutorial video is in the form of adding text/subtitles, structuring the video in the opening section, and clarifying the narrator's voice. The addition of text/subtitles is intended to make the students pay more attention to what is conveyed in the video. The opening part of the scene is specified only to the laboratory because the UNNES profile scene is too wide, and coherent from the laboratory entrance to the practicum room. After being revised, it is hoped that the digestive system practicum tutorial video can be more focused on the attention of students before starting the digestive system practicum.

In the opinion of the researcher, the tutorials video for the digestive system practicum as a whole from the media side is already good, which is seen from 3 aspects: aspects of software engineering, aspects of audio-visual communication, and aspects of educational design. This is in accordance with the expert's assessment of voice media that sounds less clear, so there needs to be improvements so that it can be heard more clearly, adding subtitles is also to make it easier for students to absorb information.

Material Validity

Based on the results of the analysis of the digestive system tutorial video assessment by material experts, it is known that the digestive system tutorial video is very valid with an average score of 100%. There are 2 aspects of assessment, namely the content feasibility component and the presentation component. The content feasibility component consists of 2 items and the presentation component consists of 6 items, both of which reach the maximum value.

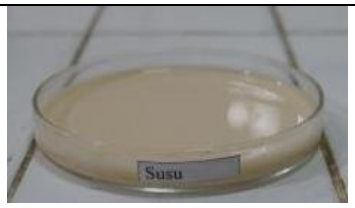
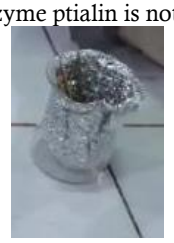
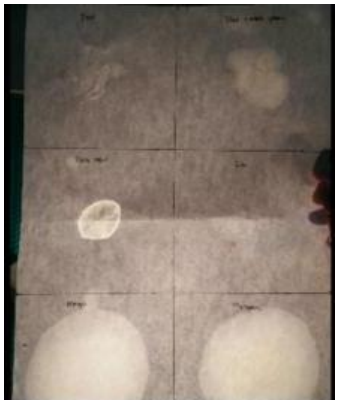
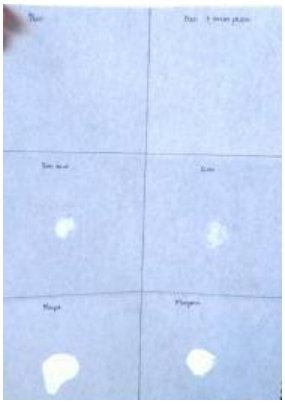
The digestive system tutorial video is right on target for high school class XI children with clear video learning objectives, relevant to Basic Competencies. The video contains appropriate and appropriate material for practical guidance on the digestive system. The video presents the truth of the concept of testing the content of food substances which in the delivery of material coherently, logically and systematically. The description, interpretation on the video is clear, as well as the ability of the video to improve students' skills, where a detailed description of the work steps is very helpful in doing practicum. This is in accordance with the opinion of Arsyad (2014, p.6) explaining that one of the criteria for media that is feasible to choose is media that is compatible with the needs of the learning task and supports the content of learning material.

The overall assessment aspect is in the very valid category, so the practicum learning media developed can be used at a later stage, namely the feasibility field trial to then measure its effectiveness. However, in this case the effectiveness is not tested because it is not possible to do practicum in schools. Then, based on the notes given by the validators on each validated component, it is necessary to make improvements in accordance with the notes given.

Based on the results of the material expert's assessment of the digestive system practicum tutorial

video, it is known that the video still needs to be revised. Tutorials video for the digestive system practicum before and after the revision of material expert advice are presented in Table 2.

Table 3 Tutorials video for the digestive system practicum before and after the revision of material expert advice

No.	Before Revision	After Revision
1.	 Using sweetened condensed milk	 Using pure milk / UHT ingredients
2.	The enzyme ptialin is not heated	The enzyme ptialin is heated
3.	 The trash uses aluminum foil	 Trash without aluminum foil
4.	 In the test the fat spots have not been dried	 In the test the fat spots have been dried
5.	The voice is less clear	The sound is clearer
6.	 The test results are not given an arrow	 The test results are given an arrow

Based on Table 3, it is known that the advice given by material experts on the digestive system practicum tutorial video is in the form of milk used by pure milk/UHT so that the practicum results are truly valid, the ptyalin enzyme is activated first by heating, garbage (matches, sticks) is disposed of in the space provided without the need to use aluminum foil paper, and in the test the fat spots were dried to dry to make them look transparent which really contained fat. In addition to suggestions about the material, matters relating to the digestive system practicum tutorial video media were also given input by material experts, namely clarifying the volume of the voice, giving arrows to the appropriate test results to reference the correct test results. After being revised, it is hoped that the digestive system practicum tutorial video can provide a

better overview of the practicum to students before starting the digestive system practicum.

According to the opinion of the researcher, overall from the material side, it is appropriate for students class XI. There are 2 aspects in the material assessment: the aspect of the content feasibility, and presentation. The learning objectives on the video are clear, the material content on the video is right and according to the material chosen. Practicum tutorials video can be used as a guide in practicum. The delivery of material in a logical, systematic, description, and interpretation on the video is clear so that it is easy for students to understand. In accordance with the expert's appraisal, the material on the fat spot test must be completely dried first to see the test results containing fat, the ptyalin enzyme must be in an active state, when using selected milk ingredients which are pure milk.

Video feasibility

Based on the results of the feasibility analysis of the digestive system tutorial videos for SMAN 1 Ungaran teachers and 10 students, it is known that the digestive system tutorial videos are very feasible, the assessment by teachers and students varies. Software engineering, content feasibility and presentation dominate the feasibility assessment. Full scores were given by the teacher and 10 students on the aspects of software engineering and content feasibility. However, there are still imperfect aspects with the lowest score of 80%, namely the educational design aspect.

Feasibility analysis is used to ensure that the product being distributed is suitable for learning. The advantages possessed by video affect its feasibility value. The video developed has advantages including coherent, logical and systematic according to the food content test material in the digestive system. Another important thing is the labeling and detailed description of the work steps. These advantages really help students in doing practicum.

Based on the results of the analysis of the responses of teachers and students, it was found that an average percentage of feasibility was 97% which was in the very feasible category. Overall teachers and students gave excellent responses to learning media in the form of digestive system practicum tutorial videos. This is evidenced by the aspects that are asked on the questionnaire sheet of students' responses where the questionnaire obtains the appropriate and very appropriate criteria. This development research provides a medium that is very suitable for use in learning where videos can optimize practicum. It still needs to be tested for its effectiveness, but due to constraints the meetings cannot be held at school so that the optimization of practicum is not carried out.

CONCLUSION

Based on the results of research and discussion, it is concluded that:

1. Tutorials video for digestive system practicum has reach the very valid criteria according to media and material experts. The results of the validity by the media expert obtained a percentage score of 98% and material experts obtained a percentage score of 100%.
2. Feasibility video analysis obtained an average score of 97% with very feasible criteria according to teacher and students.

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