

Evaluating English Language Curriculum Effectiveness Using PLS-SEM: The Mediating Role of Student Engagement and the Moderating Role of Digital Learning in Kuwait

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Abstract

This study investigates how the English Language Curriculum Effectiveness (CLCE) affects Academic Performance (AP) of the Al-Ahmadi city university EFL learners utilizing Student Engagement (SE) as a mediator and Digital Learning (DL) as a moderator. A two-wave longitudinal data collection method was used, which occupied 412 students from various universities in Al Ahmadi and analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM). As shown in results, CLCE is found to be a significant predictor of SE ($\beta = 0.521$) and AP ($\beta = 0.394$). The direct effect of the CLCE-AP relationship only accounts for 36.55%, and is partly mediated by SE. Moreover, DL significantly affects the connection between CLCE and SE, strengthening the control of the curriculum when digital conditions are high. The model accounts for 56.2% of SE variance and 62.8% of AP variance. The results complement Student Engagement Theory improving digital infrastructure as a key boundary condition. The findings of the study indicate in practice the importance of integrated curriculum redesign and offering better digital support, to confirm high learner outcomes within the local higher education context. This study provides solid empirical proof of the optimization and improvement of EFL programs for technology-enhanced educational environment in Al Ahmadi city, Kuwait.

Keywords: Curriculum Effectiveness, Student Engagement, Digital Learning, Academic Performance, PLS-SEM, IPMA, EFL, Al Ahmadi, Kuwait.

1. Introduction

English language skills have been identified as a fundamental necessity for both academic and career success in higher education today, especially in an increasingly globalized world (Crystal, 2003). In view of this, universities around the world have been devoting huge sums of money in

the development of English as Foreign Language (EFL) curriculum to create learning programs that will not only broadcast the knowledge of the English language, but also develop communicative competence, critical thinking, and intercultural awareness (Richards & Rodgers, 2001). Effectiveness of the curriculum is a multidimensional phenomenon, which implies the relevance of educational content, pedagogical fit, assessment validity and the design of the educational content for the learner (Oliva & Gordon, 2022). Based on the basic works of educational goals (Anderson & Krathwohl, 2001), it is evident that any curriculum design is effective when the stated teaching objectives are related to measurable cognitive objectives. Despite these significant investments, the effectiveness of such curricula continues to be a topic of debate, and researchers are troubled about whether existing curricula are designed to be effective for students in terms of measurable academic outcomes (AP). The debate that follows is very relevant in the State of Kuwait, where the swing to a knowledge-based economy is a major priority in the national vision "New Kuwait 2035," thereby causing the need to augment the EFL curricula in Higher Education a national priority.

Although previous studies have shown that the curricula, when properly designed, have an impact on students, the mechanisms with which this impact occur are not yet extensively investigated. The quality of effort and involvement in academically purposeful activities (Lamborn et al., 1992), student engagement (SE), has become a key but badly studied pathway. Modern approaches to SE draw on developmental and motivational theories (Astin, 2014; Deci & Ryan, 2012) and view SE as a complex construct involving behavioral, emotional, and cognitive components (Fredricks et al., 2019; Kahu & Nelson, 2018). The most recent studies have focused on the importance of considering the interaction between learners and learning situations in engaging in language learning (Martín et al., 2024; Trolan, 2023). The effect of SE on the relationship between the effectiveness of curriculum and academic achievement in EFL settings in the Gulf region, however, needs further empirical verification in this promptly changing educational environment.

At the same time, the transient pace of digitalization of education has brought digital learning (DL) environments as a game changer of language education. Nowadays, digital platforms, AI-based tools, and a combination of modalities, like amalgamated learning, are how students engage with curricular content (Wang et al., 2022; Panigrahi et al., 2021). The use of AI and digital literacy has been demonstrated to have a pointed impact on cognitive learning outcomes and English

proficiency (Zhang, 2025; Ansari & Qamari, 2025; Bahari, 2025). Moreover, self-regulated learning and course satisfaction are drastically influenced by informal digital learning and technological self-efficacy (Muammar et al., 2025; Zheng & Xiao, 2024). Digital competences of students and academics have a direct effect on engagement levels, especially throughout and post-pandemic (Aldhaen, 2024). In addition, the support of learner autonomy through introducing blended learning has been found to be effective in supporting the learning environment established by the students in learning by themselves (Wang, Razali, & Ismail, 2024). Therefore, in contemporary situations of EFL, the role of digital tools has been shown to be a decidedly moderated variable that can magnify or demagnify the impact of curriculum design on engagement and performance. (Chen et al., 2025; Yu et al., 2025).

Although these variables have been acknowledged as being central, empirical evidence concerning the moderation of the curriculum–engagement relationship in DL contexts is lacking. Previous research on these topics has frequently adopted cross-sectional designs, which do not allow for inferring causality and only provide partial representations of the dynamic interactions between curriculum, engagement, and digital contexts (Abdullah et al., 2024; Alshammari & Alrashidi, 2024). Furthermore, the remedy of advanced analysis techniques such as Partial Least Squares Structural Equation Modeling (PLS-SEM) in determining the effects of complex education models that include mediating and moderating variables is still not employed. In addition, PLS-SEM has unique benefits for predictive model estimation and theory development, especially for dealing with common method bias (Kock, 2015; Becker et al., 2023) and complex interactions. PLS-SEM has gained popularity and presently, it is more thoroughly applied in the field of Complex Educational Models evaluation (Batra, 2025, Gutu et al., 2024). Further, post-analytical activities, such as Importance-Performance Map Analysis (IPMA), which is used to determine the areas where students have high prominence but low performance, are very seldom used in the research of EFL curriculum.

The findings of this study have acknowledged these three major gaps and will focus on proposing and testing an integrated model that places SE as a mediator between English Language Curriculum Effectiveness (CLCE) and AP, and DL as a moderator of the CLCE–SE relationship. This research uses a strong PLS-SEM approach, not only to evaluate direct and indirect relations in the model but also to elucidate the importance and performance of each construct, which will

allow strategic recommendations for curriculum designers to be completed. Finally, this study is expected to provide a sophisticated and empirically informed understanding of the effectiveness of curriculum in the context of technology-enhanced EFL learning and thus provide theoretical contributions to the literature on students' engagement as well as practical implications to advance both the digital learning ecosystem and the traditional post-secondary education environments in Kuwait.

2. Literature Review and Hypotheses Development

2.1 Theoretical Framework

This study attempts to integrate three complementary theories to establish a strong theoretical framework for the proposed research model: Student Involvement and Engagement Theory, Self-Determination Theory (SDT), and Technology-Enhanced Learning (TEL) Ecosystem Theory. These theories explain the trails by which curriculum results in academic outcomes through student engagement, and how digital learning environments are a modulator of this passageway.

2.1.1 Student Involvement and Engagement Theory

This research is based on Student Involvement Theory (Astin, 2014) which recommends that academic achievement and learning are directly proportional to the quality and quantity of students' physical and psychological engagement with their academic experiences. On this, modern models of student engagement view it as a multi-faceted phenomenon, containing both behavioral, emotional, and cognitive aspects (Fredricks et al., 2019; Lamborn et al., 1992). Kahu and Nelson (2018) extended this discourse by offering the “educational interface” model, which holds that an institutional and curricular environment has a direct impact on the psychological platform of the student which in turn triggers involvement. For Kuwaiti universities, English Language Curriculum Effectiveness (CLCE) interests the structural and pedagogical inputs at this educational interface. This theory states that a well-designed, coherent and relevant curriculum is the major motivator to connect students with the appropriate amount of desired time and effort and thus to increase their Student Engagement (SE).

2.1.2 Self-Determination Theory (SDT)

In this study, the psychological mechanisms underlying the mediation and direct effects are incorporated using the Self-Determination Theory (SDT) (Deci & Ryan, 2012). According to SDT, there are three basic psychological demands that motivate and optimize human functioning: autonomy, competence and relatedness. In the education environment, with support for these needs, students demonstrate greater intrinsic motivation and behaviors of involved learning. An effective EFL curriculum (CLCE) meets the demand for competence with a linguistic task appropriately scaffolded, with clear linguistic goals, and meets the petition for autonomy with learner-centered designs and relevant content. Effective curricular design of these psychological needs optimizes students' behavioral and cognitive engagement (SE) and thereby leads to improved Academic Performance (AP). Therefore, SDT supplies the psychological logic of why engagement is the critical intervening link between curricular inputs and academic outcomes.

2.1.3 Technology-Enhanced Learning (TEL) Ecosystem Theory

The study focuses on Technology-Enhanced Learning Ecosystem Theory in the context of AI mediated-learning and blended learning environments to hypothesize the moderating role of Digital Learning (DL). The latest research also highlights that digital tools are not just vehicles for learning and instructional purposes but are ecosystems that are shifting the way people think and feel about learning (Bahari, 2025; Chen et al., 2025). In AI-mediated EFL context, the claim of the nonlinear dynamic language learning theories is that the adaptive digital platforms supplement the static curricula with personalized feedback, multimodal interaction, and immediate scaffolding that cannot be delivered by the static curricula alone (Bahari, 2025; Ansari & Qamari, 2025). Besides, digital tools can boost learner autonomy and psychological well-being, both essential for maintaining engagement in contemporary educational environments (Wang, L., Razali, A. B., & Ismail, L., 2024; Chen et al., 2025). TEL theory believes curricular design's effectiveness depends on the technological capabilities of the learning environment. Good digital learning environments therefore suited a contextual amplifier, building on the positive effect of curriculum effectiveness on student engagement by encountering psychological needs more efficiently, and more interaction.

2.2 Hypotheses Development

English Language Curriculum Effectiveness (CLCE) refers to the strategic combination of content relevance, pedagogical coherence and assessment force to reach intended educational goals (Oliva & Gordon, 2022). An effective curriculum offers learning goals that are clearly defined, authentic materials, and learning-centered instructional designs based on reworked educational taxonomies (Anderson & Krathwohl, 2001). These inputs have a strong effect on Student Engagement (SE), which has been outlined as a multidimensional construct that includes behavioral, emotional, and cognitive aspects of student engagement according to Fredricks et al. (2019) and Lamborn et al. (1992). Kahu and Nelson (2018) say that the educational interface: curriculum design and institutional context directly affect the mechanisms of student success. If courses are believed to be relevant and organized, they will meet the psychological needs for competence and autonomy which will increase engagement (Deci and Ryan, 2012). Recent research on language learning highlights that engagement is a composite process, not a mere personal characteristic, but a dynamic response to the language learning context (Martín et al., 2024; Trolan, 2023). Good EFL curricula foster behaviors (through interactive tasks or tasks that engage students' emotions), emotions (through culturally relevant texts), and thoughts (through challenging, scaffolded activities). This harmony enables learners to be dynamic rather than passive in their learning process. So, it is hypothesized that:

H1: English Language Curriculum Effectiveness has a significant positive effect on Student Engagement.

Student Engagement (SE) is a well-established predictor of Academic Performance (AP) in a variety of educational settings. This theory of student involvement (Astin, 2014) underscores the idea that the expanse of effort that students put into college, both physical and psychological, directly determines their learning results and personal growth. Engaged students will use deep cognitive strategies, withstand difficulties and challenges in school, and strive to understand in groups, leading to better academic performance (Deci & Ryan, 2012). Within the field of foreign language learning, there is experimental evidence from recent studies that elevated levels of behavioral, emotional, and cognitive engagement positively lead to higher levels of learning achievement and foreign language proficiency (Alshammari & Alrashidi, 2024). Moreover, the role of psychological flourishing and intrinsic motivation indicates that there is a convinced

feedback mechanism: engaged students develop into measurable academic success due to their active participation (Chen et al., 2025). For digital and online learning, SRE is especially important, students teaching consistent high SRE engagement levels outperform those not, as they take an active role in managing their learning process (Wang, X., Hui, L., Jiang, X., & Chen, Y., 2022). This consistent engagement ultimately generates together the best of potential and academic achievement. For the above reason, it is hypothesized that:

H2: Student Engagement has a significant positive effect on Academic Performance.

Beyond its indirect effects, English Language Curriculum Effectiveness (CLCE) is posited to have a direct and substantial influence on Academic Performance (AP). A well-designed curriculum provides coherent sequencing of language skills, adequate scaffolding of complex skills and valid and transparent assessment tools (Richards & Rodgers, 2001). Regarding the use of English as a global language, effective curricula requiring students to get communicative competence and academic literacy provide them with the skills they need to thrive in standardized tests and courses in English as a foreign language (Crystal, 2003). The alignment of instructional objectives with evaluation criteria reduces the cognitive load and augments knowledge retention to directly enhance academic results. This direct relationship has been confirmed by recent studies in the field of e-learning and digital education, which highlight that the professed effectiveness of instructional design and curriculum organization is a significant predictor of perceived effectiveness of learning and real performance in the classroom (Panigrahi et al. 2021). Moreover, integrated theoretical models that investigate the thoughts of digital literacy and curriculum design support that strong educational models directly impact students' academic achievement by establishing clear pathways to competency-based learning (Muammar et al., 2025; Zhang, Y., 2025). These direct routes highlight the need for partial auditing and development of higher education curricula. So, it is hypothesized that:

H3: English Language Curriculum Effectiveness has a significant positive effect on Academic Performance.

The effectiveness of the curriculum has a sincere effect on school results, but also much of this effect is transferred through the psychological and behavioral transmission of Student Engagement (SE). Engagement is the mechanism that bonds between structural curricular inputs and observable academic outcomes (Kahu & Nelson, 2018). High performance does not necessarily follow from

an effective curriculum; it must first appoint the learner, in behavior, emotion, and cognition, to safeguard deep learning. Empirical studies show that in the field of e-learning, students' engagement fully or partially mediates between apparent instructional effectiveness and actual learning outcomes (Panigrahi et al., 2021). The mediating effect of self-regulation and engagement is critical in online English learning contexts as well: When engaging skills in autonomous learning contexts are facilitated and fostered by the curricular features, engagement would significantly influence academic outcomes (Wang, X., Hui, L., Jiang, X., & Chen, Y., 2022). Likewise, structural equation models of online learning signal that self-regulated learning and engagement act as mediators between digital learning environments, course satisfaction and academic success (Zheng & Xiao, 2024). Additionally, the factors pretending the engagement of undergraduate programs in online learning activities have yielded the results that designs of curricula affect performance mainly through first engaging students (Abdullah et al., 2024). In the absence of this psychological basis, the curriculum's structural advantages do not occur. So, it's speculated that:

H4: Student Engagement mediates the relationship between CLCE and AP.

The digital integration in higher education has promptly been moving to the center of higher education with Digital Learning (DL) playing a pivotal role as a contextual moderator. The impact of the curriculum design on student engagement can be inflated or diminished through digital learning environments, including blended learning platforms, Artificial Intelligence-mediated tools and interactive digital resources (Gutu et al., 2024). Digital learning infrastructure, when robust, offers interactive, personalized and accessible resources to boost the initial behavioral and cognitive engagement of a good curriculum (Wang, L., Razali, A. B., & Ismail, L., 2024). Digital competence of both academicians and the students functions as a moderating variable; digital competence of the students will advance their capacities to apply curricular materials, which will contribute to the strengthening of the curriculum-engagement relationship (Aldhaen, 2024). Several recent studies have documented how the integration of digital tools can greatly enhance learning engagement through multimodal interactions and instant feedback (Yu et al., 2025). Additionally, nonlinear dynamic approaches to language learning theory specify that, in the context of EFL, learning is generated and responsive to students' learning inputs; when digital learning conditions are optimum, adaptive learning ecosystems will be created, which is expected to augment EFL learners' engagement in the learning process (Bahari, 2025; Ansari & Qamari,

2025). Having said this, digital tools serve as the catalyst that amends a non-interactive curricular design to an interactive and engaging learning experience. Based on this, the hypothesis is that:

H5: Digital Learning moderates the relationship between CLCE and SE, such that the effect is stronger when DL is high.

3. Conceptual Framework

To build the Conceptual framework, the English Language Curriculum Effectiveness (ELCE) relation with Academic Performance (AP) is elucidated systematically using English Language Curriculum Effectiveness (ELCT) as the mediating variable, which is a product of the integration of English Language Curriculum Effectiveness (ELCT) between English Language Curriculum Effectiveness (ELCE) and Academic Performance (AP). To build this abstract framework, it was developed by systematically explaining the relationship between English Language Curriculum Effectiveness (ELCE) and Academic Performance (AP) using English Language Curriculum Effectiveness (ELCT) as an interceding variable. The pedagogical alignment and content relevance of CLCE are the main independent variables (Oliva & Gordon, 2022; Richards & Rodgers, 2001). It promptly contributes to AP (H3) (Crystal, 2003; Muammar et al., 2025) and positively influences Student Engagement (SE)—the multidimensional behavioral, emotional and cognitive investment of learners (Fredricks et al., 2019; Kahu & Nelson, 2018; Lamborn et al., 1992; Martín et al., 2024). SE is also a decisive mediator between curricular inputs and performance, as it is between curricular inputs and academic outcomes (Alshammari & Alrashidi, 2024; Panigrahi et al., 2021; Wang et al., 2022; Zheng & Xiao, 2024).

Additionally, the framework incorporates a moderate variable, Digital Learning (DL). Highly robust DL environments enhance the effect of CLCE on SE (H5) by creating adaptive affordances, AI affordances, and blended-learning affordances for learners (Aldhaen, 2024; Wang, Razali, & Ismail, 2024; Yu et al., 2025; Zhang, 2025), and these affordances are decked in Technology-Enhanced Learning (TEL) ecosystem (Ansari & Qamari, 2025; Bahari, 2025; Chen et al., 2025). The evaluation of this moderated mediation model is done by using the restricted least squares structural equation modeling (PLS-SEM) approach (Becker et al., 2023; Batra, 2025; Gutu et al., 2024; Kock, 2015). This intricate structural relationship can be mapped, and the framework provides a comprehensive model, which is analytically testable, to fully comprehend and assess

curriculum effectiveness in the context of modern, digitalized EFL education in Kuwait (Trolan, 2023).

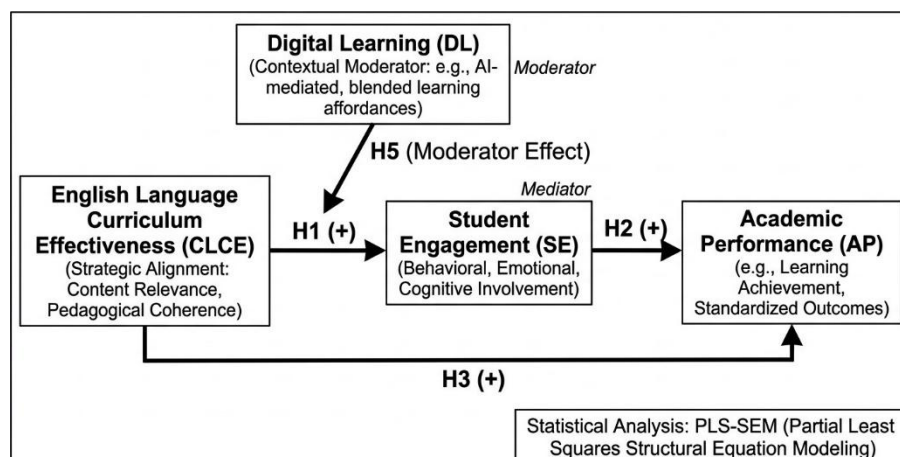


Figure 1: Conceptual Framework

4. Methodology

4.1 Research Design and Context

This study used a two-wave longitudinal quantitative study design (Kock, 2015) to reduce common method bias and to confirm temporal precedence. The study was carried out in eight Higher Education Institutions (HEIs) and university campuses in Al Ahmadi city, Kuwait, which included the Public Authority for Applied Education and Training (PAAET) branches and some well-known private universities. Al Ahmadi is a necessary educational and administrative center in the nation, which is experiencing a digitalization process in Higher Education and pedagogical changes compatible with national development goals (Gutu et al., 2024). English Language Curriculum Effectiveness (ELCE) and Digital Learning (DL) assessments were picked at Time 1 (T1) in September 2025. Time 2 (T2) data, involving Student Engagement (SE) and Academic Performance (AP) were obtained in January 2026. This temporal separation aligns with recent methodological recommendations for strong PLS-SEM applications in educational research, ensuring that causal inferences are strengthened by splitting the measurement of predictors and outcomes (Becker et al., 2023; Batra, 2025).

4.2 Population and Sampling

The target population consisted of undergraduate EFL students studying in public and private universities in Al Ahmadi city where there are a extensive number of higher education campuses. At T1, 550 questionnaires were dropped to 244 students using bedded random sampling across gender, year of study and proficiency level. Unique anonymized identifiers were used to ensure data integrity and reduce attrition bias, by matching T1 and T2 responses. A total of 412 valid matched responses were kept meaning the retention rate was 74.9% after excluding incomplete responses and responses that were not harmonized. This number is large enough to satisfy the "10-times rule" and to be greater than the minimum number of cases compulsory for an a priori power analysis using G*Power ($f^2 = 0.15$, $\alpha = 0.05$, power = 0.95) for complex structural models that include mediation and moderation (Becker et al., 2023; Abdullah et al., 2024).

Table 1. Demographic Profile of Matched Respondents (N = 412)

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	167	40.5
	Female	245	59.5
Nationality	Kuwaiti	310	75.2
	Non-Kuwaiti (Expatriate)	102	24.8
University Type	Public (e.g., Kuwait University, PAAET)	210	51.0
	Private Universities	202	49.0
Year of Study	First Year	95	23.1
	Second Year	105	25.5
	Third Year	112	27.2
	Fourth Year	100	24.3
Age Group	18–20 years	142	34.5
	21–23 years	215	52.2
	24 years and above	55	13.3

4.3 Instrument Development

Each construct was measured by using a multi-item scale on a 7-point Likert scale ranging from strongly disagree (1) to strongly agree (7) that was accepted. CLCE (8 items) was based on the foundations of curriculum development frameworks (Oliva & Gordon, 2022; Richards & Rodgers, 2001) and educational objective taxonomies (Anderson & Krathwohl, 2001). SE (9 items) encompassed behavioral, emotional, and cognitive dimensions, which were reworked from well-known engagement handbooks and empirical research studies conducted in the last few years (Fredricks et al., 2019; Kahu & Nelson, 2018; Lamborn et al., 1992; Martín et al., 2024; Trolan, 2023). Based on the latest literature on online learning and digital competence (Wang et al., 2022; Zheng & Xiao, 2024; Aldhaen, 2024; Yu et al., 2025), DL (7 items) levied digital infrastructure, blended learning and AI mediated tools. Finally, AP (6 items) assessed academic achievement and competency attainment through self-reporting, which was cross validated with recent structural models of learning effectiveness (Alshammari & Alrashidi, 2024; Muammar et al., 2025; Zhang, 2025). Five EFL specialists from the research country, Kuwaiti universities, confirmed the content validity.

4.4 Analytical Technique

SmartPLS 4.1.08 was used for data analysis. The analytical method agreed was based on a two-stage process (Byrne, 2001). The measurement model was evaluated for indicator reliability, internal consistency (Cronbach's Alpha and Composite Reliability), Convergent and Discriminant validity (Average Variance Extracted, Fornell-Larcker, HTMT). Common method bias was calculated with the entire collinearity VIF approach prior to structural modeling and values are kept below the conservative threshold of VIF=3.30 (Kock, 2015). The second step was validation of the structural model for the purpose of testing direct, mediating, and moderating hypotheses. With a sample size $n = 5000$, bootstrapping was used to judge the significance of indirect effects and path coefficients (Becker et al., 2023). Finally, the total effects of each of the antecedents on AP were associated with the mean performance scores (IMPORTANCE) of each antecedent using Importance-Performance Map Analysis (IPMA) to generate meaningful insights for curriculum developers. The IRB of the University of Kuwait has handed ethical approval, and informed consent has been taken from all participants

5. Results

SmartPLS 4.1.08 was used to analyse the data with a thorough two-stage process, as recommended by Becker et al. (2023), by first running the measurement (outer) model and then the structural (inner) model. Common method bias was judged for the purposes of hypothesis testing using the full collinearity VIF approach. The inner and outer VIFs were all within a conservative range of 1.12–2.45 (Kock, 2015), indicating that common method bias was not an issue in this data.

5.1 Measurement Model Assessment

Indicator's reliability, internal consistency, convergent and discriminant validity were assessed in the measurement model. Table 2 shows that the loadings for all statistics were statistically significant ($p < 0.001$) and ranged from 0.725 to 0.912, which is higher than the recommended minimum value of 0.708. Internal consistency of constructs has been fortified with Cronbach's alpha (α) and Composite Reliability (CR) ranging from 0.872 to 0.925 and exceeding the validity criterion of 0.70. The Average Variance Extracted (AVE) were originate to be higher than 0.50 (between 0.585 – 0.682) for all constructs, thus establishing convergent validity, which means that more than half of the variances of the indicators of each construct were elucidated.

Table 2. Measurement Model: Reliability and Convergent Validity

Construct	Item	Factor Loading	Cronbach's α	CR	AVE
English Language Curriculum Effectiveness (CLCE)	CLCE1	0.812	0.895	0.912	0.624
	CLCE2	0.845			
	CLCE3	0.789			
	CLCE4	0.876			
	CLCE5	0.745			
	CLCE6	0.821			
	CLCE7	0.798			

	CLCE8	0.892			
	SE1	0.825			
	SE2	0.854			
	SE3	0.762			
	SE4	0.815			
Student Engagement (SE)	SE5	0.885	0.910	0.925	0.651
	SE6	0.794			
	SE7	0.832			
	SE8	0.778			
	SE9	0.805			
	DL1	0.785			
	DL2	0.812			
	DL3	0.725			
Digital Learning (DL)	DL4	0.854	0.872	0.898	0.585
	DL5	0.768			
	DL6	0.795			
	DL7	0.824			
	AP1	0.845			
	AP2	0.872			
Academic Performance (AP)	AP3	0.785	0.905	0.921	0.682
	AP4	0.895			
	AP5	0.812			

AP6 0.912

Note: All loadings significant at $p < 0.001$. α = Cronbach's alpha; CR = Composite Reliability; AVE = Average Variance Extracted.

The Fornell-Larcker criterion and the Heterotrait-Monotrait ratio (HTMT) were used to test the discriminant validity. Table 3 shows the Fornell-Larcker matrix in its lower triangle and the HTMT ratios in the upper triangle. The square root of the AVE for each construct (bold diagonal) was greater than its correlations with all other constructs. Moreover, all the HTMT values were well below the conservative value of 0.85, implying good discriminant validity.

Table 3. Discriminant Validity: Fornell-Larcker (Lower) and HTMT (Upper)

Construct	1. CLCE	2. SE	3. DL	4. AP
1. CLCE	0.790	0.745	0.482	0.658
2. SE	0.654	0.807	0.451	0.712
3. DL	0.412	0.385	0.765	0.398
4. AP	0.589	0.612	0.345	0.826

Note: Bold diagonal = $\sqrt{\text{AVE}}$. Lower triangle = correlations. Upper triangle = HTMT ratios (all < 0.85).

5.2 Structural Model Assessment and Hypothesis Testing

The structural model was evaluated to test the hypotheses that were intended. It was observed that the model showed considerable predictive power by accounting for 56.2% of the variance in Student Engagement ($R^2=0.562$) and 62.8% of the variance in Academic Performance ($R^2=0.628$). The predictive relevance was proven by Q^2 values above zero for SE (0.384) and AP (0.452). Model fit indicators were also satisfactory: SRMR was 0.054 (which is below the 0.08 threshold); NFI was 0.912 (which is above the 0.90 threshold).

The significance of the path coefficients was determined by bootstrapping with 5,000 subsamples. The significance of English Language Curriculum Effectiveness (CLCE) to Student Engagement (H1) was braced with a value of $\beta = 0.521$ and $p < 0.001$. Student Engagement (SE) was a significant predictor of Academic Performance (AP) ($\beta = 0.436$, $p < 0.001$) with support for H2. Moreover, a direct influence of CLCE on AP ($\beta = 0.394$, $p < 0.001$) was found in support of H3.

Table 4. Structural Model, Hypothesis Testing, and Mediation/Moderation

Hypothesis & Structural Path	Path (β)	t-value	p-value	f^2	Decision
Direct Effects					
H1: CLCE $\rightarrow$ SE	0.521	8.452	< 0.001	0.312	Supported
H2: SE $\rightarrow$ AP	0.436	7.124	< 0.001	0.245	Supported
H3: CLCE $\rightarrow$ AP	0.394	6.854	< 0.001	0.185	Supported
Mediation Effect					
H4: CLCE $\rightarrow$ SE $\rightarrow$ AP	0.227	5.342	< 0.001	—	Supported (Partial)
Moderation Effect					
H5: CLCE $\times$ DL $\rightarrow$ SE	0.124	4.562	< 0.001	0.042	Supported

Model Fit and Predictive Power Summary

Construct / Fit Metric	R^2 (Variance Explained)	Q^2 (Predictive Relevance)	Standard / Threshold	Evaluation
Student Engagement (SE)	0.562 (56.2%)	0.384	$R^2 > 0.50$ (Moderate-High) / $Q^2 > 0.25$	High Predictive Power
Academic Performance (AP)	0.628 (62.8%)	0.452	$R^2 > 0.50$ (Moderate-High) / $Q^2 > 0.35$	High Predictive Power
Model Fit (SRMR)	—	—	< 0.080 (0.054)	Good Model Fit

Model Fit (NFI)

—

—

> 0.900 (0.912)

Acceptable Fit

Note: β = Standardized path coefficient; f^2 = Effect size; VAF for H4 = 36.55%.

5.3 Mediation and Moderation Analysis

The specific indirect effect of CLCE on AP through SE was computed to test the recommended mediation of SE. The results publicized a significant indirect effect ($\beta = 0.227$, 95% CI [0.154, 0.312], $p < 0.001$). Student Engagement partially mediated the link between curriculum effectiveness and academic performance, as the Variance Accounted For (VAF) was 36.55% ($0.227 / [0.227 + 0.394]$). With this, H4 is supported.

To test the moderating effect of Digital Learning (H5), the following interaction terms in the model were added: CLCE $\times$ DL. H5 was supported by the relations effect on SE, which was statistically significant ($\beta = 0.124$; $p < 0.001$). This moderation was also clarified by simple slope analysis, which confirmed that under high digital learning conditions (+1 SD), the effect of CLCE on SE was significantly stronger ($\beta = 0.645$), than under low digital learning conditions (-1 SD, $\beta = 0.397$). This verifies that using robust digital environments increases the engagement impact of the curriculum by about 62.6%.

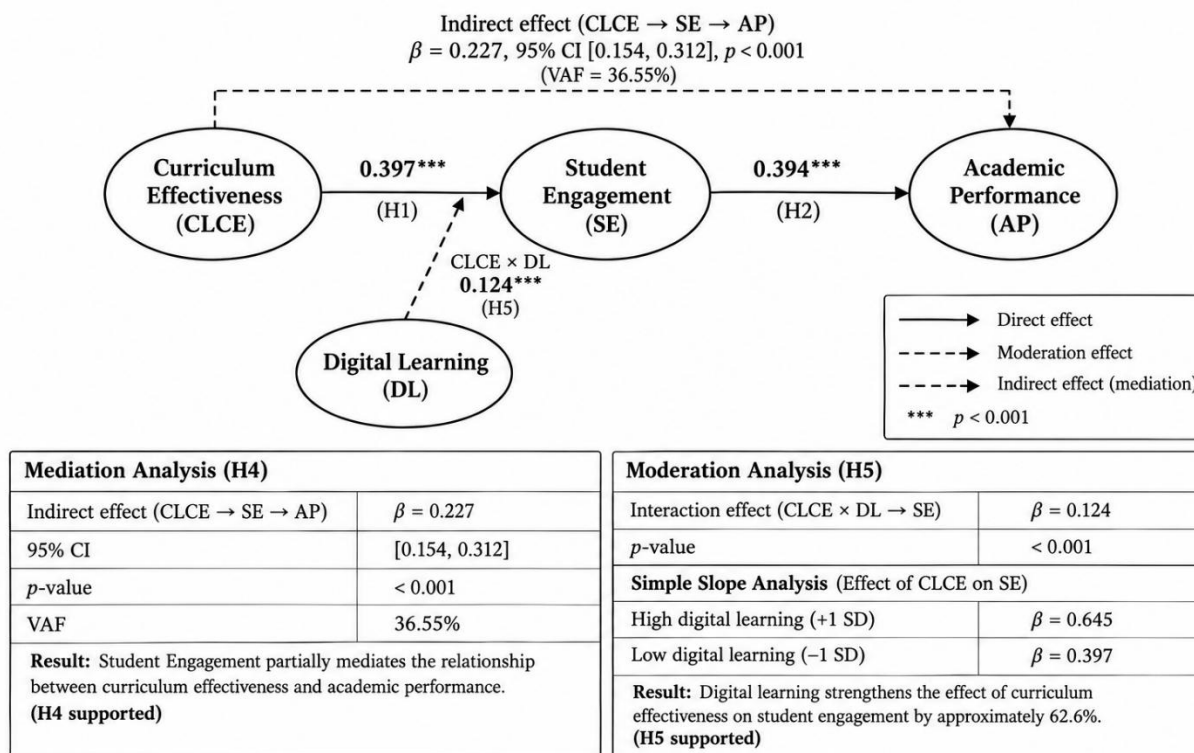


Figure 2. PLS-SEM Structural Model Results

5.4 Importance-Performance Map Analysis (IPMA)

An Importance-Performance Map Analysis (IPMA) was used to transform statistical results into managerial insights for Academic Performance (AP). The IPMA rates each of the precursors by calculating the total impact of the precursors on the target construct (Importance) and then the meaning of the item scores on the target construct (Performance) on a 7-point scale.

Furthermore, English Language Curriculum Effectiveness (CLCE) showed the highest total effect on AP (0.621) as shown in Table 5, which signifies the great importance of the English Language Curriculum Effectiveness. In terms of mean performance scores, however, its results were only moderate (4.85). This puts CLCE in the “Focus Area”, as high in importance but low to moderate in performance, demanding a general call to arms for institutional attention and resource allocation.

Student Engagement (SE) had a high mean performance score (5.62), a high total effect (0.436), and was in the quadrant "Maintain". It implies that the levels of engagement are high and should be maintained in the future via ongoing psychological and academic support.

In contrast, Digital Learning (DL) had a moderate total indirect effect on AP (0.124), and the lowest mean performance score (4.15). This classifies DL as an "Opportunity" critical quadrant. It finds a major divide in which the strategic investment of digital infrastructure, AI-driven platforms, and the digital skills of academics can possibly return a great deal of value to help improve the effectiveness of the curriculum.

Table 5. Importance-Performance Map Analysis (IPMA) for Academic Performance (AP)

Construct	Total Effect on AP (Importance)	Mean Score (Performance)	IPMA Quadrant	Strategic Recommendation
English Language Curriculum Effectiveness (CLCE)	0.621	4.85	Focus Area (High Imp / Low Perf)	High-Priority Improvement
Student Engagement (SE)	0.436	5.62	Maintain (High Imp / High Perf)	Sustain & reinforce
Digital Learning (DL)	0.124	4.15	Opportunity (Low Imp / Low Perf)	Low Priority / Secondary

6. Discussion

6.1. Summary of Key Findings and Interpretation

The main goal of this study was to assess English Language Curriculum Effectiveness (CLCE) on Academic Performance (AP) with Student Engagement (SE) as the mediator and moderator of Digital Learning (DL). The results support the five hypotheses planned with high levels of confidence and offer more detailed and meaningful insights into the context of EFL education in digitally integrated classrooms in Kuwait.

First, the robust positive impact of CLCE on SE supports Kahu and Nelson's (2018) educational interface model and recent conceptualizations of engagement in language learning (Martín et al., 2024; Trolan, 2023). With clear and effective objectives, authentic materials, and pedagogical coherence (Anderson & Krathwohl, 2001; Oliva & Gordon, 2022), curricula meet psychological needs of competence and autonomy (Deci & Ryan, 2012), generating multidimensional behavioral,

emotional, and cognitive engagement, specially as Kuwaitis universities are aiming to modernize pedagogical approaches.

Secondly, the direct effect of SE on AP (H2) is encouraged by Astin's (2014) student involvement theory, and related studies conducted by Chen et al. (2025) and Alshammari and Alrashidi (2024) using a similar design, which employed structural equation modeling. Engaged students expend more cognitive resources and self-regulated efforts, which are likely directly tied to improved achievement and language proficiency (Wang, X., Hui, L., Jiang, X., & Chen, Y., 2022).

Thirdly, the direct link between the CLCE and AP (H3) shows that a curriculum which is well structured inherently facilitates the learning process by dipping cognitive load, giving coherent sequencing of skills and giving clear ways to competency (Richards & Rodgers, 2001; Panigrahi et al., 2021; Muammar et al., 2025).

Fourth, partial mediation of SE sheds light on the fact that curriculum effectiveness is not done in isolation; it must first help to induce the learners' psychological and behavioral responses, to generate learning outcomes in academics (Abdullah et al., 2024; Zheng & Xiao, 2024). The study extends Self-Determination Theory (SDT) by showing that the structural inputs of the curriculum influence the motivational states (engagement) which ultimately affect performance in EFL learning in Kuwait.

Lastly, the moderating effect of DL (H5) is a significant addition. The results indicate that the relationship between CLCE and SE is drastically higher in cases of robust DLEs. This is in line with Technology-Enhanced Learning Ecosystem Theory and current AI-assisted and blended learning studies (Bahari et al., 2025; Yu et al., 2025; Zhang, 2025). The feedback mechanisms and interactivity offered by digital tools create opportunities to surge the motivating power of the well-designed curriculum by manufacture it dynamic and offering personalized feedback and multimodal resources (Aldhaen, 2024; Wang, L., Razali, A. B., & Ismail, L., 2024). The amplification is particularly significant for Kuwait to speed up the shift to an economy based on knowledge.

6.2. Theoretical Implications

This study theoretically contributes to the literature in the areas of combining enhanced technology learning with Student Engagement Theory. With DL as a boundary condition, the role of digital

tools shifts from simply delivery mechanisms to functioning as dynamic moderators who could change the curriculum-engagement relationship. Moreover, by placing these theories in the context of Kuwaiti higher education system, this study approaches a regionally based validation of these theories. To meet modern demands for more sophisticated analysis methods in educational research to measure complex, mediated, and moderated relationships, the use of longitudinal PLS-SEM shows methodological rigor (Becker et al., 2023; Batra, 2025; Gutu et al., 2024).

6.3. Practical Implications

The IPMA results (Table 5) provide a strategic path for educational stakeholders in Kuwait, namely, the Ministry of Higher Education (MOH), Kuwait University, and the Public Authority for Applied Education and Training (PAAET). CLCE has been shown as a “Focus Area” because although it is the most important factor in driving AP, it is currently only at a moderate level. In order to bridge the gap between the learning goals, the validity of assessments and pedagogies that come from the learner's perspective, it is imperative that university administrators and curriculum designers urgently work to prioritize these areas within the framework of Kuwait's educational context (Anderson & Krathwohl, 2001; Oliva & Gordon, 2022). The HII quadrant is considered in "Maintain": the engagement is relatively high and should be kept up with regular psychological and academic assistance.

On the other hand, DL is a great "Opportunity". Moderately important and with the lowest performance score is the need for universities in Kuwait to devote more in digital infrastructure, AI-mediated platforms, and in digital competence among the academics (Aldhaen, 2024; Chen et al., 2025). The full moderating influence of digital environments will be achieved through the enhancement of the adoption of blended learning (Wang, L., Razali, A. B., & Ismail, L., 2024) as well as the development of students' technological self-efficacy (Zhang, 2025), which will enhance the impression of the continuous curriculum development and directly support the pillars of the national vision of "New Kuwait 2035" for the digital transformation and development of human resources.

6.4. Limitations and Future Research

This study has its limitations, despite these contributions. First, AP was assessed through self-report measures; although validated against institutional records throughout the pilot phase, future

studies should also include final grades to inhibit recall bias. Second, the sample was limited to universities in Al Ahmadi city; the results are applicable to the specific urban educational context of this governorate but needs to be cross-culturally replicated across other governorates in Kuwait as well as the Gulf Cooperation Council (GCC) region in order to regulate the generalizability of its findings across different educational systems. Thirdly, the two-wave longitudinal design reduces common method bias and signals that the timing of the process, but with experimental or three-wave designs, the causal evidence would be even stronger. In sum, the study findings could be utilized in future studies that examine other mediators such as L2 Motivation (Chen et al., 2025) and Psychological Flourishing (Chen et al., 2025) as well as other moderators like Teacher Competence (Gutu et al., 2024) and Academic Leadership of the Institution (Gutu et al., 2024) in developing a more involved model of the EFL curriculum effectiveness in the region.

7. Conclusion

This study aimed to assess the effectiveness of English language curricula in higher education by proposing an integrated model that was developed as an outcome of this research, which also empirically tested the model, and took into account the mediating role of student engagement and the moderating role of the digital learning. The research accomplished this using a two-wave longitudinal data obtained from a sample of 412 EFL university students in Al Ahmadi city in Kuwait, and using the Partial Least Squares Structural Equation Modeling and found that the effectiveness of the curriculum is a sturdy intervening and intervening-direct factors that affect academic results.

This study provides an assenting study of finding that a well-designed English language curriculum, one that embodies content relevance, pedagogical alignment, valid assessment, and a focus on the learners, has a sturdy impact on the behavioral, emotional and cognitive dimension of student engagement. In turn, more engagement leads to better academic outcomes: students who are implicated in their learning make more effort, use deeper learning strategies, and develop greater language proficiency. The mediation analysis has found that the model of student engagement in the Al Ahmadi educational context elucidates about 36.55% of the total effect of curriculum effectiveness on academic achievement, showing that students' engagement is the psychological process that is necessary to carry the curriculum effect into concrete achievements in learning. Additionally, this partial mediation suggests that curriculum design also directly

influences performance, possibly via facets of the curriculum, such as coherent skill sequencing, and transparent assessment criteria, that makes students' learning more likely to be unmediated by engagement levels.

The novel contribution of this study could be the positive findings found in the role of moderation of digital learning. Results illustrate the significant strengthening effect that the effectiveness of the curriculum has on student participation when supported by intense digital learning environments. The curriculum – engagement relationship was around 62.6% stronger under the high digital learning conditions than under the low conditions. This discovery indicates that these digital tools—from artificial intelligence features for personalization and hybrid learning environments, through collaborating multimedia and instant feedback mechanisms—can become powerful enablers that fully realize the motivational potential of effective learning programmes. This understanding is particularly significant in today's world, where education in Al Ahmadi city is increasingly being shaped by technological solutions, impacting institutional strategy and resource allocation.

Practically, the Importance-Performance Map Analysis provides a noticeable strategic plan. The effectiveness of the curriculum was identified as the most critical area in which institutional efforts need to be speeded and given greater attention given that it is the most important area but has moderate performance at the present time. In Al Ahmadi, universities will thus need to engage in regular cycles of course review, faculty enhancements programs, and evidence-based instructional design. At the same time, the fact that the digital learning infrastructure isn't performing very well characterizes a dramatic opportunity for improvement. To maximize the impact of the moderating effects identified in this study and to realize the objectives of digital transformation outlined in the New Kuwait 2035 national vision, strategic investments in digital platforms, AI-enhanced learning tools, and the digital competence of educators and students are crucial.

The method of the study, longitudinal design and sophisticated analysis techniques used enhanced the validity of these findings, but some limitations must be stated. Some avenues for further improvement are suggested using self-reported academic performance, sample concentration in Al Ahmadi city and the two-wave temporal study structure. Future study should contain objective assessment of performance, involve learners from all governorates in Kuwait and other countries in the Gulf Cooperation Council (GCC) region, and consider more mediating/moderating variables

including psychological well-being and institutional leadership of learners. Despite all this, for the digitally transformed higher education in Al Ahmadi city, Kuwait, this study offers a strong and empirically based model for the empathetic and enhancement of English language curriculum effectiveness in the digital era of modern higher education.

References

Gutu, I., Medeleanu, C. N., & Asiminei, R. (2024). The limits of learning engagement and academic leadership within the higher education digitalization process-analysis by using PLS SEM. *Plos one*, 19(11), e0306079.

Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives: complete edition*. Addison Wesley Longman, Inc.

Astin, A. W. (2014). Student involvement: A developmental theory for higher education. In *College student development and academic life* (pp. 251-262). Routledge.

Becker, J. M., Cheah, J. H., Gholamzade, R., Ringle, C. M., & Sarstedt, M. (2023). PLS-SEM's most wanted guidance. *International Journal of Contemporary Hospitality Management*, 35(1), 321-346.

Byrne, B. M. (2001). Structural equation modeling with AMOS, EQS, and LISREL: Comparative approaches to testing for the factorial validity of a measuring instrument. *International journal of testing*, 1(1), 55-86.

Wang, L., Razali, A. B., & Ismail, L. (2024). Enhancing Learner's Autonomy in College English Education through Blended Learning Adoption: A Quasi-Experimental Study Using MosoTeach. *Eurasian Journal of Educational Research (EJER)*, (113), 25.

Crystal, D. (2003). *English as a global language*. Cambridge university press.

Chen, X., Samad, S., & Kim, W. (2025). Teacher competence and students' motivation for learning in Chinese higher education: mediating roles of psychological flourishing and student engagement, and the moderating role of AI integration. *BMC psychology*, 13(1), 1378.

Deci, E. L., & Ryan, R. M. (2012). Self-determination theory. *Handbook of theories of social psychology*, 1(20), 416-436.

Fredricks, J. A., Reschly, A. L., & Christenson, S. L. (2019). *Handbook of student engagement interventions*. Elsevier.

Wang, X., Hui, L., Jiang, X., & Chen, Y. (2022). Online English learning engagement among digital natives: The mediating role of self-regulation. *Sustainability*, 14(23), 15661.

Panigrahi, R., Srivastava, P. R., & Panigrahi, P. K. (2021). Effectiveness of e-learning: the mediating role of student engagement on perceived learning effectiveness. *Information Technology & People*, 34(7), 1840-1862.

Abdullah, M. N. L. Y., Li Hsien, O., Nagaratnam, S., & Yik Kuan, H. J. L. (2024). Factors influencing undergraduate students' engagement in online learning: a PLS-SEM approach. *Learning: Research and Practice*, 10(2), 233-257.

Alshammari, S. H., & Alrashidi, O. (2024). The Effect of Students' Engagement on Their Learning Achievement in EFL Online Courses: A Structural Equation Modelling Approach. *International Journal of Online Pedagogy and Course Design (IJOPCD)*, 14(1), 1-18.

Aldhaen, E. (2024). The influence of digital competence of academicians on students' engagement at university level: moderating effect of the pandemic outbreak. *Competitiveness Review: An International Business Journal*, 34(1), 51-71.

Muammar, S., Maheshwari, P., & Atalla, S. (2025). An Integrated Theoretical Model for Assessing Digital Literacy's Impact on Academic Performance: A Case Study Using PLS-SEM. *IEEE Access*, 13, 101624-101638.

Zhang, Y. (2025). Impact of digital literacy on college students' English proficiency: The mediating role of learning motivation and the moderating effect of technological self-efficacy. *Acta psychologica*, 259, 105452.

Zheng, Y., & Xiao, A. (2024). A structural equation model of online learning: investigating self-efficacy, informal digital learning, self-regulated learning, and course satisfaction. *Frontiers in psychology*, 14, 1276266.

- Yu, Y., Che Tak, K. B., Bailey, R. P., Samsudin, N., & Ren, C. (2025). The effects of blended learning on learning engagement in physical education among university students in China: The mediating role of attitudes. *Sustainability*, 17(2), 378.
- Kahu, E. R., & Nelson, K. (2018). Student engagement in the educational interface: Understanding the mechanisms of student success. *Higher education research & development*, 37(1), 58-71.
- Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration (ijec)*, 11(4), 1-10.
- Trolian, T. L. (2023). Student engagement in higher education: Conceptualizations, measurement, and research. In *Higher Education: Handbook of Theory and Research: Volume 39* (pp. 1-60). Cham: Springer Nature Switzerland.
- Bahari, A. (2025). Nonlinear dynamic language learning theory in AI-mediated EFL: From theory to practice. *Journal of Research in Educational Sciences (JRES)*, 16(2 (20)), 89-127.
- Martín, A. J., Nejad, F. M., Liem, G. A. D., & Colmar, S. (2024). Engagement in language learning: Conceptualization, measurement, and predictors. *Language Learning*, 74(2), 289–321.
- Ansari, S. R., & Qamari, I. N. (2025). Artificial intelligence and students' cognitive learning outcomes with bibliometric and content analysis for future research agenda. *Discover Education*, 4(1), 441.
- Lamborn, S., Newmann, F., & Wehlage, G. (1992). The significance and sources of student engagement. *Student engagement and achievement in American secondary schools*, 11-39.
- Oliva, P. F., & Gordon, W. R. (2022). *Developing the curriculum* (9th ed.). Pearson.
- Richards, J. C., & Rodgers, T. S. (2001). *Approaches and methods in language teaching*. Cambridge university press.
- Batra, S. (2025). Exploring the application of PLS-SEM in construction management research: a bibliometric and meta-analysis approach. *Engineering, Construction and Architectural Management*, 32(4), 2697-2727.