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The Effect of Weblog Utilization as A Learning Medium on Students' Motivation in Biology

Pengaruh Pemanfaatan Weblog Sebagai Media Pembelajaran Terhadap Motivasi Belajar Biologi Peserta Didik

Novia Anugra[1*], Nurul Nisa Muhammad [2]

1 Tadris IPA, Tarbiyah Faculty, IAIN Parepare, Indonesia.
2 SMP Negeri 5 Enrekang, Enrekang, Indonesia

* Corresponding Email: noviaanugra@iainpare.ac.id

Abstract

This study aims to determine the effect of using weblogs as a learning medium on students' motivation to learn biology. The research employed a quasi-experimental approach with a pretest-posttest nonequivalent control group design. The subjects were 11th-grade science students at SMA Negeri 11 Makassar, consisting of an experimental group (35 students) and a control group (34 students). The instrument used was a learning motivation questionnaire based on the ARCS model (Attention, Relevance, Confidence, Satisfaction). The results of the descriptive statistical analysis showed that the students' learning motivation in the experimental group increased more significantly than in the control group. The percentage of students who achieved high motivation scores in the control group was 85.29%, while in the experimental group it reached 100%. The inferential analysis using ANCOVA revealed a significance value of $p = 0.02$ (< 0.05), indicating a significant effect of weblog use on students' learning motivation. The weblog effectively enhanced the aspects of attention, relevance, confidence, and satisfaction in learning. Therefore, weblogs can serve as an effective alternative digital learning medium to foster students' motivation in the modern education era.

Article Information

Keywords:
ARCS; biology; instructional media; learning motivation; weblog

Penelitian ini bertujuan untuk mengetahui pengaruh pemanfaatan weblog sebagai media pembelajaran terhadap motivasi belajar biologi peserta didik. Penelitian menggunakan pendekatan eksperimen semu (quasi-experimental design) dengan desain pretest-posttest nonequivalent control group. Subjek penelitian adalah peserta didik kelas XI IPA SMA Negeri 11 Makassar yang terdiri dari kelompok eksperimen (35 Peserta Didik) dan kelompok kontrol (34 Peserta Didik). Instrumen yang digunakan berupa angket motivasi belajar berdasarkan model ARCS (Attention, Relevance, Confidence, Satisfaction). Hasil analisis statistik deskriptif menunjukkan bahwa motivasi belajar peserta didik pada kelompok eksperimen mengalami peningkatan yang lebih tinggi dibandingkan kelompok kontrol. Persentase peserta didik yang memperoleh nilai dengan kategori tinggi pada kelompok kontrol adalah 85,29% sedangkan untuk kelompok eksperimen adalah 100%. Rata-rata Hasil analisis inferensial menggunakan anacova menunjukkan nilai signifikansi ($p = 0,02 < 0,05$), yang berarti terdapat pengaruh signifikan penggunaan weblog terhadap motivasi belajar peserta didik. Weblog terbukti mampu meningkatkan aspek perhatian, relevansi, kepercayaan diri, dan kepuasan belajar Peserta Didik. Dengan demikian, weblog dapat dijadikan alternatif media pembelajaran digital yang efektif untuk meningkatkan motivasi belajar di era pendidikan modern.

Kata kunci:
ARCS; biologi; media pembelajaran; motivasi belajar; weblog

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A. INTRODUCTION

The rapid growth of digital technology has brought major changes and new challenges to education, demanding adjustments in teaching and learning processes to stay relevant and effective in today's dynamic era (Wiryanto et al., 2023) (Luh et al., 2023) (Lisnawati et al., 2024) In the education system, students are also expected to learn independently (Samosir et al., 2019). As a supporting means, learning media can encourage students' independent learning. Using suitable media helps them understand the material more easily and gain a clearer understanding of the concepts being studied. (Wulandari et al., 2023).

Learning media are one of the important components in the teaching and learning process, as they help improve the effectiveness of material delivery and students' understanding (Pebrianti, 2019). Learning media are used to present materials so that they can attract students' attention and interest, as well as encourage their mental and emotional involvement in the learning process to achieve the expected outcomes. (D. K. Sari et al., 2023). varied and technology-based learning media (Wiryanto et al., 2023)(Rifki, 2022) Such media are essential in this era of modernization, which demands online and fully digital learning environments, such as e-learning platforms (Chandrawati et al., 2023). E-learning has become a learning alternative that is now an integral part of the teaching and learning process in the digital era. Its use can help promote students' independent learning. (Genarsih & Tisngati, 2023), and contributes to the advancement of education, particularly benefiting both educators and students (Setiawaty et al., 2023). E-learning-based learning media can be utilized to enhance students' learning motivation. (Ulayyah & Rosy, 2022). However, the reality in many educational institutions shows that students' learning motivation remains a major issue, as indicated by low classroom participation, a lack of independent learning initiative, and a strong dependence on teachers for understanding the material. Motivation serves as a crucial factor in supporting the success of the learning process (Genarsih & Tisngati, 2023). The utilization of learning media not only enhances students' motivation and engagement but also exerts a psychological influence that supports their learning process (Rasiah, 2022).

Learning motivation is one of the key factors that determine students' success in achieving learning goals. Therefore, it is necessary to apply learning strategies that can build and maintain this motivation. The ARCS framework, which consists of Attention, Relevance, Confidence, and Satisfaction, was developed as a learning design approach to help increase students' motivation in the learning process. This model has been widely used in various educational contexts, including face-to-face, online, blended learning, and technology-based instruction. The ARCS model has been proven to improve students' attention, confidence, and satisfaction in blended learning, even more effectively than purely online or face-to-face learning (Ma & Lee, 2021). The application of the ARCS model in blended and online learning has been shown to improve students' attention, confidence, and satisfaction, even more effectively than traditional face-to-face learning (Su Song , Yiu Chi Lai, 2024).

A weblog can serve as a flexible medium that can be adapted to blended learning, which integrates face-to-face and online learning. The use of weblogs in blended learning has been proven to enhance communication, reflection, and collaboration among students(Gasaymeh & Jwaifell, 2013). A weblog is one of the e-learning media that can be utilized as a teaching aid. (Yuliyatno et al., 2019). An internet-based weblog represents one of the current e-learning technologies. (Widiastuti, 2018). A learning weblog helps students understand the material more easily while fostering their awareness and interest in learning. (Rumahorbo & Nurfajriani, 2022). A weblog is also easily accessible (Rizal, 2020), It is free of charge and engaging for learning activities. (Huda

et al., 2024). The term blog originates from the word weblog, which refers to a form of web application that displays writings or posts similar to an online journal on a publicly accessible website (Prisuna, 2022). A weblog is a type of website managed by an individual, supported by software or online platforms that facilitate users in writing and sharing content. (Artawan et al., 2023), (Simanjuntak, 2022). A weblog enhances students' writing skills, improves their dialogue abilities, and increases their interest in learning (Naro et al., 2020). A weblog contains various information related to learning materials, complemented by multimedia elements such as images, animations, sounds, and videos to help students understand the content more easily (Marpaung & Sitorus, 2024), not boring (Khozanah et al., 2020) which can be accessed anytime and anywhere without limitations of place and time (Sari & Okmarisa, 2024). Learning media based on weblogs have been found to significantly improve students' motivation and attitudes toward biology as a subject (Trisnawati Sarumaha, 2023). The use of weblogs as both learning media and learning resources can introduce variety into the learning process, creating a more dynamic and engaging learning atmosphere. This, in turn, can motivate students to be more enthusiastic in studying the material (Sari & Okmarisa, 2024).

B. METHOD

This study employs a quasi experimental design. The research design used was a pretest posttest nonequivalent control group design, involving two classes as research subjects one serving as the experimental group and the other as the control group. The population consisted of 215 students from Grade XI Science at SMA Negeri 11 Makassar. The sample was selected using purposive sampling, with the control and experimental classes chosen based on their nearly identical number of students and similar student characteristics. Consequently, the control group consisted of 34 students, while the experimental group included 35 students.

The research instrument was a motivation questionnaire administered to students to assess their learning motivation during the learning process using weblog-based learning media. The questionnaire had been validated prior to its use. It was structured as a Likert scale consisting of 50 items with five response options. For favorable items, the scoring guidelines were as follows: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), and Strongly Agree (5). For unfavorable items, the scoring was reversed: Strongly Disagree (5), Disagree (4), Neutral (3), Agree (2), and Strongly Agree (1).

Data analysis was conducted using a one-way Analysis of Covariance (ANCOVA) test, which involved two independent variables and one dependent variable. ANCOVA is a statistical method that provides control over extraneous variables that may influence the relationship between independent and dependent variables.

Table 1. Categories of Learning Motivation

No	Average Score Range	Category
1	1,00-1,49	Very Low
2	1,50-2,49	Low
3	2,50-3,49	Moderate
4	3,50-4,49	High
5	4,50-5,50	Very High

C. RESULTS AND DISCUSSION

The distribution of the number of students, percentages, and categories of learning motivation scores, including the tabulation of learning motivation data, are presented in the following table:

Table 2. Distribution of Biology Learning Motivation in the Control and Experimental Classes

Descriptive Statistics	Control Group		Experimental Group	
	pretest	Posttest	Pretest	postest
Number of Samples (N)	34	34	35	35
Mean	3,62	3,81	3,60	3,99
Standard Deviation	0,32	0,41	0,28	0,29
Median	3,57	3,91	3,52	4,00
Mode	3,58	3,78	3,48	4,36
Highest Score	4,34	4,34	4,22	4,40
Lowest Score	3,16	2,68	2,90	3,50

The Differences in students' learning motivation are reflected in the comparison of the mean, highest, and lowest scores across groups. These results were subsequently classified into learning motivation levels. The frequency and percentage distributions of students according to their motivation categories, both in learning supported by weblog media and in conventional learning, are shown in the following table:

Table 3. Frequency and Percentage Distribution of Students' Biology Learning Motivation in the Control and Experimental Classes

Kategori	Control Group		Experimental Group	
	Number of Students	Percentage (%)	Number of Students	Percentage (%)
Very High	0	0	0	0
High	29	85,29	35	100
Moderate	5	14,71	0	0
Low	0	0	0	0
Very Low	0	0	0	0
Total	34	100	35	100

The percentage of students who obtained scores in the very high category was 0% for both the control and experimental groups. The percentage of students who achieved scores in the high category was 85.29% in the control group and 100% in the experimental group. Meanwhile, the percentage of students who obtained scores in the moderate category was 14.71% in the control group and 0% in the experimental group.

Table 4. Average Scores of Students' Motivation by Perceptual Elements

Motivational Perceptual Element	Control Group		Experimental Group	
	Pretest	Posttest	Pretest	Posttest
Attention	3,58	3,80	3,63	3,89
Relevance	3,53	3,71	3,46	3,92
Confidence	3,56	3,85	3,55	3,99
Satisfaction	4,21	4,29	4,17	4,63

Table 4 presents the mean scores of students' learning motivation based on the perceptual elements influencing motivation, namely attention, relevance, confidence, and satisfaction. In terms of attention toward biology learning, both the control and experimental groups were categorized as high before and after the treatment, indicating that students' interest in the subject was already strong from the beginning.

Regarding the relevance of the learning material to daily life, the control group remained in the high category before and after the learning process. In contrast, the experimental group showed an improvement from the moderate category before treatment to the high category after learning through the weblog. For the confidence aspect, both groups were in the high category before and after the treatment. Meanwhile, the satisfaction aspect revealed that the control group consistently remained in the high category, whereas the experimental group improved from high before the treatment to very high after using the weblog. These findings indicate that the use of weblogs as a learning medium had a positive influence, particularly in enhancing the relevance of the material and students' learning satisfaction.

Prior to hypothesis testing, prerequisite analyses were conducted, including normality and homogeneity tests. The normality test was performed using the Kolmogorov–Smirnov test, with the results showing a p-value of $0.116 > \alpha = 0.05$, indicating that the data were normally distributed. The homogeneity test yielded a p-value of $0.056 > \alpha = 0.05$, suggesting that the data were homogeneous. After meeting the prerequisite criteria, hypothesis testing was carried out using Analysis of Covariance (ANCOVA).

Tabel 5. ANCOVA Test Results on the Effect of Weblog Use on Students' Learning Motivation

Comparison / Test	Significance Value (p-value)	Significance Level (α)	Test Decision	Conclusion
Uji ANCOVA	p = 0,02	0,05	$p < \alpha \rightarrow H_0$ rejected, H_1 accepted	There is a significant effect of weblog use on students' learning motivation
O1 : O2	p = 0,039	0,05	$p < \alpha \rightarrow H_0$ rejected	There is a significant difference between O1 and O2
O1 : O3	p = 0,795	0,05	$p > \alpha \rightarrow H_0$ accepted	There is no significant difference between O1 and O3
O1 : O4	p = 0,000	0,05	$p < \alpha \rightarrow H_0$ rejected	There is a significant difference between O1 and O4
O2 : O3	p = 0,018	0,05	$p < \alpha \rightarrow H_0$ rejected	There is a significant difference between O2 and O3
O3 : O4	p = 0,000	0,05	$p < \alpha \rightarrow H_0$ rejected	There is a significant difference between O3 and O4
O2 : O4	p = 0,036	0,05	$p < \alpha \rightarrow$ rejected	There is a significant difference between O2 and O4

The results of the further analysis showed that the initial motivation of the control and experimental groups (O1:O3) yielded a p-value of $0.821 > 0.05$, indicating a non-significant difference. This means that the null hypothesis (H_0) was accepted, suggesting no difference in the initial motivation between the two groups both had similar baseline motivation levels before treatment.

However, after the treatment was administered, the comparison of motivation between the control and experimental groups (O2:O4) resulted in a p-value of $0.037 < 0.05$, indicating a significant difference. This means that the alternative hypothesis (H_1) was accepted, showing that there was a significant difference in learning motivation between the control and experimental groups after the treatment.

Furthermore, the ANCOVA results confirmed a significant difference at the p-value of 0.02 < α = 0.05, particularly observed in the posttest comparison (O2:O4). Therefore, it can be concluded that the use of weblog-based learning media had a significant positive effect on students' learning motivation based on the ARCS model (Attention, Relevance, Confidence, and Satisfaction).

The use of technology, especially weblog-based learning, has a positive influence on students' learning motivation and engagement. Today, most students are familiar with technology and actively use the internet to find information, access learning materials, and complete assignments online. Devices such as smartphones, laptops, and tablets allow them to study anytime and anywhere without being limited to the classroom. Weblogs, as learning media, not only provide access to learning materials but also offer a more interactive and engaging learning experience. The presence of multimedia elements such as animations and videos makes the learning process more interesting and easier to understand. In addition, features such as chat and discussion columns enable students to interact with peers and teachers, helping those who are less confident to express their opinions in class. Thus, weblog-based learning makes the learning process more inclusive, enjoyable, and aligned with the digital lifestyle of today's students.

When viewed from the perceptual elements of motivation, namely the ARCS framework which consists of Attention, Relevance, Confidence, and Satisfaction it shows that these elements have a positive influence on students' learning motivation. Students' attention to biology learning materials delivered through weblogs, which combine offline and online learning, was notably high. This can be seen from their willingness to actively follow every learning activity conducted both online and face to face. Attention, as the first component of the ARCS model, aims to capture and maintain students' interest and focus throughout the learning process. It is considered a crucial initial step to encourage students to become actively engaged and motivated in the learning process.

Attention refers to efforts to stimulate students' curiosity, interest, and engagement through various innovative and interactive learning strategies (Song & Kao, 2023) (Zhou & Zhang, 2025). The strategy used to capture students' attention involves the use of various types of media, such as images, videos, or simulations (Keller, 2016), as well as posing questions that encourage students to think critically from the very beginning of the lesson (Fang et al., 2024). Attention has been proven to be the most influential factor in enhancing students' motivation and learning outcomes, even more significant than the other components of the ARCS model (Ucar & Kumtepe, 2020).

Another perceptual element is Relevance. The high level of motivation observed among students is also influenced by the alignment between the learning materials and their prior knowledge as well as their everyday experiences. This can be seen through various case studies provided in the learning media. Relevance refers to the effort to connect learning materials with students' experiences, goals, needs, or interests so that they perceive the learning process as meaningful and valuable for their lives and future (Fang et al., 2024). The strategy employed involves relating the learning material to students' daily lives. (Zhou & Zhang, 2025), discussing relevant case studies and linking the material to students' needs. (Saputri et al., 2020). Relevance has been shown to significantly enhance students' motivation, engagement, and learning outcomes across various educational levels and fields of study (Zhou & Zhang, 2025).

Next, another perceptual element that shapes motivation is Confidence. Students' confidence during the learning process, whether conducted online or face-to-face in the classroom, was also observed to be high. This is evident in various activities, such as asking questions about topics they do not yet understand, participating in discussion forums like weblog chatrooms with both teachers and peers, and completing assignments with the belief that actively engaging in these tasks and asking questions when needed will positively impact their own learning outcomes.

Confidence refers to efforts to foster students' self-assurance in their ability to complete tasks and achieve learning objectives (Keller, 2016). This can be achieved by providing clear learning objectives, offering positive feedback, breaking tasks into smaller steps, and creating opportunities for students to experience gradual success (Afjar et al., 2020). Confidence has been shown to significantly enhance students' motivation, perseverance, and learning outcomes across various subjects, including science, mathematics, and online learning environments (Molina & Ramirez, 2025).

The final perceptual element shaping motivation is *Satisfaction*. Students reported feeling satisfied because they were able to utilize various electronic devices to access learning materials and complete assignments online. They also expressed satisfaction with the use of weblog media, as it allowed them to interact with peers and teachers to discuss the learning materials anytime and anywhere. The results indicate that students experienced a sense of satisfaction following the learning activities.

Satisfaction refers to the feeling of contentment that arises when students successfully complete tasks or achieve learning objectives, either through external rewards (such as praise or prizes) or intrinsic satisfaction (such as personal pride or a sense of accomplishment)(Keller, 2016) Satisfaction can be fostered by providing positive feedback, recognition, opportunities for successful experiences, and ensuring fairness and consistency in assessment. Satisfaction has been shown to enhance students' motivation, engagement, and academic achievement across various educational levels, both in face-to-face and online learning environments (Molina & Ramirez, 2025).

The researchers acknowledge that enhancing students' learning motivation is not an easy task, particularly when using learning media such as weblogs, which are still relatively new to some students. However, in today's digital era, where learners are generally familiar with technology and frequently incorporate it into their daily activities, weblogs serve as a relevant and easily adaptable supplementary tool for online learning.

D. CONCLUSION

The utilization of weblogs as a learning medium has a positive and significant effect on students' motivation to learn biology. This is demonstrated by the increase in the average motivation scores in the experimental group compared to the control group after the treatment, particularly in the aspects of Attention, Relevance, Confidence, and Satisfaction as reflected in the ARCS model. Weblogs have been shown to create a more engaging, relevant, and interactive learning environment, while also providing students with opportunities to learn independently and collaboratively beyond the confines of the classroom. Therefore, weblogs can serve as an effective alternative digital learning medium for enhancing students' learning motivation in the context of modern education.

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