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ORIGINAL

What Makes Online Learning Effective from a Self-Regulated Learning Point of View

Qué hace que el aprendizaje en línea sea eficaz desde el punto de vista del aprendizaje autorregulado

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ABSTRACT

The transition to autonomous learning during the epidemic is a challenging and complex undertaking for educators and students. The purpose of this study is to determine the relationship between the five sub-variables of self-regulating learning and the student accomplishment index. This study employs the explanatory sequential design approach. The research sample was gathered at random. Data were collected from 500 samples of Yogyakarta State University students, totaling 29,451. Data gathering methods included an online questionnaire, interviews, and final exam results. The study's findings revealed that self-regulating online learning had an effect on students' cumulative achievement index with a Determinant Coefficient of 0,220. Self-regulated online learning goal formulation, environment structuring, task methods, time management, help-seeking, and self-evaluation all had a significant impact on the academic accomplishment index. The ability to define goals had the greatest contribution, while students' ability to seek aid was the least. Another aspect influencing the student accomplishment index is the psychological factor of students. More research is expected to improve the method of self-regulated online learning on the aid-seeking element.

Keywords: Learning success, Student Achievement Index, Self-Regulated Learning

RESUMEN

La transición al aprendizaje autónomo durante la epidemia es una tarea desafiante y compleja para educadores y estudiantes. El propósito de este estudio es determinar la relación entre las cinco subvariables del aprendizaje autorregulado y el índice de rendimiento estudiantil. Este estudio emplea el enfoque de diseño secuencial explicativo. La muestra de la investigación fue recolectada al azar. Se recopilaron datos de 500 muestras de estudiantes de la Universidad Estatal de Yogyakarta, por un total de 29.451. Los métodos de recopilación de datos incluyeron un cuestionario en línea, entrevistas y resultados de exámenes finales. Los hallazgos del estudio revelaron que el aprendizaje en línea autorregulado tuvo un efecto en el índice de rendimiento acumulativo de los estudiantes con un coeficiente determinante de 0,220. La formulación de objetivos de aprendizaje en línea autorregulados, la estructuración del entorno, los métodos de tareas, la gestión del tiempo, la búsqueda de ayuda y la autoevaluación tuvieron un impacto significativo en el índice de logros académicos. La capacidad de definir metas tuvo la mayor contribución, mientras que la capacidad de los estudiantes para buscar ayuda fue la menor. Otro aspecto que influye en el índice de rendimiento de aprendizaje en línea autorregulado sobre el elemento de búsqueda de ayuda. estudiantil es el factor psicológico de los estudiantes. Se espera que más investigaciones mejoren el método

Palabras clave: Éxito en el aprendizaje, Índice de rendimiento estudiantil, Aprendizaje autorregulado

INTRODUCTION

Online learning can better meet the different requirements of students by removing geographical and physical constraints. In recent years, there has been a significant surge in online learning. Students' online interaction experiences with teachers and other students have been shown to have a significant impact on their future online learning goals.[1,2,3,4]

Online learning experiences can be defined as students' experiences with various forms of online interactions. Mobile device advances have increased distance learners' access to e-learning. During the COVID-19 pandemic, online learning for colleges can provide students with opportunities and learning tools regardless of their location. The obstacles of learning during COVID-19 must be addressed by educational institutions, teachers, students, and the society. The majority of Indonesian educational institutions were abruptly pushed to adopt distance learning. The reality is that some students have significant challenges in connecting with instructors and peers. Some students lose interest in online classrooms due to communication issues.[5]

Students are often distracted from the studying material during online sessions. Furthermore, there is no guarantee or confirmation that students will fully engage with online learning.[6] The failure of online learning is connected with their incapacity to draw students' interest and attention due to differences in learning preferences, involvement, and understanding.[7] Online learning still has problems that must be addressed.[8]

The results of interviews conducted with student representatives revealed that during online learning, students have difficulty managing their abilities; additionally, limited time and communication in learning cause students to procrastinate in doing assignments and continue to rely on others; this unknowingly affects student learning achievement during online learning, which is less than optimal.[9] As a result, the researchers focus the study solely on internal elements, specifically accomplishment motivation and learning independence, as factors in obtaining learning achievement that are most closely related to online learning.

Despite the numerous flaws that arise during the process, many colleges continue to manage online learning without taking into account critical factors that require attention. To succeed in online learning, educational institutions, professors, students, and the community must overcome this difficulty by becoming accustomed to autonomous study. Self-regulated learning involvement is directly tied to how students respond when faced with difficulties in completing academic assignments.[10,11,12] SLR scholars believe that students may monitor and manage several components of their learning, including as cognition, motivation, behavior, and context.[13,14]

Self-regulated learning (SLR) is defined as an active and constructive process in which learners establish learning objectives and then attempt to monitor, regulate, and control their cognition, motivation, and behavior, guided and limited by their goals and context.[15] Self-regulated learners manage their learning process and change their behavior (self-correction) to stay on course for the intended outcomes.[16,17] The capacity to regulate learning is made up of three components: competence (knowledge and skills for planning, monitoring, and evaluating learning), desire (motivation, willingness), and freedom (permission to control).[18]

Research has demonstrated that implementing time management techniques, which involve regulating the timing and duration of academic work, can significantly improve academic performance and achievement.[19,20] Effect regulation, which refers to the efforts made by students to manage their emotional reactions to academic assignments and activities (such as reappraisal), has a moderate correlation with both achievement and the adoption of other learning strategies.[21]

An essential element of SLR theory is the consideration of context.[12,22] Engagement of students in Systematic Literature Review (SLR) depends on the particular task they are confronted with. Upon identifying and acknowledging a distraction or a group of distractions, students have the ability to either regulate certain elements of their learning or employ particular techniques to surmount the distractions. Metacognitive skills, time management, environmental structuring, persistence, and help-seeking as significant predictor variables in achieving academic success in self-regulated online learning.[23,24,25] Several scholars have investigated variables that could impact students' inclination to select online learning components in a mixed learning setting from a self-directed learning (SLR) standpoint.

A study conducted by examined the context of blended language learning. It revealed that students' inclination to acquire a foreign language through online means is influenced by their attitude towards the learning environment, trust in the individuals in their surroundings, and proficiency in the learning environment.[26] Students' intention to use online lectures is most strongly predicted by higher work commitment, greater reliance on practice, and higher levels of self-regulation and critical thinking.[27]

The attribute of independence is of utmost significance and is anticipated to be observed in students who engage in online learning (e-learners) as opposed to students who participate in learning activities inside traditional classroom settings and environments.[28] Hence, the objective of this study was to establish the relationship between the five sub-variables of self-regulated learning and the student achievement index. These

sub-variables encompass metacognitive skills, time management, environmental arrangement, persistence or perseverance, willingness to seek help, and self-evaluation. Students must demonstrate the ability to utilise the self-regulated learning process while engaging in learning activities.

METHOD

This study employed a mixed method approach. The combined research method is a research approach that integrates quantitative and qualitative methodologies to facilitate the acquisition of more comprehensive, valid, reliable, and objective data.[29,30] This study employed a sequential explanatory strategy. Sequential explanatory designs are research methodologies that sequentially integrate quantitative and qualitative approaches.[31,32] In the first stage, the research is conducted using quantitative methods, while in the second stage, it is examined qualitatively. The collection and processing of data are conducted both sequentially and concurrently.The initial phase commences with quantitative data and is subsequently succeeded by qualitative data. The study sample was obtained via the process of random sampling. The study population consisted of all students from all faculties of Yogyakarta State University, spanning the years 2019 to 2022. This population was selected to demonstrate the impact of self-directed learning among UNY students during the COVID-19 epidemic on their actual accomplishment index. Sample selection based on the Krejcie table at a confidence level of 90 %. The overall student population at UNY is 29,451, with a representative sample size of 500 students.

The data-gathering process is conducted via online-based scale methodologies, final examination outcomes, and direct interviews. The simultaneous multiple regression approach is employed in quantitative data analysis to ascertain the extent of the correlation between each sub-variable and academic success, as well as jointly with the dependent variable of academic accomplishment. This approach is employed to determine the statistically significant contribution of the predictor variables to the multiple regression model developed. [33] Furthermore, the level of influence of each sub-variable is also being investigated to ascertain the determinants of online learning success. This involves comparing two or more independent variables to evaluate the predictive capability of each variable. Qualitative data analysis is completed by the procedures of data reduction, data presentation, and validation.[34]

RESULTS

This study is based on the results of quantitative data collected using the simultaneous multiple regression technique. Qualitative data were acquired through interviews and observations. As with previous rounds of this investigation, quantitative data in the form of research variable validity was generated using the product moment correlation technique. The conclusions of the data analysis are as shown in Table 1.

Table 1. Results of Product Moment Correlation Analysis and Partial Correlation with the Dependent Variable Academic Achievement Index

No.	Independent Variable	Correlation Product Moment		Partial Correlation	
		rxy	p	r	p
1.	Goal Setting (X1)	0,369	0,000	0,104	0,020
2.	Environment Structuring (X2)	0,343	0,000	0,092	0,041
3.	Task Strategies (X3)	0,356	0,000	0,113	0,012
4.	Time Management (X4)	0,334	0,000	0,102	0,024
5.	Help-Seeking (X5)	0,256	0,000	0,051	0,256
6.	Self-Evaluation (X6)	0,025	0,000	0,101	0,025

Table 1 shows appropriate results for the validity of self-regulating learning. All rx, y values in self-regulating learning met the required p-value of larger than 0,000. In short, the self-regulating learning variable has been validated and is suitable for use as a research data collection method.

Table 2. Research Reliability Results

Variable	Cronbach Alpha	Cut Off	Result
Self-regulating learning	0,89	0,60	Reliable

Based on the reliability data, it is possible to conclude that the self-regulating learning variable was reliable or had the accuracy and precision of a measuring instrument in a measurement technique. After being deemed dependable, the device is utilized to collect data. Before moving on to the hypothesis step, the acquired data is normalized and homogeneously calculated. Table 3 presents the normalcy data for this research data.

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Table 3. Post-Test Normality Test for Experimental and Control Classes

Class	Average	Standard Deviation	L Count	L Table	Result
Experiment Control	89,332	11,683	0,000	0,052	Normal Data

The data in table 3 demonstrates that the data in both classes are normal with the condition of L count < L Table (0,000 < 0,052), indicating normal distribution. The homogeneity test is recalculated once normalcy has been estimated as part of the pre-requisite testing. The results are shown in table 4.

Table 4. Homogeneity Test of Experimental and Control Class Post-Test

Class	**Variant**	**F count**	**F table**	**Result**
Experiment Control	19,87 11,38	3,41	4,66	Homogenous Data

Table 4 shows that the data was homogenous between experimental and control classes, with a computed F value of 3,41 < F table 4,66. After the data was pronounced homogeneous, the researcher continued to investigate the impact of self-regulating learning on UNY students' cumulative achievement index. Table 5 shows the statistical analysis results.

Table 5. The Influence of Self-Regulating Learning Online on Cumulative Achievement Index in Students

Independent Variable	**Unstandardized Coefficients**		**Standardized Coefficients**	**tcount**	**sig.**
	B	**Std. Error**			
(Constant)	2,773	0,072	--	38,619	0,000
Self-Regulated Learning Online	0,009	0,001	0,466	11,760	0,000
Koefisien Korelasi		= 0,466			
Koefisien Determinan (R^2)		= 0,217			
Ajusted R Square		= 0,216			
FRegresi		= 138,302			
p-Value (sig.)		= 0,000			

Table 5 shows a correlation coefficient of 0,466, R^2 = 0,217, F regression = 138,302, and a p-value of 0,000. The study found that self-regulating online learning has a significant favorable impact on UNY students' cumulative accomplishment index (p < 0,05). After evaluating the hypothesis, the data was found to have a beneficial influence on UNY students' cumulative accomplishment index. Thus, the researcher carried out a multiple regression analysis on the academic success index variable to determine the proportionate impact of each self-regulating learning online to UNY students' cumulative achievement index. Table 6 presents the outcomes of the analysis.

Table 6 shows a multiple correlation coefficient (R) of 0.469; R^2 = 0,220, Fregresi = 23,149, and p = 0,001. The study found that self-regulated learning online factors (goal setting, environment structuring, task strategies, time management, help-seeking, and self-evaluation) have a significant positive impact on UNY students' cumulative achievement index (p < 0,05). Figure 1 depicts the impact of each self-regulated learning online on the cumulative accomplishment index of UNY students.

The next step is to determine the effective contribution of each self-regulated learning indicator. The purpose of this analysis is to assess how much of an effective impact each Self-Regulated Learning Online variable makes to the Academic Achievement Index. The results of the effective contribution analysis are reported in table 7.

Based on table 7, the results obtained are that the contribution of each indicator of self-regulated online learning to the academic achievement index: (1) the goal setting indicator contributes effectively by 4,5 % of 21,9 % self-regulated online learning to the academic achievement index; (2) the environment structuring indicator contributes effectively by 3,5 % of 21,9 % self-regulated online learning to the academic achievement index; (3) the task strategies indicator contributes effectively by 4,5 % of 21,9 % self-regulated online learning to the academic achievement index; (4) the time management indicator contributes effectively by 3,7 % of 21,9 % self-regulated online learning to the academic achievement index; (5) the help-seeking indicator contributes effectively by 1,7 % of 21,9 % self-regulated online learning to the academic achievement index; and (6) the self-evaluation indicator contributes effectively by 4,0 % of 21,9 % self-regulated online learning to the

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academic achievement index. Based on the findings of the analysis, it is clear that self-regulated learning online and self-regulated learning online components have an impact on the academic achievement index, which is 0,220. This suggests that self-regulated learning online contributes 22,0 % of the academic accomplishment index, with the remaining 78,0 % impacted by other factors.

Table 6 Multiple Regression Results with Academic Achievement Index as the Dependent Variable

Independent Variable	Unstandardized Coefficients		Standardized Coefficients	tcount	sig.
	B	Std. Error			
(Constant)	2,775	0,073	--	38,146	0,000*)
Goal Setting (X1)	0,011	0,005	0,123	2,326	0,020*)
Environment Structuring (X2)	0,009	0,004	0,102	2,050	0,041*)
Task Strategies (X3)	0,012	0,005	0,127	2,518	0,012*)
Time Management (X4)	0,010	0,005	0,110	2,269	0,024*)
Help-Seeking (X5)	0,005	0,004	0,056	1,137	0,256
Self-Evaluation (X6)	0,010	0,004	0,116	2,253	0,025*)
Koefisien Korelasi Ganda (R)		= 0,469			
Koefisien Determinan (R^2)		= 0,220			
Ajusted R Square		= 0,210			
FRegresi		= 23,149			
p-Value (sig.)		= 0,000*)			

Remarks: *) = significant at 5% significance level (95% confidence level)

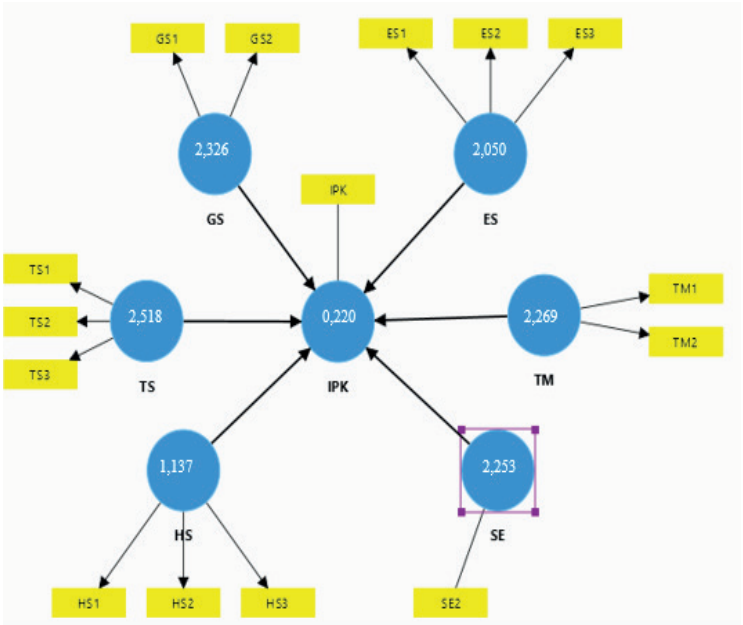

Figure 1. The Magnitude of the Influence of Self-Regulated Learning Online on Academic Achievement Index

Table 7. Contribution of Self-Regulated Learning Online Factors to Academic Achievement Index

No.	Independent Variables	Effective Contribution (SE) %
1.	Goal Setting (X1)	4,529
2.	Environment Structuring (X2)	3,514
3.	Task Strategies (X3)	4,530
4.	Time Management (X4)	3,675
5.	Help-Seeking (X5)	1,685
6.	Self-Evaluation (X6)	4,043
	Total	21,976

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DISCUSSION

The use of self-regulated learning online strategies in the learning process will help students become experts (masters) in their subject. Students who engage in self-regulated online learning will have an impact on the academic accomplishment index. The more self-regulated learning they do online, the higher their academic accomplishment index will be. Students with low or poor self-regulated learning online, on the other hand, achieve less than optimal or expected academic accomplishment index scores.

Implementing self-regulated learning online can improve students' academic achievement indexes through a variety of techniques and circumstances. Students that use self-regulated learning online are more engaged and invested in the learning process.[35,36] They are better able to control how they comprehend the content, overcome hurdles, and locate more resources. This allows them to have a better and more thorough comprehension of the learning content, which can lead to higher academic accomplishment.

Self-regulated online learning also promotes students to apply a variety of successful learning tactics, including lesson planning, summarizing, asking critical questions, and reflecting on what they've learned.[37,38] Using these tactics allows for more in-depth processing of information and the development of a greater understanding.

Students that engage in self-regulated online learning constantly check their progress and make adjustments as needed. They can identify areas for improvement and take specific efforts to improve their understanding. This capacity reduces assignment delays and confusion.[39] Self-regulated online learning promotes the development of intrinsic motivation by giving students more control over the learning process.[40,41] This strong incentive can inspire pupils to study more carefully and persistently, ultimately leading to higher academic accomplishment.

Self-regulated online learning teaches students how to manage their time, make goals, and reflect on themselves.[42] These abilities are closely related to learning efficiency and effectiveness, which can boost academic performance. Students that engage in self-regulated online learning are more likely to participate in online discussions, collaborate with their peers, and take an active role in the learning process.[43] These interactions enable students to assimilate information more deeply, appreciate diverse points of view, and apply concepts in more realistic settings. Self-regulated online learning allows students to think critically, examine material, and improve their reasoning skills.[44,45] These abilities are essential for assessing complicated situations, developing compelling arguments, and achieving high academic outcomes. Factors influencing self-regulated online learning include goal setting, environment structuring, task methods, time management, help-seeking, and self-evaluate. The whole results are described as follows:

4.1 Goal Setting on Academic Achievement Index

The goal setting component makes the most effective contribution among self-regulated online learning elements to the academic performance index, accounting for 4,5 %. Goal planning allows students to have a clear understanding of what they want to achieve in online learning. These goals can help them focus their learning on relevant and significant knowledge while minimizing unproductive attention.[46] Students who set clear and organized goals are more effective at managing their online learning time, avoiding procrastinating, and obtaining higher learning outcomes. This remark is consistent with the findings of interviews done with students, as follows:

"I make goals to assist me manage my study time while learning online; for example, if I want to understand a chapter of information, I read and summarize it in two hours. If the topic being examined is wide, I will concentrate on the most important key points."

This statement provides data indicating students controlled their study time for two hours by reading and summarizing the content in the form of pertinent key points. Summarizing exercises are productive and help pupils become more discerning. Students will first read the subject being studied, then write down and remind themselves of the readings they have chosen. This technique requires both cognitive and writing abilities. As a result, students have improved their understanding of the content being studied by practicing two abilities at the same time.

Goal setting is defined as an important activity in achieving goals by identifying particular targets within a given time frame.[47] Setting goals requires a person to devote all of his or her attention and efforts to what has been determined. This procedure is often carried out by establishing focus and priorities, enhancing productivity, and creating possibilities for achievement. Achieving goals creates a positive emotional state. This leads to satisfaction. Meanwhile, failing to meet goals causes an unpleasant sense of discontent.

Other research have found that those who are highly motivated to succeed are more likely to set approach goals. Those who are strongly driven to avoid failure, on the other hand, are more likely to utilize avoidance goals.[48] This is related to someone setting goals that they want to achieve. Other studies have shown similar findings, indicating that high-quality goal framing has a considerable impact on the performance outcomes of virtual project teams.[49] Similar research highlights that goal setting is best effective in ethical and supportive organizations that do not punish individuals who fail to reach their desired goals.[50]

4.2 Environment Structuring on Academic Achievement Index

The environment structuring factor also adds significantly to self-regulated online learning and the academic accomplishment index. Students can promote self-regulated online learning by creating a consistent and supportive atmosphere. [51] A well-structured environment will enable students to be more focused, efficient, and motivated when managing their online learning time and attaining their learning objectives. The quantitative results are consistent with the qualitative results acquired from interviews. Students said that:

"During synchronous online classes, I select a calm environment devoid of distractions to concentrate on the lecture. I typically take lectures in my room because there are few interruptions. I ask my parents and family not to disrupt me during lectures. It greatly improves my comfort while studying. Before the lecture, I ensure that the device is correctly linked to the internet network, as I do not want to miss my online lesson due to a network outage."

This remark implies that the student's learning environment has a significant impact on their academic progress. Students have particular strategies for dealing with challenges that arise throughout the learning process, such as the internet and other distractions. Students' preparedness to avoid distractions ensures that the lecture process runs well. Consequently, their learning results improve.

Individuals are stimulated by their surroundings, and the environment in turn stimulates them.[52] The school learning environment has a huge impact on students' personalities and development since it influences their learning motivation, social interactions, sense of security, and comfort. As a result, schools must provide a favorable, inclusive, and stimulating learning environment in order for the learning process to be effective and kids to reach their full potential.

Accordingly, an optimum learning environment encourages students to learn, provides a sense of comfort and happiness, and assists them in achieving their learning objectives.[53] Thus, the learning environment plays a crucial role in ensuring that the learning process goes smoothly and efficiently. When the classroom environment is conducive to learning, kids' performance improves. However, if the school atmosphere does not support the teaching and learning process, kids' learning development will suffer. As a result, it is critical for schools to properly fulfill their tasks and obligations.

Several research have found that a positive physical environment influences students' motivation and learning performance.[54,55,56] For example, an organized and clean classroom can provide a more comfortable environment for pupils, increasing their focus and interest in studying. Similarly, a safe and well-maintained school building can give children and staff a sense of security and comfort, both of which are vital components of creating an effective learning environment.

4.3 Task Strategies on Academic Achievement Index

Task techniques indicators have an impact on effective self-regulated learning online and academic performance. Task strategies help students build, perform, and evaluate learning activities in a structured and efficient manner.[57] Strategic tasks help students manage tasks in a structured manner, optimize study time, and improve overall student learning outcomes. Task strategies also serve as interviews for students. Students said that:

"I pay close attention to online lecture assignments and ensure that I fully grasp them. If something is unclear, I will seek clarification from the instructor or peers. Other activities include reading books at the library, talking with classmates, and searching on Google. Usually, the challenges I have are resolved following a discussion. Typically, I prepare my questions before participating and discussing on the webmeet."

The evidence provided by students demonstrates that they have developed solutions for issue solving throughout online learning. Students have their own approach to the online lecture process and how to finish their homework for distinct courses. The tactics they employ are designed to improve lectures and learning results. Strategies refer to the efforts made by pupils during their study. Information regarding effective learning strategies in various types of learning environments might assist students in selecting the most appropriate learning tactics. There are several types of strategies, including the usage of learning models, learning styles, and learning tools. Previous researchers have extensively used methodologies, models, styles, or learning media as tactics. Their investigation yielded favorable results.

A positive linear link between student work programs and their Cumulative Achievement Index at the university. [58] Other studies revealed that using creative learning methodologies greatly boosted student achievement. [59] Other research has found that utilizing a learning technique that is tailored to students' learning styles increases their conceptual understanding.[60] However, some data contradict the favorable association between learning models and student accomplishment Learning styles and instructional approaches had little impact on academic performance.[61]

4.4 Time Management and Academic Achievement Index

Time management indicators contribute significantly to self-regulated online learning and the academic achievement index. Good time management enables students to plan and allocate time properly for online

learning activities.[62,63,64] In an online learning environment, good time management enables students to make better use of their time, prevent procrastination, and achieve higher learning results. This is according to student results.

"I normally create a timetable and a list of chores to do in one week. I will prioritize depending on urgency and importance. I use my phone to set reminders for online lecture schedules and college assignment deadlines."

Time management is a decision that can have an impact on a person's activities; if the decision is incorrect, resulting in no decision, daily activities will be wasted, causing frustration, stress, and even reduced endurance, as well as decreasing student achievement.[65,66] Students who can successfully manage their time will be able to handle any situation. Time management is one of three supporting abilities for learning. This talent is equally vital as the others, such as the ability to concentrate and recall information. Effective time management motivates students during the teaching and learning process, resulting in favorable outcomes. Similarly, the caliber of students will contribute to predicted success. The capacity to manage learning time is critical. Effective time management while learning can help students achieve better learning outcomes.

Time management is an important self-regulation process in which students voluntarily control when and how long they engage in activities that are deemed necessary to attain their academic objectives.[67] According to other research, time management is an important part of self-regulation behavior (i.e., taking the initiative to budget, monitor, and regulate time use).[68] Previous research has indicated that time management improves students' mathematical learning outcomes.[67] Other studies give empirical evidence for the impact of time management on students' academic progress.[69]

4.5 Help Seeking for Academic Achievement Index

Help-seeking indicators contribute significantly to online self-regulated learning and the academic success index. In an online learning environment, students can develop stronger self-regulated learning skills and obtain higher learning outcomes by seeking support effectively.[70] In this study, the help seeking component had the poorest effective contribution of any online self-regulated learning factor to the academic performance index. This demonstrates that when students have challenges when learning online, they do not optimize their attempts to locate and contact other parties such as college friends, specialists, lecturers, or other sources that can assist them. Other elements that influence students' ability to overcome their learning issues include embarrassment, worry, fear, and a lack of knowledge about who to ask. The capacity to access resources to assist with learning issues on the internet is currently limited. Using technology as a learning medium necessitates a high level of discipline and self-motivation, particularly when dealing with technical obstacles. Students have stated these factors,

"When I have trouble understanding online lecture materials, I express my concerns with my students, yet my friends face the same challenges. I'm hesitant to approach the professor if there's something I don't understand because I don't want to be accused of not paying attention in class."

Help-seeking conduct is deliberate. Experts recognize active selection and pursuit of sources of aid as an important component of help-seeking behavior, which can be described as a planned conduct. Help-seeking behavior is an important self-regulation method that influences student activity feedback. Students who are having problems completing their duties will require assistance. The help-seeking process begins with recognizing the need for assistance. The choice to seek help begins with the presence of a problem and is impacted by social cognitive aspects.[71] Once behavioral intentions have been formed, the person proceeds to choose a source of assistance to contact and expresses the problem by asking for assistance. Help-seeking activity, such as a response to health changes, is part of a larger pattern of health-seeking behavior. This definition implies that help-seeking happens in reaction to perceived changes in health and that it is part of a process.[72] Other research have found a favorable and significant link between mental health literacy and help-seeking in adults.[72]

4.6 Self-Evaluation of Academic Achievement Index

Self-evaluation factors contribute significantly to the academic accomplishment index. Self-evaluation is the process by which people review and evaluate their own performance, growth, and work outcomes. Self-evaluation has a substantial impact on how individuals govern and manage their online learning.[73,74] Self-evaluation allows people to have a better grasp of their own strengths and shortcomings in online learning. By reviewing their own performance, they can find areas for improvement as well as areas where they have succeeded. This enables them to focus their learning efforts more efficiently. Students can steadily enhance their proficiency in online courses. They can obtain better results over time by identifying areas for improvement and taking necessary action.

"I occasionally summarize after a lecture to assess my grasp of what I've learnt. I discuss with my classmates to see whether my understanding differs from what they have learned. Following a presentation or providing a response/opinion in an online class. I question my buddies if what I did in the lecture was correct."

Self-evaluation enables people to reflect on their learning experiences. It enables people to identify potential difficulties and devise strategies to overcome them. In doing so, they can improve their problem-solving abilities

in online learning contexts that frequently involve technological and logistical problems.

Self-evaluation involves assessing one's strengths and values as an individual. Researchers have found that self-evaluation improves numerous factors, including learning goals, self-satisfaction, self-performance, and decision-making.[75-77] Other research findings support this finding, indicating that core self-evaluation improves job search outcomes.[78]

Self-assessment plays several critical functions in learning evaluation, including increasing desire and responsibility for learning, strengthening metacognitive skills, and enhancing learning outcomes. Self-assessment helps pupils feel more in control of their learning. This can boost their drive and sense of responsibility, leading to better study habits. Self-evaluation enables pupils to comprehend their own learning process.[79] They learn how to track their progress, identify areas for development, and select effective learning tactics. Research indicates that self-evaluation can improve student learning results in a variety of courses.[80] This is because self-assessment helps pupils become more motivated and understand their own learning process.

Overall, we may conclude that online self-regulated learning has an impact on UNY students' cumulative accomplishment index. This influence is influenced by various online self-regulated learning aspects, including goal setting, environment structuring, task methods, time management, help-seeking, and self-evaluation. However, there are other elements that influence the rise in the cumulative accomplishment index of UNY students.

CONCLUSION

Online learning success is measured by students' cumulative accomplishment index, which is impacted by self-regulated online learning. Self-regulated online learning is made up of several components, including goal setting, environment structuring, task methods, time management, help-seeking, and self-evaluating. The ability to set goals is the most important, while the ability to seek help is the least important. According to these findings, students' ability to request assistance in online learning should be improved. Researchers urge additional study on developing self-regulated online learning systems based on the support seeking aspect.

There are some drawbacks to this study. The research suggests that psychological variables, rather than self-regulated online learning, are the primary determining elements. Future studies should conduct an in-depth investigation of the psychological elements that influence students' cumulative accomplishment indexes. Furthermore, the study's scope is limited to one educational institution that provided full-time online learning throughout the COVID-19 epidemic. As a result, the findings may not be applicable in larger contexts and scenarios. Thus, future researchers should perform mixed method research with a focus on online and offline learning with a variety of educational institutions. For example, at elementary educational institutions with district territories, the outcomes will be broader and generalizable.

REFERENCES

1. Huang L, Zhang J, Liu Y. Antecedents of student MOOC revisit intention: Moderation effect of course difficulty. Int J Inf Manage. 2017;37(2):84–91.

2. Brahmasrene T, Lee JW. Determinants of intent to continue using online learning: A tale of Two Universities. Interdiscip J Information, Knowledge, Manag. 2012;7:1–20.

3. Guo Z, Xiao L, Van Toorn C, Lai Y, Seo C. Promoting online learners' continuance intention: An integrated flow framework. Inf Manag. 2016;53(2):279–95.

4. Lee BC, Yoon JO, Lee I. Learners' acceptance of e-learning in South Korea: Theories and results. Comput Educ. 2009;53(4):1320–9.

5. Karim A, Shahed FH, Rahman MM, Mohamed AR. Revisiting innovations in ELT through online classes: An evaluation of the approaches of 10 minute school. Turkish Online J Distance Educ. 2019;20(1):248–66.

6. Raes A, Vanneste P, Pieters M, Windey I, Van Den Noortgate W, Depaepe F. Learning and instruction in the hybrid virtual classroom: An investigation of students' engagement and the effect of quizzes. Comput Educ. 2020;143(April 2019):1–16.

7. Magd H, Nzomkunda A, Negi S, Ansari M. Critical Success Factors of E-Learning Implementation in Higher Education Institutions: A Proposed Framework for Success. An Int J. 2022;14(2s):20–38.

8. Helmi A. An analysis on the impetus of online education Curtin University of Technology, Western Australia. Internet High Educ. 2002;4(3–4):243–53.

9. Matsani N, Rafsanjani MA. Peran Kemandirian Belajar dalam Memediasi Pengaruh Motivasi Berprestasi terhadap Prestasi Belajar Mahasiswa Selama Pembelajaran Daring. J Pendidik Ekon Undiksha. 2021;13(1):9.

10. Boekaerts M. Self-regulated learning: A new concept embraced by researchers, policy makers, educators, teachers, and students. Learn Instr. 1997;7(2):161–86.

11. Pintrich PR. A conceptual framework for assessing motivation and self-regulated learning in college students. Educ Psychol Rev. 2004;16(4):385–407.

12. Zimmerman BJ. Attaining self-regulation : A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), handbook of self-Regulation. In: Cambridge, MA : Academic Press. 2000. p. 13–39.

13. Kim Y eun, Brady AC, Wolters CA. College students' regulation of cognition, motivation, behavior, and context: Distinct or overlapping processes? Learn Individ Differ. 2020;80(May 2019):101872.

14. Pintrich P, Garcia T. Student Motivation and Self-Regulated Learning: A LISREL Model. 1991;

15. Papamitsiou Z, Economides AA. Exploring autonomous learning capacity from a self-regulated learning perspective using learning analytics. Br J Educ Technol. 2019;50(6):3138–55.

16. Carver, C.S. and Scheier MF. Self-Regulation of Action and Affect. In: Handbook of Self-Regulation. New York: In: Vohs, K. and Baumeister, R.F., Eds., : Research, Theory, and Applications, The Guilford Press; 2011. p. 3–21.

17. Pintrich PR, De Groot E V. A Motivational Science Perspective on the Role of Student Motivation in Learning and Teaching Contexts. J Educ Psychol. 2003;95(4):667–86.

18. Huang J (Peter), Benson P. Autonomy, Agency and Identity in Foreign and Second Language Education. Chinese J Appl Linguist. 2013;36(1):7–28.

19. Kitsantas A. a. J Adv Acad. 2008;20(1):42–68.

20. Wolters CA, Won S, Hussain M. Examining the relations of time management and procrastination within a model of self-regulated learning. Metacognition Learn. 2017;12(3):381–99.

21. Ben-Eliyahu A, Linnenbrink-Garcia L. Integrating the regulation of affect, behavior, and cognition into self-regulated learning paradigms among secondary and post-secondary students. Metacognition Learn. 2015;10(1):15–42.

22. Hadwin AF, Winne PH, Stockley DB, Nesbit JC, Woszczyna C. Context moderates students' self-reports about how they study. J Educ Psychol. 2001;93(3):477–87.

23. Cetin B. Academic Motivation And Self-Regulated Learning In Predicting Academic Achievement in College. J Int Educ Res. 2015;11(2):95–106.

24. Kulusakli E. Exploring self regulated online learning skills of EFL learners in distance education. Turkish Online J Distance Educ. 2022;23(1):86–96.

25. Jansen RS, van Leeuwen A, Janssen J, Kester L. Validation of the Revised Self-regulated Online Learning Questionnaire. Lect Notes Comput Sci (including Subser Lect Notes Artif Intell Lect Notes Bioinformatics). 2018;11082 LNCS:116–21.

26. Alhamami M. Beliefs about and intention to learn a foreign language in face-to-face and online settings. Comput Assist Lang Learn. 2018;31(1–2):90–113.

27. Hood M. Bricks or clicks? Predicting student intentions in a blended learning buffet. Australas J Educ Technol. 2013;29(6):762–76.

28. Jansen RS, Leeuwen A Van, Janssen J, Conijn R, Kester L. Supporting learners ' self-regulated learning in Massive Open Online Courses Computers & Education Supporting learners ' self-regulated learning in Massive

Open Online Courses. Comput Educ [Internet]. 2019;146(January 2020):103771. Available from: https://doi.org/10.1016/j.compedu.2019.103771

29. Sugiyono. Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D. Bandung: Alfabeta; 2021.

30. Eckhardt AL, DeVon HA. The MIXED framework: A novel approach to evaluating mixed-methods rigor. Nurs Inq. 2017;24(4):1–13.

31. Draucker CB, Rawl SM, Vode E, Carter-Harris L. Integration Through Connecting in Explanatory Sequential Mixed Method Studies. West J Nurs Res. 2020;42(12):1137–47.

32. Sugiyono. Wiac.Info-Pdf-Buku-Metode-Penelitian-Sugiyono-Pr_287184C379B531858Bcafefa4E2Bd86E. 2016.

33. Chakraborty A, Bhattacharya A, Mallick BK. Bayesian sparse multiple regression for simultaneous rank reduction and variable selection. Biometrika. 2020;107(1):205–21.

34. Elliott VF. The qualitative report : an online journal dedicated to qualitative research since 1990. Qual Rep. 2018;23(11):2850–61.

35. Latiffah N. SELF-REGULATED LEARNING AND ONLINE LEARNING : 2017;(October).

36. Mahmud, Yogi Saputra & German E. Online self-regulated learning strategies amid a global pandemic : insights from indonesian university students Yogi Saputra Mahmud & 2 Emilius German Faculty of Humanities , President University , West Java , Indonesia. Malaysian J Learn Instr. 2021;2(2):45–68.

37. Al-hawamleh MS, Alazemi AF, Al-jamal DAH, Shdaifat S Al, Gashti ZR. Online Learning and Self-Regulation Strategies : Learning Guides Matter Online Learning and Self-Regulation Strategies : Learning. 2022;(April).

38. Albantani AM, Madkur A, Rozak A. Student Self Regulated Learning Strategy In Online Arabic Learning. J Arab Learn. 2022;5(1):179–91.

39. Atmoko A, Hitipeuw I. The impact of self-adjustment on academic achievement of the the impact of self-adjustment on academic achievement of the students. ISLLAC J Intensive Stud Lang Lit Art, Cult. 2018;2(1):1–6.

40. Ahmed W. Motivation and Self-Regulated Learning : A Multivariate Multilevel Analysis. Int J Psychol Educ Stud. 2017;4(3):1–11.

41. Magay MVF, Gorospe JD. Motivation For Learning In Virtual Environments , Online Self-Regulated Learning , And Writing Performance Of OMSC Students. Int J Educ Res Soc Sci. 2020;1016–41.

42. Khiat H. motivation and reflection in learning. J Univ Teach Learn Pract. 2022;19(2):43–59.

43. Reinders IH, Lai C, Routledge PSE. Author version (accepted) Handbook of Language Teaching and Learning beyond the.

44. Heydarnejad T, Fatemi AH, Ghonsooly B. The Relationship between Critical Thinking , Self-regulation , and Teaching Style Preferences among EFL Teachers : A Path Analysis Approach. J Lang Educ. 2021;7(1):96–108.

45. Maksum, Arifin;Widiana, I Wayan & Marini A. Path Analysis of Self-Regulation , Social Skills , Critical Thinking and Problem- Solving Ability on Social Studies Learning Outcomes. Int J Instr. 2021;14(July):3.

46. Tinggi S, Negara S. The Effect of Goal Setting, Self Efficacy, Interest and Peer Support on Self Regulated Learning. TARBIYA J Educ MUSLIM Soc. 2020;7(1):88–101.

47. Locke E, Latham G. Goal-setting theory. In: Organizational Behavior 1. Routledge; 2015. p. 159–83.

48. Pritchard-Wiart L, Thompson-Hodgetts S, McKillop AB. A review of goal setting theories relevant to goal setting in paediatric rehabilitation. Clin Rehabil. 2019;33(9):1515–26.

49. Forester GL, Thorns P, Pinto JK. Importance of goal setting in virtual project teams. Psychol Rep. 2007;100(1):270–4.

50. Latham GP. The motivational benefits of goal-setting. Acad Manag Perspect. 2004;18(4):126–9.

51. Awni, Nour & Dina F. FACTORS INFLUENCING LEARNERS ' SELF-REGULATED LEARNING SKILLS IN A MASSIVE OPEN ONLINE COURSE (MOOC). Turkish Online J Distance Educ. 2019;20(3):1–16.

52. Wang C, Zhang F, Wang J, Doyle JK, Hancock PA, Mak CM, et al. How indoor environmental quality affects occupants' cognitive functions: A systematic review. Build Environ. 2021;193:107647.

53. Mulang H. The effect of competences, work motivation, learning environment on human resource performance. Golden Ratio Hum Resour Manag. 2021;1(2):84–93.

54. Sam-Kalagbor VO. Perceived influence of school physical facilities on students' academic performance in public secondary schools in Rivers State. Int J Innov Soc Sci Educ Res. 2021;9(1):46–59.

55. Baafi RKA. School physical environment and student academic performance. Adv Phys Educ. 2020;10(2):121–37.

56. Cayubit RFO. Why learning environment matters? An analysis on how the learning environment influences the academic motivation, learning strategies and engagement of college students. Learn Environ Res. 2022;25(2):581–99.

57. Steiner HH. The Strategy Project : Promoting Self-Regulated Learning through an Authentic Assignment. Int J Teach Learn High Educ. 2016;28(2):271–82.

58. Fatwa I, Rofiq Z. Relationship between Student Activity Unit Involvement and Cumulative Achievement Index of Students at the Departement of Mechanical Engineering Education, State University of Medan. In: 3rd International Conference on Current Issues in Education (ICCIE 2018). Atlantis Press; 2019. p. 280–3.

59. Adeniji SM, Ameen SK, Dambatta BU, Orilonise R. Effect of mastery learning approach on senior school students' academic performance and retention in circle geometry. Int J Instr. 2018;11(4):951–62.

60. Murwaningsih T, Fauziah M, Astuti D. Improving concept mastery through learning media with interactive conceptual instruction approach viewed from learning style. In (Vol. , No. 1). . In: AIP Conference Proceedings. 2023. p. 1–13.

61. Cimermanová I. The Effect of Learning Styles on Academic Achievement in Different Forms of Teaching. Int J Instr. 2018;11(3):219–32.

62. Azizah MNM. HUBUNGAN ANTARA MANAJEMEN WAKTU DAN REGULASI DIRIDENGAN KECANDUAN SMARTPHONE. Empati-Jurnal Bimbing dan Konseling. 2021;8(2):82–98.

63. Ningsih RS, Usman O. The influence of time management on academic procrastination mediated by self-regulated learning in the COVID-19 pandemi at smk PGRI 1 JAKARTA. J Pendidik Ekon PERKANTORAN DANAKUNTANSI. 2022;7(4):120–8.

64. Khiat H. Using automated time management enablers to improve self-regulated learning. Act Learn High Educ. 2022;23(1):3–15.

65. Ingkavara T, Panjaburee P, Srisawasdi N, Sajjapanroj S. The use of a personalized learning approach to implementing self-regulated online learning. Comput Educ Artif Intell. 2022;3:100086.

66. Omer MM, Mohd-Ezazee NM, Lee YS, Rajabi MS, Rahman RA. Constructive and destructive leadership behaviors, skills, styles and traits in BIM-based construction projects. Buildings. 2022;12(12):2068.

67. Hwang GJ, Wang SY, Lai CL. Effects of a social regulation-based online learning framework on students' learning achievements and behaviors in mathematics. Comput Educ. 2021;160:104031.

68. Xu J, Du J, Wang C, Liu F, Huang B, Zhang M, et al. Intrinsic motivation, favorability, time management, and achievement: A cross-lagged panel analysis. Learn Motiv. 2020;72:101677.

69. Zimmerman BJ, Greenberg D, Weinstein CE. Self-regulating academic study time: A strategy approach. In: Self-regulation of learning and performance. 2023. p. 181–99.

70. Karabenick SA, Dembo MH. Understanding and Facilitating Self-Regulated Help Seeking. Wiley Online Libr. 2009;(126):33–43.

71. Doll CM, Michel C, Rosen M, Osman N, Schimmelmann BG, Schultze-Lutter F. Predictors of help-seeking behaviour in people with mental health problems: a 3-year prospective community study. BMC Psychiatry. 2021;21:1–11.

72. McLaren T, Peter LJ, Tomczyk S, Muehlan H, Schomerus G, Schmidt S. The Seeking Mental Health Care model: prediction of help-seeking for depressive symptoms by stigma and mental illness representations. BMC Public Health. 2023;23(1):69.

73. Wetcho S. Fostering Pre-Service Teachers ' Reflection in Self-Regulatory Process Through Socio-Emotional Collaborative Note-Taking in the mCSCL Environment. Contemp Educ Technol. 2021;13(4).

74. Atmojo SE, Muhtarom T, Lukitoaji BD. Jurnal Pendidikan IPA Indonesia THE LEVEL OF SELF-REGULATED LEARNING AND SELF-AWARENESS IN SCIENCE LEARNING IN THE COVID-19 PANDEMIC ERA. J Pendidik IPA Indones. 2020;9(4):512–20.

75. Itzchakov G, Latham GP. An Examination of the Moderating Efect of Core Self-Evaluations and the Mediating Efect of Self-Set Goals on the Primed Goal-Task Performance Relationship. Appl Psychol. 2020;69(4):1248–1270.

76. Gurbuz, Costigan R, Teke K. Does being positive work in a mediterranean collectivist culture? Relationship of core selfevaluations to job satisfaction, life satisfaction, and commitment. Curr Psychol. 2021;40(1):226–241.

77. Ahn J, Lee S, Yun S. Leaders' Core Self-evaluation, Ethical Leadership, and Employees' Job Performance: The Moderating Role of Employees' Exchange Ideology. J Bus Ethics. 2018;148(2):457–470.

78. Chen H, Liu F, Wen Y. The influence of college students' core self-evaluation on job search outcomes: Chain mediating effect of career exploration and career adaptability. Curr Psychol. 2023;42(18):15696–707.

79. Martínez V, Mon MA, Álvarez M, Fueyo E, Dobarro A. e-Self-Assessment as a Strategy to Improve the Learning Process at University. Educ Res Int. 2020;2020(1):3454783.

80. Lenski S, Elsner S, Großschedl J. Comparing construction and study of concept maps–An intervention study on learning outcome, self-evaluation and enjoyment through training and learning. In: Frontiers in Education. 2022. p. 892312.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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