Making A Hydrogen Peroxide Synthesis Cartoon Film For A Learning Model For Applied Chemistry Courses

Yusuf Nurrachman [1], Mawan Nugraha[2] , Sulistiyo Wibowo [3]

{yusuf@polimedia.ac.id[1]}

Politeknik Negeri Media Kreatif, Indonesia, Jakarta, Indonesia[1,2,3]

Abstract. Creativity in delivering lecture material is especially important for courses that are considered difficult, particularly in departments where these courses do not form the core competencies. For example, courses like mathematics, physics, and chemistry in the graphics engineering department require innovative teaching approaches. One way to enhance creativity is by presenting scientific concepts through life-like images that are easier to understand, more realistic, and engaging. This study focuses on presenting chemical concepts through images with unique characters, which are then packaged into a cartoon film. Each character is designed to represent the properties of atoms and molecules, such as hydrogen, oxygen, and water, which are essential elements in the formation of hydrogen peroxide. The cartoon films are designed to stimulate curiosity and encourage deeper questioning, addressing both basic and advanced concepts. The answers provided in the films also relate to practical real-world applications. Therefore, the cartoons created in this study aim to improve the quality of applied chemistry learning and enhance graduate competencies.

Keywords: cartoon films, hydrogen peroxide synthesis, applied chemistry

1 Introduction

As technological advances make human life easier, lifestyles are also evolving. These changes contribute to the development of the character of each generation. Generation Z and the Alpha generation, who grew up amidst rapid technological development, tend to have characteristics that differ from previous generations. These differences are influenced by the increasing complexity and accessibility of technology. The wide variety of choices, made easier by technology, fosters a creative attitude and leads to rapid shifts in preferences to match individual tastes. For example, if someone is passionate about a particular product, they can effortlessly browse through many similar products with a simple touch, and have their selection delivered directly through online services [1]. To make it easier for the eye's senses to capture objects and then record them in memory, symbols/images and image movements in video form will make it easier for someone to make one choice from many similar choices compared to choosing objects in the form of narratives or sentences. Understanding science to students who require an understanding of concepts has tended to be delivered in the form of narrative presentations or conceptual schemes that require concentration to understand. In practice, concentrating for a certain period of time is not always easy for generation Z who are used to making quick decisions because of the habit of using technological assistance in their decision making. With the latest technology, business

JICOMS 2024, November 11-12, Jakarta, Indonesia

DOI 10.4108/eai.11-11-2024.2354487

involvement using the power of personal senses, especially for generation Z, can be reduced compared to previous generation individuals who are more accustomed to narratives in text form. Therefore, changing the text narrative into audio-visual form will simplify the text narrative to make it easier to understand. In this work, an animated film will be made to reveal the reaction process for the synthesis of hydrogen peroxide from oxygen and hydrogen with the help of a catalyst. [2][6] [7]. From the film will prompt many questions about the why of this process.

This can happen, such as why hydrogen and oxygen have different physical animations so that there is a touch of entertainment when learning while maintaining the basic concepts of chemistry [3]. The combination of entertainment and presenting a more realistic picture of the principles of chemical science is expected to make understanding the basic concepts easier to convey and accept. In this research, the researcher wants to produce a media that has a purpose and is useful in increasing insight into one of the chemical processes in a form that is easier to understand [4]:

a) Make a hydrogen pyroxide synthesis cartoon film that is able to explain basic chemical concepts related to atoms, molecules, chemical equilibrium and how catalysts work in one discussion meeting[5].
b) We obtain teaching materials for basic chemistry concepts which are packaged in the form of cartoon films that are easy to understand, realistic and fun which can be a vocational education product that is rich in content because it is cross-scientific.

2 Research Method

The research method used is qualitative, which will yield results in the form of a cartoon film focusing on the formation of hydrogen peroxide through several stages.

2.1 Technical

This section requires several stages from planning to the production process where in the planning process a discussion group is held to find out how the film will be made, both in terms of characters, storyline and production, which uses several applications to produce a film in accordance with the objectives of this research.

2.2 Non technical

The author looked for several pieces of literature both in online and offline media, both through journals and books, which can open up insight into making an interesting cartoon film in which there is a lesson related to chemical processes.interesting.

2.3 Comparison

Conducting a comparative study with several cartoon films or animation movies related to chemistry in terms of subject and object of the story, storyline, and most importantly, the film does not deviate from the chemical scientific theory studied such as atoms, molecules, and combinations of several materials in chemistry.

2.4 Main Research Tools

To produce good research results in accordance with the desired objectives and useful for students so that they understand the material in this film, the author uses several different applications which are very important in the production process, because this process will

consist of character creation, animation, illustrations, sound in this case in the form of a voice over and an application to combine all the parts that have been created.

2.5 Supporting devices

Other supporting tools that will be implemented are the use of after effects for animation, toon boom for rigging, Clip Paint and software for sound recording.

2.6 Manifestation Stage

At this stage, the author makes several plans based on references and analyzes several cartoon film results related to Education, especially in the field of chemistry.

2.7 Reference Exploration

In the reference exploration stage, the author carries out several activities that can help in the process of making cartoon films.

a) References related to atoms and molecules, especially Oxygen and Hydrogen.
b) Looking for references to the function of combining Oxygen and Hydrogen and what products can be produced
c) Looking for references to the form / properties of Oxygen and Hydrogen.
d) Determining story ideas, settings, objects and situations that can provide maximum results and in accordance with the output produced.

2.8 Technical Exploration

At this stage the author carries out several activities that will help the film-making process

a) Planning, at this stage the author tries to describe the storyline that will be created from beginning to end.
b) Determining the characters, storyline, dialogue is also done in this stage
c) Determining the use of software to produce a cartoon film that is in accordance with the objectives.

2.9 Execution/Improvisation

This process is carried out after the author obtains data related to the process of hydrogen peroxide produced from Oxygen and Hydrogen with the help of a catalyst and products that can be made from hydrogen peroxide.

a) Determination of the storyline to be created Where it will describe a professor who is conducting an experiment to produce Oxygen Peroxide.
b) Determination of Atom Model Design Where in theory the oxygen atom has 2 hands and Hydrogen has 1 hand and later there will be a chemical process with a catalyst called palladium to produce Hydrogen Peroxide.
c) Determination of the software to be used such as clip studio paint, toon boom, Adobe Illustrator, Adobe After effect.

3 Result and Discussion

In the process of making a cartoon film when planning to determining the character there are some interesting things where the determination of the professor's character, at the beginning the professor is depicted like a professor's design in general, but here there is a change where in terms of skin, face and nose depicts a professor from Indonesia where the skin is brown, the nose is not too sharp. And some object designs that depict Oxygen and Hydrogen and how the results of hydrogen peroxide. Depiction of the laboratory and furniture related to the professor's research who wants to produce Oxygen Peroxide.

The following image is a model of the professor who will be in the cartoon film that was made which has strong characteristics as a Professor character in a chemistry laboratory. This character was made using a studio paint clip.

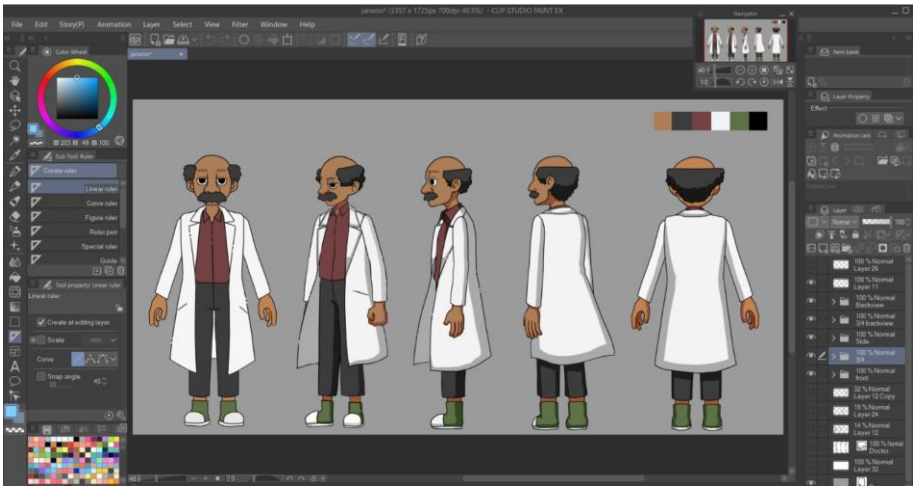

Fig.1. Professor Character Design with Clip Studio Paint

For rigging, toonboom was used to facilitate the process of creating character movements and this was done on all characters in this film, and in the image below you can also see the characteristics of hydrogen with a shape resembling H with hand 1 and Oxygen with a shape like a ball or "o" with hand 2.

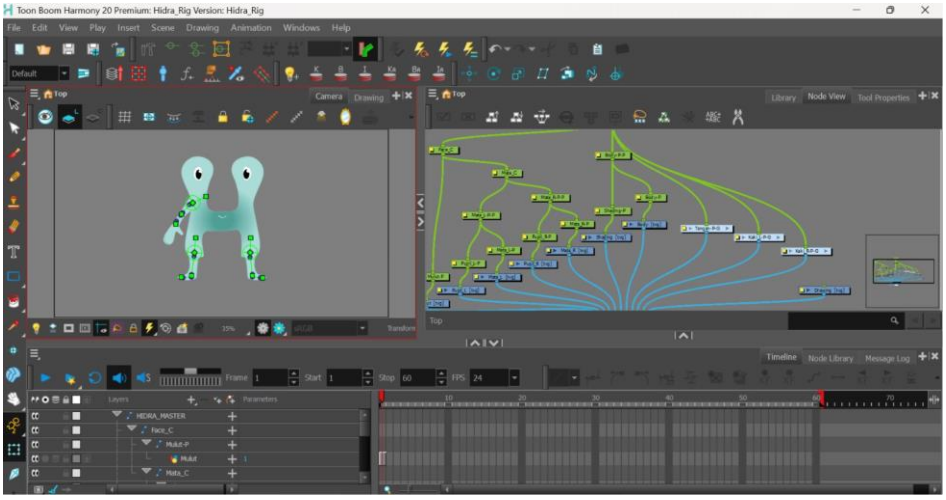

Fig.2. Hydrogen Character Rigging with Toon boom

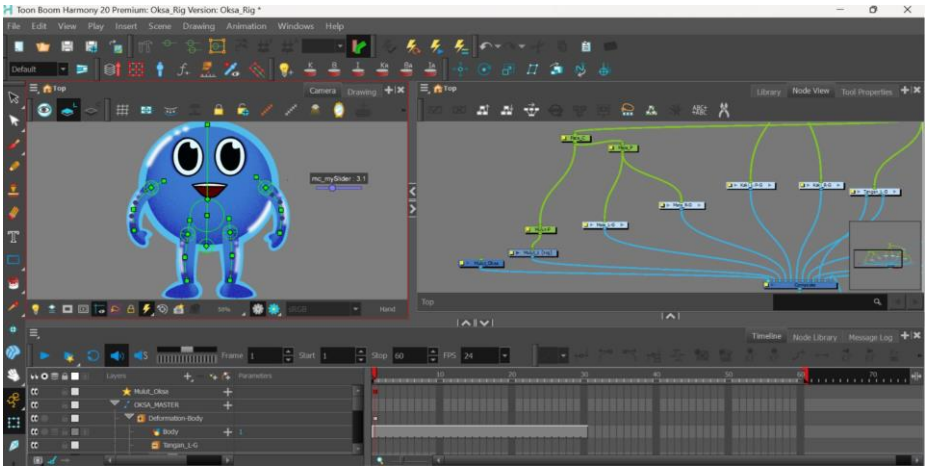

Fig.3. Oxygen Character Rigging with Toon boom

In making characters and other designs, some also use Adobe Illustrator and the final process will be edited with after effects and include voice over and background music.

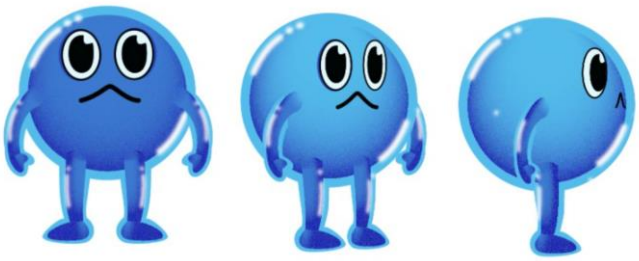

Fig. 4. Oxygen Character Design with Adobe Illustrator

4 Conclusion

From the research we have carried out, a conclusion can be drawn in this research, namely that the process that occurs in chemical form can be visualized into an interesting cartoon film, of course through several stages according to procedures so as to produce a film in which there is a science related to connecting oxygen and hydrogen.

Acknowledgments

Thank you to P3M Polimedia for the very significant financial support. Assistance and cooperation from these two institutions has enabled this research to be carried out well.

References

[1] Diharjo, R. F., Budijanto, B., & Utomo, D. H. (2017, May). Pentingnya kemampuan berfikir kritis siswa dalam paradigma pembelajaran konstruktivistik. In *Seminar Nasional Teknologi Pembelajaran dan Pendidikan Dasar 2017* (pp. 445-449).

[2] Maskur, R., Nofrizal, N., & Syazali, M. (2017). Pengembangan media pembelajaran matematika dengan Macromedia Flash. Al-Jabar: Jurnal Pendidikan Matematika, 8(2), 177-186.

[3] Mayasari, A., Pujasari, W., Ulfah, U., & Arifudin, O. (2021). Pengaruh Media Visual Pada Materi Pembelajaran Terhadap Motivasi Belajar Peserta Didik. Jurnal Tahsinia, 2(2), 173-179.

[4] Mustofa, R. H., Pramudita, D. A., Atmono, D., Priyankara, R., Asmawan, M. C., Rahmattullah, M., ... & Pamungkas, L. N. S. (2022). Exploring educational students acceptance of using movies as economics learning media: PLS-SEM analysis. International Review of Economics Education, 39, 100236.

[5] Nugraha, M., Tsai, M. C., Rick, J., Su, W. N., Chou, H. L., & Hwang, B. J. (2017). DFT study reveals geometric and electronic synergisms of palladium-mercury alloy catalyst used for hydrogen peroxide formation. Applied Catalysis A: General, 547, 69-74.

[6] Nugraha, M., Pupon, S., & Setyasmara, N. (2020). A Study of Palladium-Nickel Catalyst for Direct Synthesis of Hydrogen Peroxide: A DFT Approach. J. Phys.Sci. Eng, 5(10).

[7] Nugraha, M., Tsai, M. C., Su, W. N., Chou, H. L., & Hwang, B. J. (2018). Descriptor

study by density functional theory analysis for the direct synthesis of hydrogen peroxide using palladium–gold and palladium–mercury alloy catalysts. Molecular Systems Design & Engineering, 3(6), 896-907.