jurnal βeta kimia
e-ISSN: 2807-7938 (online) dan p-ISSN: 2807-7962 (print)
Volume 6, Number 1, May 2026
http://ejurnal.undana.ac.id/index.php/jbk

The Use of Zep Quiz as a Digital Quiz-Based Learning Tool in Teaching Basic Chemical Laws on Student Learning Motivation

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ARTICLE INFO

Article history:
Received:
26 Maret 2026
Revised:
15 April 2026
Accepted:
17 April 2026

Keywords:
Zep Quiz, Learning motivation, digital learning media, Basic Laws of Chemistry.

ABSTRACT

The purpose of this study was to determine the relationship between the use of digital learning media Zep Quiz on student learning motivation in the material of Basic Chemical Laws at SMA Ciputat. This study used a quantitative descriptive method. The research sample was 71 grade X students determined by purposive sampling. The instrument used was a questionnaire consisting of 25 question items with two main aspects, namely internal and external motivation using a four-point Likert scale (strongly disagree, disagree, agree, strongly agree). The data obtained by calculating the average percentage and explained descriptively. The results showed that student learning motivation was in the high category, with an average score of 82.65. This indicates that the use of Zep Quiz is related to high student learning motivation..

How to cite: Nurfajriah, M., Rahman, N.A., Meylani, K., Kaffila, A.R., Bahriah, E.S. (2026). The Use of Zep Quiz as a Digital Quiz-Based Learning Tool in Teaching Basic Chemical Laws on Student Learning Motivation, 6(1), 63-74. https://doi.org/10.35508/jbk.v6i1.27462

INTRODUCTION

In this rapidly developing digital era, the world of education is undergoing a major transformation in adapting to advances in science and technology. Education now functions not only as a means of transferring knowledge, but also as a platform for developing critical thinking, creativity, and decision-making skills relevant to the demands of the 21st century [1]. Therefore, the education system must continue to innovate through the use of technology to make the learning process more engaging, interactive, and contextual.

Chemistry, as a branch of science, plays an important role in developing students' logical and analytical thinking skills [2]. However, many students find it difficult to understand chemistry concepts due to their abstract and complex nature [3]. These difficulties often make chemistry seem like a difficult and boring subject [4], which lowers students' motivation to learn [5].

Learning motivation is an important factor that influences students' success in the learning process. Motivation can originate from within (internal) or from outside (external), which encourages students to be active, diligent, and enthusiastic in learning. Conversely, students with low motivation tend to be passive, lack focus, and easily lose interest [6]. This

condition reflects the five indicators of learning motivation, namely interest, attention, persistence, participation, and effort [7]. Learning motivation is influenced by internal factors such as interest, goals, self-confidence, and individual needs, as well as external factors such as teaching methods, the learning environment, social relationships, family support, and teacher personality [8]. In the context of chemistry learning, variations in student motivation can be observed through the level of participation, attention, and persistence during the learning process. Therefore, teachers need to design learning strategies that can enhance student learning motivation.

One effort that can be made is to integrate digital media into the learning process. The use of media such as videos, animations, simulations, and interactive quizzes has been shown to increase student engagement and active participation [9]. Digital quiz-based learning media, particularly those incorporating gamification elements, are increasingly being used to create a more enjoyable and meaningful learning experience [10].

Zep Quiz is a digital platform that allows teachers to create interactive quizzes in real-time with attractive visual displays. This platform also provides various game modes and automatic assessment features that facilitate the evaluation process [11]. By using Zep Quiz, students can engage in a more enjoyable and competitive learning process, thereby increasing their motivation and learning outcomes [12].

Through Zep Quiz, teachers can create various types of questions, such as multiple choice, short answers, and true/false. This platform also features live scoring, leaderboards, interactive displays, various game modes, and attractive avatars that can increase student engagement in the learning process [13]. In addition, Zep Quiz is equipped with a scoreboard and point system, creating a competitive yet enjoyable learning atmosphere [14]. These features not only increase intrinsic motivation but also stimulate extrinsic motivation in students.

The ZEP Quiz application is an interactive digital quiz medium which can significantly increase students' attention, motivation, and engagement in the learning process [15]. The use of ZEP Quiz in learning activities has various benefits, including increasing student motivation and active participation, being accessible through various types of devices, providing score information immediately after the quiz is completed, and presenting material with an attractive display that supports various learning styles of students [16].

With an attractive appearance and easy-to-use features, Zep Quiz is an alternative for teachers to carry out more interesting and meaningful assessments [17]. Zep Quiz has advantages in terms of accessibility, because it can be run through various devices such as mobile phones, tablets, and laptops, making it easier to implement distance learning. This flexibility allows teachers and students to access learning materials anytime and anywhere. Additionally, this platform helps students become accustomed to digital practice questions.

Zep Quiz is also in line with the spirit of modern formative assessment, which is to assess in order to improve the learning process, not just to measure the final results [18]. This platform allows teachers to monitor student learning progress in real-time, while encouraging students to be more active and reflective in the learning process. The use of interactive quizzes can significantly improve the focus and memory of elementary school students [19].

In chemistry education, particularly in basic laws of chemistry, students often face difficulties because the material requires logical reasoning, mathematical skills, and conceptual understanding [20]. Interactive digital quizzes such as Zep Quiz can help present conceptual and calculation-based questions more engagingly, thereby supporting deeper student understanding [21].

Previous research has shown that Zep Quiz, as a digital gamification medium, effectively increases learning motivation, provides rapid feedback, and helps identify students' conceptual

weaknesses [16]. Furthermore, Zep Quiz also increases learning interest through engaging interactive quizzes [22] and has been shown to improve chemistry learning outcomes through peer tutoring, as demonstrated by increases in pretest and post-test scores [23].

However, research on Zep Quiz is still limited because it focuses more on learning outcomes [23] and general learning interest [22] and has not yet examined learning motivation in depth in chemistry learning. Furthermore, research generally does not specifically address the Basic Chemical Laws topic and still uses conventional or group- motivation to learn [16]. These various studies confirm that Zep Quiz has great potential in increasing student learning motivation.

In fact, the Basic Chemical Law material requires a strong conceptual understanding and is often difficult for students [23] so learning innovations are needed that can also increase learning motivation. Therefore, this study offers a novelty in the form of implementing Zep Quiz in an individual maze game mode that allows for independent exploration and real-time feedback, so it is expected to increase student motivation and conceptual understanding and become a new contribution to gamification-based chemistry learning.

Based on this description, the research problem is how to use the digital learning media Zep Quiz with student learning motivation in the material of Basic Laws of Chemistry The purpose of this study is to describe the relationship between the use of digital learning media Zep Quiz with student learning motivation in the material of Basic Chemical Laws.

RESEARCH METHOD

This study used a quantitative descriptive research method. Quantitative descriptive is a method used to describe, summarize, and analyze quantitative data [24]. This study aims to describe the level of student learning motivation after the implementation of Zep Quiz in learning the Basic Laws of Chemistry, based on internal and external motivation aspects.

The population in this study were 10th grade students at SMA Ciputat in the 2025/2026 academic year, while the sample included classes X-1, X-2, and X-3, totaling 71 students selected using purposive sampling. Purposive sampling was chosen because the researcher selected specific classes based on particular considerations, such as the teacher's recommendation regarding students' varying levels of motivation, selected teaching materials and the accessibility of the classes for data collection.

Data collection was conducted using a questionnaire consisting of 25 questions with two main aspects, namely internal motivation and external motivation. The questionnaire was compiled based on theoretical indicators from relevant literature [25]. Before use, the instrument was assessed for content validity through a judgement expert by a lecturer in the field of chemistry education to evaluate the clarity, relevance, and appropriateness of each item. Revisions were made based on the expert's feedback. Learning motivation is basically a force that comes from within or outside the students who are undergoing the learning process, thereby encouraging behavioral change through various indicators or supporting factors.

Table 1. Student Learning Motivation Questionnaire

Aspect	Indicator	Item Number	Number of Items
Internal Motivation	The existence of drive and needs in learning	1.2	2
	The existence of desire and desire to learn	3.4	2
	The existence of self-esteem and learning achievements learning	5.6	2
	Existence of hopes and aspirations	7.8	2
	The existence of desires for progress in oneself	9.10	2
	Satisfaction with performance	11.12.13	3
External Motivation	The existence of rewards	14.15	2
	The existence of learning competence	16.17	2
	The existence of sanctions/punishments	18.19	2
	Praise/appreciation from teachers	20.21	2
	General environmental situation	22.23	2
	Reward system obtained	24.25	2
Total Items			25

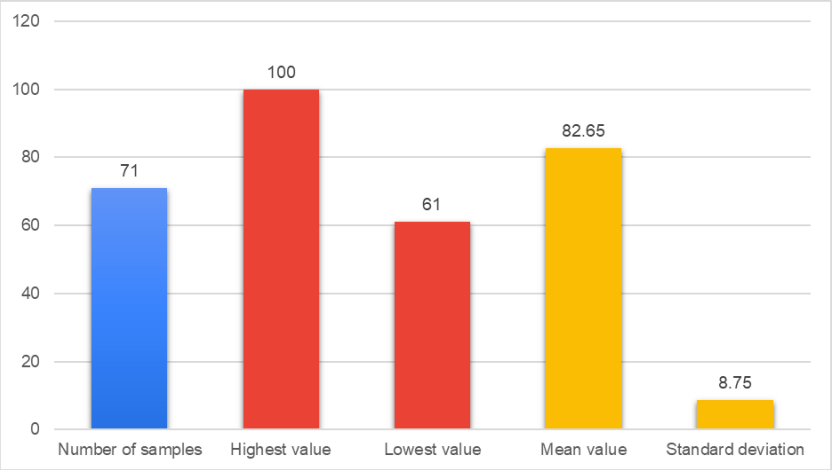
The questionnaire was compiled using a four-point Likert scale (Strongly Disagree, Disagree, Agree, Strongly Agree). The data obtained was calculated as a percentage average. The data was analyzed descriptively and grouped into four categories [26].

Table 2. Criteria for the Percentage of Student Learning Motivation Questionnaire Scores

Percentage Obtained	Description
85% - 100%	Very High
70% - 84%	High
55% - 69%	Moderate
40% - 54%	Low
0% - 39%	Very Low

RESULTS AND DISCUSSION

This study aims to determine the effect of implementing Zep Quiz in teaching the Basic Laws of Chemistry on student learning motivation. Data collection on student learning motivation was conducted on 10th grade students at SMA Ciputat in the 2025/2026 academic year. The overall results of the motivation questionnaire can be seen in the following graph.



Graph 1. Overall Student Motivation Data

Based on the data processing results in Figure 1, student learning motivation scores show quite a wide range of variation. The highest score obtained was 100, while the lowest was 61. This range of scores indicates differences in motivation levels among students, but they remain within the relatively high category. The average student learning motivation score is 82.65, indicating that, in general, students have high learning motivation.

This average shows that most students are above the adequate category, so it can be interpreted that learning motivation in the learning process is going well. The standard deviation of 8.75 shows that the distribution of is at a moderate level. This means that most students have fairly homogeneous motivation. This shows the success of the implementation of digital learning media such as Zep Quiz in increasing student motivation, as stated in the results of previous research which states that the application of gamification media such as Zep Quiz can be an effective solution to create more interesting learning and have a positive effect on student learning motivation [27].

Learning motivation is determined by two aspects, namely internal and external motivation. The following are the questionnaire results based on the indicators.

Table 3. Data on Internal and External Motivation

Aspect	Indicator	Item Number	Number of Items
Internal Motivation	The existence of drive and needs in learning	88	Very High
	The existence of desire and desire to learn	86	Very High
	The existence of self-esteem and learning achievements learning	84	High
	Existence of hopes and aspirations	80	High
	The existence of desires for progress in oneself	83	High
	Satisfaction with performance	81	High
	Average	84	High
External Motivation	The existence of rewards	85	Very High
	The existence of learning competence	81	High

	The existence of sanctions/punishments	79	High
	Praise/appreciation from teachers	83	High
	General environmental situation	81	High
	Reward system obtained	82	High
	Total Items	82	High

Based on the student motivation data table, it can be seen that both internal and external motivation are in the high to very high category. However, there are different patterns between the two aspects.

Internal motivation is a learning drive that arises from within the student, such as the need to understand the material, the desire to achieve, personal satisfaction, and belief in one's abilities. In this study, the internal motivation indicator showed a range of 81–88%, with the indicators of learning need (88%) and desire to learn (86%) falling into the very high category. This condition illustrates that the majority of students have a strong personal drive to participate in the learning process. Intrinsic motivation is a dominant factor in influencing students' perseverance and consistency in learning [28]. Internal drives, including curiosity, interest in the material, and clear academic goals, have been proven to be the main determinants of learning success. The study shows that students who are aware of the need to understand the lessons and improve their competencies tend to show better academic performance.

Intrinsic motivation contributes significantly to improving learning outcomes [29]. Students with high internal motivation usually have clear learning goals, strong curiosity, and a tendency to learn independently. These findings reinforce the results of this study that internal motivation arises from students' awareness of the importance of learning, not because of pressure or coercion from outside parties. This is in line with Self- Determination Theory, which explains that interest, curiosity, and personal satisfaction are the main drivers that shape long-term motivation.

Meanwhile, external motivation relates to factors outside the student, such as rewards, teacher appreciation, classroom atmosphere, competition, and reward systems. In this study, external motivation scores ranged from 78–85%, with rewards (85%) as the highest score. These findings indicate that external reinforcement still plays a role in encouraging students' interest in learning. These results are in line with the findings of previous research which show that external support in the form of praise, rewards, and a conducive learning environment can increase students' motivation to learn [30]. Rewards have been proven to encourage student enthusiasm and participation, while a conducive school environment creates a learning atmosphere that supports their optimal involvement.

These findings are reinforced by other research which analyzed the influence of intrinsic and extrinsic motivation on learning outcomes and found that extrinsic motivation through rewards or praise continues to play an important role in fostering students' enthusiasm for learning [31]. This confirms that external support is still needed to maintain student engagement, especially for those who do not yet have strong internal motivation.

Based on the overall research results, it can be concluded that internal motivation has a stronger influence on students' perseverance, consistency, and learning outcomes. External motivation still contributes as a supporting factor, but its nature is more fluctuating than internal motivation. Therefore, developing internal motivation needs to be a top priority in efforts to optimally improve student motivation and learning outcomes.

The results of the analysis on the aspect of internal motivation show that the use of ZepQuiz in teaching Basic Chemical Laws is associated with all indicators of students' internal motivation. In general, all indicators are in the high to very high category. The indicator of drive and need to learn received the highest score of 88%, which is categorized as very high, indicating that students demonstrate a strong inclination to engage in learning activities. This finding suggests that the use of Zep Quiz may support this drive and need because students feel more challenged, more involved, and enjoy the evaluation process. Application-based evaluation media have been reported to increase learning motivation and reduce student boredom during the learning process [32].

However, these results differ from those of other studies, which showed that the learning motivation and need indicators had the lowest average scores, at 71%. In that study, the learning motivation indicator for chemistry learning among high school students in Baubau City was in the moderate category. This difference suggests that the learning context, strategies used, and the use of digital media such as Zep Quiz can produce different results on students' levels of internal motivation [33].

The indicator of desire and willingness to learn achieved a score of 86%, which is classified as very high. These results show that students become more enthusiastic in participating in learning activities when the material is delivered through interactive quizzes that combine competitive elements while providing a fun learning atmosphere. The attractive visual display, the presence of a leaderboard, and the provision of immediate feedback on Zep Quiz may contribute to a more engaging learning experience, thereby encouraging students to continue to deepen their understanding and strive for more optimal achievements.

These findings, when compared to previous research, show a significant difference. In that study, the indicator of strong willingness to learn only reached a percentage of 63.83%, which is in the moderate category, while in this study, it obtained a higher category. This difference indicates that the use of gamification-based learning media such as Zep Quiz has the potential to have a greater impact on increasing student willingness to learn compared to conventional learning approaches, thus being able to encourage student engagement and motivation more optimally [34].

The indicators of self-esteem and academic achievements scored 84%, which is considered high. This finding indicates that the use of Zep Quiz is associated with an increase in students' confidence in their academic abilities. The automatic scoring system and clear presentation of results help students understand their achievements objectively. When students receive high scores, they feel proud, which encourages them to maintain and even improve their performance. These results align with previous research showing that students with high self-esteem tend to have greater intrinsic motivation, are more motivated to face academic challenges, and are more confident in expressing their abilities. Conversely, students with low self-esteem tend to experience self-doubt, which can hinder academic achievement and reduce the quality of learning. Comparatively, these results reinforce previous findings that increasing self-esteem through positive learning experiences, such as those facilitated by Zep Quiz, can directly contribute to improved student motivation and academic performance [35].

The indicator of students' desire for self-improvement scored 83% and was categorized as high. These results show that students have a strong drive to continue improving their abilities after participating in Zep Quiz-based evaluations. The real-time feedback feature allows students to identify their mistakes and areas that require improvement, which may encourage continuous learning efforts. Gamification in learning has been shown to be associated with increase intrinsic motivation by providing relevant challenges, opportunities to experience progress, and learning experiences that support independent learning development [36].

The performance satisfaction indicator showed a high score of 81%, indicating that students felt proud and satisfied with the results they obtained when using Zep Quiz as an evaluation tool. This satisfaction may be related to the provision of feedback in the form of scores, progress charts, and rankings, which allow students to observe their learning outcomes more clearly. These findings are consistent with previous studies indicating that Zep Quiz is associated with increased student engagement and improved learning outcomes through gamification features such as scoring and ranking systems [12].

However, the indicator of students' hopes and aspirations for the future had the lowest score, at 80%, but still remained in the high category. This shows that the use of Zep Quiz may also support students' optimism and long-term goal orientation. When they successfully complete the quiz, they feel confident that their current learning efforts will support their future academic and career achievements. Similarly, other research also shows that the indicator of students' hopes and aspirations scored 78.5% were categorized as high or good, both findings indicate that the hope and aspirations aspect is in the positive category, although it tends to have lower scores than other motivational indicators. This suggests that while gamification like Zep Quiz can increase learning motivation, strengthening students' future orientation still requires additional support, such as guidance on learning goals or self-reflection [37].

Overall, a comparison of each indicator shows that students' learning motivation, desire to learn, self-esteem and achievement, desire for self-improvement, future expectations, and performance satisfaction are all within the high-to-very-high categories. These findings indicate that the use of Zep Quiz is associated with a positive pattern of students' internal motivation, rather than demonstrating a direct causal relationship.

The results of the analysis on external motivation show that the use of ZepQuiz in teaching Basic Chemistry is associated with positive outcomes across all indicators of external motivation among students. In general, all indicators are in the high to very high category. The indicator with the highest score is rewards, with an average of 85%, which corresponds to that the reward feature and score achievement in ZepQuiz being perceived as a competitive and enjoyable learning experience for students. The reward element is accompanied by students to achieve high scores and maintain their position in the rankings. This is in line with the results of previous research, which reported that the ranking board element is associated with learning motivation more strongly than other gamification elements [38].

The praise or appreciation indicator from teachers, which scored 83%, reflects the level of positive reinforcement in relation to student motivation. Through ZepQuiz, teachers can give appreciation quickly because the application provides immediate results, so students immediately know their performance and report feeling more confident and actively involved in learning. In addition, the reward system indicator with a score of 82% is also associated with motivation, as students can see their progress, rank improvements, and performance consistency transparently. Gamification elements such as points, rankings, and feedback have been described in previous studies as creating a perception of progress that corresponds to students' external motivation [39]. This transparency helps students understand the relationship between their learning efforts and the results they achieve, which is accompanied by their willingness to continue improving their academic performance.

The learning environment indicator also shows a high score of 81%, suggesting that ZepQuiz is perceived as contributing to a more engaging, competitive, and less monotonous classroom atmosphere. Digital quiz activities make learning more interactive, reduce boredom, and correspond with students to be more active in answering questions. This is in line with research, which states that the application of Zep Quiz can create a fun, challenging, and

competitive learning atmosphere, which accompanies student enthusiasm in the learning process [40].

Another indicator with the same value is learning competency, with a score of 81%, indicating that external aspects such as academic abilities to be achieved are also related to motivation. Presenting material in a game format is described as an effective way to convey knowledge while being associated with the improvement of students' learning competencies [41]. The use of ZepQuiz allows students to practice answering questions repeatedly and see their success rate directly, which is accompanied by them to improve and enhance their competence.

The indicator with the lowest score is sanctions or penalties, with a score of 79%, although this is still relatively high. This low position reflects that students do not really view punishment as a motivator in digital learning. The use of rewards is described in the literature as more effective in the long term than punishment, which risks causing negative psychological effects [42]. This finding aligns with the characteristics of ZepQuiz, which emphasizes rewards over penalties.

Overall, a comparison of external indicators suggests that gamification rewards, teacher appreciation, a transparent reward system, and an interactive learning environment are the external factors most strongly associated with student learning motivation. The implementation of ZepQuiz is observed to accompany positive and productive motivation, along with an observed increase in students' understanding of the material on the Basic Laws of Chemistry.

CONCLUSION

The results of the study indicate that the use of the digital learning media Zep Quiz has been proven to increase student motivation in learning the Basic Laws of Chemistry. This is evidenced by the overall average score of 82.65, which is included in the high category. These findings suggest that digital gamification tools such as Zep Quiz can be used as an alternative learning medium to increase student engagement and motivation in chemistry learning. For further research, it is recommended to use an experimental design so that the obtained relationships can be tested more deeply.

ACKNOWLEDGEMENTS

The author would like to express their deepest gratitude to all parties who have played an important role in the collection and compilation of this article, especially to SMA Ciputat and the Chemistry Education Study Program at UIN Syarif Hidayatullah Jakarta.

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