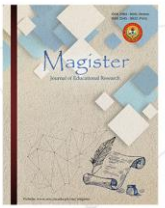

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Exploring the Influence of Self-Regulated Learning Strategies on Learning Motivation in a Blended Learning Environment

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Abstract

In developing economies, blended learning presents challenges, including effectively implementing self-regulated learning (SRL) strategies, sustaining motivation, and ensuring active engagement in the educational landscape. This study investigates how self-regulated learning (SRL) strategies affect motivation through engagement and satisfaction. Covariance-based Structural Equation Modeling was utilized to analyze the 919 valid responses from high school students in the Visayas Region, Philippines. The results supported four out of five hypothesized paths. SRL strategies positively affect satisfaction and engagement. Satisfaction negatively predicted motivation, while engagement positively influenced motivation to learn. The significance of these results informed tailored approaches for educators and institutions in a blended learning environment. These findings contribute valuable insights to the ongoing discussions on effective educational strategies in the context of blended learning.

Keywords: *blended learning, self-regulated learning, motivation, engagement, structural equation modeling*

1. Introduction

The digital era has brought about a revolutionary transformation in education during the twenty-first century. The rapid evolution of educational technology has led to blended learning, a pedagogical approach combining traditional classroom instruction with online learning to foster student-centered, self-paced, and flexible learning experiences (Tang & Chaw, 2016). Blended learning represents an integration of face-to-face classes with offline or online activities

facilitated through computer technologies (Tang & Chaw, 2016). This approach has been particularly impactful since the beginning of digital learning in 1999 (Sivaranjani & Prakash, 2014), providing students with technological tools for comprehensive knowledge acquisition.

Despite the advantages, the success of blended learning depends on learners' adept control of digital learning processes, posing challenges to students' learning processes (Boelens et al., 2017). Emphasizing the importance of increased learner control, the demand for higher student engagement and self-regulated learning in the digital learning landscape is inevitable (Zhu et al., 2016). The World Economic Forum's Future of Job Survey Report (2018) underscores the significance of active learning and teaching approaches as essential skills in 2022, acknowledging that learners must focus on what they learn and how they learn. In the digital environment, the current generation of students requires quality education with developed and mastered learning strategies, recognizing that individual management of learning progression is a crucial predictor of academic success. One of the key predictors of academic success lies in an individual's ability to manage their learning progression.

Self-regulated learning plays a pivotal role in assessing the efficacy of blended learning from the student's perspective (Anthonysamy et al., 2020; Kassab et al., 2015; Wong et al., 2019). This approach becomes particularly relevant when control over the learning process has shifted from educational institutions to individual students (Pelika et al., 2021; Wong et al., 2019). In this transformed educational landscape, students assume responsibility for tasks previously managed by institutions, such as goal-setting and overall learning process management, while simultaneously grappling with the multifaceted crises imposed by the ongoing pandemic, including economic, social, health, and mental challenges (Soria-Barreto et al., 2021). However, not all students are equally equipped to adapt to and navigate this ever-evolving situation (Adnan & Anwar, 2020; Kumar et al., 2022; Martha et al., 2021). Critical issues, such as access to internet infrastructure, pose significant challenges, particularly in underdeveloped areas, making it imperative to explore students' self-regulated learning in the context of distance learning during the pandemic, with a focus on these underserved regions (Chet et al., 2022; Ilangarathna et al., 2022). Addressing this emerging phenomenon is crucial to helping students confront and overcome challenges, ultimately enhancing their academic performance (Wong et al., 2019).

Despite the growing body of research on blended and self-regulated learning, little is known about understanding the specific dynamics and interplay between self-regulated learning processes and the effectiveness of blended learning environments. While previous studies have addressed self-regulation or explored elements of blended learning separately, a comprehensive investigation utilizing Structural Equation Modeling (SEM) to examine the connections between self-regulated learning components and blended learning outcomes is notably lacking. This research aims to fill these gaps using SEM to provide a detailed understanding of how self-regulated learning influences various aspects of the blended learning experience.

This study is organized into four primary sections. The following section encompasses the literature review and hypotheses, comprehensively exploring existing research and formulating hypotheses. Next is the methodology section, which describes the research questions of this study, the literature search process, and the study selection process. The third section presents the results and discussion, which presents the findings, categorization, and analysis. Lastly, the study concludes with the conclusion section, summarizing key insights and implications drawn from the research.

2. Literature Review Hypotheses

2.1. Self-Regulated Learning (SRL) Under Blended Learning Setting

Blended learning, a term based on constructive learning theory, focuses on student-centered learning, in which students acquire knowledge and skills through active construction (Jiang et al., 2022). Before technology became an integral part of education, blended learning was viewed as a pedagogical approach that utilized diverse teaching styles or theories to enhance learning without the reliance on technology. However, the definition of blended learning has evolved with the integration of e-learning, or online learning, as a complementary tool to traditional face-to-face instruction (Xiong et al., 2022). Gurley (2018) characterized blended learning as a combination of traditional face-to-face (F2F) and online learning, with "at least 30% to 79% of the course materials and activities delivered online". However, Nortvig et al. (2018) defined blended learning as a learning process where 50% of total course time is dedicated to F2F instruction". In this research, blended learning is conceptualized as an integrative approach that combines face-to-face class time with online learning

within the same course, consistent with the approaches adopted in other studies (Alvarado-Alcantar, 2018; Gurley, 2018; Spring & Graham, 2017; Wang et al., 2022).

Within the blended learning context, various formats are integrated into the learning process, blending theories and practices of online learning with traditional learning methodologies. These blended approaches include offline and online learning, self-regulated and structured and unstructured learning, and cooperative learning. By combining the strengths of classroom face-to-face and online learning, blended learning provides students with diverse and enriching learning experiences, fostering independent, group, and collaborative learning (Broadbent & Poon, 2015; Castro, 2019). This model is particularly well-suited for learners pursuing independent study or self-regulated learning styles, as asynchronous models offer greater flexibility and enhance their learning motivation and engagement (Hainey et al., 2017; Spanjers et al., 2015).

Self-regulated learning (SRL) is the process of self-generated thoughts, feelings, and actions that are strategically planned and cyclically adjusted to achieve individual goals (Zimmerman & Schunk, 2011). Within blended learning environments, self-regulated learners take ownership of their learning process by actively planning and scheduling their study time, setting learning goals, and employing effective strategies to achieve those goals. They continuously monitor and evaluate their learning progress, adapting strategies to improve the progression toward goal attainment (Zimmerman & Schunk, 2011).

SRL positively correlates with academic achievement in traditional classroom and online learning environments (Schneider & Preckel, 2017). By engaging in SRL, learners can enhance their time management skills, meta-cognitive abilities, effort regulation, critical thinking skills (Broadbent & Poon, 2015; Yukselturk & Bulut, 2007), and self-efficacy (Honicke & Broadbent, 2016). Studies have consistently demonstrated that successful students in blended learning settings typically employ SRL strategies, and the impact of self-regulation on student academic success is statistically significant (Yukselturk & Bulut, 2007). SRL is a dynamic construct that can be developed over time through the interplay of personal, behavioral, and environmental factors (Broadbent & Poon, 2015; Tsai et al., 2011). Even learners with initially low SRL skills can enhance their self-regulatory strategies within supportive environments, emphasizing the importance of fostering a positive

attitude and cultivating attention towards SRL in achieving learning goals.

In this study, self-regulated learning (SRL) encompasses three key dimensions: time management, goal setting, and task strategies. Time management is effectively planning, scheduling, and organizing one's time to achieve learning goals (Dabbagh & Kitsantas, 2004). Goal setting involves establishing specific, measurable, achievable, relevant, and time-bound (SMART) goals to guide learning (Zhou et al., 2021). Task strategies encompass the specific cognitive, metacognitive, and behavioral processes employed to accomplish learning tasks effectively (Zimmerman, 2000). These strategies may include selecting critical information from lectures, organizing notes, and employing effective study techniques (Yukselturk & Bulut, 2007). Therefore, we hypothesize that:

H1: Self-regulated learning significantly predicts engagement.
H2: Self-regulated learning significantly predicts satisfaction.
H3: Self-regulated learning significantly predicts motivation towards learning.

2.2. Engagement

Engagement in the educational context is a multifaceted construct encompassing behavioral, emotional, and cognitive dimensions (Wang & Degol, 2014). This multifaceted nature of engagement has gained significance in blended learning, with student engagement increasingly recognized as a critical indicator of successful instructional approaches (Groccia, 2018). When the challenge of a task aligns with their skills, high school students demonstrate increased engagement (Annetta et al., 2009). This engagement is a behavioral pathway, enabling students' motivational processes to contribute to their subsequent learning and development in blended learning environments (Reeve et al., 2004). Engaged learners are more motivated to learn, finding the material relevant, meaningful, and enjoyable (Ferrer et al., 2020). This positive relationship is further supported by recent studies highlighting engagement as a critical predictor of Motivation (Alemayehu & Chen, 2023; Raza et al., 2020). Thus, we hypothesized that:

H4: Engagement significantly predicts motivation towards learning.

2.3. Satisfaction

Satisfaction refers to the students' fulfillment and pleasure level about different aspects of the learning service they received in the blended learning instruction (Horzum, 2017). Extensive research has been conducted to study the relationship between self-regulated learning strategy and students' satisfaction with blended learning. Lim et al. (2020) revealed that learners were provided with better learning opportunities with their blended learning instruction and suggested that satisfaction levels strongly affect learning success. It is widely agreed that self-regulation is essential for online learning in terms of improving student satisfaction (Song & Kim, 2020; Wang et al., 2013). Recent literature emphasizes the influence of self-regulated learning (SRL) on enhancement in learning satisfaction (Li, 2019; Wong et al., 2019). The underlying assumption is that well-designed learning environments foster students' engagement in self-regulation behaviors, leading them to employ diverse SRL strategies like effort management, time management, and environment structuring strategies (Puzziferro, 2008). This would lead to increased learning satisfaction (Li, 2019). Thus, we hypothesized that:

H5. Satisfaction significantly predicts motivation toward learning.

2.4. Motivation Towards Learning

Motivation refers to the enjoyment of learning, orientation toward success and persistence, and a factor that sustains increased performance (Fuchs et al., 1997). In educational contexts, Hancock (2004) described motivation to learn as a student's tendency to find academic activities meaningful and worthwhile when deriving the intended benefits of those activities. Motivation is a significant factor that can actively involve students in learning in blended learning instruction and make them academically motivated (Law et al., 2019). Gu and Lee (2019) also claimed that motivation is critical to students' learning. An inner source, desire, emotion, reason, need, impulse, or purpose moves learners to a particular action when they can maintain a high ability and are competent in their learning.

Figure 1. The Proposed Model

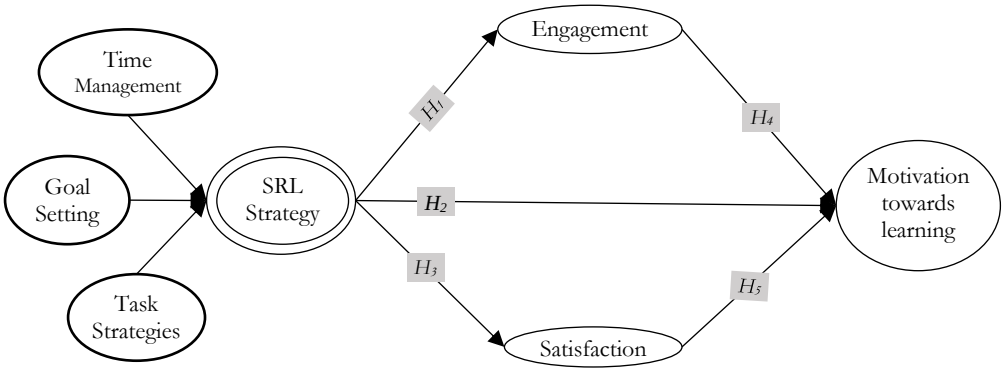

Figure 1 presents the proposed model of this study. It explores how these variables affect students' SRL on Motivation toward learning in a blended learning environment.

3. Research Methodology

3.1. Participants

A total of 1,116 junior and senior high school students from the Visayas region in the Philippines participated and volunteered to complete the survey. Data in this study was obtained through online and paper-based survey instrumentation. An online questionnaire through Google Forms was sent to a possible student respondent who could not be reached due to distance and time constraints. Of the total respondents, 197 responses were excluded due to duplication, missing data, and failure to hold the sincerity test. The total number of respondents included in the analysis is 919 (see Table 1).

Table 1. Profile of the Respondents

Category	Total, N = 919	
	n	%
Gender		
Male	309	33.62%
Female	610	66.38%

Age		
12-17	557	60.60%
18-23	349	37.98%
24-31	13	0.14%
Year Level		
Grade 7	37	4.03%
Grade 8	86	9.36%
Grade 9	97	10.55%
Grade 10	186	20.24%
Grade 11	189	20.57%
Grade 12	324	35.26%

3.2. Instrument Development

A set of questionnaires was created and divided into two parts. The first part gathers the student participants' demographic information (name/nickname, sex, age, school, and year level). The second part dealt with the constructs indicators used in the study and the references of the instrument development. All indicators of the constructs in the proposed model were adapted from existing studies published in reputable journals indexed in Scopus and the Institute for Scientific Information (ISI). Minor revisions of the item indicators were done to fit the local situation.

Self-regulated learning was assessed using a 10-item questionnaire adapted from Barnard et al. (2009), encompassing three constructs: Goal Setting, Task Strategies, and Time Management, with sample items such as "I set standards for my assignments in blended learning instruction" and "I maintain high standards for learning in my modular classes." Satisfaction was measured through 8 items drawn from the questionnaire developed by Barnard et al. (2009), including statements like "If given the opportunity, I would willingly enroll in another course in blended learning distance learning" and "My decision to pursue studies through blended distance learning was judicious." Motivation was measured with seven items developed by Kuo et al. (2019), with sample items such as "I found the subject matter interesting" and "My primary goal was to absorb as much knowledge as possible." Engagement was assessed using a six-item questionnaire adapted from Mintrop and Trujillo (2007), with sample items like "Most of the topics we are studying are interesting and challenging" and "I typically look forward to most of my classes."

4. Results and Discussion

4.1. Instrument Development

Confirmatory factor analysis (CFA) validated the instrument items' properties. The fit indices used to determine the model strength were the root mean square error approximation (RMSEA) and the standardized root mean square residual (SRMR). The relative fit measures were the comparative fit index (CFI) and the Tucker–Lewis index (TLI). Guided by Hair et al. (2014), the following threshold values of the model fit indices implemented: RMSEA must be ≤ 0.060, SRMR must be ≤ 0.080, TLI must be ≥ 0.900, and CFI must be ≥ 0.900 (Hu & Bentler, 1999). The average variance extracted (AVE) estimates must have values greater than 0.5 (Fornell & Larcker, 1981). Table 2 shows the standardized loadings, composite reliability (CR), average variance extracted (AVE), and Cronbach's alpha of the final model.

Table 2. CFA Results

Construct	Item	Standardized loadings	AVE	CR	α
Self-regulated Learning	Goal Setting	0.747	0.747	0.898	0.725
	Task Strategies	0.917			
	Time Management	0.917			
Satisfaction	S2	0.683	0.537	0.821	0.784
	S3	0.790			
	S4	0.817			
	S5	0.626			
Motivation	M3	0.675	0.512	0.759	0.753
	M6	0.745			
	M7	0.725			
Engagement	E2	0.655	0.467	0.637	0.633
	E3	0.711			

Visual inspection of the initial CFA model results revealed that all fit measures met all the required threshold values. However, there are some issues with the modification indices, specifically on the correlated errors of indicators in the same factors. There are two ways to remove correlated errors during CFA for an excellent fitting model. The first way is to remove the lower factor loading item between the two or constrain the correlated errors' effects through covariation. Since all

pairs of error terms belong to the same factors, they were constrained to covariate each other (Hair et al., 2014). As reflected in Table 2, all factor loadings were acceptable, ranging from 0.626 to 0.917. Engagement has an AVE that is less than the threshold level of 0.5. However, Fornell and Larcker (1981) argued that an AVE less than 0.5 is adequate if composite reliability is higher than 0.6. These results confirm the correct identification of factors and established multicollinearity in variables used in path analysis. The scale's reliability is confirmed because each construct's composite reliability (CR) indices are more significant than 0.6 (Bagozzi & Yi, 1988). The overall measurement model revealed very satisfactory fit measures of the RMSEA (0.047), SRMR (0.0452), TLI (0.928), and CFI (0.939).

4.2. Instrument Development

The relationship among the variables is tested using SEM, and the standardized regression weights are reported in Table 3. All of the fit measures of the final model were acceptable (TLI = 0.925 and CFI = 0.937). The RMSEA of 0.042 indicates an excellent fit between the hypothesized and observed data (Hu & Bentler, 1999). The result shown in Figure 2 depicts the final model of this study.

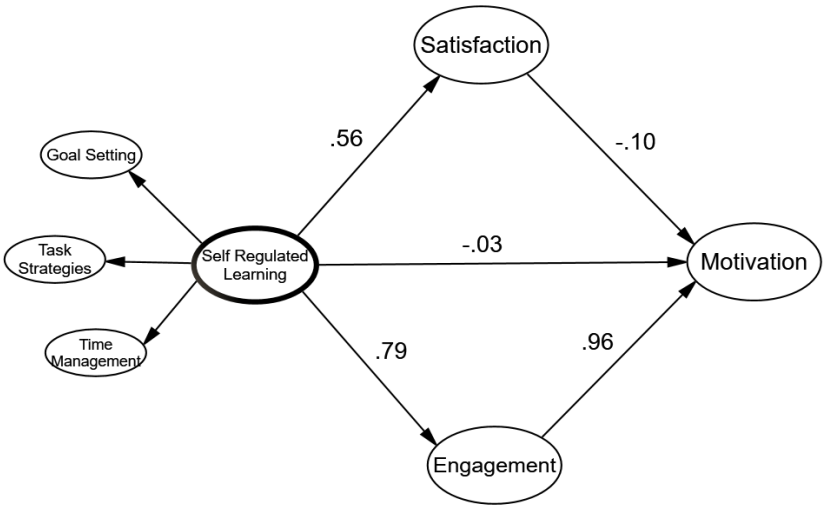

Figure 2. The Final Study

Table 3. SEM Results

Path	β	SE	CR	ρ	Label
H1: SRL → Satisfaction	0.785	0.077	10.256	<0.001	Yes
H2: SRL → Motivation	-0.029	0.147	-0.2	0.842	No
H3: SRL → Engagement	1.001	0.086	11.627	<0.001	Yes
H4: Satisfaction → Motivation	-0.079	0.033	-2.389	0.017	Yes
H5: Engagement → Motivation	0.833	0.131	6.363	<0.001	Yes

The path analysis results show significant relationships among the variables. The positive relationship between self-regulated learning and both satisfaction ($\beta = 0.785$, $\varrho < 0.001$) and engagement ($\beta = 1.001$, $\varrho < 0.001$) aligns with prior research emphasizing the positive impact of self-regulation on learning outcomes (Albelbisi et al., 2021; Bernardo et al., 2022). This implies that students employing effective self-regulated learning strategies will likely experience higher satisfaction and engagement in their learning journey. It suggests that students adept at planning, monitoring, and adapting their learning strategies might feel more fulfilled and satisfied with their progress. SRL might equip students with the tools and strategies to become active participants in their learning, leading to higher levels of engagement.

However, the relationship between self-regulated learning and motivation was insignificant ($\beta = -0.029$, $\varrho = 0.842$). This implies that certain aspects of self-regulated learning may not directly contribute to students' motivation in the blended learning context. Additionally, the association between satisfaction and motivation was negatively significant ($\beta = -0.079$, $\varrho = 0.017$). One potential explanation could be that overly satisfied students may perceive less need for additional motivation. This highlights the importance of balancing satisfaction and the need for continuous learning and improvement.

Furthermore, the positive impact of engagement on motivation ($\beta = 0.833$, $\varrho < 0.001$) aligns with recent studies highlighting engagement as a critical predictor of Motivation (Alemayehu & Chen, 2023; Raza et al., 2020). This underscores the crucial role of fostering engagement to enhance students' motivation levels in the blended learning environment. When students participate actively in the educational process, it enhances their motivation and drive to pursue ongoing learning. This positive feedback loop suggests that promoting engagement can be a powerful strategy for fostering motivation.

5. Conclusion

This paper examined the impact of SRL strategies on satisfaction, engagement, and motivation in blended learning. The observed positive correlations between self-regulated learning and satisfaction and engagement underscore the crucial role of effective learning strategies in fostering student fulfillment and active participation in their educational journey. However, the nuanced discovery that specific aspects of SRL do not significantly contribute to motivation prompts a deeper exploration into the diverse components shaping student motivation in blended learning environments. This underscores the necessity for a comprehensive understanding of the complex dynamics influencing motivational factors.

Moreover, the identified negative association between satisfaction and motivation underscores the careful balance required, encouraging satisfaction while fostering an ongoing drive for learning and improvement. Educators are encouraged to create environments that cultivate contentment without diminishing the motivation for knowledge acquisition. Also, this research highlights the pivotal role of engagement as a critical predictor of motivation. Actively engaged students demonstrate an increased likelihood of motivation, suggesting that engagement can enhance overall motivation in blended learning settings.

These findings offer practical insights for educators and institutions seeking to improve instructional strategies in a blended learning environment. This research extends to developing tailored approaches that empower students to become proactive, motivated, and fulfilled learners within the blended learning paradigm.

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