Formosa Journal of Multidisciplinary Research (FJMR)
Vol. 5 No. 10, 2026: 3493-3500

# Student Response to an Interactive Learning Medium Based on the Game "Who Wants to Be a Millionaire" for the Topic of Redox (Reduction-Oxidation) Reactions

Vika Puji Cahyani[1], Zulqifli Alqadri[2]*, Nurul Fadiah[3], Nur Isnaeni[4]
[1,3,4]Departement of Chemistry, Universitas Negeri Makassar, Indonesia
[2]Science Education Study Program, Faculty of Mathematics and Natural Sciences, Universitas Negeri Makassar, Indonesia
**Corresponding Author:** Zulqifli Alqadri zulqifli.alqadri@unm.ac.id

A R T I C L E I N F O
*Keywords:* Media, Interactive, Redox, Response, Student

*Received : 25, August*
*Revised : 22, September*
*Accepted: 26, October*

©2026 Cahyani, Alqadri, Fadiah, Isnaeni: This is an open-access article distributed under the terms of the Creative Commons Atribusi 4.0 Internasional.

A B S T R A C T
This study was motivated by students' difficulties in understanding redox reactions, particularly oxidation numbers and electron transfer, and limited internet access at school. To address these challenges, an offline interactive learning tool inspired by "Who Wants to Be a Millionaire" was developed to support practice exercises. This study aimed to analyze student responses to the tool. A descriptive quantitative method was employed, involving 31 eleventh-grade students. Data were collected using a four-point Likert-scale questionnaire. The results showed very positive responses across all indicators: material understanding (95.2%), content and instruction clarity (97.1%), visual appeal and interactivity (95.3%), and technical usability and navigation (98.4%). These findings indicate that the tool is well-received and supports student engagement in practicing redox reaction concepts.

DOI: https://doi.org/10.55927/fjmr.v5i10.231
ISSN-E: 2829-8896
https://journalfjmr.my.id/index.php/fjmr

## INTRODUCTION

Chemistry instruction in secondary schools often encounters various challenges, particularly regarding abstract topics such as reduction-oxidation (redox) reactions. This subject matter requires the ability to analyze oxidation numbers and understand electron transfer processes that cannot be directly observed making it difficult for many students to grasp the concepts comprehensively. This difficulty often leads to a decline in student interest and engagement in the chemistry learning process (Zainuddin, 2024).

One effective way to enhance student interest and motivation is through the use of appropriate, accurate, and engaging learning media (Azzahra & Prasetyo, 2024). The primary function of instructional media is to create conditions that allow students to acquire knowledge accurately and deeply, while fostering cognitive capacity and shaping their personalities. In general, instructional aids have proven to play a significant role at every stage of the teaching process, particularly in stimulating student motivation and interest (Saleh & Azis, 2023).

Furthermore, an analysis of student needs reveals that a learning process dominated by traditional lectures often results in low student engagement, with learners tending to remain passive. This situation is further exacerbated by limited internet connectivity at schools, which hinders the optimal use of technology-based learning media. Consequently, there is a need for innovative learning media that is not only engaging but also functional without reliance on an internet connection.

The use of appropriate learning media ensures that instructional activities are carried out effectively, contingent upon the specific learning objectives, the subject matter, and the characteristics of the students involved (Saleh & Azis, 2023). Media capable of responding to and processing information for learners are known as "interactive media," as they can convey content ranging from simple concepts to highly complex ideas (Mukarromah & Andriana, 2022).

One viable alternative is the use of game-based learning. Interactive learning media refers to tools used within the learning process to achieve specific educational objectives (Luma'ul'adilah, 2023). Such media has the potential to enhance student engagement and make the learning process more compelling and effective (Putri & Aini, 2024). Furthermore, instruction based on interactive quizzes has been shown to encourage students to participate more actively in their learning (Alfatikh, 2021).

## LITERATURE REVIEW

The use of interactive learning media has also been proven to improve learning effectiveness, while making the study process more engaging and less monotonous (Fadzillah & Syaadah, 2023). This suggests that game-based learning media could serve as a solution to address low student engagement in chemistry lessons. Despite the significant benefits of interactive learning media, there remain several challenges to overcome—notably, the availability of infrastructure and equitable access to the necessary technology. Not all schools or regions possess adequate access to the devices and internet connectivity required to implement interactive learning media effectively (Maharani, 2022).

Teachers can employ various instructional techniques to foster a more comfortable and welcoming classroom environment, such as utilizing the educational game "Who Wants to Be a Millionaire?" (Kusnasari & Rakhmawati, 2022). Based on this, the present study aims to analyze student responses to the use of the interactive learning medium "Who Wants to Be a Millionaire?" in the context of redox chemistry topics. This research is intended to provide an effective and engaging alternative learning tool—one that can also function offline to circumvent limitations in school network infrastructure.

## METHODOLOGY

This study is a descriptive quantitative research project aimed at analyzing student responses to the use of an interactive learning medium, "Who Wants to Be a Millionaire," covering the topic of reduction-oxidation (redox) reactions. The research design focuses on collecting and analyzing data regarding student feedback following their use of this game-based learning tool during instructional activities.

The population for this study consists of all 12th-grade students at the institution in question. A sample of 21 students was selected using a total sampling technique, meaning the entire population was included in the study. This selection was based on the premise that the students had already studied the redox topic, enabling them to provide informed responses regarding the medium used.

Data collection was conducted by distributing a student response questionnaire designed using a four-point Likert scale (1–4): 1 (strongly disagree), 2 (disagree), 3 (agree), and 4 (strongly agree). The questionnaire comprises 9 statements covering several indicators, including the ease of using the medium, the clarity of its interface, the clarity of the language, and student engagement in completing the exercises. The instrument was used to determine the level of student response to the learning medium.

The learning medium employed in this study is an interactive, game-based tool modeled after "Who Wants to Be a Millionaire," which contains practice questions on redox reactions with varying levels of difficulty. The medium serves as a tool for practice and evaluation and can be operated offline, without requiring an internet connection. Its implementation is intended to enhance student engagement in the learning process through a game-based approach.

Data analysis was performed using descriptive statistics. Data obtained from the questionnaires were processed by calculating percentages—determined by comparing the total score achieved against the maximum possible score and multiplying the result by 100%. These percentages were then categorized to assess the level of student response to the use of the learning medium. Conclusions were drawn based on the predominance of positive scores (scores 3 and 4), which indicate that the interactive learning medium "Who Wants to Be a Millionaire" received a favorable response from students and is suitable for use as a tool for practicing questions on the topic of redox.

## RESEARCH RESULTS AND DISCUSSION

This research resulted in the creation of an interactive learning tool based on the "Who Wants to Be a Millionaire" format, focused on the topic of reduction-oxidation (redox) reactions. It serves as a game-based evaluation tool designed to help students practice and reinforce their understanding of redox concepts. The research was conducted through several stages: analysis, design, development, validation, and limited-scale testing.

The analysis phase, informed by teacher interviews, revealed that the primary considerations for selecting learning media are ease of access for students and alignment with the teaching methods employed. Furthermore, the analysis indicated that redox reactions are often perceived by students as a challenging chemistry topic, as they require analytical skills to determine oxidation numbers, identify oxidation and reduction processes, and analyze electron transfer. These difficulties often lead to a lack of student interest and engagement during lessons and practice exercises. Traditional evaluation methods also tend to cause boredom, highlighting the need for more engaging, interactive, and accessible evaluation tools to boost student participation.

During the design phase, the "Who Wants to Be a Millionaire" interactive learning tool was developed, featuring redox-related questions aligned with specific learning indicators. The questions are structured progressively, ranging from fundamental concepts—such as determining oxidation numbers—to more complex analyses of redox reactions. The tool is designed to resemble a quiz game, creating a more enjoyable and challenging learning environment for students.

In the development phase, an interactive, quiz-based evaluation tool was produced, which can be accessed via digital devices or used offline. It features a multi-level question structure where students must select the correct answers to advance to the next stage. The content covers concepts such as oxidation and reduction, oxidation numbers, the identification of oxidizing and reducing agents, and the analysis of redox reactions. Through this tool, students can practice repeatedly in an interactive setting, which helps to strengthen their grasp of previously learned concepts. The validation phase is conducted by subject matter experts and media experts to assess the suitability of the media before it is implemented in instruction. Subsequently, a limited-scale trial is carried out with grade XII students at UPT SMAN 9 Makassar to gauge student responses to the use of the interactive learning medium "Who Wants to Be a Millionaire" for the topic of redox reactions.



Figure 1. "Who Wants to Be a Millionaire" Learning Media

The research findings regarding the use of the interactive learning medium "Who Wants to Be a Millionaire" for the topic of reduction-oxidation (redox) reactions are presented based on student response questionnaire data, which covers four key indicators: understanding of the subject matter through the medium, clarity of content and instructions, visual appeal and interactivity, and technical ease of use and navigation. The analysis was conducted by examining the percentage of positive student responses—specifically, students who provided a score of 3 ("agree") or 4 ("strongly agree") for each indicator.

Table 1. Percentage of Student Responses to the Learning Medium

| Assessment Indicators | Percentage Score 3 and 4 (%) | Category |
|---|---|---|
| Understanding of Material Through Media | 95.2 | Very Positive |
| Clarity of Content and Instructions | 97.1 | Very Positive |
| Visual Appeal and Interactivity | 95.3 | Very Positive |
| Technical Ease of Use and Navigation | 98.4 | Very Positive |

The data in Table 1 indicate that all indicators in this study fall into the "very positive" category. The indicator for content and instruction clarity received a 97.1% positive response rate, while the indicator for technical ease and navigation yielded the highest score at 98.4%. Furthermore, the indicator for visual appeal and interactivity achieved 95.3%, and the indicator for material comprehension through the media reached 95.2%. These findings suggest that the "Who Wants to Be a Millionaire" interactive learning medium provides a positive learning experience for students, both in terms of technical aspects and engagement in the learning process.

These findings can be contextualized within the primary challenges of learning redox chemistry—specifically, the difficulties students face in grasping analytical concepts, such as determining oxidation numbers and understanding electron transfer processes. By using an interactive, quiz-based medium, students are not merely presented with conventional questions; rather, they encounter a scenario that demands quick and accurate responses within a more enjoyable atmosphere. This encourages students to become more active in processing

information and applying previously learned concepts. The high percentage for the content clarity indicator suggests that students encountered no difficulty in understanding the questions or the provided instructions. The systematic presentation of questions, combined with the use of simple language, allows students to focus directly on the cognitive processes required to answer the questions. This facilitates more effective learning, as potential barriers to understanding instructions are minimized.

The aspects of visual appeal and interactivity also contribute significantly to student engagement. The "Who Wants to Be a Millionaire" medium incorporates game-like elements—such as a level-based system and multiple-choice options—that foster a competitive environment. This encourages students to remain focused and motivated as they work through each question. In line with the theory of multimedia learning, presenting information through engaging visuals can enhance student attention and cognitive engagement (Mayer, 2009). The use of game-based learning media is closely linked to an increase in students' intrinsic motivation to learn. Media that presents progressive challenges and immediate feedback encourages students to persist until they arrive at the correct answer. This aligns with research by Rizky Ramadhan (Ramadhan, 2022), which states that the use of interactive, game-based learning media can enhance student engagement and facilitate the understanding of concepts through repetitive activities. In this study, these characteristics are exemplified by the "Who Wants to Be a Millionaire" format, which provides students with the opportunity to practice problems repeatedly in an enjoyable environment.

Furthermore, the research findings indicate that students' active involvement in answering questions contributes directly to strengthening their conceptual understanding. Although this medium does not present the subject matter explicitly, the process of repeated practice allows students to test and refine their comprehension. In the context of redox chemistry, this is evidenced by the students' improved ability to analyze changes in oxidation numbers and accurately identify oxidation and reduction reactions.

These findings are also consistent with the theory of gamification in education, which posits that the integration of game elements can boost student motivation and participation (Zainuddin, 2024). Additionally, research by Ebid Rocky Alfatikh (Alfatikh, 2021) demonstrates that the use of interactive, quiz-based media can increase student engagement during the learning process.

The connection between these research results and instructional practice suggests that the use of interactive, game-based media can shift the learning paradigm from teacher-centered to student-centered. Students do not merely receive information; rather, they become actively engaged in the thinking process by working through questions. This medium also serves as a tool for formative assessment, as students can immediately gauge their own level of understanding regarding the material.

From a practical standpoint, a key advantage of this medium is its offline functionality, meaning it does not rely on an internet connection. This makes it an effective solution for schools that face limitations in network connectivity. Thus, the “Who Wants to Be a Millionaire” medium not only elicits a positive response

from students but is also relevant for application across various learning conditions.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the research findings and discussion, it can be concluded that the use of the interactive learning tool "Who Wants to Be a Millionaire"—applied to the topic of reduction-oxidation (redox) reactions—elicited a highly positive response from students. This is evidenced by the high percentage of positive feedback across all assessment indicators, including comprehension of the subject matter, clarity of content and instructions, visual appeal and interactivity, as well as technical ease of use and navigation.

This game-based learning tool enhances student engagement in the learning process, particularly during practice exercises. The interactive and competitive elements inherent in the tool encourage students to be more active in their thinking and in answering questions, which helps to strengthen their grasp of redox concepts—a topic that requires analytical reasoning. Furthermore, the tool's ease of use and its capability to function offline are significant advantages, especially in environments with limited internet access. Consequently, the "Who Wants to Be a Millionaire" tool serves as an engaging and practical alternative for supporting practice exercises related to redox chemistry.

## ADVANCED RESEARCH

This study was limited to analyzing student responses and did not directly measure the tool's impact on improving learning outcomes. Therefore, future research is recommended to examine the effectiveness of this tool in fostering a deeper understanding of the concepts.

## REFERENCES

Alfatikh, E. R. (2021). Pengaruh model pembelajaran kuis interaktif Who Wants to Be a Millionaire terhadap hasil belajar siswa. Jurnal Geografi, 19(1), 13–24.

Azzahra, S., & Prasetyo, T. (2024). Penggunaan Media Pembelajaran Digital dalam Meningkatkan Motivasi Belajar Siswa berdasarkan Perspektif Guru. 1(1), 40–55.

Fadzillah, N., & Syaadah, R. (2023). Media pembelajaran digital berbasis website dalam meningkatkan efektivitas pembelajaran. Jurnal Riset Pendidikan Kimia, 13(1), 1–10.

Kusnasari, Z. Z., & Rakhmawati, A. (2022). Inovasi Pembelajaran Bahasa Baku Dengan Media Pembelajaran Game Edukasi Who Wants To Be A Millionaire. 1(1), 46–50.

Luma'ul'adilah, H. (2023). Dampak media pembelajaran interaktif dalam pendidikan. Eksponen, 13(2), 66-76.

Maharani, S. (2022). Media pembelajaran interaktif. Jurnal Akademika, 15(1), 70-75.

Mayer, R. E. (2009). Multimedia Learning. New York: Cambridge University Press.

Mukarromah, A., & Andriana, M. (2022). Peranan guru dalam mengembangkan media pembelajaran. Journal of Science and Education Research, 1(1), 43-50.

Putri, D., & Aini, S. (2024). Pengembangan media pembelajaran interaktif berbasis problem based learning pada materi reaksi kimia fase E SMA. Jurnal Pendidikan Tambusai, 8(2), 33580–33588.

Ramadhan, R. (2022). Pengembangan media pembelajaran berbasis game interaktif untuk meningkatkan hasil belajar siswa. Jurnal Pendidikan Sains Indonesia, 10(2), 123–130.

Saleh, M. S., Syahruddin, S., Saleh, M., & Azis, I. (2023). Media pembelajaran.

Zainuddin. (2024). Pengaruh penggunaan media interaktif terhadap minat dan hasil belajar siswa. Jurnal Ilmiah IPA dan Matematika, 2(3), 1–6.