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Development of Video Tutorials for Simple Distillation Tools for Making Essential Oils in Junior High Chemistry Course

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Abstract
This study aims to develop a video tutorial for simple distillation equipment for making essential oils that is suitable for use in junior high school chemistry courses. The research is a development research using the Design Thinking approach. The Design Thinking approach includes five steps, namely: empathic, definition, idea, prototype, and test. The instruments used in this study are student response questionnaires and validity on video tutorials for simple distillation equipment for making essential oils. The results of validation and student response to the video were analyzed using a Guttman scale and obtained a percentage of validation of the feasibility of media design 100% with a very valid category, articulation and intonation 100% with a very valid category, operation 100% with a very valid category, and suitability of material with sub-CPMK 100% with a very valid category. The percentage in the response test, namely the media display indicator 96.8% with a very good category, 100% operation with a very good category, and 98.95% usefulness with a very good category. Thus it can be concluded that the results of the analysis of video tutorial development are worth testing in the learning process.

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INTRODUCTION

The teaching process has five important components, namely: goals, materials, methods, media, and learning evaluation. These five components have a great relationshipbetween one another (Wandini & Lubis, 2021). For example, the method chosen in the process of delivering learning materials affects the learning media used to deliver materials to students based on the needs and characteristics of the students concerned (Audie, 2019).One of the factors that can increase students' interest in learning is learning media (Tafonao, 2018). Media plays an important role in achieving learning outcomes, because the media makes it easier for a teacher to explain material to students. Learning will be more with the media, where students can receive learning easily and make it easier for educators to provide stimulation (Ulfadhilah & Suyadi, 2021). Media can increase the effectiveness ofstudents' learning and can stimulate students' minds so as to encourage the learning process in students (Nurmadiah, 2016). The presence of media

capable of displaying images and sound can help students divert boredom and be more interested in participating in learning using multimedia such as videos when teaching rather than just learning through teacher lectures (Maryanti & trie Kurniawan, 2018).

Video media is media that has sound, there is movement and the shape of the objectcan be seen, video media has the aim of displaying information that is interesting and fun and easy to understand (Haryoko, 2009). Video media is very useful in the growth and development of children from infants to adults because videos can be imitated by children through viewing (Swastyastu, 2020). Video media is known to have the potential to help educators, because videos can be played repeatedly and stopped sequentially, so that the material can be well understood by students (Fatmadiwi et al., 2022). The video tutorial provided by the teacher makes it easier for students to practice by following the directions in the video tutorial (Chandra & Nugroho, 2017). Video tutorial-based teaching materials arevery effective in helping students learn (Ali et al., 2018). Video media in learning has advantages such as combining visual and auditory elements, improving understanding of complex concepts, being engaging and interactive, easily accessible, saving time, enabling independent learning, showing real context, improving information retention, and expanding learning resources (Palullu et al., 2023). A video tutorial is a series of live images that present information from an expert or instructor to a group of people so that a group of people canunderstand a process or increase their knowledge just by watching the video (Utomo & Ratnawati, 2018). Video tutorials in learning show more sophisticated results in learning mediaand can adjust to the development of developing technology and make significant progress onstudent learning outcomes (Rodemer et al., 2021).

Junior high school chemistry course is one of the courses taught to chemistry education students FKIP UNTAN. In the sub CPMK (Course Learning Outcomes) of the course contained the word simple experiments that utilize plants in the surrounding environment with the following CPMK contents: (c) conduct simple experiments in supporting the understanding of chemical content or concepts learned in integrated sciencesubjects at the junior high school level by utilizing plants in the surrounding environment(Hidayat, 2023). Thus, the course instructor should use media that can help achieve the CPMK in the junior high school chemistry course (Fitriyati & Munzil, 2016). There are many tools and materials in the surrounding environment that can help teachers to achieveCPMK, one of which is a simple distillation device for making essential oils that can be made by students themselves (Kawulur et al., 2022). Used goods have a high use value ifwe are wise in processing them, one of which is as a learning media that we can make ourselves and save more costs (Laila & Sahari, 2016). It is important for students to be able to be creative in making learning media to increase the critical thinking of students, increase student motivation and interest in learning, all students can be involved in learning(Nurrita, 2018).

The results of interviews with teachers of junior high school chemistry courses on chemical separation material, obtained information that the teacher has assigned students to make a distillation device to separate water and salt. However, the distillation

device cannot be used to make essential oil. Students have learned to make simple distillation devices, but for simple distillation devices for making essential oils, students do not knowhow to make and the components that make up the distillation device. For this reason, a video tutorial on how to make a simple distillation device for making essential oils is important to be developed (Thawichsri & others, 2015).

Distillation equipment is a set of tools that can be used to separate liquid mixtures based on differences in boiling points through the process of heating, evaporation, and condensation (Górak & Olujić, 2014). Distillation tools have several types, one of which is a simple distillation tool, a simple distillation tool is different from other distillation tools becauseit can be made using tools and materials that we can find in the environment around us, one of which is used goods (Fadiawati et al., 2019). The advantages of simple distillation devices suchas low cost, customization as needed, in-depth understanding of how the device works, useful in the world of education and learning, ease of maintenance and repair, and encouraging creativity and innovation in students in the learning process (Wahyu et al., 2018). Developing a simple distillation apparatus allows students to better learn the principles of distillation through new designs and technologies that are more efficient, safe, and can be used in various fields of study and laboratory experiments, with materials and tools that are easy to find and make (Tesfaye et al., 2020). From the results of the analysis that has been carried out by researchers, there are several studies that have made simple distillation devices by utilizing usedgoods such as used cans and hoses, cans are used for the distillation process and hoses where the distilled water comes out (Novita et al., 2023). What is developed in this study is a simple distillation device that utilizes household waste, namely used pans and pipes, which distinguishes the distillation device in this study from existing research is the condenser becausethe researcher makes a condenser from a used pipe that can remove and enter water to keep thecondenser cool.

The results of the study found that students gave a positive response and a more contextualized impression of a simple distillation device made from used good (Budiyanto &Others, 2016). This simple distillation tool can be used for making essential oils so thatit can produce essential oils that have high benefits and selling value (Putri et al., 2021). Essential oils, also known as essential oils, are natural compounds extracted from plants (Sharmeen et al., 2021). This oil has a distinctive aroma and has many benefits, in the health sector essential oils have benefits, namely: providing a relaxing effect, treating digestion, treating infections, and increasing immunity (Sofiani et al., 2017). In the world of essential oil entrepreneurship, it is very much in demand by consumers, giving an increase in the contribution of essential oil utilization (Thahir et al., 2022). Not only entrepreneurship in the world of beauty essential oils also have many benefits in making serum, toner, cream, perfume and so on (Julianto, 2016). The many benefits of essential oils in various fields, researchers hope that students can have innovation and motivation to make tools that can produce essential oils by looking at the video tutorials developed.

Based on the above statement, it is necessary to develop a video tutorial on a simple distillation tool for making essential oils to achieve CPMK in the SMP Chemistry course and broaden students' insights regarding the use of distillation tools on plants that

contain essential oils and provide a visual, interactive, and easy-to-understand learning resource, which can improve students' understanding of the principles of distillation, and facilitate direct practice with tools that they make themselves using materials that are easyto find. Through this research, it is hoped that a video tutorial will be produced that is suitable for use by students in the SMP Chemistry course and the validity of the video tutorial for a simple distillation tool for making essential oils can be known.

METHOD

This research is a development research using the Design Thinking approach. Development research is a type of research that aims to create new products or procedures, and test their effectiveness and efficiency. The products developed can include various things, such as software, learning methods, teaching materials, curriculum, medical devices, and so on (Mulyana et al., 2023). Design thinking is defined as a thought process,thinking ability, innovation or new product development process, problem-solving tool, and step-by-step guide for an innovation. The Design Thinking method has six steps, namely empathy, definition, idea, prototype, and test (Darmalaksana, 2020). The process of researching video media for simple distillation equipment for making essential oils includes the empathic stage, the first stage carried out by researchers to find information about the problems obtained. The second stage is definition, where researchers identify theinformation that has been obtained (Fariyanto et al., 2021). The third stage is the idea, thisstage is useful for finding and determining effective solutions to the problems that have been collected. The fourth stage is prototyping. After getting ideas from the problem (Soedewi et al., 2022). The next stage is prototyping, where at this stage the researcher designs or designs the initial product or media to be made. The fifth stage is the test of thefinished prototype design results tested by potential users by seeing their reactions to the media that has been made by the researcher. The tests in this study used media validation sheets and response questionnaires (I. P. Sari et al., 2020). Instrument validation was carried out by experts, namely 2 lecturers, and for media validation was carried out by media experts, namely 2 lecturers and 7 junior high school science teachers. Data validation instrument questionnaire assessment, video feasibility used Guttman scale, which has two options, “Yes” or “No” if the validator answers yes then the value is 1 and answer then the value is 0. The formula used in the Guttman scale data analysis is:

$$K\% = \frac{\text{Total Score}}{\text{Criterian Score}} \times 100$$

Criterion score (K%) = highest score of each item x ∑item x∑ validators. The results of the calculation were used to determine the validity of the research instrument and the feasibility of the video using a Guttman scale (Table 1).

Table 1 Categories of Instrument and Video Validity

Range (%)	Categories
0 – 40	Invalid
41 – 60	Less Valid

61 – 80	Valid
81 – 100	Very Valid

(Meliana et al., 2022)

The results of the analysis and calculation of student responses to video tutorials on simple distillation equipment for making essential oils using a questionnaire. This is done to see how students respond when learning to use video tutorials for simple distillation equipment for making essential oils (Table 2).

Table 2 Student Response Interpretation Criteria

Assessment (%)	Interpretation Criteria
0 – 20	Not very good
21 – 40	Not good
41 – 60	Fairly good
61 - 80	Good
81 - 100	Very good

(Sudaryono, 2019)

RESULTS AND DISCUSSION

The results of the development of video tutorials Video tutorials on making simple distillation equipment for making essential oils developed are simple in making and can be accessed easily by users. Both lecturers, teachers and students can access the video tutorial through links opened on cell phones or computers and laptops. The learning videowas developed based on a story board consisting of an opening, content, namely about thematerials needed, and how to make a simple distillation device, the last is the closing (Tomczyk et al., 2023). The learning video was developed using the capcut application. The capcut application is a video editing application that can be downloaded from the playstor application, the capcut application has advantages, which are easy to edit and canhelp smooth the learning process by teachers and for students (Zulfa et al., 2023). The result of this video development is a prototype of a simple distillation video tutorial tool for making essential oils. The opening section of the video presents greetings.opening and self-introduction of the talent before entering the main discussion on the video.

Figure 1. Opening Video Tutorial for Simple Distillation Equipment for Making Essential Oils

The content part of the video displays the tools and materials used, and explains how to make a simple distillation device. The video tutorial display of a simple distillation device for making essential oils can be seen in Figures 2 and 3.

Figure 2. Tools and Materials Used

Figure 3. How to make a simple distillation device

The closing part of the video tutorial on a simple distillation device for making essential oil briefly shows how to use a simple distillation device to produce essential oil (Figure 4).

Figure 4. Application of Distillation Device

Tabel 3. Instrumen Validasi dan Angket Respon

Aspect	Category	Percentage
Video validation questionnaire instrument	100%	very valid
Student response questionnaire instrument	100%	very valid
Total	100%	very valid

Based on Table 3, it can be seen that the validation questionnaire instrument and the response questionnaire are very valid. Furthermore, the video was validated by nine media expert validators and conducted a response test on students.

Media feasibility validation test

The Validation Test aims to produce media that is suitable for use in learning activitiesand can be used to achieve CPMK in junior high school chemistry courses. The media validation test is based on four aspects, namely media design, articulation and intonation, operation, and suitability of material with sub-CPMK. The following validation results are presented in Table 4.

Table 4. Percentage of Validity of the 1st Video Tutorial

Aspect	Category	Percentage
Media design	67	very valid
Articulation and intonation	100	very valid
Operation of	100	very valid
Suitability of material with sub CPMK	100	very valid
Total	91,75	very valid

The media validation process was carried out twice. The first validation on the media design aspect obtained a percentage of 67%. The validator suggested improving the sound so that it does not echo, adding lighting, and improving the size of the text on the video. From the above suggestions, the researcher chose to revalidate the video so that it obtained a percentage of 100% on media design. The revised media validation results arepresented in Table 5.

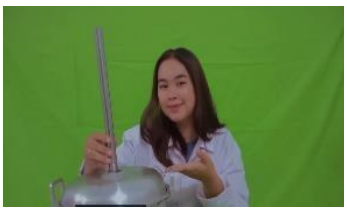
Table 5. Percentage of Validity of the 2nd Video Tutorial

Aspect	Category	Percentage
Media design	100	very valid
Articulation and intonation	100	very valid
Operation of	100	very valid
Suitability of material with sub CPMK	100	very valid
Total	100	very valid

Based on the table above, it is known that the media design aspect is very valid, where the video displayed is very good, in terms of background color, wardrobe, narration, lighting, sound, font and placement. Paying attention to light, sound, and text size can improve the quality and effectiveness of messages in videos (Aslah et al., 2017). The articulation and intonation aspects of the video are very valid, indicating that the articulation and intonation are clear so that the video is easy to understand. Proper articulation and intonation can increase audience absorption and communication effectiveness in videos (D. P. Sari, 2017). The aspect of video operation is very valid which indicates that the video is easily accessible by teachers

and students. This is in linewith research (Putra et al., 2014). Which states that the ease of operating the video will help teachers and students easily learn the content of the material presented in the video.In the aspect of conformity with the sub CPMK, it is very valid, characterized by the delivery of material on the video in accordance with the sub CPMK of the junior high school chemistry course. The results of the validation of the feasibility of video tutorials for simple distillation tools for making essential oils by validators obtained a percentage of 100%with a very valid category. This is in line with research which states that a percentage of 81- 100 is categorized as very valid (Nadiroh & Wibowo, 2018). Based on the results of the firstvideo feasibility validation, it is suggested to improve the prototype that has been developed so that the video tutorial made has a good quality appearance. These improvements can beseen in Table 6.

Table 6: Video Improvement Results Based on Validator Suggestions

Before revision	After revision
The sound on the video is echoey and lacks clarity	Researchers re-recorded for voice-over so that the sound would be clearer.
 Rocking video capture	 Researchers stabilized the image quality on the video to reduce the shaky effect on the video.
 The lighting on the video is lacking	 Researchers added lighting to the video

The response test in this study was applied to 7th semester chemistry education students who had taken junior high school chemistry courses with a total of 48 students. The response test results are presented in Table 7.

Tabele 7. Student Response Test Results

Aspect	Indicator	Percentage Trial	Category
Student response test	Media display	96,8	very good
	Ease of	100	very good
	Usability	98,95	very good
Total		98%	very good

Based on the table above, it is known that the display indicator is very good. This shows that the appearance of the video tutorial is very clear and interesting. A clear and interesting video display can generate enthusiasm for learning for students (Maulani et al.,2022). The ease indicator is very good. This shows that video tutorials are very easy to understand, learn, and access. Videos that are easily accessible to students will be easy touse as learning media, and the content of the video becomes interesting and easy to understand (Sumanto & Sadewo, 2021). The usefulness indicator is very good, which is marked by the video being able to inspire and increase the curiosity of students. This is inline with research which states that video tutorials have benefits in improving student

learning outcomes (Wulandari & Pritasari, 2020). The results of the student response test to the video showed an average percentage of 98%, in general, the response test value on the video was declared very good. This is in line with research which states that the interpretation criteria of 80 - 100 are declared very good (Sudaryono, 2019).

Based on the results of the response test, it is found that the video tutorial for distillation equipment for making essential oils fulfills every aspect and indicator. There are suggestions to improve the prototype that has been developed. These improvements can be seen in Table 8.

Tabele 8. Results of Video Tutorial Improvement for Simple Distillation Equipment for Making Essential Oils

Before Revision	After Revision
	
Add text to video	Researchers added text to the video

The results of validation by several media experts and response tests by students on video tutorials for simple distillation tools for making essential oils stated that video tutorials for simple distillation tools for making essential oils are valid and feasible for usein learning activities by junior high school science teachers, lecturers, and students. Video tutorial simple distillation tool making essential oils has an advantage in explaining the making of the condenser where the way of making the condenser in this video has never been made by others the results of the analysis that has been done by researchers most distillation tools made condenser on distillation using a hose and can not make water in and out of the condenser (Asnawati et al., 2015). The following is a comparison picture ofdistillation devices that have been made by other researchers and are being developed now,attached in Figure 5.

Photo source: (Novita., 2023)

Distillation apparatus created in the video

Figure 5. Comparison of distillation devices

Video media has properties that can help educators convey material well because videos can be played repeatedly and stopped according to the wishes of students so that students can pay close attention to the material presented (Fatmadiwi et al., 2022). In addition, through videos educators can also communicate with students indirectly, makingcommunication more than just one way (Chandra et al., 2016). This is in line with researchwhich states that through the use of videos as learning media, it can overcome the limitations of time and distance from students because they can learn anytime andanywhere, so it can be said that learning videos are one of the tools that facilitate the learning process (Mulyono et al., 2021).

CONCLUSION

Based on the results of the study, it is concluded that the video tutorial for simple distillation equipment for making essential oils is suitable for use in learning. This is in accordance with the results of video media validation which obtained 100% results so that it iscategorized as very valid. The results of the video media response test obtained 98% results which categorized the video tutorial for simple distillation tools for making essential oils verywell.

RECOMMENDATION

The use of media in the learning process is very beneficial, especially in the context of independent learning in the digital era.

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