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ANALYSIS OF TEACHER NEEDS FOR THE DEVELOPMENT OF WEB-BASED LEARNING MEDIA

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ABSTRACT

The purpose of this research is to describe teachers' needs for web-based chemistry learning media to support the chemistry learning process in the classroom. Needs analysis is conducted based on the first stage of the ADDIE model, which is Analysis. The method used in this research is the survey method. There are 5 chemistry teacher volunteers from SMA Negeri 1 Sidamanik in Simalungun Regency. Data collection was carried out using questionnaires and interviews with qualitative data types. The questionnaire was distributed using Google Forms so that respondents could fill it out online. The research results were analyzed descriptively, and it was found that the media frequently used by teachers, such as projectors and PPT/LCD, had a percentage of 100%, while web-based chemistry learning media was never used. The obstacles faced by teachers include the creation, use, and development of media that are considered difficult, leading teachers to feel less motivated to create media for chemistry education. So they need a tutorial on how to create and use learning media.

Keywords*: *Analysis Of Needs, Learning Media, Chemistry.

A. INTRODUCTION

Chemistry is a part of science, which means that the subject of chemistry is closely related to everyday life. By studying chemistry, the phenomena occurring in the surrounding environment can be understood, so the process of learning chemistry involves not only mastering cognitive aspects in the form of theory but also developing reasoning and thinking skills. (Hirza, Muchtar, Sutiani, Dibyantini, & Sinaga, 2023). Learning about chemistry generally involves a large number of abstract concepts because chemistry is often related to the internal structure of matter. As a result, in chemistry education, students find it more challenging to construct the meaning of chemical concepts compared to concepts in other natural sciences (Sitepu and Herlinawati, 2022). The complexity of chemical concepts, which requires mastery of foundational knowledge as well as its application in daily life, becomes an issue during the learning process. (Nurfajriani, 2021).

One of the predominant subjects that frequently captures the attention of high school students and educators alike is the intricate realm of acid-base chemistry; however, it is a well-documented phenomenon that many students encounter significant challenges and obstacles when attempting to grasp and master this particular area of study. The structure of the curriculum pertaining to acid-base chemistry has been aptly described as resembling a sequential layering system akin to the geological formation of stratum, whereby it is suggested that: "This structure, much like the layers of sedimentary rocks, presents a multitude of sequential strata." Each layer of conceptual understanding is imbued with its own historical context, which, unfortunately, can lead to considerable confusion and bewilderment among learners who are trying to navigate through these complexities. Furthermore, the conceptual frameworks at both the macroscopic and microscopic levels

play critical roles in elucidating the various processes associated with acid-base reactions (Hirza, Muchtar, Sutiani, Dibyantini, & Sinaga, 2023).

There exist four distinct levels of comprehension that students must traverse: the macroscopic, the microscopic, the symbolic, and the processual levels. An alternative perspective posits that the inherently complex nature of chemistry as a discipline contributes to the difficulties that students face when attempting to visualize microscopic phenomena, which are often abstract and not easily accessible. This inherent micro complexity is a fundamental characteristic of chemical concepts, necessitating the integration of various representational tools to effectively convey these ideas and to bolster students' overall conceptual understanding. In light of this, it becomes apparent that the implementation of an effective learning model is not merely beneficial; rather, it is imperative, and the role of media as a pedagogical tool becomes equally crucial, as it serves to facilitate students' comprehension of chemistry across various levels of understanding (Yudha dkk, 2023).

Fundamentally, the advantages that arise from technology-enhanced learning environments in supporting the educational process are manifold; they include amplifying students' capacity to absorb and retain learning materials, promoting the development of independent learning skills, fostering active engagement and participation among students, and enhancing their proficiency in presenting information through technological means, all of which are vital for equipping students with the competencies required to thrive in the 21st century. These competencies encompass essential skills such as creativity, critical thinking, collaboration, and effective communication. Research conducted by Sutiani et al. (2022) has revealed that the array of skills that educators must cultivate in order to effectively implement digital learning encompasses critical thinking, staying abreast of technological advancements, facilitating discovery learning, engaging in collaborative learning, employing blended learning strategies, and conducting online learning sessions to optimize students' capabilities; additionally, creating stimulating learning media and developing game-based educational experiences are also fundamental components of this process.

Recognizing this vast potential, it is evident that a suitable medium for educators to utilize in order to foster engaging, enjoyable, and interactive learning experiences for students is one that is rooted in web-based learning methodologies. Therefore, this research initiative is deemed necessary with the explicit objective of investigating the types of educational media that are currently employed in the context of chemistry education, as well as identifying the various factors that may impede teachers from effectively creating and utilizing learning media within the educational environment of SMA Negeri 1 Sidamanik.

B. RESEARCH METHOD

This particular research endeavor can be classified as a qualitative descriptive study, which seeks to delve deeply into the intricacies of a specific phenomenon rather than merely quantifying it. The primary focus of this investigation is to conduct a thorough analysis regarding the needs of educators, specifically teachers, in the context of developing

effective learning media that can enhance the educational experience. This comprehensive needs analysis is systematically executed in accordance with the initial phase of the widely recognized ADDIE model, which emphasizes the critical importance of the analysis stage in the instructional design process. In terms of methodology, the research employs a survey method that allows for the collection of rich, detailed information from the participants involved in the study. The subjects selected for this investigation comprise a targeted group of four chemistry teachers who are currently employed at SMA Negeri 1 Sidamanik, providing a focused context for the analysis. To facilitate data collection, a combination of questionnaires and interviews is utilized, with a particular emphasis on qualitative data types that can yield nuanced insights.

The distribution of the questionnaire is executed through the use of Google Forms, ensuring that respondents are able to conveniently fill it out in an online format that enhances accessibility and participation. Once the data from the questionnaire is collected, it is meticulously presented in the form of percentages reflecting the proportion of teachers who responded with either "yes" or "no" to each specific inquiry, thereby providing a clear overview of their perspectives. Subsequently, this data is subjected to a rigorous analysis aimed at identifying and elucidating the specific needs of teachers for the development of web-based chemistry learning media, which is increasingly relevant in today's educational landscape. The findings of this study are anticipated to contribute significantly to the understanding of educators' requirements and preferences in the realm of digital learning tools. Ultimately, this research holds the potential to inform future instructional design efforts and enhance the overall quality of chemistry education in the digital age.

C. RESULTS AND DISCUSSION

The initial phase of a comprehensive series of developmental research efforts involves the meticulous distribution of meticulously designed questionnaires and the systematic conduct of interviews with educators, specifically teachers, which collectively aim to thoroughly identify and analyze the specific needs of these educators in their endeavor to effectively support the intricate chemistry learning process within the classroom environment. Following this initial stage, the results that emerge from the analysis of the collected data will subsequently serve as a foundational reference point for the subsequent development of innovative learning media, which will take the form of an advanced web-based application designed to enhance educational practices. This newly developed website is intended to function as a vital resource that will significantly assist educators and students alike throughout the chemistry learning experience, with a particular focus on the complex topic of Acids and Bases, which is essential for a deeper understanding of chemical principles.

The insights garnered from both the questionnaires and the interviews conducted will culminate in the collection of valuable data, which will be systematically organized and presented in a structured format that can be observed in Table 1. This table will provide a clear and comprehensive overview of the findings, thereby facilitating a better understanding of the specific needs and challenges faced by teachers in the realm of chemistry education. Ultimately, the combination of these research methodologies and the

subsequent development of targeted educational resources is expected to yield significant advancements in the quality and effectiveness of chemistry instruction within educational institutions.

Table 1 Analysis of teachers' needs for the development of web-based learning media

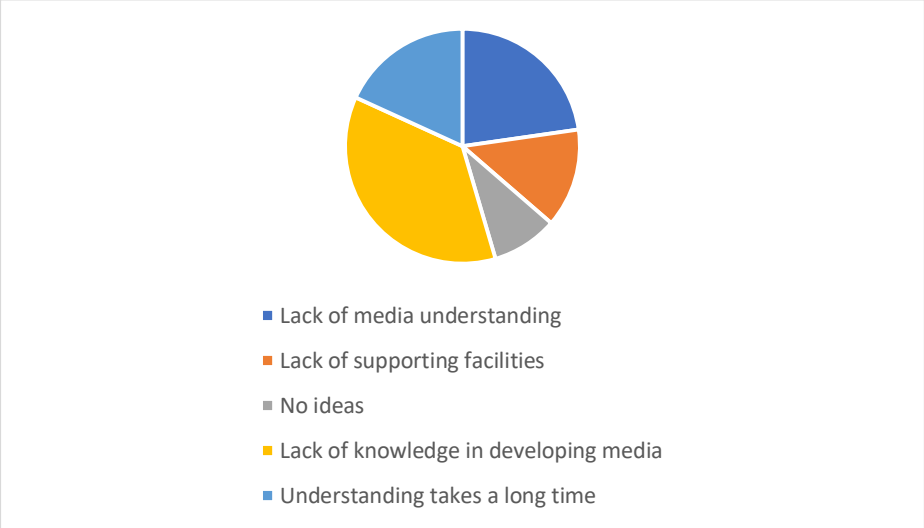
No	Question	Response	Percentage
1	Have you ever taught the topic of Acids and Bases?	Ever	100%
		Never	0%
2	What are the common learning resources used in Acid and Base education?	Book	0%
		Internet	0%
		Both	100%
3	Do you think that learning media is necessary for the topic of Acids and Bases?	Yes	60%
		No	40%
4	What are the learning media commonly used for the topic of Acids and Bases?	PPT	100%
		E-Learning	0%
5	What is the effectiveness of using the learning media commonly used for Acid and Base topics?	Effective	100%
		Ineffective	0%
6	Can the learning media available be revisited by students if they want to study outside of class hours?	Yes	100%
		No	0%
7	Can the existing learning media be effectively used for distance learning?	Yes	0%
		No	100%
8	Do the chemistry teachers at this school have the ability to develop technology-based learning media?	Yes	80%
		No	20%
9	Do the chemistry teachers at this school have the ability to develop distance learning media?	Yes	80%
		No	20%
10	According to you, how important is a teacher's ability to develop technology-based and distance learning media?	Yes	100%
		No	0%

According to the information presented in Table 1, it is abundantly clear that the implementation and utilization of learning media within the educational framework, particularly in the domain of Chemistry, holds significant importance that cannot be understated. The constraints imposed by both time limitations and the varying levels of capability among educators indicate that the instructional media currently employed at SMA Negeri 1 Sidamanik, as revealed through interviews conducted with relevant personnel, are largely restricted to the use of PowerPoint presentations and a few additional supportive technological tools. Notably, the exploration of online media, encompassing educational websites and analogous digital platforms, has not been incorporated as a resource within the instructional practices of this institution. This oversight is particularly concerning given that web-based learning media possesses an extensive array of functionalities and advantages that could greatly enhance the learning experience; for

instance, it allows for accessibility from virtually any location and at any time, thereby providing a more flexible and accommodating learning environment.

In light of the comparative analysis of the merits and drawbacks associated with the development of web-based media, the data indicates that the prevalent media utilized in academic settings significantly enhances the learning process, particularly because a number of instructors have benefitted from training sessions that equip them with the necessary skills to effectively utilize these technological tools. Nevertheless, it is important to acknowledge that there exist certain educators who encounter various challenges or impediments when attempting to leverage alternative media platforms, especially when it comes to the creation and management of educational websites tailored to their specific teaching needs. The findings derived from the analytical evaluation of both the advantages and disadvantages of these media are meticulously illustrated in Figure 1, which provides a visual representation of the current state of media use in educational contexts and highlights the ongoing need for professional development and support in this area.

Figure 1. Barriers to Media Development



The resolution to the aforementioned challenges lies in the provision of comprehensive tutorials that focus on the creation, development, and effective utilization of chemistry learning media, which consequently empowers individuals to produce customized educational resources tailored to their specific needs and contexts. With the relentless progression of technological advancements, it becomes imperative for educators to acquire the necessary skills and proficiency to adeptly harness technology in the formulation and enhancement of multimedia learning resources that facilitate the educational process (Humairah et al., 2020). Consequently, it is of utmost importance for teachers to engage in continuous professional development, striving to explore and implement contemporary methodologies and innovations that align with the rapidly evolving technological landscape.

Given the swift pace at which technology is developing, it is essential that educators remain vigilant and proactive in their efforts to stay abreast of these transformative advancements. One fundamental aspect of this integration involves the capacity to

amalgamate technology seamlessly with the instructional process, serving as an effective medium that enhances learning outcomes. Furthermore, several impediments exist that may hinder the optimal utilization of technological resources in educational settings, which include the feelings of overwhelm among teachers who may perceive an increased demand for creativity, the necessity for thorough and meticulous preparation, and the requirement for a certain level of technical proficiency to operate such technologies effectively. Engaging in learning experiences that incorporate various forms of media can lead to a profound impact on the overall educational process. Moreover, the implementation of effective learning media can significantly activate student participation in the learning process, thereby deepening their comprehension of the subject matter being presented. As students' understanding of the content improves, there exists a direct correlation with enhanced academic performance and achievement levels (Noviza et al., 2018).

This assertion is further substantiated by the research conducted by Royani et al. (2021), which involved the development of a sophisticated web application designed specifically for the instruction of acid-base concepts using two distinct builders. The feedback provided by students regarding the efficacy and usability of the learning media that was developed, as indicated by the effectiveness index, revealed remarkably high percentages for various aspects, including media attractiveness at 90%, ease of use at 92%, and media appeal at an impressive 93%. In a complementary study conducted by Gulo and Sofia (2015), web-based media was meticulously crafted to address the concepts of solubility and solubility product, and the results of the assessment indicated that an overwhelming 94.28% of the 35 participating students achieved scores that met or exceeded the threshold of 70. The mean test score achieved by the students was calculated to be 80.14, illustrating a significant level of understanding among the learners.

Additionally, the research conducted by Syam Qeisha and Achmad (2022) focused on the development of mobile media specifically designed for Android platforms, and the findings from this investigation demonstrated a marked increase in students' motivation to learn. The outcomes derived from the motivation questionnaire yielded an average overall rating of an impressive 95%, indicating a high level of engagement. Finally, the study carried out by Purba et al. (2021) investigated the effects of integrated website learning media within the context of thermochemistry education, and the results indicated that students who participated in inquiry-based learning strategies that incorporated the integrated website exhibited superior learning outcomes when compared to those who adhered to the minimum competency standards established by their respective educational institutions.

D. CONCLUSION

Through a comprehensive analysis of the specific needs of educators, which serves as a foundational basis for the creation and implementation of web-based instructional media pertaining to the subject of chemistry, it becomes evident that the predominant form of media employed throughout the educational process is the PowerPoint projector, whereas the utilization of websites as a medium for learning has not been observed at all. Furthermore, the challenges that educators face in effectively employing various media types can be attributed to a combination of factors, notably the inadequacy of supportive

technological infrastructure as well as a general deficiency in the requisite knowledge and skills necessary for the development and effective utilization of such media resources. Consequently, these impediments significantly hinder the ability of teachers to integrate innovative and interactive media into their instructional practices, thereby limiting the potential for enhanced student engagement and learning outcomes in the field of chemistry.

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