Engagement and Satisfaction in Science Employing Blended Learning in Junior High School Students

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Abstract

Blended learning is an essential aspect of education that integrates technology into the teaching and learning process. This study aimed to examine the relationship between engagement and satisfaction in science in blended learning among junior high school students. The study utilized a quantitative descriptive correlational research design and selected 100 junior high school students through simple random sampling using an adapted questionnaire. This study revealed that with blended learning, the level of engagement and satisfaction in science of junior high school students are both high. In addition, the study found a significant relationship between engagement and satisfaction in science. Further, behavioral and emotional engagement indicators significantly influenced satisfaction in science employing blended learning while cognitive engagement does not show significance. Thus, more exploration and refinement of cognitive engagement methods contribute to a deeper understanding of effective pedagogy in blended learning contexts. Given the results, educators and curriculum developers may consider designing blended learning activities that promote emotional engagement. Furthermore, educators may focus on improving the ease of use of blended learning platforms to reduce potential barriers to student engagement and satisfaction in science.

Keywords: engagement in science; cognitive, behavioral and affective domains; satisfaction in blended learning; junior high school students.

1. Introduction

Our educational system increasingly adopts blended learning, integrating technology to enhance student understanding and incorporating science materials that foster collaboration. However, as educators strive to leverage blended learning to enhance students' engagement, they also face challenges related to equity and access where multifaceted science concepts require more effort to execute in a blended setting, directly impacting students' satisfaction. Despite the widely acknowledged advantages of blended learning, utilizing it while aiming to obtain satisfaction in science is a concern that needs to be addressed urgently. A research conducted in New York by Roff (2018) some students were dissatisfied with the features of blended learning, such as disconnection and technology. Similarly, according to the research by Tosun (2015) in Turkey, certain students expressed dissatisfaction with the digital tools utilized within the blended learning approach that needs to be improved in terms of engagement and overall effectiveness. Moreover, this dissatisfaction may worsen because studying science tends to become less appealing to most students over time (Krapp & Prenzel, 2011, as cited in Conel, 2021). Hence, guiding students to understand its concepts has often posed challenges for science teachers (Hadzigeorgiou & Schulz, 2019). In the Philippines, Redillas (2023) discovered that a lack of internet access, gadgets, and even printouts adds an unusual degree of distress and challenge to every student, teacher, and home-navigating blended learning. Furthermore, in a national high school where the researcher is connected, the school Video lessons and PowerPoint presentations are used to supplement science subjects. As a result, students face challenges in grasping fundamental concepts

due to the absence of immediate teacher response that leads to poor engagement impacting their satisfaction in science; will be the gap to focus in this study. In this regard, Rajabalee and Santally (2020) cited some issues related to a lack of assistance from teachers and experiencing technical problems across blended learning, while Hesse (2017) stated that the lack of instant teacher feedback in some blended learning platforms causes students to be dissatisfied and less engaged in science. In addition, Gyimah (2019) demonstrates considerable gaps in factors impacting student engagement and satisfaction, such as course material quality, teaching style efficacy, and support levels. Also, Nortvig et al. (2018), emphasizing the urgent need for research on factors influencing students' learning experiences in blended learning settings. Therefore, building on the significance emphasized by Mohd et al. (2016) and Corneja and Mendoza (2023) regarding the relationship between engagement, satisfaction, and academic achievement in science education, this study aims to contribute a comprehensive analysis and set of indicators for learner engagement, filling a gap in existing literature. The anticipated findings hold relevance for Department of Education Policymakers, school heads, teachers, students, and future researchers.

1.1. Statement of the Problem

The primary aim of this study is to investigate the significant relationship between engagement and satisfaction in science utilizing blended learning of junior high school students. The following research questions were adapted and modified from Kong, et al. (2003) and Huang (2021) are the following:

1. What is the level of student engagement in terms of: cognitive; emotional; and behavioral?
2. What is the level of satisfaction in science employing blended learning in terms of: perceived usefulness; perceived ease of use; learning motivation; and learning satisfaction?
3. Is there a significant relationship between engagement and satisfaction in science employing blended learning in junior high school students?
4. Is there an indicator of engagement that significantly influences satisfaction in science employing blended learning to junior high school students?

1.2. Hypotheses

On the other hand, the following hypotheses were tested at a .05 level:

Ho1 There is no significant relationship between engagement and satisfaction in science employing blended learning of junior high school students.

Ho2 There is no domain of engagement that significantly predicts the satisfaction in science employing blended learning of junior high school students.

1.3. Theoretical Framework

The primary theoretical framework underpinning this study is the Sociocultural Theory proposed by Lev Vygotsky in (1981) that concisely explains the relationship between satisfaction and engagement by emphasizing the role of social and cultural factors in learning. According to this theory, learners gain enhanced understanding and satisfaction through interactions with knowledgeable peers and teachers, combined with culturally-contextualized tools, and meaningful science tasks that bridge theory to real-world

scenarios; factors that enhance the learners' motivation, self-regulation, and cognitive development (Lane et al., 2021).

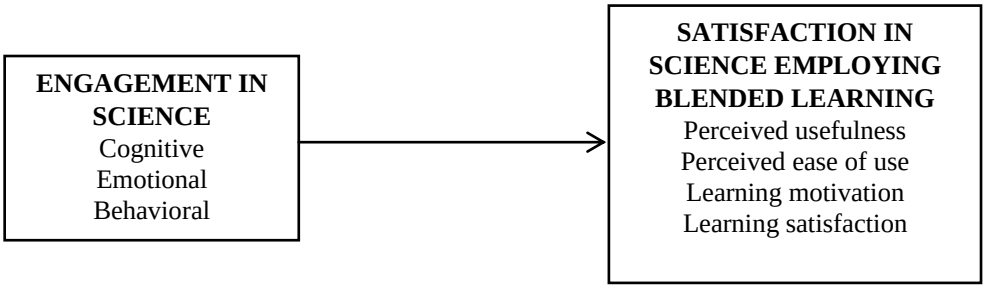

Figure 1. Conceptual framework showing the relationship between two variables

2. Methodology

Following McCombes (2019), a quantitative descriptive correlational design was employed in this study to examine the influence of engagement on satisfaction in science employing blended learning among junior high school students. The study was conducted in a National High School in Mati City, Philippines. It is chosen due to the school's urgent concern for satisfaction in science using blended learning. The 100 respondents were randomly selected junior high school students from the school who had experience with blended learning. Data were collected during the first semester of the school year 2022-2023, and outliers were removed during the analysis phase. The research instrument is adapted from Kong et al. (2020) and Huang (2021), underwent careful validation and included questions on engagement (cognitive, emotional, and behavioral) and satisfaction indicators (perceived usefulness, perceived ease of use, learning motivation, and learning satisfaction) using Likert scale ranging from strongly disagree (1) to strongly agree (5). The questionnaire was validated by the experts, then pilot-tested on 20 junior high school students with specifications similar to the actual respondents, and the results gained were examined further for reliability using Cronbach's Alpha with the result of 0.884. This study goes through rigorous review from REC, where ethical guidelines were strictly followed and with informed consent obtained from parents and assent form from students. The researcher employed descriptive and inferential statistical analyses post-empirical data collection such as Mean, Standard Deviation, Pearson Product-Moment Correlation and Linear Regression.

3. Results and Discussions

This section sequentially presents analyzed data of engagement and satisfaction in science employing blended learning of junior high school students.

Table 1. Level of Engagement in Science of Junior High School Students

Indicators	SD	Mean	Description
Cognitive Engagement	.41	3.92	High
Emotional Engagement	.47	4.20	Very High
Behavioral Engagement	.49	4.15	High
Overall	**0.35**	**4.09**	**High**

The primary goal of this study is to assess the level of Engagement in Science of junior high school students across three domains. Based on the results, cognitive engagement (SD=0.41, x=3.92) “High” despite being rated as the lowest among other indicators, suggests that students are somewhat engaged in the cognitive aspects like understanding science concepts rather than memorizing it. On the other hand, emotional engagement (SD=0.49, x=4.20) “Very High”, denotes that they are always engaged and like to attend science classes, while behavioral engagement (SD=0.49, x=4.15) “High”, signifies that they are regularly engaged and listen to teachers instructions attentively. The total standard deviation (0.35) proposes little variability, indicating a consistent and dependable dataset clustered around the mean (4.09). Therefore, it points out further that students are often emotionally and behaviorally engaged in science.

Moreover, the result for emotional engagement is parallel with the study of Siry and Brendel (2016) that students find their learning activities appealing, satisfying, and worthwhile, however, the item test-related anxiety needs to be addressed, to maximize blended science education. Furthermore, the finding for behavioral engagement suggests active participation that is congruent with the study of Tucker (2019) indicating that actions and behaviors influence learning. On the other hand, the lower mean for cognitive engagement highlights the need to address particularly the aspect of memorization that might contribute to the declining interest in studying science, as memorization-focused approaches may be less appealing to students (Krapp & Prenzel, 2011, as cited in Conel, 2021).

Table 2. Level of Satisfaction in Science employing Blended Learning in Junior High School Students

Indicators	**SD**	**Mean**	**Description**
Perceived Usefulness	.59	4.22	Very High
Perceived Ease of Use	.49	3.69	High
Learning Motivation	.57	4.16	High
Learning Satisfaction	.60	4.14	High
Overall	**.47**	**4.05**	**High**

Table 2 compares four indicators of Satisfaction in Science using Blended Learning: perceived usefulness, perceived ease of use, learning motivation, and learning satisfaction. Among these, students rated perceived usefulness as highest (SD=0.59, M=4.22) suggesting that they perceive the content and methods used in the blended learning environment as relevant and effective for their learning goals while perceived ease of use as lowest but still positively high (SD=0.49, M=3.69) proposes that while students may find certain aspects of the blended learning system slightly less intuitive, they still find blended learning system as reasonably easy to navigate and use. Then, the overall mean score (SD=0.47, M=4.05) suggests junior high school learners were satisfied in science with blended learning.

Furthermore, the result is parallel with the study of Jing et al. (2021) that perceived usefulness is the most significant factor influencing how eager learners are to use blended instruction. Moreover, Zeqiri et al. (2021) notes that blended learning's impact on student performance and satisfaction is closely tied to instructional management and interaction. Despite a positive perception of ease of use, the slightly lower score indicates that there might be specific features, functions, or elements in the learning system that could be refined to enhance the user experience that aligns with the study of Shiau & Chau (2016), that the impact of perceived ease of use on readiness to study with the concept that the ease with which students can use a system influences their perception of its value and utility.

Table 3. Pearson Correlation Table and Model Fit Summary

	Level of Satisfaction in Science Employing Blended Learning	Correlation Strength	p-value	Decision for the Hypothesis
Level of Engagement in Science	0.53	Moderate Positive Correlation	0.000	Reject

* Significant at 0.00 >0.01 level of significance (2-tailed)

A Pearson correlation coefficient was computed to evaluate the linear relationship between two variables, and the result, r (97) = 0.53, p<.01 revealed moderate positive correlation. It suggests a significant relationship between engagement and satisfaction in science using blended learning in junior high school students. While the obtained p-value = 0.00<0.05 leading to the decision to reject null hypothesis 1 (Ho1). Furthermore, the moderate positive correlation between engagement and satisfaction science using blended learning aligns with the principles of Sociocultural Theory where learners are more engaged and satisfied when they interact with more knowledgeable peers, use culture-specific tools, participate in meaningful and authentic tasks, and experience positive emotions. Also, it is parallel with the literature of Lam et al. (2018) that developing strong student engagement in both face-to-face and technological environments is critical for delivering effective blended learning and is a prerequisite for successful learning.

Table 4. Regression Coefficients with Engagement in Science Variables as Influencers of Satisfaction in Science using Blended Learning

Variables	**B**	**SE**	**β**	**t**	**P**	**R-squared**
Constant	1.528	0.469		3.258	0.002	.343
Cognitive Engagement	-0.043	0.104	-0.037	-0.411	0.682	
Emotional Engagement	0.232	0.102	.230	2.268	0.026	
Behavioral Engagement	0.419	0.100	.438	4.201	0.000	
$R = 0.585;\ \Delta R^2 = 0.343;\ F = 16.342;$ Sig. = <0.001						

Based on the result, it implies that emotional (p-val = 0.026; B =0.232) and behavioral engagement (p-val = 0.000; B = 0.419) significantly influences satisfaction in science in junior high school students using blended learning. However, cognitive engagement does not appear as a significant predictor of satisfaction in science, rejecting the null hypothesis 2 (Ho2). The statistically significant F-value of 16.342 ($p < 0.001$) suggests that the model is a good fit, while the substantial R-squared value of 0.343 indicates that 34.3% of the variance in satisfaction is explained by emotional, behavioral, and cognitive engagement. The regression equation for this model is as follows: $y= 0.232x + 0.419z + 1.528$ where x is the emotional engagement and z is the behavioral engagement.

Therefore, the finding is parallel with the study of Lane et al. (2021) that emotional engagement is an important predictor of both student satisfaction and achievement in blended learning education. On the other hand, cognitive engagement being not a predictor implies that students may be intellectually stimulated but dissatisfied due to presentation style or perceived real-world applications. It aligns with the study of Sadera (2020) that students deal with challenges and hurdles such as subject matter content, medium of instruction, learning environment, resources, and curriculum when studying science.

4. Conclusion

Based on the data gathered, conclusions were made that junior high school students are highly engaged in science classes, with emotional and behavioral indicators playing a significant role in their overall engagement. However, some students tend to rely on understanding-based study methods and may experience test-related anxiety, suggesting a need for specialized pedagogical support. To maximize the benefits of science education, it is essential to promote well-rounded engagement strategies. Additionally, the study indicates that students generally have a positive perception of blended learning in science education. Despite initial usability challenges, this approach is beneficial for acquiring new knowledge and increasing class participation. While there may be a slight decrease in average learning motivation, most students remain motivated to study using blended learning, highlighting their overall satisfaction with the system. These findings emphasize the strengths of blended learning and the need for ongoing improvements to enhance the overall learning experience. The results underscore the importance of promoting comprehensive engagement strategies in science education, addressing memorization and test-related anxiety issues. Moreover, the positive perception of blended learning highlights its potential to improve the overall learning experience, especially in fostering emotional and behavioral engagement.

5. Recommendation

Based on the study's results, specific recommendations have been suggested. Teachers are encouraged to design learning activities and implement teaching practices that enhance students' cognitive engagement to address the lowest mean result in cognitive engagement. Strategies such as problem-based, inquiry-based, and project-based learning could be employed to improve cognitive engagement among students. These educational strategies will help students strengthen their critical thinking abilities, which is essential for enhancing their grasp of science concepts. Second, to address the concern of perceived ease of use, teachers may simplify instructions, make them more transparent, and consider giving additional technical support to students to improve their abilities in using blended learning tools and platforms. This can make students feel more comfortable utilizing available resources, enhancing their blended learning experience. Finally, the findings further recommend that curriculum developers and school administrators plan to establish blended learning activities and strategies to help students manage test-related anxiety and create a supportive testing environment to improve satisfaction in science with the blended learning experience. Lastly, the researcher recommends future researchers to explore the factors connected to perceived ease of use and cognitive domain. Other factors influencing learners' satisfaction in science using blended learning, such as learning style and prior understanding of the subject matter, may also be addressed.

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