

# Preliminary Study of Chemical Bonding Learning Media Based on Podcast as Digital Entertainment Era 5.0

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**Abstract.** In the ever-evolving digital era, technology has changed the way we access information. Era 5.0, has a technological concept where data and information is collected by the Internet of things (IoT) which is transformed by Artificial Intelligence (AI) into something that can help people live a better life. In the context of chemistry learning, one of the approaches that can be developed is digital entertainment-based learning media. This preliminary study aims to dig deeper into the potential and benefits of digital entertainment chemistry-based learning media in the context of Era 5.0. The method used was a survey involving 177 high school students by providing 30 open and closed question items via Google Forms online. Based on the survey results, it is known that the use of podcasts as digital entertainment-based learning media is considered suitable and has many positive impacts, as long as it is properly implemented and receives adequate support from the school and the government.

## 1 Introduction

In the ever-evolving digital era, technology has changed the way we access information. For example in the field of education, technological developments have influenced learning media innovations which play an important role in facilitating a more interesting, interactive and effective learning process. Learning media is used to convey messages or information that contains learning objectives. Learning media plays an important role in helping students acquire the necessary concepts, skills and competencies [1].

One area of education that can be well integrated into learning media is chemistry. Chemistry is a branch of natural science that studies the properties, structure, composition and changes of matter. Chemistry contains complex and abstract concepts, so that a strong conceptual understanding and ability to apply is needed in real situations to obtain effective chemistry learning [2]. The use of appropriate and interesting learning media can play an important role

in conveying chemistry understanding to students with fun learning. Information technology-based learning media functions as a physical and non-physical tool that can be used as an intermediary between teachers and students in understanding subject matter more effectively and efficiently [3].

Era 5.0, has a technological concept where data and information is collected by the Internet of things (IoT) which is transformed by Artificial Intelligence (AI) into something that can help people live better lives [4,5,6]. This era is characterized by the integration of advanced technologies such as artificial intelligence, virtual reality, augmented reality and other interactive media. This development will have a profound effect on every aspect of life, including health, industry, and education [7]. Therefore, learning media is needed that is integrated with technology as interactive multimedia that is harmoniously integrated so that learning is more memorable for students and makes it easier to explain abstract material [8]. In the context of learning chemistry, one of the approaches that can be developed is entertainment-based learning media. The combination of education and entertainment in the context of chemistry is an approach to learning chemistry that incorporates elements that are entertaining so that students feel happy and interested in learning chemistry [9]. Based on this concept, chemistry learning is integrated with interesting and entertaining entertainment elements, such as games, simulations, animations, videos, and other multimedia content. This approach aims to arouse students' interest, increase their motivation in learning, and make it easier to understand complex chemical concepts. Several chemistry learning media developed with an edutainment approach such as wordwall game-based learning media [10] and Instagram social media-based learning media [11]. Based on several research results it was concluded that digital-based learning media with a multi-representational approach is more attractive to students' learning interests so that they can improve learning abilities [12]. This preliminary study aims to dig deeper into the potential and benefits of digital entertainment-based chemistry learning media in the context of the 5.0 era. Through this study, we will explore entertainment-based digital media that can be used and students' responses to the use of these media. In addition, we will also discuss the challenges and opportunities that arise in the implementation of entertainment-based chemical bonding learning media 5.0 in the educational environment.

## **2 Methodology**

This preliminary study was carried out using a survey method. The research instrument consists of 10 open and closed question items via online Google Form. The instrument was developed by including several component questions related to respondents' views, namely implementation of learning, use of podcast-based chemistry learning media, and chemical bonding material. Respondents to the survey were 177 high school students in various regions of East Java. The data obtained was analyzed using quantitative and qualitative data analysis techniques. Quantitative data was obtained from questionnaires that were distributed to high schools throughout Indonesia and qualitative data was obtained from respondents' notes.

**Table 1.** Survey Instrument Grid.

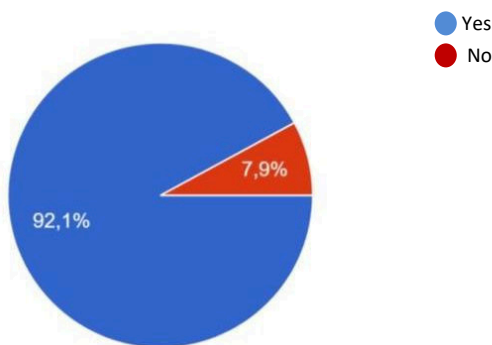
Main Component	Indicator	Number and Type of Question
Digital Entertainment	Youtube as digital entertainment	1 closed choice question
	Duration of using YouTube platform	1 closed choice question
	Purpose of using Youtube	1 open question
Learning Media	Podcast as potential learning media	2 closed choice questions
	Pros and Cons of using podcast as learning media	2 closed choice questions 3 open questions

### 3 Results and Discussion

#### 3.1 The Role of Youtube as Media *Entertainment and Education*

YouTube is an online video sharing platform that provides various kinds of content, ranging from entertainment, music, tutorials, vlogs, education, and much more. YouTube is the second most visited website in the world with more than two billion users and one billion daily [13]. Indonesian people are also active users who access this platform every day. This is evidenced by the results of the questionnaire using the YouTube platform.

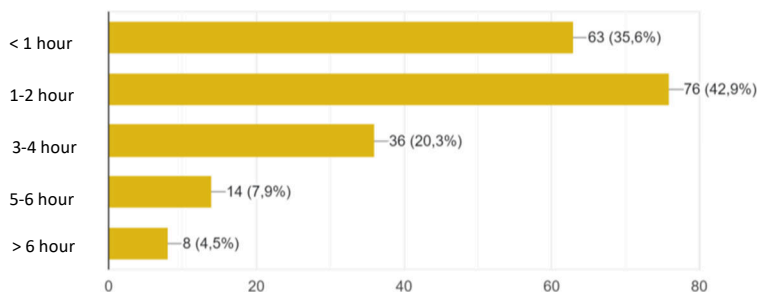
177 respondents



**Fig. 1.** Percentage of YouTube platform usage.

Based on the data obtained, from the 177 respondents who filled out the survey, it was found that 92.1% or 163 respondents stated themselves as active YouTube users with an average access of 1-2 hours per day and the remaining 7.9% or 14 respondents said they were not using YouTube. This shows a great interest in the use of YouTube among Indonesians. Interesting, up-to-date audio-visual (video)-based content and ease of access can be a supporting factor for the high level of interest in the YouTube platform.

177 respondents

**Figure 2.** Duration of using the YouTube platform in a day.**Table 2.** Purpose of using YouTube.

The intended use	Percentage
Entertainment	84.2 %
Education	57.1 %
Fill the free time	71.2 %
Searching for information	59.9 %

Based on survey data, YouTube users tend to access this platform with the aim of seeking entertainment (entertainment), filling their free time, and adding insight (education). As an entertainment medium, YouTube offers a variety of entertaining content, such as music videos, short films and reality shows. While YouTube as an educational tool, presents informative and useful content. YouTube can be used as an additional learning resource because it is video-based which is certainly more interesting for students' learning. Noetel et al (2021) stated that video-based learning media is unlikely to be detrimental but usually enhances student learning [14].

### 3.2 Podcasts as Entertainment-Based Learning Media

Entertainment-based learning media is media that contains elements of entertainment in its content which aims to provide a more interesting and enjoyable learning experience, as well as increase student interest in learning. Podcast is a digital tool that is effectively used as a means to convey learning. Podcasts come with a combination of educational and valuable information and are presented in an interesting and entertaining teaching style [15]. Based on the results of the questionnaire, many students are familiar with and access podcasts for various purposes such as education, arts and entertainment, stories, comedy, and so on. The following is a table of the percentage of podcast categories that are frequently accessed by students:

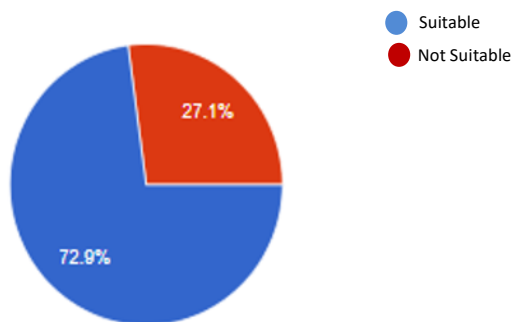
**Table 3.** Frequently accessed podcast categories

Podcasts category	Percentage
Education	33.3 %
Comedy	55.4 %
Arts and entertainment	36.7 %
Story	62.1 %
Sports and recreation	14.7 %
News and politics	23.7 %

Podcasts are loved by many people because the content is varied, flexible, and more fun than visual content [16]. Based on the results of the questionnaire, many students enjoy podcasts through the YouTube platform. This platform is suitable as a medium for sharing content widely. Podcasts can be said to be entertainment-based media because they contain entertainment elements. In the context of learning, podcasts for educational purposes have a narrator or podcaster and resource persons to convey the material being studied in a more relaxed and less formal manner as is done in class. The existence of elements of entertainment and a more relaxed learning atmosphere will attract students' interest and motivation to learn and provide more meaningful learning. But it's important to always remember that even if you provide content that contains elements of entertainment and is not too formal, you still have to provide information that is educational, accurate, and useful for listeners.

### 3.3 Podcast as Media for Chemistry Learning

177 respondents

**Figure 3.** The percentage of podcast compatibility as learning media

Podcasts are a form of digital technology that is developing rapidly in the millennial generation. Podcasts can be accessed in the form of audio files and over time podcasts are available in video form, so that podcasts can be enjoyed in audio-visual form. Podcasts are generally used by people to access information needed in various fields such as business, industry, and education or just to find entertainment. The use of podcasts in classroom teaching is considered to be able to influence student learning processes and improve the quality of learning outcomes because it can help students improve listening, analyzing, and critical thinking skills [17]. Based on the results of the questionnaire obtained by the podcast, it is suitable for use as a chemistry learning medium. Based on these results, 129 of 177 students with a percentage of 72.9% agree that podcasts can be used as chemistry learning media, this is because podcasts can be practical and flexible to be accessed anytime and anywhere, using language and a more relaxed atmosphere so that students

understand the material presented better. , while the remaining 48 students with a percentage of 27.1% stated that podcasts were not suitable because they could not visualize material and might be difficult to understand because chemistry subjects often required visualization with pictures of molecules, atomic structures, and also mathematical chemistry. Therefore, in making a podcast as a medium for learning chemistry, pay attention to the use of visualization because a lot of chemical material contains analysis at the microscopic and symbolic levels, so that what is conveyed in the podcast is not only an oral explanation but is accompanied by visualizations that describe at the level of microscopic and symbolic [18].

### 3.4 Pros and Cons of Podcasts as a Learning Media

The use of podcasts as an entertainment-based learning media certainly reaps the pros and cons regarding the advantages and disadvantages.

**Table 4.** The advantages and disadvantages of podcasts as learning media.

Excess	Lack
A new innovation in the development of chemistry learning media	Not suitable for some chemical topics that require visual depiction
It can be accessed anytime anywhere so it is more relaxed and flexible in learning	Not all students have adequate internet access and devices
More interesting because it is based on audio-visual	Long duration will cause boredom
Can be repeated many times if you do not understand the material presented	

Based on the survey results, podcasts can be a new innovation in the development of chemistry learning media that are suitable for students in the 5.0 era. High accessibility allows this media to be accessed flexibly and easily anytime and anywhere through devices such as smartphones, tablets or computers. Podcast media also allows students to have time flexibility where they can listen to podcasts while doing other activities, such as walking, driving, or cleaning the house. This allows them to turn previously unproductive time into effective learning time. Interest in podcast media is supported by the use of audio-visual- based media which allows students to visualize concepts and increase understanding and can also be listened to repeatedly to ensure student understanding. Podcasts can also include interviews, stories, or discussions that enrich the learning experience. In line with several study results showing that students are motivated, they consider podcasts as instructional media that positively help obtain needed information thereby increasing learning and improving performance [19, 20].

However, there are deficiencies in the use of podcasts as a medium for learning chemistry. The lack of direct interaction is one of the main weaknesses of podcasts where there is no direct interaction between students and teachers. When using podcasts as a learning medium, students cannot directly ask questions or interact with speakers. This may limit the ability to obtain additional clarification or explanation. In some learning contexts, visualization can be an important component. In podcasts, visualization cannot be highlighted so that it can become an obstacle for students who need more visual support in understanding the material. In addition, not all students in Indonesia have internet access and electronic devices that can support the use of this podcast media. The existence of the internet allows us to learn anytime and anywhere with a very broad scope, we can share information without having to meet face to face with the source of the information [21]. Obstacles and problems in the application of technology in the field of education are partly caused by the uneven distribution of infrastructure that supports the application of technology in all schools in Indonesia and the unpreparedness of Human Resources (HR) to support implementation [22].

## 4 Conclusion

The high interest of students in the use of entertainment-based technology media is a new opportunity to develop innovative learning media by utilizing entertainment media. YouTube is one of the most accessible entertainment media for students for various purposes, from filling their spare time, looking for entertainment to looking for educational information. YouTube offers various types of interesting content on it. This can be used to develop entertainment-based learning media on YouTube. Podcasts are considered to be a superior innovation by utilizing entertainment-based audio-visual media which of course can attract a lot of students' interest in learning. Easy accessibility and flexibility in study time are also added values in the development of podcasts as learning media. Overall, the use of podcasts as an entertainment-based learning medium is considered suitable and has many positive impacts, as long as it is properly implemented and receives adequate support from the school and the government. To find out significantly the level of effectiveness of using podcasts as a digital entertainment-based learning medium, further research is needed in this regard.

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