Motivation and Self-Regulation of High School Students in Online Learning

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The COVID-19 pandemic compelled educational institutions to adopt online learning to curb the virus's spread. Amidst the ongoing pandemic's effects, some private schools continue in implementing online instruction (Yu et al., 2022). This quantitative study focuses on measuring the motivation and self-regulation levels of junior high school students engaged in online learning during School Year 2022-2023. Utilizing a researcher-made scale that has validity and reliability properties, the researchers assessed motivation and self-regulation, addressing a gap in the literature. Gender-related differences in motivation scores and variations across grade levels were observed, underscoring the need for tailored strategies. The study provides insights into the dynamics of online learning, and its recommendations include creating engaging learning environments, gender-specific interventions, personalized approaches based on grade levels, and ongoing research to explore additional factors influencing student engagement and well-being in online learning.

Keywords: motivation, self-regulation, online learning, flipped classroom

Background of the Study

Online learning emerged as a crucial necessity amid the COVID-19 pandemic to mitigate virus transmission. As the world continues to grapple with the pandemic's effects, some private schools continue to implement online learning. Long before the pandemic started, online learning had gained popularity in modern education due to its convenience and utility (Sun et al., 2008). The rapid growth of the internet and advancements in technology, including smartphones, facilitated the integration of technological resources into education (Cidral et al., 2018). The affordability of devices and the rapid rise of information technology diversified and made online learning more accessible to younger learners (Cole & Derry, 2005). On the other hand, in developing countries, there was difficulty experienced by some families in acquiring devices and high internet costs (Rahiem, 2020). Most students were unable to buy the devices needed for online learning (Niwas, 2020).

This study aims to significantly contribute to existing literature on motivation and self-regulation in online learning among high school students. Despite available research on the effects of online learning, a noticeable gap exists in the literature regarding non-cognitive factors, specifically motivation and self-regulation. Understanding and addressing this gap is crucial, given that these factors significantly impact students' academic success. By focusing on these aspects, the study aims to show the dynamics influencing students' experiences in online education, providing essential insights for creating effective instructional strategies. The research seeks to contribute valuable knowledge to enhance the overall effectiveness and potential sustainability of online learning for high school students enrolled in School Year 2022-2023 and beyond.

In an online learning environment, students must be highly motivated and eager to learn to continue their education effectively. Motivation, a key predictor of academic success (Wang & Eccles, 2013), is generally higher in students who are intrinsically motivated, expressing genuine appreciation and interest in their learning materials (Mendoza et al., 2023). Additionally, self-regulation and students' ability to exercise self-control are indispensable for success in the online environment (Bylieva et al., 2021). To study effectively, students need to set goals, use appropriate tactics, and make efficient use of online resources (Wang & Eccles, 2013). Without self-control, students may engage in off-task activities like computer gaming during their online classes.

Within alternative teaching methodologies, the 'flipped classroom' stands out. In this model, traditional learning methods are inverted, with students engaging with instructional content, often delivered through online videos or readings, before attending class (Ozdamli & Asiksoy, 2016). Classroom time is then dedicated to discussions, collaborative activities, and problem-solving (Strelan, et al., 2020). This fosters a more interactive and engaging learning experience (Liu & Qi, 2021).

This study contributes to the understanding of online learning among high school students by investigating the motivation and self-regulation levels of those enrolled in an online learning modality. The study compares motivation and self -regulation levels across demographic variables to deepen our understanding of these constructs. The research underscores the critical importance of motivation and self-regulation for successful learning in online environments, emphasizing that highly motivated learners who are confident in their capacity to succeed in online learning are more likely to exhibit self-regulated learning practices.

Statement of the Problem

This quantitative study examines the motivation and self-regulation of high school students engaged in online learning, specifically within the framework of a flipped classroom.

The research aims to address the following research questions:

1. What is the level of motivation and self-regulation among high school students enrolled in a flipped classroom online learning environment?
2. Is there a significant difference in students' motivation and self-regulation when students are grouped according to gender and grade level?

Scope and Delimitation of the Study

This study concentrates on examining the levels of motivation and self-regulation of junior high school students enrolled in private institutions in Metro Manila. The researchers developed and administered motivation and self-regulation scales tailored to address the unique demands of online learning. These were subjected to validity and reliability measures.

To ensure the credibility of the scales, a rigorous testing process, including validation and reliability assessments, was carried out. Permission to conduct the study was given by the school's ethics committee. The development process involved an extensive literature review, expert consultations, and pilot testing. Cronbach Alpha was used to establish the reliability of the scales, while exploratory factor analysis established the validity of the scales.

The scales were designed with a keen understanding of the nuances of online learning, striving to capture the diverse facets of motivation and self-regulation within this specific setting. This consideration for context makes the research instrument relevant to the research sample.

The researchers aspire to gain in-depth insights into the motivation and self-regulation mechanisms among high school students using these context-specific scales. This research provides valuable information on how students adapt to and navigate the challenges of online learning, particularly in maintaining motivation and self-regulation.

Online Learning Effects

Online learning can produce the same student achievement results as face-to-face instruction, given good teaching practices (Cavanaugh et al., 2004). Roach and Lemasters (2018) discovered that online learning can have a favorable impact on student motivation and self-regulated learning if the teachers can structure interesting learning activities. If the teacher's online presence is felt by the students, online learning can be successful (Yuelin, et al., 2023). Online education has the potential to be successful as students who took part in online learning performed as well as, or even better than, those who participated in traditional face-to-face classrooms, when classes are interesting (Glaser, et al., 2019). However, the success of online education is dependent on several factors, such as the structure of the course, the level of participation from students, and each person's unique learning preferences (Kew & Tasir, 2022). The quality of the course design, the amount of student participation, the different learning styles, the availability of technology, and the support from the school system are some of the important aspects that determine the effectiveness of online learning in K-12 contexts (Chai, et al., 2015). To improve the likelihood of success for both students and the educational institution as a whole, schools that are considering implementing online learning programs ought to give serious consideration to the aforementioned factors (Colthrope et al., 2015).

In addition, the research conducted by Mallalieu (2016) indicates the favorable impact that teacher presence has on the learning outcomes of students who participate in online learning. To foster academic achievement in a virtual classroom, it is essential to encourage students' active participation and to cultivate healthy connections between the instructor and the students.

For online learning to be successful, educators should place a high priority on developing their organizational and time management abilities in order to improve their efficacy in online education (Dai, et al., 2017; Diep, et al., 2016). Essential habits that contribute to a smooth and productive educational experience include being well-prepared, having clear expectations, swiftly responding to student inquiries, and offering timely feedback (Holland, 2019). Peer feedback mechanisms in online student work also enhance learning (Fidan & Gensen, 2022).

Mallalieu (2016) added that the ability to adapt quickly to changing circumstances is another crucial quality for effective online instruction. Teachers are able to manage barriers and sustain a productive virtual learning environment if they are able to adjust to unforeseen challenges, such as problems with technology or shifts in the schedules of their students (Kim et al., 2021). In the context of online learning, teachers must be patient to address the needs of the online learners as there might be gaps in both learning and instruction (Greenhow, 2022). Patience exhibited by the teachers enables their students to overcome obstacles in online learning (Mercic, 2023). Students who can utilize higher-order thinking skills have higher motivation levels compared to those who cannot utilize critical thinking skills (Haleva et al., 2020). Flow, emotional engagement, and gamification of lessons can enhance motivation among online learners (Ozhan & Kocadere, 2019). Personality types can influence student's academic success in the online learning environment (Dewar & Whittington, 2000).

Challenges in Online Learning

Instructional design can pose a challenge in online learning. Teachers who employ a one-size-fits-all type of instruction pose learning challenges for some learners (Gillett-Swan, 2017). Inflexibility in instruction can hamper learning (Liang & Chan, 2012). Teachers' inability to use online learning platforms pose a challenge to the effective delivery of online learning (Yusuf & Ahmad, 2020). The inability to design creative and relevant instructional materials for online learning hampers student success (Rosalina et al., 2020).

Inability to access technological resources, such as good internet connection and devices pose a challenge to some learners (Simamora, 2020; Della Ratta, 2015). Access to open-source materials that can be used for instruction can be challenging to institutions who cannot provide learning resources to their students (Liang & Chen, 2012).

Motivation

As it propels students to participate in academic activities and work toward educational goals, motivation is a critical component of learning (Shih & Tsai, 2017). Examining how the online learning technique affects motivation might reveal how it impacts students' intrinsic motivation, autonomy, and mastery orientation. Demotivation and issues with emotional control can harm a person's health and performance, and motivation is a crucial indicator of academic achievement. Effective learning requires self-regulation, which involves restraining one's behavior and emotions. For self-improvement and personal progress, self-awareness, which is characterized by identifying thoughts, feelings, and actions, is also essential (Pintrich & Zusho, 2007). Stepwise regression analysis of Kim and Fric's (2011) study revealed that predictors of motivation in online learning were perceived relevance, reported technology competence, and age.

According to a study by Zhang et al. (2022), the COVID-19 pandemic made it more difficult for online students to access technology and the internet, concentrate at home due to more distractions, interact socially with peers and teachers, and manage their stress and anxiety levels. These difficulties resulted in deficits in motivation and involvement in online learning. However, students with high achievement motivation can adopt learning strategies and other mechanisms that influence study motivation (Adescope et al., 2015). This high level of achievement motivation enables them to reach success.

Access to technology and internet connectivity and difficulties in engaging in interactive and online learning posed challenges to online learners (Song et al., 2004). Fostering opportunities for social interaction between students and instructors, offering students support and encouragement, and addressing any stress or anxiety that students may be feeling are effective strategies for overcoming these challenges (Rowe & Rafferty, 2013).

According to the Self-determination Theory (SDT), people are driven when they feel independent, capable, and a part of a community. According to Wang and Chen's (2014) study, competence, relatedness, and support for autonomy were all positively correlated with motivation in online learning. Therefore, giving students the freedom

to choose their own path means supporting their autonomy. Making a welcoming and inclusive learning environment is part of relatedness. When students feel competent, they are more likely to complete the course successfully.

Learners who are engaged in online learning are more motivated when they feel in charge of their education, connected to their teachers and peers, and confident in their own abilities (Chen & Jang, 2010). Identifying learning paths and giving students leeway in choosing their learning pathway can enhance learning and motivation to learn in online education (Landau & Ungar, 2022). Further, students can also help by giving their ideas or inputs on what they would like to add to their curriculum or field of study (Dhawan, 2020). Moreover, using online tools for learner interaction and project collaboration can help create a supportive atmosphere (Dormer & Kumar, 2016). Additionally, to ensure that students feel capable and interested, the course design should strike a balance between difficulty and clarity while offering interactive activities and timely feedback (Stoian et al., 2022). These techniques can be used to create online learning courses that increase learner motivation while developing autonomy, relatedness, and competency as well as a good and enjoyable learning environment.

Self-regulation

Self-regulation is even more important in online learning contexts where students are expected to be accountable for their own learning (Roach & Lemasters, 2018). Setting goals, making plans, monitoring them, and evaluating them are all parts of self-regulation. Self-regulated students typically succeed more in online learning, which emphasizes the importance of self-regulation in this setting. By giving students opportunity to practice, clear learning objectives, and helpful criticism, instructors can help students regulate their emotions. According to Kitsantas and Dabbagh (2008), developing self-regulation abilities in online learning increases student engagement and achievement. Self-regulation is essential for high school students' academic achievement because it enables them to set objectives, track their progress, and deal with difficulties (Rutherford, 2017).

The findings of the study by Aguhob et al. (2023) align with existing literature that underscores the positive impact of online learning on motivation and self-regulation. Similarly, a study by Shih and Tsai (2017) reported higher levels of motivation and self-regulation among students engaged in online learning compared to those in traditional classroom settings. The interconnectedness of these studies suggests a broader trend where online learners, including Filipino Science students, exhibit commendable self-regulatory tendencies, contributing to enhanced motivation and a more effective learning experience in the online educational landscape.

In a separate study of Akçayr & Akçayr (2018), it was discovered that students who engaged in online learning significantly improved their self-regulation abilities. Further, students' capacity to make objectives, organize their education, and keep track of their advancement were present in this set up.

A thorough analysis of the literature on self-regulated learning in online learning environments is provided by the study undertaken by Barnard, et al. (2009). The study highlights the significance of self-regulated learning for success in online learning and identifies a number of elements, such as student characteristics, course design, and instructor support– all of these affect self-regulated learning in online environments.

Self-regulated learning in online contexts was found to be influenced by learner traits as self-efficacy, motivation, prior knowledge, and learning style. These variables have an impact on learners' self-confidence, motivation to participate and persevere, prior knowledge and skills, and preferred learning strategies (Song et al., 2004).

For self-regulated learning to be effective, there should be course design elements to be considered. Self-regulated learning is also influenced by course design elements like the degree of structure, the usage of interactive activities, the accessibility of feedback, and the incorporation of social media (Rowe & Rafferty, 2013). These elements offer direction, chances for active participation, progress monitoring, and social connection, all of which support efficient self-regulated learning (Nambiar, 2020). (Nambiar, 2020).

Self-regulated learning is greatly facilitated by instructor support characteristics, such as the instructor's availability, teaching style, and willingness to offer feedback (Chen & Jang, 2010; Brackett, (2011). Learners are able to request assistance, monitor their progress, and make required corrections when their teachers are approachable and offer aid, encouragement, and prompt feedback (Nambiar, 2020; Boekaerts, 2000). Lack of teacher engagement, inability to deliver effective instruction, low levels of online presence of the teacher, difficulties of teacher-student and student-student interaction, and technical difficulties hinder self-regulated learning in online environments (Nambiar, 2020; Liu & Zhang, 2021).

Research design

The research design adopted for this study is purely quantitative in nature. It follows a descriptive comparative quantitative design that is non-experiment (Siedlecki, 2020). This method facilitates the systematic measurement and analysis of motivation and self-regulation levels among high school students immersed in online learning during the School Year 2022-2023. Descriptive statistics such as means and standard deviations identify levels of motivation and self-regulation of the sample. On the other hand, One-Way Analysis of Variance (ANOVA) identifies significant differences across demographic variables.

However, it is imperative to acknowledge the inherent limitations associated with the exclusive use of quantitative methods. This approach may risk oversimplifying complex phenomena, potentially missing the nuanced intricacies that qualitative methodologies can unveil. Future research initiatives are encouraged to consider integrating qualitative approaches, thereby enriching the understanding of the underlying reasons and contextual factors contributing to observed quantitative patterns.

Research Locale

This research took place in a private high school located in Metro Manila The name of the school is held confidential. This school offers a K to 10 education. Originally designed as a private sectarian basic education institution offering face-to face instruction, the school underwent a transformative shift in response to the exigencies of the COVID-19 pandemic. With the onset of the global health crisis, the school transitioned to online learning. This continued until the School Year 2022-2023.

Most of the students enrolled in this school have devices that are used for online learning. Some of the students came from a homeschooling set-up. All parents of the participants wanted their children to undergo online learning as they fear contagion. Further, most of the parents believe that educating their students in a home-based set up is the best kind of instruction, based on religious beliefs and traditions. Despite this set up, if students would like to have further consultations with their teachers, they can make face-to-face consultations.

The decision to resort to online learning was propelled by the imperative to curb the transmission of the virus and uphold the safety of students and faculty members. This unique context positions the research within the dynamic landscape of an educational institution that has transitioned from traditional face-to-face instruction to a virtual learning environment. It is within this adaptive setting that the study explores the motivation and self-regulation levels of high school students, delving into the distinctive challenges and opportunities presented by the online education paradigm.

Research Participants

The study involved a total of 189 students participating in online learning during the School Year 2022-2023. The selection criteria encompassed junior high school students across different grade levels, providing a comprehensive perspective on motivation and self-regulation in this specific academic setting. Junior high school students were chosen as the school only caters to elementary and high school students. Further, these students were selected as they have more language skills and are better at comprehension than their elementary school counterparts as they have spent more time in school. By focusing on junior high school students, the study aims to shed light on the nuanced dynamics of motivation and self-regulation during a critical phase of their academic journey.

Table 1

Demographic Profile of the Research Participants

Sex at Birth	*n*	%
Male	93	49.2
Female	96	50.8
Total	189	100.0

Grade Level	*n*	%
7	62	32.8
8	56	29.6
9	34	18.0
10	37	19.6
Total	189	100.0

From the table, it can be seen that the majority of the participants are females (n=96, 50.8%), belong to the age of 13 years old (n=55, 29.1%), and are in Grade 7 (n=62, 32.8%). The demographic profiles were chosen as the research that delved into either motivation levels of students in face-to-face classes or online learning modalities. The study identified significant differences across sex at birth and this supports the literature on motivation levels (Soysal et al., 2022; Hoskin & Van Hoof, 2005; Yukselturk & Bulut, 2009; Alaugab, 2007; and Mohd Bassar et al., 2021) and grade level (Lim & Kim, 2003; Barnard-Brak et al., 2010; Stephen et al., 2020). Given the demographic variables presented in previous studies, the researchers also utilized these demographic profiles as a guide to identify significant differences.

Phases of Data Gathering

The research underwent a thorough ethical review by the school's ethics committee, ensuring the protection and welfare of participants throughout the study.

Phase 1 focused on obtaining informed consent from parents or legal guardians of the student participants, and this portion is discussed in the Ethical Considerations section. In Phase 2, student participants were provided with assent forms, mirroring the information in the consent forms for parents. Stated in the forms given to students were the nature of the study, voluntary involvement, and the right to drop out of the study at any point. Confidentiality was also guaranteed, and the forms included a statement on the school's responsibility in safe data storage of the collected data.

The final phase involved statistical treatment of the gathered data. Means and standard deviations were computed to identify levels of motivation and self-regulation. One-way ANOVA was used to identify significant differences across demographic variables.

Research Instruments

The study employed two researcher-made instruments, which were administered to the students simultaneously. Reliability-wise, the Motivation in Online Learning scale yielded Cronbach's alpha of .720. The Self-Regulation in Online Learning Scale has a Cronbach's alpha of .718. In terms of validity, the items of the Motivation in Online Learning Scale yielded two factors with factor loading ranges from .361 to .798. The Motivation in Online Learning Scale yielded two factors, namely Engagement in Online Learning and Goal Setting and Achievement in Online Learning. For the Self-Regulation in Online Learning Scale, it has a single factor, and factor loading values range from .423 to .726.

The items of the scale were derived from existing literature on motivation, self-regulation, and online learning. The questionnaire contained sections addressing motivational factors, self-regulation strategies, and perceptions of the online learning environment. These constructs constitute non-cognitive factors that influence students' academic experiences in the context of online education.

Data Analysis

Means and standard deviations were used to describe the levels of motivation and self-regulation levels in the context of online learning. One-Way Analysis of Variance (ANOVA) identified significant differences across demographic variables such as gender and grade level. Percentile Ranks were computed to note where the scores fall. Further, the percentile ranks were given to students for them to have an objective basis of the level of their motivation and self-regulation. This is beyond the scope of the study as the main focus is not on instrument development. Quantitative procedures were recommended by the school's ethics committee as data gathering was permitted only once.

Ethical Considerations

The research upholds ethical standards that guarantees the anonymity of the participants and the protection of their rights. Participation in this research is voluntary and the participants can drop out at any point that they feel discomfort. The parents of the participants signed informed consent forms stating the nature of the research and the provision for dropping out at any time that their child felt uncomfortable. Similarly, the students signed an assent form stating their interest to join the research. They were given the right to withdraw from the study. It was also explained that their answers will not in any way affect their grades.

Motivation Levels of High School Students Enrolled in Online Learning

The mean level of motivation among the participants is at Average (M=19; Percentile Rank=48). Variability is relatively more homogenous (S.D.=3.20). This supports the study of Shih & Tsai (2017), stating that motivation of online learners is usually at the Average to High Levels. Online learners who understand the rudiments of technology have greater appreciation and interest in their learning materials (Mendoza et al., 2023; Aghaee & Sharifmoghadam, 2018). On the other hand, the findings of this study are contrary to Xie and Huang's (2014) research that states that most online learners display low levels of motivation. Perhaps, the online learners in this study are more exposed to technology as their parents can afford to provide them with devices needed.

Motivation Scores of Males and Females

To probe the levels of motivation further, scores were compared across demographic variables. Table 2 presents motivation scores across sex at birth.

Table 2

Motivation Across Sex at Birth

Sex at Birth	N	Mean	Std. Deviation
Male	93	19.42	2.78
Female	96	18.64	3.54

In Table 2, it can be seen that males (M=19.42, SD=2.78) have a higher level of motivation compared to females (M=18.64, SD=3.54). Male students (SD=2.78) also scored more homogeneously. The findings are opposite of Soysal et al.'s (2022) findings that showed male students suffered from higher levels of anxiety and lower levels of motivation. On the other hand, Alemany-Arrebola et al.'s study (2020) showed that female students had higher levels of anxiety and lower levels of motivation.

To test whether there are significant differences in motivation scores between males and females, an independent sample t-test was performed. Table 3 shows the results.

Table 3

Independenet Samples t-Test on Motivation Levels Male and Female Students

	Levene's Test for equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. 2-tailed	Mean Difference	Std. Error Difference	95% Confidence Interval of the difference	
								Lower	Upper
Equal variance assumed	6.085	.015	1.691	187	.093	.78394	.46364	-.13070	1.69858
Equal variances not assumed			1.697	179.127	.091	.78394	.46186	-.12746	1.69533

Table 3 shows that the mean male scores (M=19.42) are higher than mean female scores (M=18.62). The results show that there is a significant difference in motivation scores between male and female students t(187)= 6.085, p=.015. Hoskin and Van Hoof's (2005) study, on the other hand, shows that females are more motivated in digital tasks such as emailing and researching online. On the contrary, the study of Yukselturk and Bulut (2009) stated that female students displayed higher levels of self-regulation and motivation in online learning environments compared to their male classmates. Alaugab's (2007) study found that more female students enjoyed online modalities compared to males and faculty counterparts and are willing to engage in more online educational experiences. Kim and Fric's (2011) study discusses that online learners are usually de-motivated to study as there is limited peer interaction. Mohd Bassar et al.'s (2023) study concluded that most of their online learners are demotivated as they do not have enough peer-to-peer interaction.

Motivation Across Grade Levels

Motivation across grade levels was studied to identify if there are specific needs per grade level. Through this, knowledge of motivational patterns can inform teachers on how to teach their students better. Adjustments in teaching can be made according to grade level. Table 4 shows the means and standard deviations of motivation scores across grade levels.

Table 4

Means and Standard Deviations of Motivation Scores Across Grade Levels

Grade Level	N	Mean	Std. Deviation
7	62	19.03	2.99
8	56	18.02	3.02
9	34	20.32	2.80
10	37	19.32	3.74

Table 4 presents that motivation scores are highest among Grade 9 students (M=20.32, SD=2.8) and the lowest is among Grade 8 students (M=18.02, SD= 3.02). The students in Grade 8 might have been used to engaging in face-to-face activities more than the other grade levels. Further, this is the batch of students who missed their face-to-face graduation rites. Going on another year of online schooling might have had a slight effect on their motivation levels.

Table 5 shows the results for one-way ANOVA across grade levels.

Table 5

One-Way ANOVA of Motivation Across Grade Level

Self-regulation	Sum of Squares	dF	Mean Square	F	Sig.
Between Groups	117.448	3	39.149	4.000	.009
Within Groups	1810.467	185	9.786		
Total	1927.915	188			

Table 6

Scheffe Test for Motivation of Online Learners Across Grade Levels

I	J	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Grade 7	Grade 8	1.0440	.57671	.380	-.6127	2.6415
	Grade 9	-1.29127	.66759	.294	-3.1748	.5923
	Grade 10	-.29207	.64988	.977	-2.1256	1.5415
Grade 8	Grade 7	-1.01440	.57671	.380	-2.6415	.6127
	Grade 9	-2.30567*	.68014	.011	-4.2246	-.3867
	Grade 10	-1.30647	.66276	.277	-3.1764	.5634
Grade 9	Grade 7	1.20127	.66759	.294	-.5923	3.1748
	Grade 8	2.30567*	.68014	.011	.367	4.2246
	Grade 10	.99921	.74319	.614	-1.0976	3.0960
Grade 10	Grade 7	.29207	.64988	.977	-1.5415	2.1256
	Grade 8	1.30647	.66276	.277	-.5632	3.1764
	Grade 9	-.99921	.74319	.614	-3.0960	1.0976

Note: * The mean difference is significant at the 0.05 level.

Based on Table 5, there is a significant difference between groups determined by the One-way ANOVA (F(1,188)=F=4.00, p=.009). Xie et al.'s (2020) study shows that more mature learners have better levels of motivation. To identify significant differences between the grade levels, a Scheffe Post Hoc Test was performed.

Table 6 shows the Scheffe Test of the significant differences in motivation of online learners across grade levels.

A Scheffe post hoc test revealed that there is a significant difference in the level of motivation between students enrolled in Grades 8 and 9 (*p=0.11)*. Lim & Kim's (2003) study showed that younger students are more likely to be motivated in learning online compared to older students as their lessons are more interesting for the teachers tend to produce gamified instruction. On the other hand, the study of Ferrer et al. (2022) showed that more mature learners have higher motivation in online learning.

Self-Regulation Levels of High School Students Enrolled in the Online Learning

Mean scores of self-regulation among high school students is also at Average (M=17.79; Percentile Rank=52). Variability is relatively more homogenous (S.D.=3.49). The results support the study of Chung et al. (2020) that

states that majority of students are prepared for online learning as they are equipped with technological skills. Students can also be self-regulated if there are carefully crafted instructional schemes (Lock et al., 2017).

Self-Regulation across Sex at Birth

Self-regulation scores were compared across sex at birth. Table 7 shows that male students (M= 18.31, SD= 3.03) have a higher level of self-regulation compared to female students (M=96, SD=17.30). They can manage activities required to comply with their school work better than their female counterparts. Despite the difference, no difference in self-regulation scores were found. This supports the findings of Behzadnia et al. (2022). No significant differences in self-regulation across gender were found in Engzell's (2021) study.

Table 7

Mean Scores and Standard Deviations Across Sex at Birth

	Sex at Birth	N	Mean	Std. Deviation	Std. Error Mean
Self Regulation	Male	93	18.31	3.03	.3140
	Female	96	17.30	3.84	.3916

To know if there is a significant difference between the mean scores of male and female students when it comes to self-regulation, an independent sample t-test was performed, and the results are shown in Table 8.

Table 8

Independent Samples Test of Self-Regulation Scores of Male and Female Students

	Levene's Test for equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. 2-tailed	Mean Difference	Std. Error Difference	95% Confidence Interval of the difference	
								Lower	Upper
Equal variance assumed	5.895	.016	2.004	187	.046	1.00974	.50381	.01585	2.00363
Equal variances not assumed			2.012	179.739	.046	1.00974	.50195	.01927	2.00022

The results show that there is a significant difference in motivation scores between male and female students t(187)=5.895, p=.016. The study negates the findings of Chung et al.'s (2020) study that states that females are more self-regulated and would like to continue learning using online modalities. Rovai and Baker (2005) reports that female students are more motivated and adjusted to online learning compared to their male counterparts. Karimpour et al.'s (2019) study stated that female students were better in goal setting and motivation.

Self-Regulation Across Grade Levels

Self-regulation among online learners across grade levels were identified to identify the specific grade levels that can stay focused and persist during times of challenges. As self-regulation can be a critical factor in academic success in online environments, the researchers checked if these vary across grade levels.

Table 9 shows the means and standard deviations of self regulation across grade levels.

Table 9

Means and Standard Deviations of Self-Regulation Scores Across Grade Levels

Grade Level	N	Mean	Std. Deviation
7	62	17.85	3.35
8	56	17.16	3.46
9	34	19.00	2.98
10	37	17.57	4.02

Table 9 shows that the Grade 9 students have the highest level of self-regulation (Mean=19, SD=2.98). It was observed that this group of students are more compliant compared to the other grade levels. They do not have to be reminded to complete their tasks. In contrast, Tümen-Akyildiz & Donmus-Kaya's (2021) study showed that students in the higher grade levels tend to display more self-regulation skills. There was no significant difference across grade levels in terms of self-regulation in Engzell et al.'s (2021) study. Innately motivated students were able to comply with school requirements, despite their year level (Pokhrel & Chhetri, 2021).

To check whether there is a significant difference of self-regulation across grade levels, a one-way ANOVA was computed. Table 10 shows the data.

As presented in Table 10, there is no significant difference between groups determined by the One-way ANOVA (F(1,187)=F=2.060, p=.107). All the students, regardless of grade level, had relatively the same level of self-regulation scores. The study supports that of Lim & Kim (2003). Barnard-Brak et al. (2010) concluded that self-regulation of online learners did not significantly increase across grade level. This negates the findings of Lock et al. (2017) that states that self-regulation is present among more mature learners.

Table 10

One Way ANOVA of Self-Regulation Across Grade Levels

Self-regulation	Sum of Squares	dF	Mean Square	F	Sig.
Between Groups	117.448	3	39.149	4.000	.009
Within Groups	1810.467	185	9.786		
Total	1927.915	188			

Conclusion

In conclusion, it can be said that the students have an average level of motivation and self-regulation as indicated by the mean scores and described by the corresponding percentile ranks. Given this, it can be said that the students can stay motivated and self-regulated despite changes in instruction. It shows significant differences in gender and grade level when it comes to motivation and significant differences in gender when it comes to self-regulation. Male students exhibited higher motivation scores than their female counterparts, indicative of potential gender-related distinctions in the online learning experience. Moreover, the identification of a significant difference in motivation levels across different grade levels emphasizes

the importance of tailoring strategies to meet the diverse needs of students at various stages of their high school education.

Similarly, the exploration of self-regulation levels brought to light an overall average score among the participants. The study discerned that male students demonstrated higher levels of self-regulation compared to females. Despite this, the absence of significant differences across grade levels suggests a relatively consistent level of self-regulation throughout high school grades.

Given the findings, educators, policymakers, and administrators can explore the effects of motivation and self-regulation in the academic success of students in an online setting. Armed with this understanding, educational stakeholders can formulate targeted interventions and instructional approaches to optimize the online learning journey for high school students. The research outcomes show valuable insights that can shape the development of programs and policies geared toward enhancing motivation and self-regulation among online learners.

Recommendations

Even though the COVID-19 pandemic has ceased to be a global threat, it is important to note that there are other emergencies that can make schools revert to online learning. Extreme climate issues, transportation strikes, calamities, and new diseases can warrant schools to follow online learning. Given the results of the study, the following are recommended:

1. Teachers engaged in online instruction should be able to foster an interesting learning environment among their students to enhance motivation. They should be able to curate and communicate interactive, high-quality learning materials that provide academic assistance to students. They should also be effective in facilitating discussions and providing feedback, enabling students to take ownership of their learning and reflect on their progress. By implementing these steps, students can enhance students' motivation skills.
2. Students should be empowered to have a personalized learning plan to enhance self-regulation. Advisers can help them devise a schedule to meet their learning needs. A Growth Mindset Program can be developed as a personalized learning plan. A growth mindset program instills the belief that abilities can be developed through effort, learning, and perseverance. On the other hand, a fixed mindset shows that people cannot change their abilities. This program is designed to make the learners adaptable and have a love for learning. This program espouses that learners who love learning will be able to succeed in academic, personal, and professional realms. The growth mindset program can have seminars and workshops on the concept of growth mindset on the topics of setting realistic goals and problem-solving. The participants in this program can undergo mentoring and peer support.
3. Research on motivation and self-regulation in the online classroom can be conducted in other institutions that enforce it. Though the World Health Organization declared that the COVID-19 pandemic has ceased to be virulent, the current global scenario is characterized to be volatile, uncertain, complex, and ambiguous (VUCA). Therefore, it would be essential to continue research on the motivation and self-regulation of students enrolled in online learning modalities as a safety net to continue educational endeavors despite changing times.
4. Qualitative research can be conducted to further probe the motivation and self-regulation of students enrolled in online learning. This kind of research will enable the administrators to touch base with the needs of their online learners.

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