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Development of Online Learning Videos Using Animiz Software on Hydrocarbon Topics

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Abstract

Animated videos as interactive learning media are rarely made using animation software. The study aims to develop online learning videos using Animiz Animation Maker Software on hydrocarbon material and analyze video quality based on assessing material experts, media experts, reviewers, and student responses. The research is development research (R&D) with development model consisting of the define, design, develop, and disseminate stages, but is limited to the developing stage. The final product is an animated video of hydrocarbon topics. The result of product quality assessment by material experts, media experts, and reviewers, respectively 84%, 95%, and 87% with very good category. The video was responded positively by students with an ideal percentage of 97%. Based on the assessment results, this learning video can be used as alternative chemistry learning media for online learning.

Keywords: animation, hydrocarbon, learning media, online learning

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1. Introduction

The *Coronavirus Disease* (COVID-19) pandemic has created a new paradigm about something that is considered impossible to be possible (Alfirdaus & Yuwono, 2020). The COVID-19 pandemic is an outbreak of an infectious disease caused by the coronavirus and has a significant impact on various important sectors of human life (Bhavana et al., 2020). One of the most affected sectors is education (Solviana, 2020). Learning activities that were initially carried out face-to-face in the classroom must now also be carried out through online learning (Nurrahmawati & Kurniawan, 2021). Most schools during the pandemic conducted online learning activities (Churiyah et al., 2020; Salahuddin & Yamin, 2021). Online learning is the best solution so that learning continues and as an effort to suppress the spread of the COVID-19 virus (Dahlia & Supriatna, 2021). However, online learning is less effective than face-to-face learning, so it is necessary to use learning media to implement distance learning (Atsani, 2020).

Learning media is a tool used to give messages, and increase the power of thought, attention, and willingness of students that can support the learning process so that students can achieve learning goals (Suprihatiningrum, 2012). In order to achieve the maximum learning objectives, the learning media can be designed attractively but does not reduce the essence of the material presented (Mustaqim, 2017). Interesting learning media can make students more interested and enthusiastic about learning (Uno & Ma'ruf, 2016). In order to form learning that is more interesting and easy for students to understand, abstract learning materials can be visualized using animated learning media (Anjarsari et al.,

2020). Based on research conducted by Apriansyah (2020), learning media made using animated videos in the learning process can improve understanding of the material and effectively reduce boredom in the learning process. However, the skills of teachers in creating learning media using information technology and the internet are still low (Mustofa et al., 2022; Syahroni et al., 2020).

Learning media that support the learning process can be packaged using developing technology (Susilo & Widya, 2021). Teachers can use various free or paid software to develop interesting learning media (Fisabilillah & Sakti, 2021; Shalikhah, 2017). The software that can be used in developing interesting animated video learning media is Animiz Animation Maker Software. Based on literature studies, it is still very rare for interactive learning media in the form of animated videos made by teachers using Animiz Animation Maker Software. Many teachers still use web apps-based animation video maker software such as PowToon. Animiz Animation Maker software has a complete feature of animated images, text, shapes, and transition effects. The operation of the Animiz Animation Maker Software does not require programming skills, so it is easy to use for all teachers. In addition, various kinds of animated templates can be used to create interactive learning media and the editing process can be done without having to be connected to an internet connection. The final results of the animated videos that have been made can also be saved or published both online and offline (Animiz Help Manual, 2017).

Chemistry is a branch of science that deals with matter and the changes that occur (Chang, 2005; Lehn, 2004). Most students consider chemistry a difficult subject because the material is complex and abstract (Kristin et al., 2019; Wolf, 2001). One of the abstract chemical materials is hydrocarbon material (Nazalin & Muhtadi, 2016). Students must have a strong understanding of concepts, so they have no difficulty understanding hydrocarbon material (Ramadani et al., 2020). Understanding inappropriate material concepts can lead to misconceptions (Muntholib et al., 2018). Based on research conducted by Redhana (2011), at least nine misconceptions are experienced by students in studying the material of hydrocarbon compounds, one of which is related to isomerism. Misconceptions about the isomerism of hydrocarbon compounds get the highest percentage (Qodriyah et al., 2020). Research by Vellayati et al. (2020) produced data that overall students did not understand the hydrocarbon material correctly with a percentage of 69.9%. This indicates that students' understanding of concepts related to hydrocarbon material is still weak. Hydrocarbon material is a prerequisite for students to understand the material of functional groups, polymers, and benzene (Putra et al., 2020).

There are still many hydrocarbon materials taught by teachers in the classroom who have not used innovative media (Pramita, 2016). Teachers are still limited to using available books as a medium for subject matter, so the learning media tends to make students passive and less interactive (Mahesti & Koeswanti, 2021; Roziyah & Kamaludin, 2019; Titiana et al., 2019). The tendency of chemistry teachers to use textbooks shows that teachers prioritize content aspects rather than process and context aspects as the actual characteristics of hydrocarbon material (Hasanah & Ahmadi, 2015). According to Hidayati & Fatisa (2019), textbooks cannot attract students' attention because they are still too general and monotonous. Most teachers also still explain hydrocarbon material using the lecture method only so that learning becomes boring (Panut, 2022). In line with the research of Sa'adah et al. (2020), classes that only use media in the form of textbooks with the lecture method make students less curious because the teacher dominates the class. In addition, some teachers still do not thoroughly explain all the hydrocarbon material subchapters, affecting student learning outcomes (Vinanda et al., 2022). The use of chemistry learning media plays an important role in the delivery of subject matter, especially on hydrocarbon material (Subagyono et al., 2021). Chemistry learning media that support online learning in

high school are also few, so chemistry teachers in high school have difficulty implementing online learning (Lestari, 2020). Therefore, the animated video is expected to make it easier for students to understand hydrocarbon material and make it easier for teachers to explain hydrocarbon chemistry (Putra et al., 2020).

Based on some of the descriptions above, the novelty in this research to develop interactive learning videos using Animiz Animation Maker software on hydrocarbon materials and asses their quality. In addition, the developed learning media is expected to provide convenience for high school students in understanding hydrocarbon material and make it easier for teachers to teach online learning in high school.

2. Research Method

The research method used is Research and Development (R&D). The development model used in this study is a 4D model consisting of define, design, develop, and disseminate stages. The research was carried out until the development stage. Meanwhile, the defined stage includes five main stages: front-end analysis, learner analysis, concept analysis, task analysis, and specifying instructional objectives. The design stage comprises five stages: media selection, format selection, reference collection, initial design, and instrument making. The development stage is carried out through two stages consisting of expert appraisal and developmental testing.

The assessors in this study consisted of one material and media expert, four high school chemistry teachers (reviewers), and ten high school students in 11th grade. The type of data in the research is in the form of product validation data and product assessment. Product validation data contains suggestions and input from media experts, material experts, reviewers, and peer reviewers. Product assessment data in qualitative data is then converted into quantitative data based on the rules for scoring using a Likert scale. Next, the validation score is calculated using the equation:

$$\bar{X} = \frac{\sum x}{n} \quad (1)$$

Description:

$\bar{X}$ = Average score
ΣX = Total score of each rater
n = Number of appraisers

The score obtained is then calculated as the average score for all aspects of the assessment. The results are then converted into qualitative values based on the ideal assessment criteria as shown in Table 1.

Table 1. Ideal Assessment Criteria

Score Range	Category
Xi + 1.8SBi < X	Very Good
Xi + 0.6SBi < X ≤ Xi + 1.8SBi	Good
Xi – 0.6SBi < X ≤ Xi + 0.6SBi	Enough
Xi – 1.8SBi < X ≤ Xi – 0.6SBi	Less
X ≤ Xi – 1.8SBi	Very Less

(Mardapi, 2008)

Description:

X = actual score
Xi = average number of ideal scores
= $\frac{1}{2}$ × (ideal maximum score + ideal minimum score)
SBi = standard deviation of ideal score
= $\frac{1}{6}$ × (ideal maximum score – ideal minimum score)
Ideal maximum score
= ∑ criteria item × highest score
Ideal minimum score
= ∑ criteria item × lowest score

Data analysis of student responses was carried out by changing qualitative data to quantitative data in the form of scores using the rules on the *Guttman* scale (Sugiyono, 2015). The data that has been converted into a score is then calculated as the percentage of the ideal product from all aspects through the equation:

$$\% = \frac{\text{The average score of all aspect}}{\text{The highest ideal score of all aspect}} \times 100\% \quad (2)$$

3. Result and Discussion

The learning media developed from this research is in the form of animated learning videos on hydrocarbon material. This study uses the Research and Development (R&D) method with a 4D development model consisting of define, design, develop, and disseminate stages. The stages are:

3.1. Define

The define stage aims to define and determine the instructional requirements for developing learning media. This stage includes five main stages, they are;

3.1.1. Front-End Analysis

Front-end analysis was conducted through interviews with four chemistry teachers in MAN 1 Sleman, MAN 2 Yogyakarta, SMAN 2 Yogyakarta, and Muhammadiyah 3 senior high school Yogyakarta. The interviews showed that students' understanding of hydrocarbon material was still lacking, especially in the nomenclature and isomers of hydrocarbon compounds. The difficulty of students in making isomers, according to the research of Hidayani et al. (2019), shows that students' understanding of isomerism is still lacking. The learning media teachers in schools are in the form of textbooks and PowerPoint. Based on research by Badri & Iswendi (2018), it is stated that most teachers in explaining hydrocarbon material use textbooks and powerpoints. Teachers have never used self-made learning videos because they do not know the software used to make learning videos. In addition, training for teachers to make animated videos is still very limited. Research by Fuadiah et al. (2021) shows that there are still few teachers who can make learning videos. As a result, online learning carried out during the pandemic is less than optimal. Teachers tend to dominate the implementation of online learning. This can be seen from student participation when online learning is very low, as evidenced by some students being late, inactive, and so on. According to research by Nisa (2022), teachers still dominate online learning by applying the lecture method more. Teachers usually share material with studentsthrough chat in Whatsapp groups and the learning process via zoom or google meet.

3.1.2. Learner Analysis

Student analysis was conducted through interviews with 11th grade high school students. The interviews showed that students still had difficulties understanding hydrocarbon material, especially nomenclature and isomers. Most students are still confused and go back and forth in determining the compound's name and forming an isomer. Students also do not understand the benefits of studying hydrocarbon material for everyday life. Student participation during learning is also very small. In addition, students also tend to be passive and confused about the material presented by the teacher. Students usually look for in-depth material on the internet or online tutoring. Purwanto et al. (2022) stated that during online learning, 41% of students could not understand chemical concepts well, 46% could not remember chemistry concepts longer, and 43% of students experienced learning tension.

3.1.3. Concept Analysis

Concept analysis is carried out by analyzing the material in the 2013 revised 2017 edition of the chemistry curriculum. This research focuses on Basic Competence 3.1, which is analyzing the structure and properties of hydrocarbon compounds based on understanding the peculiarities of carbon atoms and the classification of their compounds. It is known that hydrocarbons are compounds that consist of only the elements hydrogen and carbon. The complete combustion of hydrocarbons produces H_2O (water vapor) and CO_2 (carbon dioxide gas). Meanwhile, incomplete combustion of hydrocarbons produces H_2O (water vapor), CO (carbon monoxide gas), and C (soot). The primary sources of carbon compounds in the world are petroleum and coal (Kartini et al., 2019; Rostianingsih et al., 2019)

3.1.4. Task Analysis

Task analysis is carried out by describing the results of the concept analysis into several indicators in learning activities. The indicators obtained from this analysis include: explaining the definition of hydrocarbon compounds; analyzing the peculiarities of carbon atoms; determining the type of C atom based on the number of C atoms attached to the carbon atom chain; classifying hydrocarbon compounds based on bond saturation; name and structure alkanes, alkenes, and alkynes based on IUPAC rules; explain the types of isomers in hydrocarbon compounds; and analyze the types of reactions of hydrocarbon compounds and their properties.

3.1.5. Specifying Instructional Objectives

The formulation of learning objectives to be achieved from the learning media developed by lowering the learning indicators in the task analysis into learning objectives to be achieved by students.

3.2. Design

The design stage has the aim of designing learning media. The design stage is carried out through five stages, they are;

3.2.1. Media Selection

The selection of media in the form of animated learning videos using the Animiz Animation Maker Software on hydrocarbon material.

3.2.2. Format Selection

The selection of learning video formats includes opening, content, and closing using a student-centered approach.

3.2.3. Reference Collection

Hydrocarbon material references were collected through literature studies and several references to existing learning videos.

3.2.4. Initial Design

Product creation begins with initial product planning by making storyboards and writing animated video narrator scripts. The storyboard is a picture sequence of scenes in the form of a picture sketch that aims to previsualizing (Desyanti et al., 2022). Meanwhile, the script is a dialogue that will be delivered in the video (Rosalina et al., 2021).

Components in video products include opening, content, and closing. Making a video starts from the content component and then prepares the hydrocarbon material as a script. After the script is created, the dubbing sound or video narrator is recorded. A recording is done using a supporting device such as a Voice Recorder application installed on a smartphone to produce a clearer and more organized sound. The resulting audio format is .m4a, and then the recorded audio must be converted to .mp3 so that it can be entered into the Animiz Animation Maker Software.

The next step is to create an animated video in Animiz Animation Maker Software. Making a video begins by entering the voice of the narrator first. After the narrator's voice is entered, then synchronize the narrator's voice and the animation visualization to be created. Making visualizations also includes adding backgrounds, writing, cutting audio, choosing colors, and using other supporting effects to produce the expected video quality.

The process of creating the opening and closing components for the entire animated video. The opening is the initial view of the video that contains the video title, apperception, learning objectives, and content snippets. The closing part of the video contains conclusions or practice questions, thanks, credits, and material info. All video components consisting of opening, body, and closing are combined on separate slides in one video project in Animiz Animation Maker Software. Back sound and transition effects are added at this stage to produce a more interesting animated video. The process of making video content as shown in Figure 1.

Figure 1. Video Content Creation Process

Animated videos that have gone through the next finishing stage can be published as videos. The publication video format is .mp4, with a size of 720p. 720p size is also known as HD (High Definition), which has a screen resolution of 1280 × 720 pixels which is better than SD (Standard Definition) (Harding, 2022).

3.2.5. Instrument Making

The instrument for product quality was made using a *Likert* Scale and the instrument for student responses was made using the *Guttman* Scale. Each assessment instrument contains several aspects as assessment material. The product quality instrument is used to assess the quality of the developed product, which material experts will assess, media experts, and high school chemistry teachers (reviewers). Meanwhile, student response questionnaires were used to determine the product's feasibility. The supervisor reviews the instrument that has been made before being validated by the instrument validator.

3.3. Develop

The development stage aims to produce the final form of the learning media that will be developed. The development stage is carried out through two stages, which is;

3.3.1. Expert Appraisal

Material experts and media experts then validate the finished video. This stage aims to determine the products' effectiveness (Nurhayati et al., 2019). Material experts play a role in validating media from the material and online learning aspects. The results of the quality assessment of hydrocarbon learning videos according to material experts as shown in Figure 2.

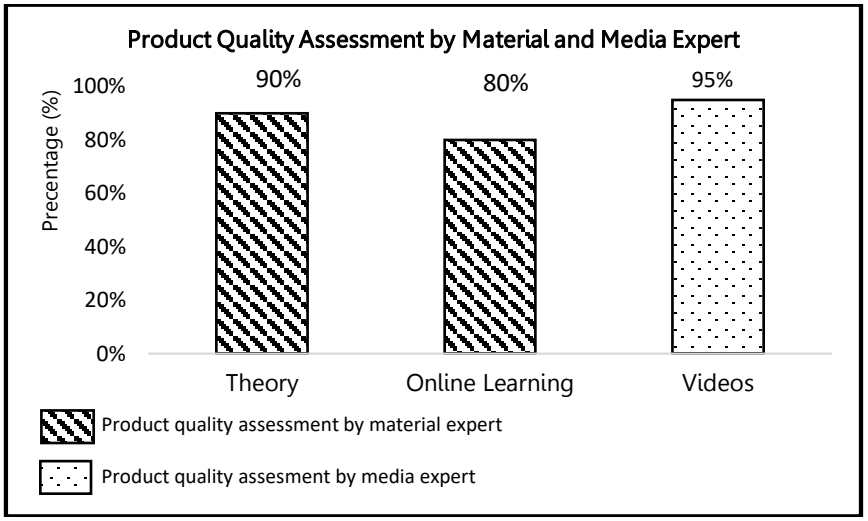

Figure 2. Product Quality Assessment by Material and Media Expert

Based on Figure 2, material experts' assessment of product quality can conclude that the hydrocarbon learning video for online learning is in the very good category with an ideal percentage of 84% and is declared feasible according to material experts.

Media experts play a role in validating media from the video aspect. According to media experts, the quality assessment results of hydrocarbon learning videos as shown in Figure 2.

Based on Figure 2, the media experts' assessment of product quality can conclude that the hydrocarbon learning video for online learning is in the very good category with an ideal percentage of 95% and is declared feasible according to media experts.

3.3.2. Developmental Testing

The hydrocarbon learning video for online learning, revised based on suggestions or input submitted by material and media experts, is then assessed by four high school chemistry teachers (reviewers) to determine the quality. The teacher's role is to assess the aspects of the material, online learning, and video. According to the reviewer, the results of the product assessment of the hydrocarbon learning video as shown in Figure 3.

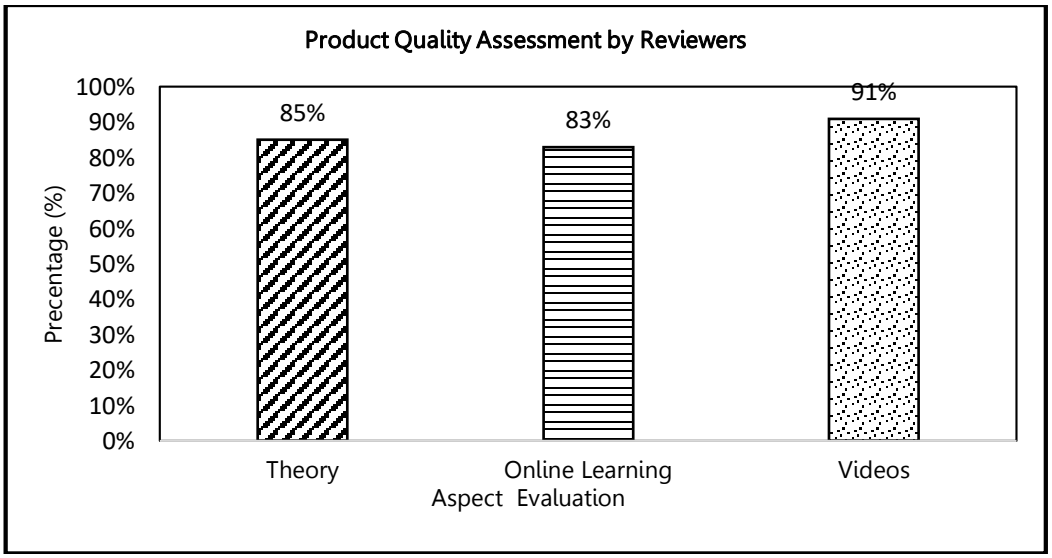

Figure 3. Product Quality Assessment by Reviewers

Based on Figure 3, the reviewer's assessment of product quality shows that the hydrocarbon learning video for online learning is in the very good category with an ideal percentage of 87% so that teachers or students can utilize it. This is in line with research conducted by Anggraini et al. (2022), which states that the hydrocarbon media in the animated video developed is suitable for use in learning.

Furthermore, the hydrocarbon learning video product for online learning was tested on a limited basis on ten high school students of 11th grade. Student responses play a role in assessing the product from understanding the material, presentation, video, role in online learning, and the benefits of video. The data on the results of student responses to hydrocarbon learning videos in online learning as shown in Figure 4.

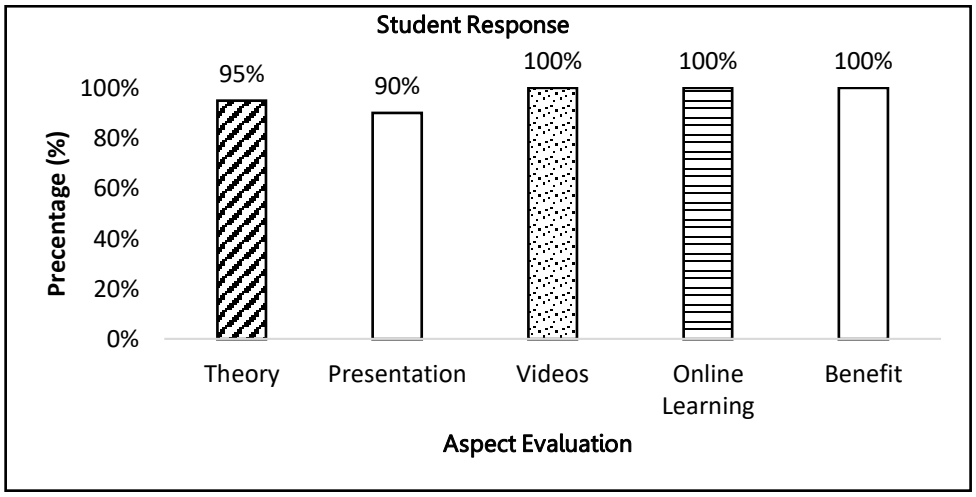

Figure 4. Student Response

Based on Figure 4, student responses to the feasibility of animated videos of hydrocarbon materials for online learning got an ideal percentage of 97% with a very good category. Therefore, it can be concluded that animated videos can improve students' understanding of the material and are used as media to support online learning. It is supported by research conducted by Septryanesti & Lazulva (2019), that student responses regarding the learning media developed to get a percentage of 87.2% in the very good category so that the developed media can be used in the learning process.

4. Conclusion

The results of the learning video assessment on hydrocarbon material experts obtained 84% (very good category), 95% for media experts (very good category), and reviewers of 87% (very good category). In addition, student responses in 97% (very good category), so this animated video can be used as alternative chemistry learning media for online learning.

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