JOURNAL OF CULTURAL ANALYSIS AND SOCIAL CHANGE

Journal of Cultural Analysis and Social Change,
2025, 10(2), 2436-2449
ISSN: 2589-1316

Investigating Self-Regulation as a Mediator Between Learning Context and Academic Performance in Cambodian Universities

Chumneanh Lork [1*], Dhakir Abbas Ali [2], Piseth Holl [3], Chanbopheak Nguon [4]

[1] *School of Business and Management, Lincoln University College, Malaysia; ORCID: https://orcid.org/0009-0007-9158-1953*
[2] *School of Business and Management, Lincoln University College, Malaysia; Email: drdhakir@lincoln.edu.my; ORCID: https://orcid.org/0009-0000-6842-0157*
[3] *School of Business and Management, Lincoln University College, Malaysia; Email: holl@lincoln.edu.my; ORCID: https://orcid.org/0009-0007-8686-0026*
[4] *School of Business and Management, Lincoln University College, Malaysia; Email: nguon@lincoln.edu.my; ORCID: https://orcid.org/0009-0001-0368-9275*

*Corresponding Author: lork@lincoln.edu.my

Citation: Lork, C., Ali, D. A., Holl, P. and Nguon, C. (2025). Investigating Self-Regulation as a Mediator Between Learning Context and Academic Performance in Cambodian Universities, *Journal of Cultural Analysis and Social Change*, 10(2), 2436-2449. https://doi.org/10.64753/jcasc.v10i2.1962

Published: November 17, 2025

ABSTRACT

This study investigates the mediating role of self-regulation in the relationship between learning context, specifically technology use and curriculum design, and academic performance in Cambodian higher education institutions. A quantitative research design was employed using data collected from 320 lecturers across public and private universities, analyzed through Structural Equation Modeling (SEM) with SmartPLS. The findings indicate that technology use positively influences both self-regulation and academic performance, while curriculum design has a significant effect on self-regulation but does not directly predict academic performance. However, self-regulation plays a crucial role in enhancing academic outcomes and serves as a mediator linking both technology use and curriculum design to academic success. The model demonstrates acceptable explanatory power and predictive relevance, highlighting the importance of internal learner processes in shaping performance outcomes. These results underscore that fostering self-regulated learning through effective technology integration and well-structured curriculum design is vital for improving academic performance. The study provides valuable insights for educators and policymakers seeking to enhance learning effectiveness in resource-constrained higher education contexts such as Cambodia.

Keywords: Technology Use, Curriculum Design, Self-Regulation, Academic Performance, Cambodian Universities

INTRODUCTION

In the evolving landscape of Cambodian higher education, the learning context has emerged as a critical factor influencing student academic performance. While the country has made notable strides in expanding its higher education system through increased university enrollment, program diversification, and infrastructural development, the effectiveness of these reforms depends largely on the quality of the learning environment. This study investigates how various components of the learning context, such as curriculum design, and technology use, shape students' academic outcomes. Recognizing learning as a dynamic and socio-cultural process, this research emphasizes that the educational environment can significantly enhance or impede students' ability to acquire knowledge and skills. Central to this investigation is the concept of self-regulation, students' capacity to plan,

monitor, and adapt their learning strategies. As a psychological and behavioral process, self-regulation is believed to play a crucial role in mediating the relationship between the learning context and academic performance. Students with strong self-regulatory skills are often better positioned to succeed academically, particularly in diverse and evolving learning environments.

In today's increasingly interconnected and technologically driven world, higher education institutions are adapting to more complex and evolving learning environments. The COVID-19 pandemic significantly accelerated this shift, moving many institutions from traditional face-to-face instruction to digital and hybrid learning formats. As a result, the concept of the learning context has expanded to include elements such as classroom layout, teaching strategies, instructional design, and the integration of digital tools. In Cambodia, where the higher education sector has seen considerable development, these changes have had a noticeable impact on student academic performance. The pandemic exposed gaps in digital accessibility and revealed issues related to technology use, course delivery, and student engagement. In response, many Cambodian universities introduced digital platforms to sustain learning during disruptions, with blended learning emerging as a key instructional approach. Blended learning, which combines conventional and digital methods, presents opportunities but also poses challenges. While some students benefit from its flexibility and interactive features, others struggle due to unreliable internet access, limited access to devices, or low digital literacy. Institutions like the Royal University of Phnom Penh and the Institute of Technology of Cambodia responded by adopting online systems, offering digital training for faculty, and providing virtual support services (Heng & Sol, 2021). Nevertheless, sustaining student motivation and performance—particularly among disadvantaged groups—remains a concern. This study addresses this issue by examining the impact of both online and in-person learning context on academic performance in Cambodian higher education. It focuses on critical factors such as technology use and curriculum design and explores the mediating role of self-regulation, which enables students to manage academic challenges more effectively. As the country continues to reform its higher education landscape, adopting blended learning strategies may be vital in enhancing academic success. Lessons from neighboring systems, including China's applied universities, underscore the value of innovative, digitally enabled educational ecosystems that support engagement, knowledge sharing, and the development of entrepreneurial skills (Wang & Ali, 2024; Xiaoling & Ali, 2025). To shape this investigation, the study is framed by the following research questions:

RQ1: Does learning context have an influence on academic performance in Cambodian universities?
RQ2: Does learning context have an influence on self-regulation in Cambodian universities?
RQ3: Does self-regulation have an influence on academic performance in Cambodian universities?
RQ4: Does self-regulation have a mediating influence on the relationship between learning context and academic performance in Cambodian universities?

This study aims to investigate the influence of the learning context on academic performance and self-regulation among students in Cambodian universities. Specifically, it seeks to examine whether the learning context significantly impacts students' academic outcomes and their ability to self-regulate their learning behaviors. Furthermore, it aims to assess the mediating role of self-regulation in the relationship between learning context and academic performance, thereby providing a comprehensive understanding of how educational environments and learner behaviors interact to shape academic success in the Cambodian higher education setting.

LITERATURE REVIEW

The concept of the learning environment has deep roots in the history of education, yet its definition remains fluid and context dependent. While commonly used across academic literature, the term often lacks a clear and universally accepted meaning. Interpretations vary widely ranging from the physical settings in which learning occurs, to digital and technological platforms, and even to the pedagogical methods and instructional interactions involved. This conceptual ambiguity reflects differing research priorities and disciplinary perspectives. As such, definitions of the learning environment often serve pragmatic purposes, tailored to specific academic or institutional agendas. This study revisits a range of definitions to provide a synthesized perspective on how the term has evolved and been applied within higher education research. The increasing integration of technology in the learning environment, particularly artificial intelligence, has redefined educational administration, leadership practices, and instructional delivery, enhancing both efficiency and personalization while also influencing strategies for student career development. (Iwadi et al., 2024; Peng & Ali, 2025).

Higher education plays a critical role in shaping individuals, societies, and economies within an increasingly interconnected global landscape. Its evolving concept encompasses key elements such as equitable access, quality assurance, globalization, and curriculum innovation. Efforts to expand access focus on reducing socioeconomic and geographic disparities, while quality assurance mechanisms strive to maintain academic standards amid rapid growth. Globalization drives international collaboration and student mobility, fostering multicultural competencies and research partnerships. However, challenges persist, including financial barriers, balancing expansion with

quality, technology integration, and promoting inclusivity. Despite these obstacles, higher education holds promising prospects through lifelong learning, digital transformation, and enhanced global cooperation. Embracing these trends will enable institutions to adapt to shifting labor markets and technological advances, thereby reinforcing their role as engines of social mobility and economic development (Altbach & Wit, 2020; Fernández et al., 2023). Self-regulation refers to the process through which individuals manage their thoughts, emotions, and behaviors to achieve specific goals, playing a critical role in higher education by enabling students to take ownership of their learning, regulate their time, and persist through challenges. Central to this concept is Zimmerman's Social Cognitive Model, which emphasizes self-efficacy, goal setting, self-monitoring, and self-reflection as essential components of effective learning regulation. Students with high self-efficacy are more likely to engage in adaptive learning strategies and maintain motivation, leading to improved academic outcomes. The cyclical nature of self-regulation, which involves setting goals, monitoring progress, and adjusting behaviors, promotes continuous improvement. Given its significant impact on student motivation and achievement, self-regulation is positioned in this study as a key mediator in the relationship between the learning context and higher education academic performance (Zimmerman, 2000).

Technology Use and Academic Performance in Cambodian Universities

Transactional distance theory conceptualizes the psychological and communicative gap between instructors and learners, highlighting that effective communication, often facilitated by technology, can reduce this distance and enhance learning outcomes (Moore, 1993). Complementing this, Self-Determination Theory (SDT) emphasizes that students achieve higher motivation and performance when their needs for autonomy, competence, and relatedness are met, conditions that technology can support by allowing personalized pacing and resource selection. Control-Value Theory (CVT) further posits that technology enhances students' perceived control and the value of academic tasks by offering tools to organize learning, monitor progress, and increase engagement. Empirical research substantiates the positive impact of technology integration on higher education student performance. Meta-analytic evidence indicates that technology-enhanced instruction generally leads to better academic outcomes compared to traditional methods (Means et al., 2009). Furthermore, studies reveal that technology fosters increased student engagement, satisfaction, and critical thinking skills, contributing to improved academic achievement. The shift from instructor-centered to learner-centered pedagogies, enabled by digital tools, supports more active, reflective, and self-directed learning, which correlates with higher student success rates. These findings underscore the critical role of technology in modern higher education environments, positioning technology use as a significant factor influencing student learning and achievement (Kim et al., 2019; Means et al., 2009). Drawing from these theoretical perspectives and empirical findings, the following hypothesis is proposed:
H1: Technology use has a significantly influence on academic performance in Cambodian universities.

Curriculum Design and Academic Performance in Cambodian Universities

Curriculum design is a key factor in influencing student engagement and academic success in higher education. Drawing from Transactional Distance Theory, the degree of psychological and communicative separation between students and instructors significantly impacts learning quality (Moore, 1993). A thoughtfully designed curriculum can bridge this gap by integrating content, pedagogy, and interactive opportunities in ways that enhance student involvement and meaningful learning. When instructional activities are clear and interaction-rich, learners are more inclined to participate actively and perform well. In a similar vein, Self-Determination Theory highlights that motivation improves when learners feel autonomous, competent, and connected (Deci & Ryan, 1985). A curriculum that fosters choice, challenges students appropriately, and encourages collaboration can enhance intrinsic motivation, leading to better academic performance. These theoretical perspectives reinforce the idea that curriculum design is not simply about structuring content but a deliberate strategy to optimize learning outcomes. Supporting this view, Biggs (1999) introduced the notion of "constructive alignment," where learning goals, assessments, and teaching strategies are cohesively structured to facilitate deeper understanding and improved results. Likewise, Tam & Quynh (2024) underscore the importance of synchronizing learning objectives with assessments and instructional approaches to increase student engagement and promote successful learning outcomes. Drawing from these theoretical perspectives and empirical findings, the following hypothesis is proposed:
H2: Curriculum design has a significantly influence on academic performance in Cambodian universities.

Technology Use and Self-Regulation

Bandura's Social Cognitive Theory highlights the dynamic interplay between personal factors, environmental contexts, and behavior in shaping individual learning and development (Bandura, 1986). Within this framework, technology use is conceptualized as both an environmental influence and a behavioral tool that can support self-regulation through observation, modeling, and reflective practice. When learners engage with technology through

a self-regulatory lens, they are more likely to implement strategies such as goal setting, self-monitoring, and behavioral adjustment. For instance, digital tools like educational apps or task management platforms enable learners to structure their activities, monitor progress, and adapt their strategies to improve outcomes. Zimmerman's Social Cognitive Model of Self-Regulation further conceptualizes self-regulation as a cyclical process involving forethought, performance, and self-reflection, underpinned by constructs such as self-efficacy and outcome expectations (Zimmerman, 1989). Empirical findings offer a detailed and complex perspective on how technology use relates to self-regulation. Hsin & Cigas (2013) found a positive association between students' use of educational technologies and their self-regulated learning behaviors, suggesting that appropriate use of technology can foster metacognitive skills and autonomous learning. In contrast, Rosen et al. (2013) observed that excessive technology engagement, particularly for non-academic purposes, was linked to reduced self-regulation and lower academic performance. These findings underscore the importance of purposeful technology integration to enhance self-regulatory capacity rather than hinder it. Drawing from these theoretical perspectives and empirical findings, the following hypothesis is proposed:
H3: Technology use has a significantly influence on self-regulation.

Curriculum Design and Self-Regulation

Zimmerman's Social Cognitive Model of Self-Regulation emphasizes the cyclical nature of self-regulated learning, where individuals actively engage in goal setting, self-monitoring, self-evaluation, and self-reinforcement to achieve desired outcomes. Within this model, curriculum design is identified as a key environmental factor that can either facilitate or hinder self-regulatory development. A well-structured curriculum provides clear learning objectives, scaffolded tasks, and opportunities for reflection and feedback, enabling students to develop and apply self-regulation strategies effectively. In contrast, disorganized or overly rigid curricula may obstruct learners' ability to engage in autonomous learning and adaptive behaviors. Social Cognitive Theory (SCT) further explains how self-regulation is cultivated through personal experiences and social contexts, including modeling and guided instruction. From this perspective, curriculum design aligned with SCT principles can promote observational learning and self-efficacy, thereby enhancing students' self-regulatory capacity. For example, instructional practices such as explicit modeling of learning strategies and the use of reflective activities can support the internalization of self-regulatory behaviors. Empirical evidence underscores the value of embedding self-regulatory interventions within curriculum frameworks. Panadero (2017) demonstrated that instructional interventions targeting goal setting, self-monitoring, and self-reflection significantly improve academic outcomes. Similarly, Cleary & Callan (2012) found that integrating self-regulated learning strategies into curricula enhances both self-regulation and academic achievement, supporting the critical role of curriculum design in fostering effective learning behaviors. Drawing from these theoretical perspectives and empirical findings, the following hypothesis is proposed:
H4: Curriculum design has a significantly influence on self-regulation.

Self-Regulation and Academic Performance in Cambodian Universities

Social Cognitive Theory (SCT) underscores the dynamic interplay between personal attributes, environmental influences, and behaviors, identifying self-regulation as a key mechanism in achieving goals like academic success (Bandura, 1986). Self-regulation encompasses skills such as self-monitoring, self-assessment, and self-reinforcement, which help learners manage their motivation and learning processes efficiently. Meanwhile, Self-Determination Theory (SDT) stresses the importance of fulfilling basic psychological needs, including autonomy, competence, and relatedness, in sustaining intrinsic motivation and engagement. (Ryan & Deci, 2000). When learners experience a sense of autonomy and capability, they are more likely to engage in self-regulated learning practices that contribute to academic achievement. In alignment with this, Zimmerman's Social Cognitive Model portrays self-regulation in higher education as a cycle involving goal setting, monitoring progress, and adjusting learning strategies to enhance outcomes. A substantial body of empirical research supports the strong link between self-regulation and academic performance. For example, Zimmerman & Martinez-Pons (1988) demonstrated that students who frequently employed self-regulatory strategies such as setting goals and tracking their progress achieved higher academic results. Similarly, a meta-analysis by Credé & Kuncel (2008), encompassing more than 100 studies, affirmed a significant positive correlation between self-regulation and academic success across diverse educational settings. These findings collectively underscore the essential role of self-regulation in promoting effective learning and academic performance in higher education. Drawing from these theoretical perspectives and empirical findings, the following hypothesis is proposed:
H5: Self-regulation has a significantly influence on academic performance in Cambodian universities.

Self-Regulation, Technology Use and Academic Performance in Cambodian Universities

Informed by Bandura's (1986) Social Cognitive Theory, self-regulation is a dynamic process through which students observe, interpret, and control their behaviors in response to environmental stimuli, including the use of technology, instructional methods, and curriculum design. Within higher education, the integration of educational technologies can significantly shape learning environments that promote observational learning and enhance self-regulatory behaviors. These technologies offer tools for planning, monitoring, and reflecting, which are core components of self-regulated learning, thus contributing to improved academic performance. According to Zimmerman's (2000) Social Cognitive Model of Self-Regulation, students engage in a cyclical process of forethought, performance, and self-reflection, which is influenced by contextual factors such as classroom climate and digital learning tools. Research has demonstrated that self-regulation mediates the relationship between the learning environment and academic outcomes. For instance, digital platforms can support self-monitoring and feedback, empowering students to take greater control of their learning trajectories. Empirical evidence confirms that students who effectively regulate their learning through technological tools exhibit higher levels of academic achievement and satisfaction (Zimmerman, 2000). Similarly, studies have found that students in structured and supportive learning environments that leverage technology for autonomy and feedback are more likely to develop strong self-regulation skills, which in turn predict academic success (Richardson et al., 2012). Therefore, fostering self-regulation through the strategic use of technology is crucial for enhancing academic performance in contemporary higher education contexts. Drawing from these theoretical perspectives and empirical findings, the following hypothesis is proposed:

H6: Self-regulation significantly mediates the relationship between technology use and academic performance in Cambodian universities.

Self-Regulation, Curriculum Design and Academic Performance in Cambodian Universities

Grounded in Bandura's (1986) Social Cognitive Theory, self-regulation is a core mechanism through which students manage their learning behaviors in response to environmental cues, including curriculum design. In higher education, well-structured curricula, characterized by clarity, coherence, flexibility, and relevance, serve as powerful environmental factors that shape students' cognitive engagement and behavioral regulation. By setting goals, monitoring their own progress, and reflecting on their learning, students adjust to curriculum requirements and improve their academic outcomes. Zimmerman (2000) cyclical model of self-regulation, which includes forethought, performance, and self-reflection phases, highlights how curriculum design directly influences each stage. For instance, curricula that emphasize active learning and autonomy foster deeper engagement during the planning phase, while structured feedback mechanisms support students' ability to monitor progress and make strategic adjustments. Empirical evidence confirms that students in supportive curricular environments are more likely to engage in self-regulated learning strategies that positively impact academic achievement. Structured curricular elements such as formative assessments, project-based learning, and technology-integrated instruction, provide scaffolding for self-regulatory behaviors, thereby strengthening students' capacity to maintain motivation and persist in the face of academic challenges. Zimmerman (2000) emphasized the influence of instructional design, including curriculum structure, in cultivating self-regulated learners. Similarly, Richardson et al. (2012) concluded that self-regulation acts as a key mediator between curriculum-driven learning environments and academic success. Thus, curriculum design plays a critical role in fostering self-regulation and optimizing student performance in higher education. Drawing from these theoretical perspectives and empirical findings, the following hypothesis is proposed:

H7: Self-regulation significantly mediates the relationship between curriculum design and academic performance in Cambodian universities.

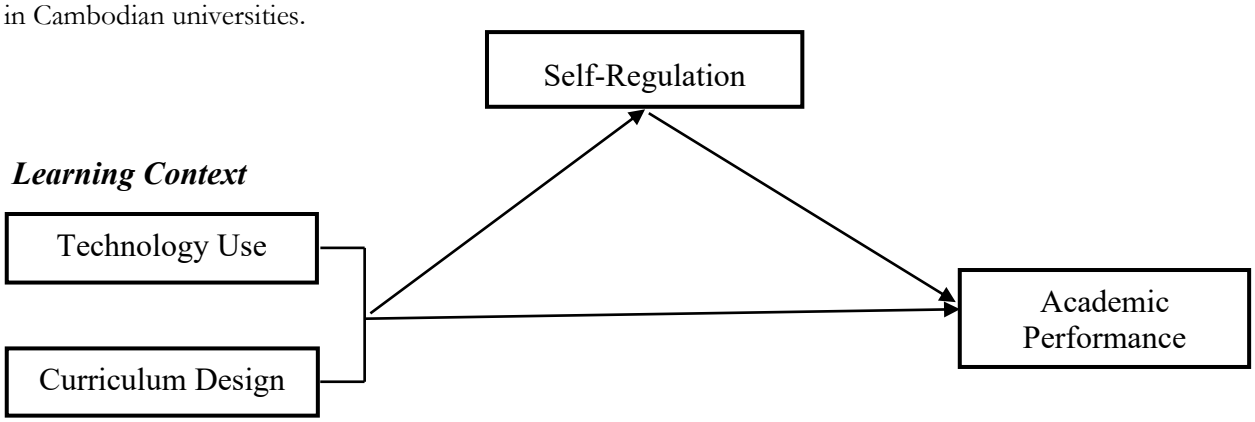

Figure 1: Theoretical Framework

RESEARCH METHODOLOGY

Sampling and Data Collection

A research design serves as a structured and methodical plan that guides the entire research process, ensuring alignment among the research questions, theoretical foundation, hypotheses (where applicable), and the selected methodology. It serves as a comprehensive blueprint guiding the collection, measurement, analysis, and interpretation of data throughout the research process. By providing this framework, the research design plays a critical role in maintaining the study's validity, reliability, and adherence to ethical standards, thereby reinforcing the overall credibility and rigor of the research (Creswell & Guetterman, 2018). For this study, a descriptive research design using quantitative methods was deemed most appropriate. In alignment with (Rauteda, 2025), the preference for quantitative over qualitative methods supports a more objective and measurable assessment of variable relationships.. The target population consists of lecturers from selected public universities in Cambodia, chosen based on their relevance and accessibility. Based on the sample size guidelines proposed by (Krejcie & Morgan, 1970), the appropriate number of participants for a population of 2,000 was adhered to in this study.

A structured questionnaire was designed using previously validated items aligned with the study's main constructs. A pilot study was undertaken to evaluate the instrument's reliability, with Cronbach's alpha values ranging from 0.708 to 0.911, all exceeding the generally accepted minimum threshold of 0.70 (Nunnally, 1978). After finalizing the instrument, printed questionnaires were distributed to lecturers in selected public and private universities. A total of 405 questionnaires were handed out, and 347 were successfully completed and returned, yielding an initial response rate of 85.7%. After removing 27 incomplete responses, a total of 320 valid surveys were retained, yielding a final usable response rate of 79% as shown in Table 1, which is acceptable for quantitative studies. Among these respondents, 89.4% were male and 10.6% were female. The majority were aged between 41 and 50 years (50.6%), followed by those aged 51–60 (25.3%) and 31–40 (16.3%). In terms of academic qualifications, 84.7% held a master's degree, while 15.3% possessed a PhD. Regarding professional experience, the largest group had 11–15 years of experience (51.9%), followed by those with 16–20 years (21.3%), 6–10 years (14.7%) and below 5 years (8.8%).

Table 1. The Demographic Characteristics of the Respondents

Factors	Classification	Repetition	Proportion
Gender	Female	34	10.6
	Male	286	89.4
Age	Below 30yrs	18	5.6
	31-40yrs	52	16.3
	41-50yrs	162	50.6
	51-60yrs	81	25.3
	61yrs and above	7	2.2
Academic Qualification	MSc.	271	84.7
	PhD	49	15.3
Working Experience	Below 5yrs	28	8.8
	6 – 10yrs	47	14.7
	11 – 15yrs	166	51.9
	16 – 20yrs	68	21.3
	Above 20yrs	11	3.4
N		**320**	

Measurement

A structured survey instrument with five sections was developed to measure the study's key constructs. Items on technology and curriculum design were tailored to the technological context of the research setting. Self-regulated was measured using items that assess students' capacity to plan, monitor, and control their own learning processes. Student achievement was measured using items reflecting skill performance, retention, interest, and cognitive ability. Participants responded on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), enabling consistent quantification of perceptions across all sections.

Data Analysis

SPSS version 26 was employed for descriptive analysis of the respondents' demographic profiles and to conduct a pilot test assessing the reliability of the measurement instruments. SmartPLS 3.0 was used to evaluate the proposed research framework, due to its suitability for complex models involving latent constructs (Hair et al., 2017). The analysis followed a two-stage approach: assessment of the measurement model and the structural model. The measurement model evaluation focused on indicator reliability, internal consistency, convergent validity, and discriminant validity. The structural model was then assessed to test the hypothesized relationships among constructs and evaluate the model's predictive relevance. This approach is consistent with established guidelines for applying PLS-SEM in social science research.

RESEARCH RESULT

Measurement Model Evaluation

Table 2 presents the construct reliability and validity results. All item loadings are above the acceptable threshold of 0.70 (Hair et al., 2017), confirming indicator reliability. Cronbach's Alpha values range from 0.931 to 0.971, and composite reliability (CR) values range from 0.946 to 0.974, exceeding the recommended 0.70 benchmark. The AVE values (0.661–0.795) are above 0.50, demonstrating adequate convergent validity. These results confirm that all constructs are reliable and valid for further structural analysis.

Table 2: Construct Reliability and Validity

Construct		***Items***	***Loadings***	***Cronbach Alpha***	***Composite Reliability***	***Average Variance Extracted***
Tecchnology Use		TU10	0.947	0.962	0.969	0.795
		TU11	0.948			
		TU12	0.750			
		TU13	0.749			
		TU14	0.938			
		TU3	0.874			
		TU8	0.951			
		TU9	0.946			
Cuarriculum		CD1	0.826	0.943	0.951	0.661
Design		CD10	0.779			
		CD2	0.854			
		CD3	0.776			
		CD4	0.832			
		CD5	0.857			
		CD6	0.776			
		CD7	0.836			
		CD8	0.808			
		CD9	0.778			
Achievement		AP1	0.884	0.971	0.974	0.699
Performance		AP1	0.884			
		AP10	0.902			
		AP11	0.850			
		AP12	0.906			
		AP14	0.906			
		AP15	0.906			
		AP16	0.801			
		AP17	0.890			
		AP2	0.746			

		AP3	0.716			
		AP4	0.736			
		AP5	0.716			
		AP6	0.744			
		AP7	0.890			
		AP8	0.904			
Self-Regulation		SR1	0.914	0.931	0.946	0.745
		SR2	0.901			
		SR3	0.819			
		SR4	0.793			
		SR5	0.823			
		SR6	0.919			

Table 3 displays the square roots of the AVE for each construct along the diagonal (in bold). These values are greater than the correlations between the constructs, thus satisfying the Fornell–Larcker criterion for establishing discriminant validity (Fornell & Larcker, 1981). For instance, the square root of the AVE for Academic Performance (0.836) exceeds its correlations with Curriculum Design (0.214), Self-Regulation (0.333), and Technology Use (0.347). This pattern holds for all constructs, confirming that each construct is empirically distinct and suitable for inclusion in the structural model.

Table 3: Latent Variable Correlations (Fornel-Larcker Criterion)

Constructs	**AP**	**CD**	**SR**	**TU**
Academic Performance (AP)	0.836			
Curriculum Design (CD)	0.214	0.813		
Self-Regulation (SR)	0.333	0.395	0.863	
Technology Use (TU)	0.347	0.275	0.406	0.892

All HTMT values are below the conservative threshold of 0.85 and well within the more liberal threshold of 0.90 (Henseler et al., 2016). For example, the highest HTMT value (0.428 between Self-Regulation and Technology Use) is far below 0.85, indicating strong discriminant validity. These results, along with the Fornell–Larcker criterion (Table 3), confirm that the constructs are conceptually distinct and free from multicollinearity issues.

Table 4: Discriminant Validity (Heterotrait-Monotrait Ratio - HTMT)

Constructs	**AP**	**CD**	**SR**	**TU**
Academic Performance (AP)				
Curriculum Design (CD)	0.218			
Self-Regulation (SR)	0.348	0.411		
Technology Use (TU)	0.358	0.286	0.428	

Structural Model Evaluation

The R^2 value for Academic Performance is 0.168, indicating that 16.8% of its variance is explained by Technology Use, Curriculum Design, and Self-Regulation. Similarly, the R^2 for Self-Regulation is 0.252, suggesting that 25.2% of its variance is explained by Technology Use and Curriculum Design. As per Chin (1998), R^2 values can be interpreted as follows: 0.19 indicates a weak effect, 0.33 a moderate effect, and 0.67 a substantial effect. Thus, the model demonstrates a weak to moderate explanatory power, which is acceptable for social science research.

Table 5: Coefficient of Determination (R Square)

Constructs	**R-square**	**R-square adjusted**
Academic Performance	0.168	0.160
Self-Regulation	0.252	0.247

Additionally, the f^2 effect sizes were calculated to determine the extent to which each independent variable contributes to the variance explained (R^2) in the dependent constructs. Based on Cohen (1988) classification, these effect sizes are interpreted as small (0.02), medium (0.15), and large (0.35). The effect size (f^2) analysis shows that Curriculum Design ($f^2 = 0.004$) has almost no effect on Academic Performance, while Self-Regulation ($f^2 = 0.039$) and Technology Use ($f^2 = 0.059$) have small effects according to Cohen (1988) guidelines (0.02 = small, 0.15 = medium, 0.35 = large). Regarding Self-Regulation, both Curriculum Design ($f^2 = 0.116$) and Technology Use ($f^2 = 0.128$) exhibit small but meaningful effects, suggesting their importance in explaining variations in self-regulation behavior.

Table 6: Effect Sizes (f^2) Analaysis

Achievement Performance	**Effect Size**	**Decisions**
Curriculum Design	0.004	None
Self-Regulation	0.039	Small
Technology Use	0.059	Small
Self-Regulation	**Effect Size**	**Decisions**
Curriculum Design	0.116	Small
Technology Use	0.128	Small

Furthermore, Q^2 values were derived using the blindfolding procedure to evaluate the model's predictive relevance; values greater than zero suggest that the model has sufficient predictive accuracy (Henseler et al., 2014). The Q^2 values for Academic Performance (0.114) and Self-Regulation (0.184) are both greater than zero, confirming the model's predictive relevance (Hair et al., 2019). According to the guidelines by (Chin, 1998), Q^2 values above 0.02, 0.15, and 0.35 represent small, medium, and large predictive relevance, respectively. Thus, Academic Performance demonstrates small predictive relevance, while Self-Regulation demonstrates moderate predictive relevance.

Table 7: Construct Cross Validated Redundancy (Q2)

Constructs	**SSE**	**SSO**	**1-SSE/SSO**
Academic Performance	5,120.000	4,535.195	0.114
Self-Regulation	1,920.000	1,567.540	0.184

Note: SSO - Systematic Sources of Output; SSE - Systematic Sources of Error

Table 8 presents the model fit indices. The model's SRMR value of 0.069 is below the recommended threshold of 0.08 (Henseler et al., 2014; Hu & Bentler, 1999), indicating a good model fit. The d_ULS (3.869) and d_G (11.955) values fall within acceptable ranges, supporting the model's adequacy. Although the NFI value (0.547) is lower than the ideal cutoff of 0.90, NFI is often sensitive to sample size and model complexity. Overall, the results suggest that the model demonstrates a satisfactory fit for further hypothesis testing and structural evaluation.

Table 8: Goodness of Fit of The Model

Item	**Saturated Model**	**Estimated Model**
SRMR	0.069	0.069
d_ULS	3.869	3.869
d_G	11.955	11.955
Chi-Square	10,343.041	10,343.041
NFI	0.547	0.547

Hypothesis Testing

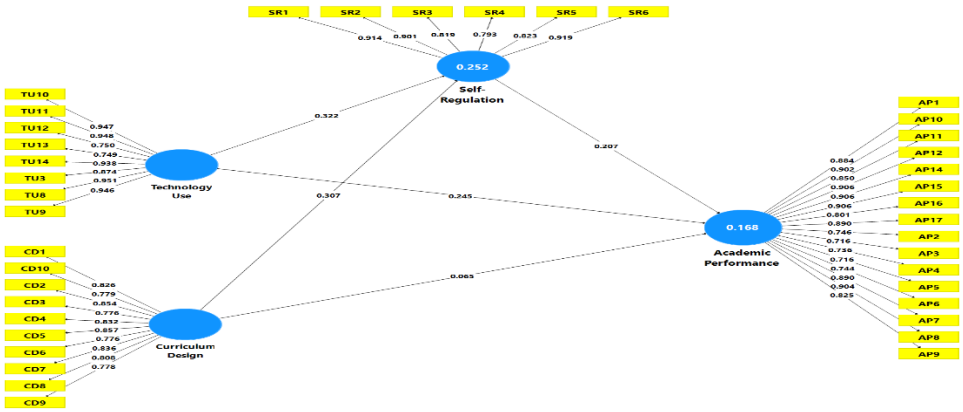

Figure 2: Path Model Significant

Table 9 presents the direct results. The results support H1 and H2, confirming that Technology Use positively influences both Academic Performance (β = 0.245, p < 0.001) and Self-Regulation (β = 0.322, p < 0.001) among Cambodian higher education students. Similarly, H4 and H5 are supported, indicating Curriculum Design positively impacts Self-Regulation (β = 0.307, p < 0.001) and that Self-Regulation significantly enhances Academic Performance (β = 0.207, p < 0.001). However, H3 is not supported; Curriculum Design does not have a statistically significant direct effect on Academic Performance (β = 0.065, p = 0.258). These findings suggest that while Curriculum Design influences Academic Performance indirectly through Self-Regulation, Technology Use exerts both direct and indirect positive effects.

Table 9: Direct Effect Hypotheses Testing

Hypothesis	Coef.	Se	T value	P values	Decision
Technology Use → Academic Performance	0.245	0.061	4.013	0.000	Supported
Curriculum Design → Academic Performance	0.065	0.057	1.113	0.258	Not Supported
Technology Use → Self-Regulation	0.322	0.047	6.856	0.000	Supported
Curriculum Design → Self-Regulation	0.307	0.051	6.025	0.000	Supported
Self-Regulation → Academic Performance	0.207	0.059	3.517	0.000	Supported

Note: Coef. = Coefficient; Se = standard error.

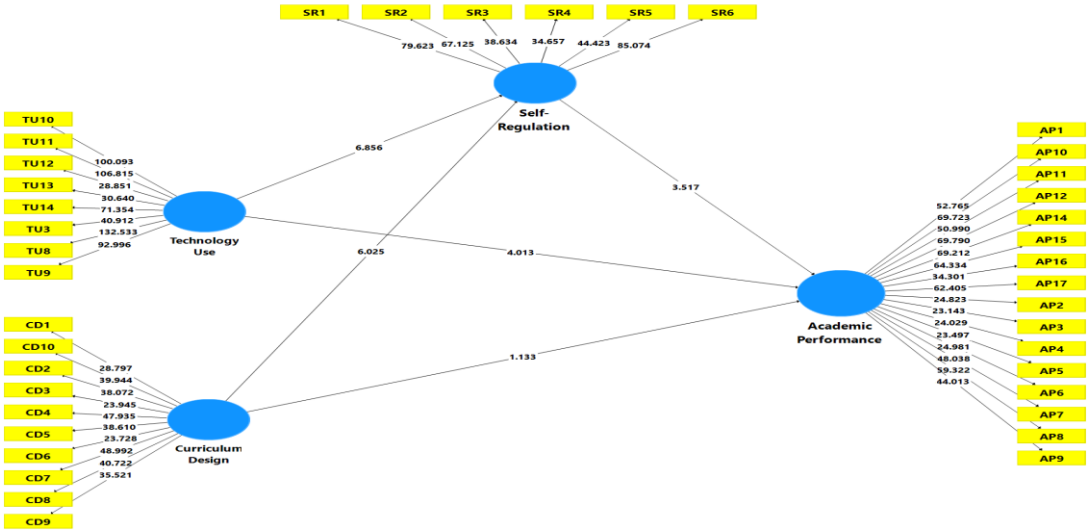

Figure 3: Path Model Results of Mediation

Table 10 presents the mediation analysis confirms that Self-Regulation significantly mediates the relationship between Technology Use and Academic Performance (β = 0.067, p = 0.002), supporting H6. Similarly, H7 is supported, as Self-Regulation mediates the effect of Curriculum Design on Academic Performance (β = 0.064, p = 0.002). These findings suggest that the positive impact of both Technology Use and Curriculum Design on

Academic Performance operates partially through enhancing students' Self-Regulation abilities. This highlights the crucial role of Self-Regulation as a psychological mechanism in the academic success of Cambodian higher education students.

Table 10: Indirect Effect Hypotheses Testing

Hypothesis	Coef.	Se	T value	P values	Decision
Technology Use → Self-Regulation → Academic Performance	0.067	0.021	3.140	0.002	Supported
Curriculum Design → Self-Regulation → Academic Performance	0.064	0.021	3.083	0.002	Supported

Note: Coef. = Coefficient; Se = standard error.

DISCUSSION AND CONCLUSION

Discussion

This study examined exploring the mediating role of self-regulation in the relationship between learning context and academic performance in Cambodian higher education. Structural equation modeling using PLS revealed that all hypothesized relationships *(H1–H7)* were statistically significant. The findings contribute to the broader literature on educational leadership, faculty development, and learning outcomes in resource-constrained higher education systems.

The findings of this study confirm that Technology Use has a significant positive effect on Academic Performance ($\beta = 0.245$, $t = 4.013$, $p < 0.001$), supporting ***H1*** among Cambodian higher education students. This result aligns with the literature, where Pinto et al. (2020) emphasize that digital technologies support student learning by enhancing access to resources and enabling active engagement. Likewise, Pathak et al. (2019) find that ICT utilization contributes to improved student performance through more interactive and collaborative learning approaches. Therefore, the current study's evidence strengthens the argument that technology integration plays a crucial role in fostering academic performance success in higher education contexts.

The study found that Curriculum Design does not have a significant direct effect on Academic Performance ($\beta = 0.065$, $t = 1.113$, $p = 0.258$), so ***H2*** is not supported. This result contrasts with TASHI (2025), who reported that well-structured curricula positively influence educational outcomes in entrepreneurship education. The discrepancy may suggest that Curriculum Design impacts Academic Performance indirectly through other factors, such as Self-Regulation, highlighting the need to explore mediating mechanisms in future research.

The results show that Technology Use has a significant positive effect on Self-Regulation ($\beta = 0.322$, $t = 6.856$, $p < 0.001$), supporting ***H3***. This aligns with Canlas et al. (2024), who found that the effective use of technology enhances students' self-determined learning behaviors by promoting self-regulated learning strategies in higher education settings. Their study emphasizes that digital tools empower students to plan, monitor, and evaluate their own learning processes, which corroborates the present finding that technology use fosters stronger self-regulation among Cambodian university students. This highlights the pivotal role of technological use in developing autonomous learning skills critical for academic performance success.

The findings support ***H4***, indicating that Curriculum Design positively influences Self-Regulation ($\beta = 0.307$, $t = 6.025$, $p < 0.001$). This aligns with Brosens (2020), who highlights that thoughtfully designed curricula, especially those involving group and project-based learning, foster the development of self-regulating skills among students. These results emphasize the importance of curriculum design in promoting autonomous learning behaviors critical for academic performance success.

The results support ***H5***, showing that Self-Regulation positively affects Academic Performance ($\beta = 0.207$, $t = 3.517$, $p < 0.001$). This aligns with Elesio (2023), who found that self-regulation strategies significantly enhance academic outcomes among college students. Similarly, Park & Kim (2022) highlight those higher levels of self-regulation correlate with improved engagement and performance in flipped learning environments. These studies reinforce the pivotal role of self-regulation in driving academic performance success.

The results show that Self-Regulation significantly mediates the effect of Technology Use on Academic Performance ($\beta = 0.067$, $t = 3.140$, $p = 0.002$), supporting ***H6***. This aligns with Urbina et al. (2021), who found that technology-enhanced learning environments improve academic outcomes by fostering self-regulated learning. The finding highlights that Self-Regulation is a key mechanism through which Technology Use benefits academic performance.

The mediation effect of Self-Regulation between Curriculum Design and Academic Performance is supported (indirect effect $\beta = 0.064$, $t = 3.083$, $p = 0.002$), validating ***H7***. Park & Kim (2022) emphasize that well-designed

curricula foster self-regulation, which in turn enhances student performance, especially in active learning contexts. This study extends their findings to the Cambodian higher education setting, confirming that Self-Regulation is a critical mediator linking curriculum design and academic performance.

CONCLUSION

This study investigated the mediating role of self-regulation in the relationship between learning context—specifically technology use and curriculum design—and academic performance in Cambodian higher education. The findings confirm that self-regulation functions as a crucial mechanism through which elements of the learning environment impact students' academic success. While technology use demonstrated both direct and indirect effects on academic performance, curriculum design's influence was primarily mediated by students' self-regulatory behaviors. These results highlight the importance of fostering environments that actively promote self-regulated learning, particularly through effective use of digital tools and thoughtful curriculum planning. Overall, the study contributes to a deeper understanding of how contextual factors in education influence learning outcomes through internal student processes, offering practical implications for educators, policymakers, and institutional leaders working in resource-constrained settings.

Despite its contributions, this study has several limitations. First, the research design was cross-sectional, which restricts the ability to infer causal relationships among the variables. Second, data collection was limited to a sample from selected Cambodian higher education institutions, which may limit the generalizability of the findings to other educational contexts or regions. Third, the study relied on self-reported measures, which may be subject to social desirability or response bias. Additionally, external factors such as institutional support, teaching quality, or students' prior academic background were not fully accounted for in the model, which may influence the observed relationships. Future studies should adopt longitudinal or mixed-method approaches, include more diverse samples, and examine additional mediators like motivation or digital literacy to deepen understanding of learning success in varied educational contexts.

REFERENCES

Altbach, & Wit, H. de. (2020). Postpandemic outlook for higher education is bleakest for the poorest. *International Higher Education*, *102*. https://ejournals.bc.edu/index.php/ihe/article/view/14583

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory* (2nd ed.). Prentice-Hall.

Biggs, J. (1999). What the student does: Teaching for enhanced learning. *Taylor & Francis*, *18*(1), 57–75. https://doi.org/10.1080/0729436990180105

Brosens, L. (2020). Self-regulating Soft Skills in Group Project-Based Design Education. *International Conference on Supporting*, 1–5. https://doi.org/10.1145/3323994.3371013

Canlas, I. P., Ceblano, M. V., Gayrama, V. P., & Panit, N. M. (2024). The influence of technology on self-determination: the case of self-regulated learning in an island university. *Pedagogies: An International Journal*, *19*(2), 165–182. https://doi.org/10.1080/1554480X.2023.2189121

Chin, W. (1998). Commentary: Issues and opinion on structural equation modeling. *Management Information Systems Research Center*, *22*(1), 7–11. https://www.jstor.org/stable/249674

Cleary, T., & Callan, G. (2012). Assessing self-regulation as a cyclical, context-specific phenomenon: Overview and analysis of SRL microanalytic protocols. *Education Research International*, 1–19. https://doi.org/10.1155/2012/428639

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). LAWRENCE ERLBAUM ASSOCIATES. https://doi.org/10.4324/9780203771587

Credé, M., & Kuncel, N. (2008). Study habits, skills, and attitudes: The third pillar supporting collegiate academic performance. *Perspectives on Psychological Science*. https://doi.org/10.1111/j.1745-6924.2008.00089.x

Deci, E., & Ryan, R. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality*, *19*(2), 109–134. https://doi.org/10.1016/0092-6566(85)90023-6

Elesio, J. (2023). The influence of self-regulated learning strategies towards academic performance of college students. *East Asian Journal of Multidisciplinary Research*, *2*(2), 823–838. https://doi.org/10.55927/eajmr.v2i2.3029

Fernández, A., Gómez, B., Binjaku, K., & Meçe, E. K. (2023). Digital transformation initiatives in higher education institutions: A multivocal literature review. *Education and Information Technologies*, *28*(10), 12351–12382. https://doi.org/10.1007/S10639-022-11544-0

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18*(1), 39–50. https://doi.org/10.1177/002224378101800104

Hair, J. F., Tomas, G., Hult, M., Ringle, C. M., & Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (2nd ed.). http://study.sagepub.com/

Heng, K., & Sol, K. (2021). COVID-19 and Cambodian higher education: Challenges and opportunities. *Online Learning during COVID-19 and Key Issues in Education*, 31–48. https://cefcambodia.com/2021/12/15/covid-19-and-cambodian-higher-education-challenges-and-opportunities/

Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., Ketchen, D. J., Hair, J. F., Hult, G. T. M., & Calantone, R. J. (2014). Common beliefs and reality about PLS: Comments on Rönkkö and Evermann (2013). *Organizational Research Methods*, *17*(2), 182–209. https://doi.org/10.1177/1094428114526928

Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). Testing measurement invariance of composites using partial least squares. *International Marketing Review*, *33*(3), 405–431. https://doi.org/10.1108/IMR-09-2014-0304/FULL/XML

Hsin, W., & Cigas, J. (2013). Short videos improve student learning in online education. *Journal of Computing Sciences in Colleges*, *28*(5), 253–259. https://doi.org/10.5555/2458569.2458622

Hu, L., & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Iwadi, I., Ali, D., & Jabari, M. (2024). Artificial Intelligence Techniques and Their Role in Enhancing the Competitive Advantage of Palestinian Schools. *Palestine Ahliya University Journal for Research and Studies*, *03*(02). https://www.academia.edu/download/117195138/Artificial_Intelligence_Techniques_and_Their_Role_in_Enhancing_the.pdf

J. W. Creswell & T. C. Guetterman. (2018). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (6th ed.). Pearson Education Company.

Kim, Hong, A. J., & Song, H. D. (2019). The roles of academic engagement and digital readiness in students' achievements in university e-learning environments. *International Journal of Educational Technology in Higher Education*, *16*(1). https://doi.org/10.1186/s41239-019-0152-3

Krejcie, R. V., & Morgan, D. W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*, *30*(3), 607–610. https://doi.org/10.1177/001316447003000308

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2009). Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies. *Centre for Learning Technology*. http://repository.alt.ac.uk/629

Moore, M. (1993). Is teaching like flying? A total systems view of distance education. *American Journal of Distance Education*, *7*(1), 1–10. https://doi.org/10.1080/08923649309526806

Nunnally, J. (1978). An overview of psychological measurement. In *Clinical diagnosis of mental disorders* (pp. 97–146). Springer US. https://doi.org/10.1007/978-1-4684-2490-4_4

Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. *Frontiers in Psychology*, *8*(APR). https://doi.org/10.3389/FPSYG.2017.00422/FULL

Park, S., & Kim, N. (2022). University students' self-regulation, engagement and performance in flipped learning. *European Journal of Training and Development*, *46*(1–2), 22–40. https://doi.org/10.1108/EJTD-08-2020-0129/FULL/HTML

Pathak, S., Raja, R., Sharma, V., & Ambala, S. (2019). ICT utilization and improving student performance in higher education. *Journal of Recent Technology and Engineering*, *8*(2), 5120–5124. https://doi.org/10.35940/ijrte.B1825.078219

Peng, Z., & Ali, D. (2025). Leadership and Career Planning in Higher Education: A Critical Review of Their Impact on Student Success. *An International Journal of Management*, *14*(2). https://doi.org/10.46360/cosmos.mgt.420251007

Pinto, M., Leite, C., Pinto, M., & Leite, C. (2020). Digital technologies in support of students learning in Higher Education: literature review. *Digital Education Review*, *37*, 343–360. https://dialnet.unirioja.es/servlet/articulo?codigo=7615204

Rauteda, K. (2025). Quantitative Research in Education: Philosophy, Uses and Limitations. *Journal of Multidisciplinary Research and Development*, *2*(1), 1–11. https://doi.org/10.56916/JMRD.V2I1.993

Richardson, M., Abraham, C., & Bulletin, R. B. (2012). Psychological correlates of university students' academic performance: a systematic review and meta-analysis. *Psychological Bulletin*, *138*(2), 353–387. https://doi.org/10.1037/a0026838

Rosen, L., Carrier, L., & Cheever, N. (2013). Facebook and texting made me do it: Media-induced task-switching while studying. *Computers in Human Behavior*, *29*(3), 948–958. https://doi.org/10.1016/j.chb.2012.12.001

Ryan, R., & Deci, E. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Tam, D. T. M., & Quynh, P. T. (2024). Alignment between Course Learning Outcomes and Assessments: An Analysis within Linguistic Programs at a University in Vietnam. *International Journal of TESOL & Education*, *4*(2), 31–45. https://doi.org/10.54855/IJTE.24422

TASHI, T. (2025). Investigating The Influence Of Curriculum Design On Entrepreneurship Education Outcomes In College Of Education, Akwanga. *International Journal of Educational Research and Library Science*, *7*(8). https://doi.org/10.70382/tijerls.v07i8.042

Urbina, S., Villatoro, S., & Salinas, J. (2021). Self-regulated learning and technology-enhanced learning environments in higher education: A scoping review. *Institute for Educational Research and Innovation*, *13*(13), 7281. https://doi.org/10.3390/su13137281

Wang, X., & Ali, A. (2024). Research on Constructing the Innovation and Entrepreneurship Education Ecosystem of Applied Undergraduate. *International Journal of Research in Education Humanities and Commerce*, *5*(4). https://doi.org/10.37602/IJREHC.2024.5414

Xiaoling, L., & Ali, D. (2025). Examining the Influence of the Entrepreneurial Ecosystem on the Success of University Startups Via the Determining Function. *Journal of Business and Management*, *2*(1), 363–374. https://prestieesci.com/journal/index.php/PJBM/article/view/279

Zimmerman, B. (1989). A social cognitive view of self-regulated academic learning. *Journal of Educational Psychology*, *81*(3), 329–339. https://doi.org/10.1037/0022-0663.81.3.329

Zimmerman, B. J. (2000). *Attaining self-regulation: A social cognitive perspective* (pp. 13–39). Elsevier. https://doi.org/10.1016/B978-012109890-2/50031-7

Zimmerman, B. J., & Martinez-Pons, M. (1988). Construct Validation of a Strategy Model of Student Self-Regulated Learning. *Journal of Educational Psychology*, *80*(3), 284–290. https://doi.org/10.1037/0022-0663.80.3.284

