



The Degree to Which Teachers Use Technological Educational Aids in Biology for the Fourth Grade of Middle School and its Impact on the Acquisition of Scientific Concepts and Thinking

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ARTICLE INFO

Article History:

Received: 06 January 2023

Received in revised form: 07 July 2023

Accepted: 03 September 2023

DOI: 10.14689/ejer.2023.107.002

Keywords

Educational Technology, Concept Acquisition, Scientific Thinking, Biology, Technology

ABSTRACT

This study aims to investigate the effects of teachers incorporating technological educational tools into the biology curriculum for fourth-grade middle school students. Specifically, it seeks to examine how this integration influences the acquisition of concepts and the development of scientific thinking skills. The study population included all secondary school biology teachers in four educational regions. A simple random sample was used, based on the records of the Ministry of Education in Iraq. The data from this research was analysed using SPSS 21, a statistical package commonly used in the social sciences. The study revealed a significant impact on students' acquisition of scientific concepts and thinking because of using

educational technology tools. This study's findings are anticipated to make a valuable contribution to the ongoing discussion on pedagogical practices. By emphasising the correlation between the utilisation of technological resources and students' grasp of concepts and scientific thinking skills, educators and policymakers can make well-informed choices regarding the incorporation of technology into biology classrooms. The involvement of teachers and students in this study will not only contribute to their knowledge but also serve as inspiration for future research and educational initiatives focused on using technology to improve science education.

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Introduction

In the dynamic field of education, the utilisation of technological tools and resources has witnessed a significant rise (Karagianni & Drigas, 2023). In the field of biology, educators are actively seeking new methods to improve conceptual comprehension and foster scientific reasoning in fourth-grade students. The incorporation of technology in biology education has proven to be a valuable method for captivating students and improving their learning outcomes (Wang, 2023). When teaching biology, it is important to consider how it affects students' understanding of concepts and their development of scientific thinking skills. Technological tools and resources encompass a wide range of devices, software, and digital resources utilised in the realm of education to facilitate teaching and learning processes (Jia et al., 2022). These tools may consist of interactive whiteboard tutorials, multimedia presentations, and other resources. Conceptual understanding involves comprehending the fundamental concepts, principles, and knowledge within a specific subject or topic (Duval-Couetil, Ladisch, & Yi, 2021). In the field of biology, the focus lies on students' comprehension of biological concepts and their capacity to apply them in practical scenarios (Yu & Gao, 2023).

In addition, scientific thinking encompasses the cognitive and intellectual processes that are integral to scientific research (Yu, 2021). The set of skills encompassed in this field involves observation, analysis, problem solving, hypothesis formulation, hypothesis testing, and drawing conclusions. In the realm of biology education, the incorporation of digital tools and resources is crucial for effectively teaching and developing an understanding of biological concepts and scientific thinking skills. Empirical proof is in favor of this. Learning outcomes pertain to the knowledge, skills, and abilities that students gain through their educational experiences (Fedorova & Skobleva, 2020). Pedagogical practices encompass the various methods, strategies, and techniques employed by educators to foster optimal teaching and learning encounters (Han, 2022). Science education is the field of education that specifically emphasises teaching students' scientific concepts, principles, and skills. This field encompasses a range of scientific disciplines, such as biology, with the goal of fostering learners' scientific knowledge and honing their critical thinking skills (Wang, 2023). However, a significant research concern revolves around the efficacy of incorporating technology to improve students' grasp of scientific concepts and their critical thinking abilities in the field of biology. What is the impact of teachers' use of technological educational means in the biology subject for the fourth grade of middle school and its effect on acquiring concepts and scientific thinking?

Through the examination of technology's role in biology education, researchers seek to emphasise the benefits of incorporating digital tools to improve student learning outcomes in this critical field. In addition, this study examines the various technological resources utilised by teachers, including interactive whiteboards, tutorials, and multimedia presentations. Through careful analysis and comprehension of the techniques employed, researchers can gain insight into the strengths and limitations of each tool. This allows for a deeper appreciation of the various ways in which these resources can be utilised to enhance conceptual understanding and scholarly research. This study's findings are anticipated to make a valuable contribution to the ongoing discussion on pedagogical practices. By emphasising the correlation between the utilisation of technological resources and students' grasp of concepts and scientific thinking abilities, educators and

policymakers can make well-informed choices regarding the incorporation of technology into biology classrooms. This study will involve the knowledge of teachers and students, and it is expected to inspire future research and educational initiatives focused on leveraging technology to enhance science education.

Review of Literature

In a recent study by [Chiu \(2022\)](#), it was found that technology has been introduced in the modern era for educational purposes. As a result, teachers are now required to incorporate technology into their classrooms. Enhancing students' comprehension of their learning perspective is crucial. Students prioritise the integration of technology in their education as they recognise its crucial role in enhancing the learning experience. As per the findings of [Changtong, Maneejak, and Yasri \(2020\)](#), technology's effectiveness is enhanced when students are motivated to learn through the utilisation of various supporting tools, such as visual descriptions of knowledge. This type of visual description is beneficial for students because it enhances their learning.

However, it is essential for them to grasp the concepts over an extended period. [Rong and Gang \(2021\)](#) suggest that technology can enhance the learning experience of science students, leading to improved understanding and comprehension. Teachers should encourage students to utilise technology to gain insights and refine their concepts. As stated by [Ali et al. \(2018\)](#), when students' understanding is enhanced using technology, they are more likely to be motivated to incorporate technology into their everyday tasks. In today's technological era, the integration of technology has emerged as a crucial element in enhancing students' learning experiences. It is important to provide students with visual aids to enhance their learning and facilitate a thorough grasp of the concepts.

As per [Sharma and Batth \(2020\)](#), motivated students have a clear understanding of the objectives and potential benefits of their education. Hence, there is a need to enhance students' learning performance and foster their critical understanding. [Throop Robinson, Lunney Borden, and Carter \(2022\)](#) suggest that students' motivation for battle performance can be enhanced using technology, leading to the development of effective strategies. Similarly, the role of technology in education has been enhanced as students have become accustomed to receiving education with the aid of technology, following a significant societal shift. According to [Antonietti, Cattaneo, and Amenduni \(2022\)](#), teachers and educational resources will likely motivate and support students to improve their learning. By improving their learning performance, their overall performance can be significantly enhanced.

[Lynch et al. \(2021\)](#) found that students who do not utilise technology for educational purposes encounter significant challenges in their academic performance. Many educational institutions in underdeveloped countries now provide classrooms equipped with technological advancements to enhance students' comprehension of their educational objectives. Using various bar applications can enhance students' learning by strengthening their understanding and critical thinking skills. In a study conducted by [Jescovitch et al. \(2021\)](#), it was found that students can enhance their learning by taking incremental steps and cultivating critical thinking skills. This approach allows students to gain a deeper understanding of the knowledge acquisition process from their own perspective.

According to research by Jones and Jones (2005), introducing concepts to students in a suitable way improves their understanding of them. Hence, enhancing student learning through suitable technology is imperative, while also incentivizing teachers to integrate this technology into their classrooms.

H1: *Educational technology tools directly impact students' acquisition of science concepts.*

Shahid and Khan (2022) suggest that students can enhance their thinking abilities through critical learning and strategic performance, leading to a more effective approach to education. Educational institutes play a crucial role in enhancing students' critical thinking skills through their enrollment and participation in various activities. As per Sukendro et al. (2020), educators should incorporate technological advancements and classroom applications to encourage students to think creatively, thereby enhancing their logical reasoning abilities. Utilising technology is crucial for primary-level students in today's technological era, as it is essential to motivate them to embrace its use. According to a study by Darazha and Glyussya (2023), using technology in the classroom can significantly improve students' critical thinking abilities, which in turn improves strategic performance. Students, regardless of their motivation, utilise technology tools to enhance their critical thinking skills and foster innovative thinking. This strategy is implemented in eight educational institutes across developed countries.

According to research by Batmetan et al. (2022), educational institutions in developing countries should improve their resources to improve students' learning and academic performance. When students engage in various educational activities using advanced applications, it enhances their participation and facilitates their learning at an advanced level. Moreover, the dependability of students' academic achievements is crucial for the progress of technology, which plays a pivotal role in enhancing student learning. Fu and Hwang (2018) state that technology enables students to engage in interactive discussions and collaborate using online platforms. The use of online platforms is crucial for students to enhance their academic performance. However, it is inappropriate when they disregard the assistance that conventional tools can provide. Hew et al. (2020) suggest that effective motivation from parents and teachers is crucial for enhancing students' learning and critical performance. This is essential for fostering better understanding and overall academic achievement. Teachers' effective performance should serve as motivation for students to enhance their learning using technology. Aditya, Nurhas, and Pawlowski (2019) suggest that the critical use of technology can positively contribute to students' psychological development, enabling them to engage in creative and logical thinking across various domains. Students must enhance their conduct and strategic execution to foster a deeper comprehension of the advanced level.

As per Shahid and Khan (2022), students can enhance their motivation to improve by analysing their performance and gaining a critical understanding of their teachers' expectations. Teachers play a crucial role in providing students with the necessary resources to enhance their critical thinking skills, ultimately leading to improved performance. Research conducted by Al-Rahmi et al. (2020) suggests that integrating technology into teaching practices can effectively foster critical thinking skills and support students in attaining their educational objectives. By utilising technology, students can enhance their learning and critical thinking abilities, leading to improved academic performance.

H2: Educational technology tools directly impact students' acquisition of science thinking.

Methodology

The study employed the descriptive survey method, which was deemed suitable for the research's nature. A questionnaire was administered to a sample of individuals from the study population to collect data. The study population included secondary school biology teachers from four educational regions. The selected areas were determined through a straightforward random sampling method, utilising the Ministry of Education's records in Iraq. The utilisation of descriptive survey methodology facilitated the gathering of quantitative data, offering valuable insights into the present practices and perspectives of biology teachers concerning the incorporation of educational technology tools. The questionnaire functioned as a structured tool for gathering information from the chosen sample, allowing the researchers to analyse and interpret the data in a structured manner.

The study seeks to gain a comprehensive understanding of the status of educational technology integration in biology teaching by including a diverse representation of biology teachers in different regions. The research findings have the potential to be valuable for educational policymakers and stakeholders. They can use these findings to develop strategies and support systems that will improve the effective use of technology in biology education. The participants were chosen through a straightforward random sampling method. The names of all biology teachers in the four educational districts that comprise the study population were randomly selected, as indicated in Table 1.

Table 1

Distribution of Sample.

Gender	Percentage	Number
Male	0.36	36
Female	0.64	64
Total	1	100
Academic qualification	Percentage	Number
Bachelor's	0.79	79
Postgraduate	0.21	21
Total	1	100
Years of experience	Percentage	Number
Less than 5 years	0.39	39
5-12 years	0.31	31
More than 12 years	0.3	30
Total	1	100
Scientific areas	Percentage	Number
Baghdad	0.25	25
Al Najaf	0.11	11
Basrah	0.21	21
Erbil	0.23	23
Total	0.2	20

A questionnaire was created to assess the utilisation of educational technology by biology teachers in secondary schools in Iraq, with the aim of enhancing students' critical thinking abilities. The questionnaire was developed by conducting a thorough analysis of relevant theoretical literature and prior research in the field. The questionnaire is divided into two primary sections. The initial section of the study examines various individual variables, such as gender, years of experience, academic qualifications, and educational background. The second section consists of four areas, comprising a total of fifty-eight items, which evaluate the present state of educational technology utilisation by biology teachers at this stage. The secondary school curriculum focuses on enhancing students' critical thinking abilities across four key areas: Programmes and tools for education: The purpose of this area is to assess the accessibility and utilisation of programmes and tools. The study employs a 5-point Likert scale to assess the participants' questionnaire responses.

The stability of the tool was assessed by measuring internal consistency. This was done by calculating Cronbach's alpha coefficient using the responses of study participants. Cronbach's alpha is a statistical measure that assesses the degree of interconnection or consistency among the items in a scale or questionnaire. When assessing the stability or internal consistency of a scale, the Cronbach's alpha value is used. This value ranges from 0 to 1, with higher values indicating greater internal consistency. Typically, a threshold of 0.7 or higher is deemed acceptable for research purposes, though the precise threshold may vary depending on the field of study and context. Using Cronbach's alpha, researchers can assess the degree to which the items in the tool measure a consistent construct or concept. A higher alpha value suggests a strong correlation among the items, indicating a dependable measure of the intended construct. The Cronbach's alpha for the constructs in this research was found to be above 0.70, meeting the accepted threshold.

The statistical analysis of questionnaire data collected from secondary school biology teachers was conducted using SPSS 21 software. The study investigated the use of educational technology by teachers to foster critical thinking skills. Calculations were performed to determine descriptive statistics for each item of the study tool, as well as for each field and comprehensive tool. This study aimed to assess the awareness of secondary school biology teachers regarding their utilisation of educational technology for the development of thinking skills.

Finding

The descriptive statistics were examined to assess the normality of the data. The study determined that the collected data did not contain any missing values. In addition, the normality of the data was assessed by examining the skewness and kurtosis values. The findings were utilised to assess whether the data exhibits left or right skewness. The data distribution is confirmed to be normal based on the skewness and kurtosis findings falling within the range of -2 and +2. Based on the results presented in [Table 2](#), it can be concluded that the data exhibits a normal distribution, as indicated by the skewness and kurtosis values.

Table 2*Data Statistics.*

Factor	ETT	ASC	AST
Mean	3.242	3.238	3.515
Std. Deviation	1.507	1.798	1.881
Skewness	0.096	0.462	0.316
Std. Error of Skewness	0.160	0.160	0.160
Kurtosis	-0.442	-0.545	-0.788
Std. Error of Kurtosis	0.319	0.319	0.319
Minimum	1.000	1.000	1.000
Maximum	7.000	7.000	7.000

ETT = Educational technology tools, ASC = Acquisition of Students Concepts, and AST = Acquisition of Students Thinking

In addition, Pearson's correlation findings were examined to assess the relationship between the variables in this study. The study examined the significance of the correlation between the variables by using a p-value threshold of less than 0.05. The results presented in Table 3 provide strong evidence of a significant correlation between the variables. This is supported by the p values, which were all less than .001. Therefore, the data presented in Table 3 was deemed suitable for further examination.

Table 3*Pearson's Correlations.*

Variable		ETT	ASC	AST
1. ETT	Pearson's r	—		
	p-value	—		
2. ASC	Pearson's r	0.779	—	
	p-value	< .001	—	
3. AST	Pearson's r	0.782	0.781	—
	p-value	< .001	< .001	—

Note. All tests one-tailed, for positive correlation.

ETT = Educational technology tools, ASC = Acquisition of Students Concepts, and AST = Acquisition of Students Thinking

The model summary findings were deemed suitable for assessing the predictive capability of the model. R values above 0.40 in the results show that there is a significant correlation between the independent variable and dependent variables. The R-square-squareents the overall variation in the dependent variable that can be accounted for by the independent variables. A value above 0.5 indicates the model's efficacy in establishing the relationship. The R-square value of 0.605 indicates that it meets the acceptable threshold. The adjusted R-square metric provides an indication of how well the results of multiple regression can be generalised to the population by measuring the variation of the sample results. It is necessary to ensure a minimum difference between R-square and Adjusted R-square. The results presented in Table 3 indicate a minimal difference between the R-square and adjusted R-square values. Therefore, the data was deemed suitable for further analysis.

Table 3*Model Summary.*

Model	R	R ²	Adjusted R ²	RMSE
H ₀	0.000	0.000	0.000	1.798
H ₁	0.779	0.607	0.605	1.130

In addition, the significance of the model in determining the outcome was tested using Analysis of Variance (ANOVA) findings. Typically, a 95% confidence interval or a 5% significance level is selected for the study. Therefore, it is necessary for the p-value to be below 0.05. The p-value in Table 4 is statistically significant. The F value indicates an enhancement in the prediction of the variable by adjusting the model to account for any inaccuracies. The F-ratio yield-efficient model requires a value greater than 1. The value in the table is 353.5, indicating a positive outcome. Therefore, the data was deemed suitable for further analysis.

Table 4*Anova.*

Model		Sum of Squares	df	Mean Square	F	p
H ₁	Regression	451.495	1	451.495	353.588	< .001
	Residual	292.409	229	1.277		
	Total	743.905	230			

Note. The intercept model is omitted, as no meaningful information can be shown.

Finally, the findings of the regression coefficients were used to assess the relationship between variables through hypothesis testing. The study has confirmed that the utilisation of educational technology tools has a substantial and direct influence on the acquisition of science concepts by students ($t = 18.804$). Additionally, the study has confirmed a direct correlation between the utilisation of educational technology tools and the development of students' scientific thinking abilities ($t = 19.015$). The findings of these paths are reported in Table 5.

Table 5*Coefficients.*

Model		Unstandardized	Standard Error	Standardized	t	p
H ₀	(Intercept)	3.238	0.118		27.365	< .001
	(Intercept)	0.224	0.177		1.267	0.207
H ₁	ETT	0.930	0.049	0.779	18.804	< .001
H ₂	ETT	0.977	0.051	0.782	19.015	< .001

ETT = Educational technology tools, ASC = Acquisition of Students Concepts, and AST = Acquisition of Students Thinking

Discussion and Conclusion

The initial study revealed that the utilisation of educational technology tools significantly influences students' understanding of science concepts. Nevertheless, these findings were evaluated in conjunction with the results of prior research. According to Ali

et al. (2018), teachers must incorporate technology into the classroom due to the widespread use of educational technology in contemporary society. Understanding the student's perspective is crucial for effective learning. Yin et al. (2021) found that students prioritise their comfort and believe that technology plays a crucial role in enhancing their education. Technology has a greater impact on education when students are motivated to learn by utilising various supplementary tools, such as visual aids, that enhance their understanding of the subject matter. As per the research conducted by Changtong et al. (2020), students can enhance their learning by utilising visual explanations; However, a substantial investment of time will be required to grasp the concepts. Students in scientific classes can enhance their learning through technology, leading to improved comprehension of underlying concepts. As per Sharma and Batth (2020), teachers should promote the use of technology to help students understand different perspectives and enhance their conceptual understanding.

As per Wu's research (2021), students who have a strong grasp of concepts using technology are more likely to integrate technology into their everyday tasks. In today's technological era, the utilisation of technology plays a vital role in enriching students' educational experiences. To enhance learning and promote a better understanding of concepts, it is advisable to provide students with visual aids. As per Antonietti et al. (2022), heightened student motivation correlates with a deeper comprehension of the purpose and objectives of their education. To improve students' learning performance and critical comprehension, it is important to find more effective methods. According to a study by Hidayat et al. (2018), incorporating technology into learning practices can improve students' motivation and performance. The use of technology enables students to develop more effective methods and strategies. Additionally, the fact that students have grown accustomed to using technology as a crucial tool for learning, reflecting the evolving nature of society, strengthens the role of technology in education.

Machmud, Widiyan, and Ramadhani (2021) found that teachers play a crucial role in motivating students to improve their education by providing encouragement and support, enabling them to become self-sufficient. Enhancing their learning performance is crucial for overall academic success, and this can be accomplished through this approach. Meanwhile, students who do not utilise technology for educational purposes face notable difficulties in terms of their academic performance. Al-Rahmi et al. (2020) found that educational institutions in less developed nations have transformed into dispensaries, utilising technological advancements integrated into classrooms to enhance students' understanding of educational objectives. Students would benefit from using a range of bar applications to enhance their conceptual understanding and critical thinking, thereby increasing their learning opportunities. Similarly, Chiu (2022) suggests that students can enhance their learning by improving it in stages and utilising critical thinking. This approach allows students to view the learning process from their own perspective as they acquire knowledge. Providing students with a proper introduction to concepts can enhance their ability to acquire knowledge. In conclusion, it is crucial to improve student learning through the effective use of technology. Additionally, it is imperative for teachers to be motivated to incorporate this technology into their classrooms.

In addition, the results of the second hypothesis support the notion that the utilisation of educational technology tools directly influences students' development of scientific thinking skills. Nevertheless, these findings were evaluated in conjunction with the results of prior research. As per [Alavi, Dashtestani, and Mellati \(2022\)](#), students can enhance their thinking abilities and adopt a more effective approach to education by utilising critical learning and strategic performance. Educational institutions have a crucial role in developing students' critical thinking abilities through their involvement in various activities. As per [Jones and Jones \(2005\)](#), educators must integrate technological advancements and applications into classrooms to foster creative thinking and logical reasoning skills in students. As stated by [Wang \(2023\)](#), in the current technological era, it is crucial for students to embrace and utilise technology. Additionally, it is important to foster a sense of inspiration among children to encourage their engagement with technology. Today holds particular significance for students in elementary school.

According to research by [Jescovitch et al. \(2021\)](#), incorporating technology into the classroom has proven to be beneficial for students because it enhances their critical thinking skills, which in turn improves their overall strategic performance. Students use technological tools to enhance their critical thinking and foster creativity, regardless of their motivation to improve their learning. This technique is also implemented in eight different educational institutions situated in industrialised nations. [Yu \(2021\)](#) also notes that this applies to educational institutions in impoverished nations; to enhance the learning and performance of their pupils, it is necessary for them to allocate additional resources. When students engage in diverse educational activities using specially designed applications, they have the chance to enhance their learning and reach a more advanced level. [Raj et al. \(2023\)](#) emphasises the importance of students' performance dependability in the development of contemporary technology. This is seen as a positive step towards improving the learning experience of students.

As per [Fedorova and Skobleva \(2020\)](#), students can effectively communicate and interact with each other using online platforms, thanks to the use of technology. While it is important for students to use online platforms to enhance their performance, it is not advisable for them to solely depend on traditional tools when seeking to improve their results. As stated by [Lynch et al. \(2021\)](#), parents and teachers play a crucial role in motivating students to enhance their learning and critical performance. This is essential for developing better comprehension and performance abilities. To enhance their learning through technology, students should draw inspiration from their teachers' exemplary academic performance. [Thoppae and Praneetpolgrang \(2021\)](#) argue that incorporating technology in a thoughtful manner can positively impact children's psychological development. This is because it allows them to engage with a wide range of subjects in a creative and analytical way. To enhance students' understanding of the advanced level, they must focus on improving their behaviour and strategic execution.

As stated by [Duval-Couetil et al. \(2021\)](#), students can enhance their performance by evaluating their own work and gaining a clear understanding of their instructors' expectations. On the other hand, teachers play a crucial role in providing students with the essential resources to develop their critical thinking skills. This strategic approach is key to enhancing overall student performance. According to a study conducted by [Jia et al. \(2022\)](#), the utilisation of technology by professors can assist students in enhancing their critical thinking abilities and

attaining their educational goals. By utilising technology, students can enhance their learning and critical thinking skills, leading to improved academic performance.

Implications

The study provided valuable insights into the existing body of literature, which had previously yielded inconsistent findings. The research findings indicate that the utilisation of educational technology tools has a clear influence on students' comprehension of science concepts. The findings of previous studies did not provide a definitive conclusion regarding this relationship. Based on a study reported in the literature, it has been found that the use of educational technology tools directly affects the acquisition of science thinking in students. In previous studies, the findings regarding this relationship were inconclusive. Therefore, the research makes a substantial theoretical contribution to the existing body of knowledge.

The significance of this research lies in the extent to which teachers utilise technological educational resources in fourth-grade biology within preparatory school and the subsequent impact on the acquisition of concepts and scientific thinking. First and foremost, improving educational experiences Utilising technological educational resources in biology teaching can enhance the learning experience for students by making it more engaging and interactive. These resources can bring abstract concepts to life, resulting in a better understanding of biological concepts. Additionally, technology can offer students the chance to develop their critical thinking skills and problem-solving abilities. Through the utilisation of simulations, virtual experiences, and interactive activities, students can analyse information, engage in effective communication, and cultivate their scientific thinking skills.

Additionally, students can accommodate various learning styles. Technological educational resources provide a variety of formats, including video lessons, graphics, and interactive modules, catering to diverse learning styles and student preferences. Ensuring effective understanding of biological concepts among students with diverse learning needs is crucial. Additionally, it is important to promote active learning. Technology-based educational resources promote active engagement and collaboration among students. It empowers students to actively engage in their learning, work together with their classmates, and gain hands-on experience with biological concepts. Additionally, technological educational resources serve as a valuable tool for connecting theoretical knowledge from textbooks to practical applications in the real world. By utilising multimedia presentations, conducting online research, and accessing current scientific information, students can gain a comprehensive understanding of the significance of biology in their everyday lives and its profound influence on society.

Incorporating technological educational resources into biology teaching equips students with digital literacy skills and prepares them for the digital age. This course familiarises students with tools and techniques that are becoming essential in scientific research and progress in the field of biology. This research examines the use of technological educational resources by teachers and its impact on the acquisition of concepts and scientific thinking in biology. The study aims to provide valuable insights into effective teaching methods and contribute to the improvement of biology education for fourth-grade preparatory school students in the classroom.

Future Direction

The research findings have important implications both in theory and in practice. Nevertheless, certain areas of research still need to be explored to fill the existing gaps in our understanding. Based on the study findings, the researcher suggests conducting a study on the challenges of implementing educational technology to enhance critical thinking skills in science among fourth-year middle school students. Additionally, it is advisable to conduct a study on parents' awareness regarding the significance of educational technology in fostering cognitive development. Previous studies have ignored this, but it would be a useful addition to the body of literature.

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