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Students' Responses and Differences in Learning Motivation after Canva-Based Interactive Ecosystem Learning among Grade X Senior High School Students

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Abstract: This study aimed to examine students' responses and compare their learning motivation in ecosystem learning after the implementation of Canva-based interactive learning media among tenth-grade senior high school students. The study employed a descriptive-comparative quantitative approach supported by qualitative data. The participants consisted of 60 Grade X students from three classes. All classes received ecosystem instruction using Canva-based interactive learning media. Data were collected through a learning motivation questionnaire, a student response questionnaire, classroom observations, and interviews. The quantitative data were analyzed using descriptive statistics and one-way analysis of variance (ANOVA), while the qualitative data were used to support the interpretation of the findings. The results showed that students generally responded positively to the use of Canva-based learning media. Students reported that Canva helped them understand ecosystem material more easily, increased their interest in learning, enhanced their enthusiasm in completing tasks, and improved classroom interaction. The statistical analysis also revealed a significant difference in students' learning motivation among the three classes after the implementation of Canva-based learning media, with Class X-3 obtaining the highest mean score. These findings indicate that Canva-based interactive learning media have strong potential to support students' learning motivation and create a more engaging and student-centered learning environment in ecosystem instruction. However, the extent of its impact may vary across classes depending on classroom conditions and the learning process.
Keywords: Learning motivation; interactive media; Canva; ecosystem; biology learning

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INTRODUCTION

The development of information and communication technology (ICT) has reshaped learning paradigms in secondary education, particularly in science instruction, which requires a high degree of visualization and interactivity (Msambwa et al., 2024; Azzahra & Prasetyo, 2024). In the perspective of constructivist learning theory, learning is understood as an active process in which students construct meaning through interaction between prior experiences and the learning environment (Liangshi, 2024). Therefore, the use of interactive learning media enables students not only to receive information passively but also to participate actively in developing understanding through visual activities, discussion, and independent or collaborative exploration. In addition, the cognitive theory of multimedia learning explains that instruction becomes more effective when information is presented through a combination of verbal and visual elements (Mayer, 2021). The integration of text, images, graphics, and animations supports processing through verbal and visual channels, thereby improving conceptual understanding and long-term retention. In biology learning, particularly in ecosystem topics, this approach is important because many concepts related to inter-organism relationships, energy flow, and interactions

between biotic and abiotic components are difficult to understand when explained only verbally (Mayer, 2021).

Ecosystem content in biology includes concepts such as food chains, food webs, energy flow, and environmental balance, all of which are systemic and complex in nature. These concepts are more easily understood when presented through visual representations connected to students' surrounding environments, such as rice fields, rivers, and school environments (Tristiyono & Carolina, 2024). Presenting content in a visual and contextual manner can help students understand the interrelationships among ecosystem components while increasing their engagement in the learning process. Therefore, the use of digital technology-based learning media is one alternative that can support the delivery of ecosystem material in a more attractive, interactive, and contextual way.

Learning media play a strategic role in enhancing students' learning motivation and the quality of their understanding of science content. The presentation of information through a combination of text and visuals can strengthen information-processing mechanisms and help students connect abstract concepts with more concrete representations (Renaldi et al., 2024). In addition to serving as a means of delivering information, learning media also function as pedagogical instruments capable of promoting interaction, active participation, and meaningful learning experiences for students (Fathahillah et al., 2023). Properly designed learning media can also encourage the development of higher-order thinking skills, improve scientific literacy, and strengthen students' independent learning capacity (Handini et al., 2024).

In the context of digital transformation, visual design platforms such as Canva offer new opportunities for developing innovative and user-friendly learning media. Canva is an online graphic design platform that enables users to create a wide range of visual learning materials through various templates, graphic design features, and animation elements in a practical manner (Sirajuddin & Wahditiya, 2024). Through this platform, teachers can develop diverse instructional materials, such as interactive presentations, infographics, learning videos, and engaging visual quizzes. The use of Canva-based learning media has the potential to increase students' active participation and create a more engaging and interactive learning atmosphere (Romero, 2025).

Previous studies have shown that Canva-based learning media can improve learning motivation, student engagement, and the effectiveness of science instruction (Prihatiningtyas & Astuti, 2024). However, most of these studies have primarily focused on the general development or implementation of media and have not extensively explored the contextual use of Canva in teaching ecosystem topics at the secondary school level. In addition, previous research has not sufficiently examined the use of Canva through qualitative approaches that could explore students' learning motivation in greater depth. Earlier studies also indicate that the development of learning media is often not based on a specific needs analysis of teachers and students in authentic classroom contexts. This indicates a research gap concerning the use of Canva-based interactive visual media in ecosystem learning.

Another common problem in biology instruction is the low level of student motivation and active participation, particularly in ecosystem topics, which involve abstract concepts and scientific terminology (Durisa et al., 2022). Learning methods that are still dominated by conventional approaches tend to limit students' active cognitive and emotional involvement in the learning process (Sari & Ferry, 2024). This condition indicates the need for innovative learning media that can provide more visual, interactive, and contextual learning experiences in order to enhance students' interest and motivation. Therefore, this study aimed to analyze the use of Canva-based

interactive learning media in ecosystem instruction and to examine how such media can improve the learning motivation of Grade X students. In addition, this study sought to identify the needs of teachers and students regarding visual features, animations, infographics, and interactive quizzes that support the contextual presentation of concepts such as food chains, food webs, energy flow, and ecosystem balance in biology learning.

METHOD

This study employed a descriptive-comparative quantitative design supported by qualitative data to examine students' responses and differences in learning motivation after the implementation of Canva-based interactive learning media in ecosystem learning. The quantitative approach was used to measure students' learning motivation and compare motivation scores across three classes, while qualitative data from classroom observations and interviews were used to enrich the interpretation of the findings through triangulation.

The study was conducted at SMA HAS Sepakat, located in Negeri Lama Seberang, Bilah Hilir District, Labuhanbatu Regency. The participants consisted of 60 Grade X students drawn from three classes: Class X-1, Class X-2, and Class X-3, with 20 students in each class. The sample was selected using purposive sampling based on its relevance to the research objectives. The students were generally between 15 and 16 years old and represented varied academic backgrounds.

The research procedure consisted of four stages: preparation, implementation, data collection, and data analysis. During the preparation stage, coordination was conducted with the school administration and the biology teacher to determine the research schedule and to prepare the instructional materials and research instruments. During the implementation stage, ecosystem learning was carried out in all three classes using Canva-based interactive learning media. Thus, all participating students were exposed to the same general instructional approach using Canva, although classroom dynamics and student responses may have varied across classes.

Data were collected after the instructional process using three techniques. First, a learning motivation questionnaire based on a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5), was administered to all students in the three classes to measure their motivation after participating in Canva-based ecosystem learning. The questionnaire was developed based on indicators of learning motivation, including interest in learning, persistence in completing tasks, attention to instructional material, and engagement in the learning process. Second, a student response questionnaire was used to identify students' perceptions of the Canva-based learning media. Third, classroom observations and semi-structured interviews with the biology teacher and several students were conducted to document student participation, interaction, and perceived changes in learning behavior. Supporting documentation, such as students' visual learning products in the form of ecosystem infographics, was also collected. Prior to use, the research instruments underwent expert validation involving biology education lecturers and subject teachers to ensure content validity, linguistic clarity, and alignment with the intended constructs.

Data analysis was conducted using both descriptive and inferential statistical techniques. Descriptive statistics, including mean and standard deviation, were used to describe students' learning motivation and responses to Canva-based learning media. To examine whether there were significant differences in motivation among the three classes after the implementation of Canva-based learning, a one-way analysis of variance (ANOVA) was performed after testing the assumptions of normality and

homogeneity of variance. Because the sample size in each class was equal, the ANOVA procedure was considered sufficiently robust for comparative analysis. The quantitative findings were then interpreted together with the results of observations and interviews to provide a more comprehensive understanding of students' responses and motivation in Canva-based ecosystem learning.

RESULTS AND DISCUSSION

The findings of this study were obtained through a learning motivation questionnaire, a student response questionnaire, classroom observations, and interviews with the biology teacher and several students. The student response questionnaire was used to identify students' perceptions of Canva-based interactive learning media after ecosystem learning had been implemented in the three classes. The results are presented in Table 1.

Table 1. Results of the student response questionnaire on the use of the canva application

Statement	SD	D	N	A	SA
I feel that Canva-based learning media make it easier for me to understand ecosystem material.	19	27	18	75	41
I feel more interested and engaged in learning about ecosystems after using Canva-based media.	9	19	12	63	17
I find it easy to access and use Canva-based media to study ecosystem material.	8	19	10	46	37
Canva-based media make me more curious and encourage me to seek further information about ecosystems.	5	4	3	27	21
Canva-based media make me more enthusiastic and motivated to complete ecosystem learning tasks.	4	4	2	28	22
The use of Canva improves my interaction and discussion with classmates in understanding ecosystem material.	4	9	7	27	21

As shown in Table 1, students generally responded positively to the use of Canva-based learning media. Across the six statements, the frequencies in the Agree and Strongly Agree categories were consistently higher than those in the neutral and negative categories. The strongest positive responses appeared in the statements indicating that Canva-based media helped students understand ecosystem material more easily and increased their interest and engagement in learning. These findings suggest that Canva was positively perceived as a supportive instructional medium in ecosystem learning.

From an academic perspective, this pattern indicates that Canva-based learning media may enhance both cognitive and affective dimensions of learning. In terms of cognitive support, students perceived the media as helpful in facilitating understanding of ecosystem concepts. In affective terms, the media also appeared to stimulate curiosity, improve classroom interaction, and enhance students' enthusiasm for completing learning tasks. This suggests that Canva functioned not only as a visual aid but also as a medium that encouraged greater student involvement during instruction.

Students' learning motivation after the implementation of Canva-based learning media was further analyzed across the three classes using descriptive statistics. The results are presented in Table 2.

Table 2. Descriptive statistics of students' learning motivation

Class	N	Mean (M)	Standard Deviation (SD)
X-1	20	35.40	7.62
X-2	20	33.05	6.82
X-3	20	40.50	5.84

As presented in Table 2, students' learning motivation varied across the three classes, even though all classes received ecosystem instruction using Canva-based interactive learning media. Class X-3 obtained the highest mean motivation score (M = 40.50), followed by Class X-1 (M = 35.40) and Class X-2 (M = 33.05). In addition, Class X-3 showed the lowest standard deviation (SD = 5.84), suggesting that students' motivational responses in this class were relatively more consistent than those in the other two classes.

These descriptive findings indicate that, although the same learning media were implemented in all classes, the motivational outcomes were not identical. This implies that the influence of Canva-based learning may vary across instructional contexts. Differences in classroom interaction, student readiness, and the overall learning atmosphere may have contributed to the variation in motivational scores among the three classes.

Before conducting the one-way ANOVA, the homogeneity of variances assumption was tested using Levene's test. The results are shown in Table 3.

Table 3. Levene's test of homogeneity of variances

Test Method	Statistic	df1	df2	p-value
Based on Mean	4.403	2	57	0.017
Based on Median	3.564	2	57	0.035
Median (Adjusted df)	3.564	2	53.77	0.035
Based on Trimmed Mean	4.474	2	57	0.016

The results of Levene's test indicated that the assumption of homogeneity of variances was violated ($p < 0.05$). However, because the sample sizes were equal across groups, the ANOVA analysis was continued with caution. The results of the one-way ANOVA are presented in Table 4.

Table 4. One-way ANOVA summary

Source	SS	df	MS	F	p
Between Groups	580.233	2	290.117	6.281	0.003
Within Groups	2632.750	57	46.189		
Total	3212.983	59			

The one-way ANOVA results revealed a statistically significant difference in students' learning motivation among the three classes ($F = 6.281$, $p = 0.003$). This finding indicates that although all classes were taught using Canva-based learning media, the level of students' motivation still differed significantly across classes. Therefore, the implementation of the same media did not necessarily produce identical motivational outcomes in every classroom setting.

This finding may be interpreted through multimedia learning theory (Mayer, 2009), which posits that students learn more effectively when information is presented through integrated verbal and visual representations. Ecosystem concepts such as food chains, food webs, and energy flow are often abstract when delivered through verbal explanation alone. The use of Canva-based visual media, including infographics and structured visual designs, likely helped students organize information more clearly and understand conceptual relationships more meaningfully. This may explain why many students reported that Canva made the material easier to understand and increased their interest in learning.

The findings are also consistent with constructivist learning theory (Piaget, 1972; Vygotsky, 1978), which emphasizes that students learn more effectively when they actively construct knowledge through meaningful learning activities. In this study, students were engaged in Canva-based tasks that required them to interpret ecosystem concepts, organize information visually, and communicate their understanding through learning products. These activities likely promoted active cognitive engagement and increased students' participation in the learning process.

Although all three classes received the same general treatment, the significant differences in motivational scores suggest that the effect of Canva-based learning was influenced by class-specific factors. Class X-3 showed the highest mean motivation score, whereas Class X-2 obtained the lowest. This variation suggests that students' motivational outcomes may have been shaped not only by the learning media itself, but also by classroom climate, student readiness, participation patterns, and the way the instructional process unfolded in each class.

The observational and interview data support this interpretation. Some classes demonstrated more active discussion, stronger collaboration, and greater enthusiasm during the learning activities, whereas others showed relatively lower participation. The biology teacher also reported that students became more confident and engaged during Canva-based learning, particularly when they were involved in creating and presenting visual products. These findings indicate that Canva-based media can support student motivation, but their impact may vary depending on how students interact with the classroom environment and learning activities.

Overall, this study demonstrates that Canva-based interactive learning media have considerable potential to support students' motivation in ecosystem learning. Students generally responded positively to the use of Canva, and significant differences in motivational scores were observed across the three classes. These results indicate that Canva can contribute to a more engaging and student-centered learning experience; however, the extent of its impact may depend on classroom conditions and student characteristics. Therefore, the integration of Canva into biology instruction should be accompanied by effective pedagogical strategies that ensure meaningful participation and active engagement in all classes.

CONCLUSION

Based on the findings of this study, the use of Canva-based interactive learning media in ecosystem instruction was positively associated with students' learning motivation. Students generally showed favorable responses to the use of Canva, particularly in terms of improved understanding of ecosystem material, increased interest in learning, greater enthusiasm in completing tasks, and better interaction with classmates during the learning process. Although all three classes received the same Canva-based instructional approach, students' motivation differed significantly across classes. Class X-3 achieved the highest mean motivation score, followed by Class X-

1 and Class X-2. This indicates that, while Canva has strong potential to support motivation in biology learning, its impact may vary depending on classroom conditions, student participation, and the overall learning atmosphere. Overall, Canva-based interactive learning media can be considered an effective tool for supporting a more engaging, visually meaningful, and student-centered learning experience in ecosystem learning. However, the effectiveness of its implementation should be supported by appropriate pedagogical strategies to ensure that all students benefit optimally from its use.

RECOMMENDATION

Future studies are recommended to involve larger samples and broader educational settings to obtain more comprehensive findings. In addition, further research should examine other factors influencing students' motivation, such as classroom conditions, teacher strategies, and student readiness. It is also suggested to investigate the effect of Canva-based learning media on other outcomes, including learning achievement, conceptual understanding, and creativity.

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