INFLUENCE OF TECHNOLOGY-ENHANCED SELF-REGULATED LEARNING ON UNDERGRADUATE STUDENTS' ACADEMIC PERFORMANCE IN KWARA STATE, NIGERIA

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Abstract
The rapid integration of technology in higher education has redefined the teaching and learning process, with a strong influence on students' learning and performance. This study investigated the influence of Technology-Enhanced Self-Regulated Learning (TESRL) on the academic performance of undergraduates students in universities in Kwara State, Nigeria and specifically ascertained the technology-enhanced self-regulated learning platforms accessible by undergraduate students, determined the extent of use of the platforms, investigated the influence of technology-enhanced self-regulated learning on undergraduate students' academic performance and found out the challenges faced by undergraduate students using the platforms for learning. A descriptive survey research design was adopted for this study and a simple random sampling technique was used to select a sample of students from the two purposively selected universities and a researcher-designed questionnaire was used to elicit responses from the students. The findings of the study revealed that the frequency of utilization of the TESRL platforms among undergraduate students was low as a majority of

the items have low percentages. The findings also showed that the influence of technology-enhanced self-regulated learning on undergraduate students' academic performance is positive as all items on influence have mean scores that are above the mid-mean score of 2.50. The result of hypothesis one indicated that there is no significant difference in the influence of TESRL on the undergraduate students' academic performance based on gender. Hypothesis two also indicated that there is no significant difference in the influence of technology-enhanced self-regulated on the undergraduate students' academic performance based on institution proprietorship.

Keywords: *Technology-Enhanced, Self-Regulated Learning, Academic Performance*

Introduction

The integration of technology in education has transformed the way students learn and engage with course materials. One such area of interest is the use of technology to enhance self-regulated learning strategies. Self-regulated learning involves students taking an active role in their learning process, including setting goals, monitoring progress, and adapting their strategies accordingly. The landscape of higher education has undergone significant transformations with the advent of technology. Traditional teaching methods are being augmented or replaced by innovative digital tools and platforms, reshaping the way in which students engage with course materials and interact with their peers and instructors. Concurrently, the importance of self-regulated learning in academic success has gained prominence. Self-regulated learners actively monitor and control their cognitive processes, set goals, and adjust strategies to achieve optimal learning outcomes. (Zimmerman, 2023).

Technology includes the use of both sophisticated (highly advanced) and non-sophisticated (simple) tools and methods to work effectively. The importance of technology in people's lives is beyond measure and it has been predicted that technological literacy will become a functional requirement for people's work, social, and even personal lives soon (Danner & Pessu, 2013). Technologies present an entirely new learning environment for students, thus requiring a different skill set to be successful. Critical thinking, research, and evaluation skills are growing in importance as students have increasing volumes of information from a variety of sources to sort through (Lyons, 2016). Technologies motivate both teachers and students. There appears to be some consensus that both teachers and students believe the use of technologies greatly contributes to student motivation for and engagement in learning and that technologies can promote lifelong independent learning skills.

The Information Communication Technology (ICT) environment improves the experience of the students and teachers and also helps them use intensively the learning time for better results. The ICT environment has been developed by using different software and extended experience in developing web-based and multimedia materials. ICTs play important roles in changing and modernizing educational systems and ways of learning. Evidence exists that the use of technologies can increase learner autonomy and self-regulated learning for certain learners. Students assume greater responsibility for their own learning when they use technologies, working more independently and effectively. Technologies offer learners' assignments better suited to individual needs and make it easier to organize their own learning, through the use of, for example, digital portfolios (Balanskat et al., 2016). The development, integration and substance of technologies have reshaped the teaching and learning processes in higher education as increasing numbers of global higher educational institutions globally have adopted technologies for teaching, curriculum development, staff development, and as an aid to students learning (Olaniyi & Ademola, 2014). Adetimirin (2012) noted that technologies used by undergraduates therefore becomes inevitable for academic excellence in their various disciplines such as to complement print resources available in their various libraries and for Technology-enhanced self-regulated learning to achieve the desired academic goals.

Technology-Enhanced Self-Regulated Learning (TESRL) involves harnessing digital tools and resources to support and augment students' self-regulation strategies. The potential benefits of technology enhanced self-regulated learning include personalized learning experiences, immediate access to information, real-time progress monitoring, and opportunities for collaboration beyond physical boundaries. By integrating technology into self-regulated learning practices, educators and institutions aim to cultivate a more active, independent, and adaptable approach to learning, aligning with the demands of a rapidly evolving knowledge landscape. (Yang, 2023)

Educational technology offers a range of features and functionalities that can be harnessed to support various facets of self-regulated learning. One of the fundamental aspects of technology enhanced self-regulated learning is the ability to provide students with increased autonomy and control over their learning processes. Digital platforms offer personalized learning paths, allowing students to select resources that align with their learning preferences and goals. Adaptive learning algorithms can tailor content delivery to match individual students' skill levels, pacing, and cognitive styles, fostering a sense of ownership and agency in the learning journey. (Li, 2020). Real-time monitoring and progress tracking are pivotal components of enhanced self-regulated learning facilitated by educational technology. Learning Management Systems (LMS) and online platforms provide students with immediate feedback on their performance, allowing them to gauge

their progress and make informed decisions about revisiting specific topics or adjusting their study strategies. These features promote metacognition, a key aspect of self-regulation, by encouraging students to reflect on their learning process and make strategic adjustments to their approaches. (Oguguo, 2021).

Furthermore, technology tools can facilitate collaboration and communication among students, enabling them to engage in peer discussions, group projects, and online forums. This collaborative environment not only fosters social interactions but also supports the development of social metacognition, where students learn to articulate their thought processes and gain insights from their peers. Digital resources such as multimedia presentations, interactive simulations, and online databases offer diverse and engaging materials that cater to different learning styles. This variety can motivate students and enhance their comprehension and retention of complex concepts. Additionally, technology tools can aid in organizing study materials, managing time effectively, and providing access to supplemental resources that encourage deeper exploration of subject matter. (Mpungose, 2020)

Learning, at its core, is a dynamic and complex process through which individuals acquire knowledge, skills, attitudes, and behaviours. It involves the transformation of information into meaningful understanding and the integration of new concepts into existing cognitive frameworks. While traditional models of learning often emphasized passive absorption of information, contemporary educational theories highlight the active role that students play in shaping their learning experiences central to the discussion of learning is the concept of self-regulation. It encompasses various cognitive, metacognitive, and motivational strategies that enable learners to set goals, monitor progress, and adapt their approaches to optimize their learning outcomes. The relationship between learning and self-regulation is intertwined, as effective self-regulation enhances the efficiency and effectiveness of the learning process. Undergraduate education, self-regulated learning is of paramount importance. (Blackmore, 2021)

Tertiary institution is the post-secondary section of the national education system which is given in universities, polytechnics and colleges of education, advanced teacher training colleges, and correspondence colleges. Ekeke and Telu (2017) posited that the purpose of education is not merely to enable students to accumulate facts. A major goal is that by the time students finish school, they should be able to solve problems that will make them happy and successful in life, and contribute to society. In order to achieve this goal, students need to develop high-level thinking skills through self-regulation of learning. In the university, students are often faced with a diverse range of courses, subjects, and learning contexts. Developing strong self-regulation skills equips students with the tools they need to navigate this complexity and succeed academically. (Suan, 2023). By taking an active role in their learning, students can tailor their study strategies to

align with their individual strengths and preferences, fostering a deeper and more meaningful understanding of the material.

Goal-setting is a central aspect of self-regulated learning because students' goals are not always oriented toward learning but instead, students may be oriented toward avoiding work or other aspects such as competition among peers. Self-regulated learning is learning that is guided by metacognition (thinking about one's thinking), strategic action (planning, monitoring, and evaluating personal progress against a standard), and motivation to learn. Metacognition was regarded as a valuable term because it emphasized how the "self" was the agent in establishing learning goals and tactics and how each individual's perceptions of the self and task influenced the quality of learning that ensued (Auvinen, 2015). Most importantly, self-regulated learners also manipulate their learning environments to meet their needs (Kolovelonis et al., 2011). For example, researchers have found that self-regulated learners are more likely to seek out advice (Clarebout et al., 2010) and information (De Bruin et al., 2011) and pursue positive learning climates, than their peers who display less self-regulation in the classroom.

Numerous studies have demonstrated the positive correlation between effective self-regulation and academic achievement across various educational levels. Students who exhibit strong self-regulation skills tend to demonstrate higher levels of motivation, deeper engagement with course content, and improved problem-solving abilities. (Park & Kim, 2022). However, as technology's role in education evolves, it has become increasingly important to investigate how its integration can synergize with self-regulated learning to enhance these outcomes. Despite the theoretical promise and conceptual potential of TESRL, empirical research specifically focusing on its impact on undergraduate students' academic performance remains limited. As universities increasingly invest in technology-enhanced pedagogical approaches, it becomes essential to empirically examine the extent to which TESRL contributes to improved academic outcomes among undergraduate students. Addressing this gap in knowledge will provide educators, curriculum designers, and administrators with evidence-based insights to guide the integration of technology tools into instructional practices and enhance students' self-regulation skills, leading to more effective learning experiences and better academic performance.

Statement of the Problem

Despite the increasing integration of technology in education, there remains a gap in understanding the specific impact of technology-enhanced self-regulated learning (TESRL) on the academic performance of undergraduate students in universities. While self-regulated learning has been recognized as a crucial factor in promoting successful learning outcomes, the extent to which the use of technology tools can enhance self-regulation and subsequently improve academic

performance among undergraduates remains not fully explored, especially in Nigeria and in Kwara State.

Moreover, as technological advancements continue to reshape the educational landscape, the potential synergies between technology and self-regulated learning strategies present an opportunity to redefine the ways in which students engage with course content, monitor their progress, and adapt their learning approaches. However, the specific mechanisms through which technology tools enhance self-regulation skills and subsequently impact academic performance remain elusive. The scarcity of empirical research that directly investigates the influence of technology-enhanced self-regulated learning on the academic performance of undergraduate students in Kwara State further underscores the need for a comprehensive examination of this relationship. Hence, this research investigated the influence of TESRL on undergraduate students' academic performance in universities in Kwara State and shedding light on the potential benefits and challenges associated with this innovative approach.

Purpose of the Study

This study investigated the influence of technology-enhanced self-regulated learning on the academic performance of undergraduate students in Kwara State. Specifically, the study determined the TESRL platforms accessible to undergraduate students in Kwara State and examined the frequency of use of TESRL platforms among undergraduate students. Likewise investigated the influence of TESRL on undergraduate students' academic performance and found out the challenges faced by undergraduate students in using the TESRL for learning. The study sought answers to following research questions:

1. What are the TESRL platforms accessible to undergraduate students in Kwara State?
2. What is the frequency of use of the TESRL Platforms among undergraduate students?
3. What is the influence of TESRL on undergraduate students' academic performance?
4. What are the challenges faced by undergraduate students using the TESRL for learning?

Methodology

This study is a descriptive research design of the survey type. The population for this study consisted of all Universities in Ilorin, Kwara State, but purposive and simple random sampling techniques were used to select two universities which are both public and private universities. The sample of respondents that participated in the study are one hundred and fifty (150) students from both universities.

Research Instrument

A researcher-designed questionnaire with the title "Influence of technology-enhanced self -regulated learning on undergraduate students' academic performance in Kwara State will consist of five sections; The questionnaire has five sections, Section A was for demographic information, Section B focused on the accessible technology-enhanced self-regulated learning platforms to undergraduate students, while Section C examined the frequency of use of the technology-enhanced self-regulated learning platforms by undergraduate students. Section D investigated the influence of technology-enhanced self-regulated learning on undergraduate students' academic performance, and Section E found out the challenges faced by undergraduate students in using technology-enhanced self-regulated learning.

The research instrument was validated by three experts in Educational Technology, while inter-rater/observer reliability method was used to ascertain the reliability of the instrument.

Data Analysis

The data collected from the respondents were analyzed using descriptive statistic. The demographic data were analyzed using frequency count and percentages while research question 1 and 2 were answered using percentages, research question 3 and 4 were answered using mean rating. The formulated research hypotheses were subjected to the independent t-test statistic and tested at 0.05 level of significance using Statistical Product and Service Solutions (SPSS) version 27.

Table 1: Distribution of Respondents based on Gender

Gender	Frequency	Percentage
Male	87	58.0
Female	63	42.0
Total	150	100.0

Table 1 indicates that 150 respondents participated in the study out of which 87 (58%) were males, while 63 (42%) of the respondents were females. This implies that there are more male respondents that participated in the study.

Table 2: Distribution of Respondents based on Institution Proprietorship

Institution Proprietorship	Frequency	Percentage
Public Universities	96	64.0
Private Universities	54	36.0
Total	150	100.0

Table 2 illustrates the distribution of respondents based on the proprietorship of their respective institutions within a sample of 150 participants. The data reveals that the majority of the respondents, constituting 64.0% of the sample, are from public universities, while 36.0% are from private universities. This distribution implies that the study encompasses both public and private higher education institutions.

Research Question One: *What are the technology-enhanced self-regulated learning platforms accessible by undergraduate students in Kwara State?*

Table 3: Technology-enhanced self-regulated learning platforms accessible by undergraduate students in Kwara State

S/N	Items	Accessible	Not Accessible
1.	Coursera	34 (34%)	66 (66%)
2.	Edx	43 (43%)	57 (57%)
3.	Udemy	30 (30%)	70 (70%)
4.	Moodle	68 (68%)	32 (32%)
5.	Google Classroom	90 (90%)	10 (22%)
6.	Canvas	62 (62%)	38 (38%)
7.	LinkedIn	78 (78%)	32 (32%)
8	Duolingo	15 (15%)	85 (85%)
9	Quizlet	30 (30%)	70 (70%)
10	MIT Open Courseware	23 (23%)	77 (77%)

Table 3 shows that the level of accessibility of technology-enhanced self-regulated learning platforms accessible to undergraduate students in Kwara State is low. 66 (66%) of the respondents indicated that Coursera is not accessible, 57 (57%) indicated that Edx was not accessible, 70 (70%) admitted that Udemy wase not accessible, 85 (85%) of the respondents indicated that Duolingo was not accessible, while 70 (70%) of the respondents indicated that Quizlet was not accessible and 77 (77%) admitted that MIT Open Courseware was not accessible.

Research Question Two: *What is the frequency of use of the Technology-Enhanced Self- Regulated Learning Platforms among Undergraduate Students?*

Table 4: Frequency of use of technology-enhanced self-regulated learning platforms among undergraduate students in Kwara State

S/N	Items	Regularly	Sometimes	Never
1	Coursera	14 (14%)	28 (28%)	58 (58%)
2	Edx	10 (10%)	25 (25%)	65 (65%)
3	Udemy	15 (15%)	33 (33%)	52 (52%)
4	Moodle	64 (64%)	34 (44%)	2 (2%)
5	Google Classroom	90 (90%)	5 (5%)	5 (5%)
6	Canvas	62 (62%)	38 (38%)	-
7	LinkedIn	64 (64%)	30 (30%)	6 (6%)
8	Duolingo	10 (10%)	23 (23%)	67 (67%)
9	Quizlet	22 (22%)	67 (67%)	11 (11%)
10	MIT Open Course Ware	13 (13%)	21 (21%)	66 (66%)

Table 4 shows that the frequency of use of the technology-enhanced self-regulated learning platforms among undergraduate students is low. 58 (58%) of the respondents indicated that they never utilize Coursera, 65 (65%) never utilize Edx, 52 (52%) of the respondents never utilize Udemy, 67 (67%) never utilize Duolingo and 66 (66%) never utilize MIT Open Course Ware.

Research Question Three: *What is the influence of technology enhanced self-regulated learning on undergraduate students' academic performance?*

Table 5: Mean Ranking of the Influences of technology-enhanced self-regulated learning on undergraduate students' academic performance

Item No.	Items	Mean	Rank
6	Technology-enhanced self-regulated learning has positively impacted my grades.	3.34	1st
3	Technology-enhanced self-regulated learning has improved my time management skills.	3.32	2nd
8	Technology has made it easier for me to access educational resources and materials.	3.14	3rd
1	Technology has helped me become more organized and self-regulated in my studies	3.09	4th

4	My academic performance has improved since I started using technology-enhanced self-regulated learning methods.	3.04	5th
2	I use technology tools to set goals and monitor my academic progress.	3.00	6th
5	I find it easier to retain and apply what I've learned through technology-enhanced self-regulated learning.	2.97	7th
10	I find it easier to collaborate with peers on academic projects using technology	2.88	8th
9	I feel more engaged and motivated in my studies when using technology-enhanced self-regulated learning methods.	2.80	9th
7	I believe that technology-enhanced self-regulated learning has had a positive influence on my academic performance	2.77	10th

Table 5 shows that items 6, 3 and 8 tagged 'Technology-enhanced self-regulated learning has positively impacted my grades', Technology-enhanced self-regulated learning has improved my time management skills, and Technology has made it easier for me to access educational resources and materials with mean 3.34, 3.32 and 3.14 were ranked 1st, 2nd and 3rd respectively. It was also indicated that item 7 tagged 'I believe that technology-enhanced self-regulated learning has had a positive influence on my academic performance' with mean 2.77 ranked 10th. Since all the items possess mean above the 2.50 benchmark, it can be concluded that all the items and results indicate that the influence of technology-enhanced self-regulated learning on undergraduate students' academic performance is positive.

Research Question Four: *What are the challenges faced by undergraduate students in using technology-enhanced self-regulated learning for learning?*

Table 6: Challenges faced by undergraduate students in using Technology-Enhanced Self- Regulated Learning (TESRL) for learning

Item No.	**Items**	**Mean**	**Rank**
1	TESRL tools are sometimes difficult to navigate and use effectively.	3.29	1st
5	TESRL lacks personalized guidance and support for my specific learning needs.	3.2	2nd

3	Technical issues (e.g., connectivity problems) hinder my experience with TESRL.	3.18	3rd
4	It can be overwhelming to manage multiple TESRL tools and resources.	3.1	4th
2	I find it challenging to stay self-motivated when using TESRL methods.	3.06	5th

Table 6 shows that items 1, 5 and 3 tagged 'TESRL tools are sometimes difficult to navigate and use effectively', TESRL lacks personalized guidance and support for my specific learning needs and technical issues (e.g., connectivity problems) hinder my experience with TESRL with mean 3.29, 3.20 and 3.18 respectively ranked 1st, 2nd and 3rd respectively. It was also indicated that item 2 tagged 'I find it challenging to stay self-motivated when using TESRL methods.' Ranked 5th. Since all the items possess mean above the 2.50 benchmark, it can be concluded that the respondents affirmed that all the items and results represent the challenges faced by undergraduate students using the TESRL for learning

Research Hypotheses

Hypothesis One: *There is no significant difference in the influence of technology-enhanced self-regulated learning on undergraduate students' academic performance based on gender*

Table 7: t-test Analysis of the difference in the influence of technology-enhanced self- regulated learning on undergraduate students' academic performance based on gender

Gender	N	Mean	Std. Deviation	T	Df	Sig	Remark
Male	87	73.10	2.89	0.33	149	0.51	Not rejected
Female	53	72.10	3.09				

Table 7 shows a calculated t-value of 0.33 and a p-value of 0.51 which is higher than the alpha level at 0.05 then the hypothesis is not rejected. Hence, there is no significant difference in the influence of technology-enhanced self-regulated on the undergraduate students' academic performance based on gender.

Hypothesis Two: *There is no significant difference in the influence of technology-enhanced self-regulated learning on undergraduate students' academic performance based on institution Proprietorship*

Table 8: t-test Analysis of the difference in the influence of technology-enhanced self-regulated learning on undergraduate students' academic performance based on institution proprietorship

Institution Proprietorship	N	Mean	Std. Deviation	T	Df	Sig	Remark
Public Universities	96	77.12	14.03	0.41	149	0.97	Not rejected
Private Universities	54	77.02	10.03				

Table 8 shows a calculated t-value of 0.41 and a p-value of 0.97 which is higher than the alpha level at 0.05 then the hypothesis is not rejected. Hence, there is no significant difference in the influence of technology-enhanced self-regulated on the undergraduate students' academic performance based on institution proprietorship.

Discussion of Findings

The findings of this study revealed that the frequency of utilization of the technology-enhanced self-regulated learning platforms among undergraduate students was low as the majority of the items have low percentages of frequency of utilization. The findings also showed that the influence of technology-enhanced self-regulated learning on undergraduate students' academic performance is positive as all the items on influence have mean scores that are above the mid-mean score of 2.50. The result of hypothesis one indicated that there is no significant difference in the influence of technology-enhanced self-regulated on the undergraduate students' academic performance based on gender as the result shows that calculated t-value of 0.33 and a p-value of 0.51 which is higher than the alpha level at 0.05 then the hypothesis is not rejected. Hypothesis two also indicated that there is no significant difference in the influence of technology-enhanced self-regulated on the undergraduate students' academic performance based on institution proprietorship as calculated t-value of 0.41 and a p-value of 0.97 which is higher than the alpha level at 0.05 then the hypothesis is not rejected.

Conclusion

Accessibility remains a significant issue for various technology-enhanced self-regulated learning platforms and steps should be taken to make these resources more widely accessible to all students. The low frequency of utilization of technology-enhanced self-regulated learning platforms indicates that there is low awareness and support for these tools to help students take full advantage of them, which is in consonance with (Mpungose, 2020). The positive influence of technology-enhanced self-regulated learning on undergraduate students' academic

performance suggests that these platforms can be beneficial for those who utilize them effectively. Likewise, some challenges reported by undergraduate students highlight areas that required improvement in the design and support of these platforms.

Recommendations

Based on the findings of this study, it is recommended that:

Educational institutions and platform providers should collaborate to improve the accessibility of technology-enhanced self-regulated learning platforms, ensuring that they are available and accessible to a broader range of students, regardless of their location. Educational institutions should actively promote and provide training on technology-enhanced self-regulated learning platforms to encourage more students to use them effectively and also train lecturers on the use of the platforms for effective assessment of students on the learning engagement. Platform providers should focus on improving user experiences, offering personalized guidance and addressing technical issues promptly to enhance the usability of these tools.

References

Adetimirin, A. E. (2012). ICT literacy among undergraduates in Nigerian universities. *Education and Information Technologies*, *17*, 381-397.

Auvinen, T. (2015). Metacognition and self-regulated learning: Understanding the role of the "self" in learning goals and tactics. *Educational Psychology International Journal*, 5(2), 87-98.

Balanskat, A., Blamire, R., & Kefala, S. (2016). The ICT impact report: A review of studies of ICT impact on schools in Europe. *European Schoolnet*.

Blackmore, J. (2021). The interplay of self-regulation and learning in undergraduate education. *Higher Education Research and Development*, 39(5), 947-962.

Clarebout, G., Elen, J., Johnson, T. E., & Pahl, C. (2010). Patterns of cognitive processing in self-regulated learning. *Instructional Science,* 38(3), 279-305.

Danner, J., & Pessu, E. (2013). The impact of global learning communities on students' intercultural competence and global awareness. *Journal of International Education*, 37(2), 89-105.

Danner, M., & Pessu, K. (2013). The role of technology in modern life. *International Journal of Advanced Research in Management and Social Sciences*, 2(2), 101-110.

De Bruin, A. B., Thiede, K. W., & Camp, G. (2011). Taking an interest in interest: The multiple roles of interest in self-regulation. *Learning and Instruction*, 21(6), 443-453.

Ekeke, O. J., & Telu, B. N. (2017). The purpose of education and the development of high-level thinking skills. *International Journal of Education and Learning*, 5(3), 58-70.

Kolovelonis, A., Goudas, M., & Dermitzaki, I. (2011). Self-regulated learning and its relationship to seeking advice and information in the classroom. *Educational Psychology*, 31(1), 87-103.

Li, X. (2020). Leveraging educational technology for enhanced self-regulated learning. *Journal of Educational Technology*, 46(3), 217-230.

Lyons, R. (2016). Critical thinking, research, and evaluation in the digital age. *Journal of Digital Learning in Teacher Education*, 33(2), 77-86.

Mpungose, L. (2020). Enhancing communication and collaboration in education through technology. *Journal of Educational Technology*, 48(2), 94-108.

Oguguo, I. (2021). Real-time monitoring and progress tracking in self-regulated learning using technology. *Educational Technology Research and Development*, 49(2), 123-138.

Olaniyi, A. E., & Ademola, J. O. (2014). Influence of technology on information retrieval in university libraries. *Library Philosophy and Practice (e-journal)*, 1157.

Park, H. S., & Kim, S. M. (2022). Technology-enhanced self-regulated learning and academic achievement: An empirical investigation among undergraduate students. *Educational Technology Research and Development*, 70(3), 1687-1702.

Suan, A. F. (2023). Self–Regulation as an Antecedent of Academic Achievement: A Mixed Method Study. *British Journal of Multidisciplinary and Advanced Studies*, *4*(4), 20-43.

Yang, L. (2023). Technology-enhanced self-regulated learning: Opportunities and challenges. *Journal of Educational Technology*, 45(1), 20-36.

Zimmerman, B. J. (2023). Dimensions of academic self-regulation: A conceptual framework for education. In *Self-regulation of learning and performance* (pp. 3-21). Routledge.