



Psychological Drivers of Learning as Mediators in Inquiry- and Evidence-Based Pedagogies: Enhancing Student Engagement and Knowledge Retention in Cost Accounting

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Abstract

The evolving demands of the modern workforce necessitate the identification of effective pedagogical strategies that enhance students' ability to acquire critical skills in cost accounting. This study investigated the efficacy of inquiry-based learning (IBL) and evidence-based learning (EBL) in fostering student engagement, knowledge retention, and critical skills acquisition in cost accounting. A total of 132 accounting students from two universities in South-East Nigeria participated in the study, which employed a 2×2 factorial research design to test the formulated hypotheses. Findings from Hierarchical Multiple Regression analysis revealed a positive relationship between students' perceptions of IBL and EBL and their knowledge retention in cost accounting. Furthermore, mediation analysis demonstrated that intrinsic motivation and self-efficacy significantly mediated the relationship between IBL/EBL practices and student engagement in collaborative group discussions. These findings underscore the transformative potential of IBL and EBL in advancing critical thinking, knowledge application, and long-term retention among accounting students. Therefore, this study advocates for the integration of IBL and EBL methodologies in cost accounting curricula, urging business educators, policymakers, and academic institutions to adopt these strategies to enhance teaching effectiveness and student learning outcomes in Nigerian universities.

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Introduction

Educational curricula in some decades ago in Nigeria were predominantly subject-content driven, with minimal emphasis on fostering deeper reasoning skills. Existing literature indicates that instructional approaches during this period were largely teacher-directed and lecture-based (Novia, Nurdianti, & Purwanto, 2024). This phase, often referred to as the instructional paradigm, was characterized by students' passive role in the learning process, where lecturers were seen as sole knowledge dispensers (Ragab, Kaid, & Sayed, 2024). Research suggests that educational outcomes from this era resulted in information overload, where students relied heavily on memorization rather than developing intellectual competencies. Learning was dominated by rote memorization and factual recall, with limited attention to higher-order thinking skills such as critical analysis, creativity, problem-solving, and essential soft skills like collaboration, communication, and teamwork (Pujiana et al., 2024). Scholars agree that this instructional paradigm has been replaced by the knowledge economy era, where subject-specific knowledge alone is insufficient to secure employment in the rapidly evolving 21st-century workforce (Yanti & Thohir, 2024, Khalaf et al., 2018). Contemporary research underscores the necessity for graduates to possess advanced cognitive abilities such as critical thinking, analytical reasoning, and problem-solving skills to thrive in the professional world (Song et al., 2024). In the context of accounting education, lecturers must equip students with these competencies by fostering deep learning and cognitive engagement (Liu et al., 2024). However, previous studies reveal that accounting students often struggle with knowledge retention, exhibit low intrinsic motivation, and experience poor self-efficacy due to ineffective teaching methodologies and uninspiring learning environments (Jamil, Bokhari, & Zia, 2024, Asdar et al., 2024). To address these challenges, scholars advocate for the implementation of interactive classrooms that encourage students' active participation through innovative pedagogical strategies (Adeyele & Ramnarain, 2024). Among the most effective approaches recommended are evidence-based learning (EBL) and inquiry-based learning (IBL), which have been shown to significantly enhance student engagement, motivation, and cognitive development in accounting education (Nykyropets et al., 2024; Larsen et al., 2019).

Inquiry-based learning (IBL) is an innovative instructional approach that fosters students' interest, enhances academic performance, and develops higher-order thinking skills. Some authors described IBL as an instructional method that enables both students and lecturers to explore subject matter through probing

questions and hypothesis generation (Latip et al., 2024; Friesen, 2009). Similarly, Qablan et al. (2024) emphasized that IBL is designed to develop students' critical thinking, problem-solving abilities, and soft skills through active teacher-student engagement. According to Latip et al. (2024), IBL places students, subject matter, and the learning environment at the core of the learning process, enabling learners to generate new ideas and construct knowledge independently. Research has consistently demonstrated that IBL actively engages students in classroom activities, boosting their intrinsic motivation, self-efficacy, and knowledge retention (Adeyele & Ramnarain, 2024). For example, Ugo and Oliweh (2024) investigated the impact of IBL and peer teaching strategies on mathematics achievement and found that students exposed to IBL demonstrated significant improvements in academic performance, knowledge retention, and subject interest. Similarly, Telaumbanua et al. (2024) explored the implementation of inquiry-based learning strategies and reported that students developed enhanced cognitive abilities and analytical skills. Using a mixed-method approach, Qablan et al. (2024) examined educators' perspectives on IBL and revealed that teachers viewed it as a transformative instructional strategy that enhances student engagement and deepens content understanding. Additionally, bibliometric analyses by Lismaya et al. (2024) and FERNIawan et al. (2024) confirmed that IBL effectively promotes higher-order thinking skills, particularly in online education. There is a broad consensus that IBL is rooted in the epistemology of scientific inquiry, equipping students with theoretical knowledge, analytical reasoning, and essential soft skills necessary for academic success. Like IBL, evidence-based learning (EBL) is another effective pedagogical approach that supports students in overcoming learning difficulties.

Evidence-Based Learning (EBL) is a structured instructional approach that ensures learning is measurable and verifiable. It emphasizes the use of empirical data to confirm that students have acquired knowledge and skills, thereby aligning with the demands of the 21st-century workforce. Preparing students for future careers requires equipping them with the ability to construct academic arguments based on scholarly evidence and established facts (Luo, Abbasi, Yang, Li, & Sohail, 2024). Through EBL, students develop critical thinking, logical reasoning, and analytical skills essential for academic and professional success. Research indicates that the application of EBL in teaching and learning enhances student performance and learning outcomes by fostering a deeper understanding of concepts (Slavin, 2020). Moreover, gathering evidence about students'

academic progress enables educators to provide targeted support, ensuring that learning processes are transparent, equitable, valid, and reliable (Mennes et al., 2024). Studies further affirm that EBL is inherently interactive and collaborative, fostering students' interest in their coursework, enhancing knowledge retention, and ultimately improving academic achievement (Herodotou et al., 2019). Within the context of this study, EBL is conceptualized as a fact-driven instructional strategy that integrates peer tutoring, metacognitive techniques, individualized learning, and collaborative learning approaches. These components collectively facilitate the monitoring and evaluation of students' progress while enabling the development of tailored strategies to sustain interest, improve retention, and enhance overall learning outcomes.

Based Learning (IBL) and Evidence-Based Learning (EBL) in fostering higher-order thinking skills. Among these factors, intrinsic motivation and ability beliefs play a crucial role. According to LaForce, Noble, and Blackwell (2017), intrinsic motivation and ability beliefs represent a psychological mechanism that reflects an individual's perception of their current competence in a specific task, as well as their confidence and conviction to perform the necessary behaviors to achieve success. While existing research has established that both IBL and EBL enhance students' academic performance, intrinsic motivation, and ability beliefs (Lismaya, Widyatmoko, & Nurcahyono, 2024; Alonso et al., 2023), they are also strongly associated with increased student engagement in the teaching and learning process (Fernihawan et al., 2024). However, despite the recognition of these variables in fostering meaningful learning experiences, there is a notable gap in empirical research exploring their mediating effects within the context of IBL and EBL. Specifically, little attention has been given to their influence on accounting students' knowledge retention and critical thinking skills development in universities. Addressing this gap is essential for designing pedagogical strategies that optimize student learning outcomes and sustain long-term academic success (Qablan et al., 2024; Adeyele & Ramnarain, 2024, Azmi et al 2024). Thus, the present study ascertained the relationships among the innovative pedagogies (IBL and EBL), intrinsic motivation, self-efficacy, knowledge retention, and students' interest in cost accounting and also the mediating effects of intrinsic motivation, self-efficacy in the relationship (Aris et al, 2024; Asdar et al, 2024).

Intrinsic motivation refers to the internal drive that compels individuals to engage in activities for the inherent satisfaction and enjoyment derived from the process itself rather than external rewards.

According to Alonso et al. (2023), fostering intrinsic motivation in education enhances students' willingness to learn by making learning a self-driven process rather than an externally imposed obligation. In academic settings, intrinsic motivation encourages students to take ownership of their learning, explore knowledge independently, and remain committed to their academic pursuits. The impact of intrinsic motivation on critical skills development is significant, as students who are intrinsically motivated tend to engage more deeply with learning materials, think critically, and apply problem-solving techniques effectively (Qureshi et al., 2024; Hosseini et al., 2024). Furthermore, intrinsic motivation has been linked to academic achievement and knowledge retention, as motivated students exhibit persistence and curiosity, which enhance their ability to comprehend and remember information over time (Situmorang et al., 2025). When students find meaning in what they learn, they are more likely to engage in reflective thinking and develop a long-term commitment to skill acquisition. Zou et al. (2024) highlighted that teachers' intrinsic motivation plays a vital role in influencing students' motivation, further reinforcing the importance of creating learning environments that encourage self-directed learning and intellectual curiosity.

Self-efficacy, on the other hand, refers to an individual's belief in their ability to successfully complete tasks and achieve desired outcomes. It is a critical determinant of student performance, influencing how they approach challenges and persist in the face of difficulties (Chen et al., 2025). When students have high self-efficacy, they exhibit greater confidence in tackling complex academic tasks, thereby enhancing their critical thinking and problem-solving skills (Aris et al., 2024). Self-efficacy is closely tied to academic achievement, as students with strong beliefs in their abilities are more likely to set higher goals, exert greater effort, and remain resilient in the learning process (Mok & Moore, 2019). Furthermore, self-efficacy fosters knowledge retention by enabling students to develop effective study strategies, actively engage in learning, and apply acquired knowledge in various contexts (Cao & Liu, 2024). According to Lendínez Muñoz et al. (2024), self-efficacy can be strengthened through structured learning experiences that provide students with opportunities for mastery and skill development. Additionally, Asdar and Hasbiah (2024) emphasized that self-efficacy, when combined with other competencies such as digital literacy, can significantly enhance students' entrepreneurial behavior, underscoring its role in preparing students for the demands of the evolving workforce. In educational settings, fostering self-efficacy requires a supportive

learning environment where students receive constructive feedback, experience gradual successes, and develop a growth mindset that reinforces their belief in continuous improvement. The interconnectedness of intrinsic motivation and self-efficacy is evident in their collective impact on student learning outcomes. While intrinsic motivation fuels students' desire to learn for personal fulfillment, self-

efficacy empowers them with the confidence to overcome academic challenges and persist in knowledge acquisition. Educators and policymakers must prioritize strategies that enhance both intrinsic motivation and self-efficacy to cultivate a generation of students equipped with critical skills, strong academic performance, and long-term knowledge retention.

Theoretical framework

The study anchored on constructivist theory propounded by Jean Piaget in 1952. Jean Piaget's constructivist theory, introduced in 1952, presents a revolutionary perspective on learning, emphasizing that knowledge is not transmitted from an external source but actively constructed by the learner. Piaget argued that cognitive development occurs through a sequential process, where individuals build upon their previous knowledge by engaging with their environment. He identified four stages of cognitive development: the sensorimotor, preoperational, concrete operational, and formal operational stages, each representing a distinct transformation in how individuals think and process information. A core principle of constructivism is that learning occurs through assimilation, where new information is incorporated into existing mental frameworks, and accommodation, where these frameworks are modified to integrate new experiences. This dynamic interaction between prior knowledge and new experiences underscores the importance of active engagement, exploration, and critical thinking in the learning process. The relevance of Piaget's constructivist theory to the present study lies in its advocacy for experiential and inquiry-driven learning, which aligns closely with inquiry-based learning (IBL) and evidence-based learning (EBL). Both pedagogical approaches require students to actively participate in their learning process rather than passively receiving information. Through investigation, problem-solving, and reflection, students construct meaning, develop higher-order thinking skills, and enhance their ability to retain knowledge. The theory further highlights the role of cognitive disequilibrium, where learners encounter new challenges that compel them to rethink and refine their understanding, an essential aspect of IBL and EBL, which engage students in questioning, analyzing evidence, and deriving conclusions through systematic inquiry. By emphasizing that meaningful learning occurs when students take ownership of their cognitive development, Piaget's constructivist principles provide a strong theoretical foundation for

the instructional strategies explored in this study. In addition, this study advances Piaget's constructivist theory by extending its application to contemporary educational settings that integrate collaborative and technology-enhanced learning environments. While Piaget's work primarily focused on individual cognitive growth, modern inquiry-based and evidence-based pedagogies leverage digital tools, peer interactions, and real-world applications to create a more interactive and dynamic learning experience. By examining the mediating roles of intrinsic motivation and ability beliefs in IBL and EBL, this study contributes to a deeper understanding of how constructivist principles influence student engagement and knowledge retention in higher education. Furthermore, it provides empirical evidence on how structured inquiry and guided discovery can foster cognitive flexibility, problem-solving skills, and a deeper conceptual grasp of subject matter. In doing so, the study not only reaffirms Piaget's constructivist framework but also adapts and expands it to address the evolving demands of 21st-century education, demonstrating its enduring relevance in fostering independent, critical, and reflective learners. Based on this background, the following hypotheses were proposed:

Hypotheses

- H₁:** IBL and EBL will predict accounting students' engagement in critical skills acquisition (ASECSA) and self-efficacy in cost accounting.
- H₂:** Self-efficacy and intrinsic motivation will predict ASECSA.
- H₃:** Self-efficacy will significantly mediate between treatment (IBL and EBL) and ASECSA.
- H₄:** Intrinsic motivation will significantly mediate between self-efficacy and ASECSA.
- H₅:** Self-efficacy and intrinsic motivation will mediate the relationship between treatment (IBL and EBL) and ASECSA.
- H₆:** IBL and EBL will predict accounting students' knowledge retention, self-efficacy, and intrinsic motivation in cost accounting.

Hypotheses Model

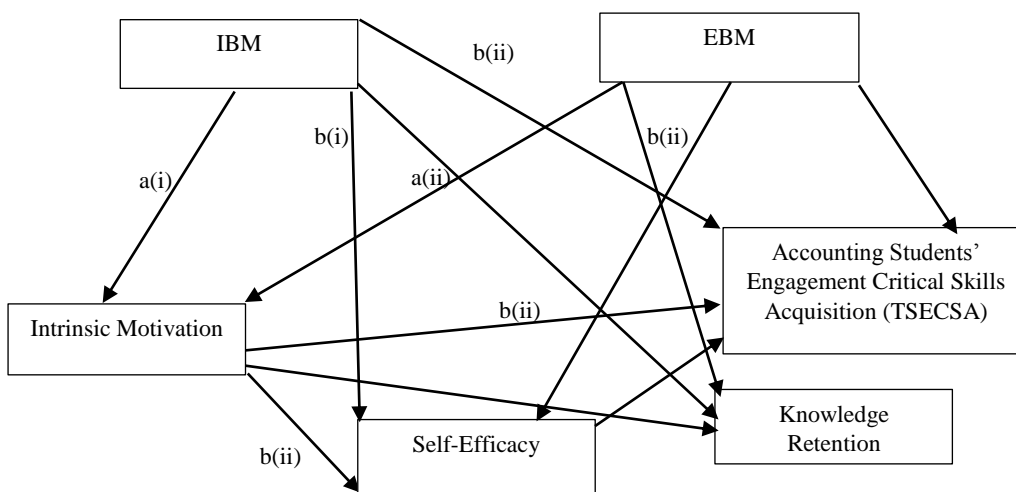


Figure 1. Study model of intrinsic motivation and self-efficacy and the inter-relationship between the innovative pedagogies (IBL and EBL) and ASECSA

Method

Design of the study

The study adopted 2×2 factorial research design. The study employed a 2×2 factorial research design to examine the independent and interaction effects of instructional methods and mediating variables on students' learning outcomes. This design is ideal for educational research as it efficiently isolates variables and reveals interaction effects (Haerling & Prion, 2020).

Participants and procedures

Using 146 400 level accounting students from two universities in South-East Nigeria, we determined the mediating effects of the study variable. One hundred and forty-eight copies of were distributed to the accounting students from the University of Nigeria, Nsukka (UNN) and Nnamdi Azikiwe University, Awka, Anambra State (UNIZIK). Out of the number distributed 139 were returned but seven copies were rejected because they were wrongly filled thus, having 132 (76 from UNN and 56 from UNIZIK) correctly filled copies representing 89 per cent return and these were used for data analysis. The age range according to the demographic data collected show that 43 (33%) students are 17 – 20 years, 55 (42%) of them were between 21- 23 years, while 34 (25%) are from 24 years and above. From the self-report generated from the participants, we determined their study hours in raking scale of 1 – 3 hours, 3 – 6 hours, and 7 hour and above. The study hour report revealed that 72 (55%) students' study between an hour to three, 38 (29%) of

them study between the range of three to six hours, while 22 (16%) students from seven hours and above. The participants involved male and female students and since gender is an important variable that influences students' skills development, we determine the study scales of the males and females. Through the self-reporting questionnaire responses, it was gathered that out of the 63(100%) male students studied, 42 (67%) of them study between 1-3 hours, 24 (38%) study between 3-6 hours, while 18 (20) others study from 6 hours and above. On the other hand, 39 (58%) female students reported that they study between 1 to 3 hours, 26 (37%) of study between 3 to 6 hours, and 5 (5%) study for 6 hours and above.

Sample and procedure

This study was conducted in two federal universities in South-East Nigeria. The choice of the universities was based on the fact that they fall within the first- and second-generation universities in Nigeria and they produce the highest number of accounting graduates per annum. The sample size of the study is 132 accounting students comprising 76 students from the University of Nigeria, Nsukka and 56 from Nnamdi Azikiwe University Awka, Anambra State. Before the commencement of the study, we obtained permission letter from the Heads of Department of Business Education of the studied institutions, and also offered informed consent to the students who filled, signed and returned to us at the spot. Prior to the administration of the research instruments, we assured the respondents of the confidentiality of their individual responses. This

study lasted for a full academic session of two semesters (nine months) of two hours lectures/week.

The intervention packages consist of IBL and EBL lesson plans on cost accounting for the two semesters, a 21st-century skills manual comprising the general instructions or the study, engagement activities, projects and assignments. It also contained teacher assessment rubrics, and procedures for the study. We also had a follow-up forum where students were allowed to interact more and to share their experiences based on the engagement and 21st-century skills learnt. To strengthen the students' collaboration, we created two independent virtual study environments using Moodle-Cloud groups (IBM and EBM). Similarly, we divided the classes into small groups of five and six students per a group. This was designed to increase active engagement of every participant in the group assignments and project with the view of encourage everyone to be involved in the critical skills developmental processes.

For the IBL group, we employed Cavallo and Laubach's models (Cavallo & Laubach, 2001). The model is a five-learning cycle approach (orientation, conceptualization, investigation, conclusion, and discussion). The core roles of the lecturers were to facilitate the learning and to guide the students in

developing research questions and hypotheses based on the topics of the day. After the generation of the questions and hypotheses, the students were allowed to search for the answers and solutions to the practical/real-life scenario problems in their small group. The students were also allowed to use their devices to search out solutions online and from web links posted on the online learning environment. The lecturers guided the students on how to develop innovative ideas, critical thinking, and infer theoretical solutions to real-life solutions (Friesen, 2009).

In EBM group we applied similar approaches but the distinctive difference between the IBL and EBL is that the lecturers of EBL used authority-based evidence to validate claims. Such evidence-based information was internal and external. While the external evidence was generated outside of the learners' control, the internal evidence relates to the students' present state in the learning process. The internal evidence was determined via in class tests and oral questions. The external evidence includes performance history of the students and their previous examination results and gross percentage average (GPA). To determine the extent, the critical skills were developed, we used rubrics to score each student.

Demographic spread

Table 1: Participants' Demographic Characteristics with their Baseline Equivalence

Method/ Group	Number	Male GPA _a	Female GPA _a	GPA by Age	X ²	Sig.
IBL n(%)	76(58%)	29(22%) 2.49	47(36%) 2.53	2.51	.582	.706
EBL n(%)	56(42%)	34(26%) 2.46	22(16%) 2.50	2.43	.539	.688
Mean n(%)	132(100%)	127(48)2.48	69(52)2.52	2.47	.561	.697

Key: IBL = Inquiry-based learning; EBL = Evidence-based learning; GPA_a = Average GPA, Average mean age and standard deviation = 33/2.74

*Highest GPA in Federal Universities =5.0; Lowest GPA= 0

The population for the study was 132 Accounting students from two federal universities (UNN and UNIZIK) in South-East, Nigeria, comprising 76 students in IBL group from UNN and 56 students in the EBM group from UNIZIK (see Table 1). The 76 students of the IBL group consist of 29(22%) students

with an average GPA of 2.49, and 47(36%) with 2.53 as their average GPA (X² = .582, p = .706). The population of the EBL group is 56 accounting students consisting of 34(26%) students with an average GPA of 2.46, 22(16%) with 2.50 average GPA (X² = .539, p = .688).

Measures

We used five sets of instruments to measure the students' experience based on interventions (IBL and EBL), ASECSA, self-efficacy, and intrinsic motivation while controlling age and gender. Two of the instruments (Inquiry-based learning experience questionnaire (IBLEQ), and Evidence-based learning

experience questionnaire (EBLEQ)) measured the students' experience based on instructional methods, Accounting Students' Critical Skills Acquisition Questionnaire (ASECSAQ) was adopted to test the students' ability to develop thinking skills. While Accounting Students' Intrinsic Motivation Questionnaire (TSIMQ), and Self-Efficacy

Questionnaire (SEQ) measured the extent to which intrinsic motivation and self-efficacy could help the students to acquire critical skills and improve academically in cost accounting.

Inquiry-based learning experience questionnaire (IBLEQ): The IBLEQ was a 20-item instrument developed in line with standard test questionnaire (Munshi et al., 2008; Savery, 2006). The instrument was a seven scaled questionnaire and the accounting students were demanded to indicate the extent their agreement based on the effectiveness of IBL (very strongly disagree = 1 to 7 = very strongly agree). According to the scale, students who obtained higher scores are believed to be learners who considered IBL to be active instructional method and verse versa.

Evidence-based learning experience questionnaire (EBLEQ): The EBLEQ was also a 20-item questionnaire adopted from (Upton & Upton, 2006). The items of the EBLEQ were scored on seven scales ranging from 1 = Poor to 7 = Best. This gave us the opportunity to calculate an average score of each sub-scale based on Practice (1), Attitudes (2), and Knowledge or Skills (3), Retrieving and Reviewing an Evidence (4), and Sharing (Instructional Materials) And Applying Evidence-Based Practices to real scenario (5).

Accounting students' Engagement in Critical Skills Acquisition Questionnaire (ASECSAQ). The ASECSAQ is a 25-item questionnaire developed based on Watson-Glaser Critical Thinking Appraisal and Partnership for 21st-Century Skills approaches (Watson & Glaser, 1980; P21 Partnership, 2009). The instrument was adopted from Course Engagement

Questionnaire by Handelsman, Briggs, Sullivan, and Towler (2005). The instrument was based on 5-point Likert scale: (ranging from strongly disagree (1) – strongly agree (5)). Students who obtained higher score are believed to have gained higher scores in cost accounting based on treatment (EBL).

Accounting students' Intrinsic Motivation Questionnaire (TSIMQ): The TSIMQ contained 12-items used to measure accounting students' intrinsic motivation (Zou et al., 2024; Vallerand et al., 1992). TSIMQ was centred on a general scale with three subscales focusing on ability to know, accomplish, and experience stimulation based on intrinsic motivation (i.e., Intrinsic Motivation to Know, Accomplish, and Experience Stimulation) (Zou et al., 2024). The TSIMQ was rated and scored on a 5-point Likert scale ranged from 'strongly disagree (1) to strongly agree (5). Students who obtained higher scores on the TSIMQ are assumed to have high intrinsic motivation based on the treatment received or the study environment adopted or both.

Self-Efficacy Questionnaire (SEQ) was a 12-item structured instrument adopted from self-efficacy questionnaire by Riopel (2019) and Motivated Strategies for self-efficacy developed by Pintrich et al. (1993). The SEQ was scored on 6-point scale of strongly disagree to strongly agree. Students who obtained high scores are inferred to have demonstrated a high degree of self-efficacy belief. All the instruments used were tested for internal consistency using Cronbach Alpha which yielded high internal reliability indices of 0.82 for IBLEQ, 0.91 for EBLEQ, 0.89 for ASECSAQ, 0.88 for TSIMQ, and 0.86 for SEQ with an over index of 0.87.

Data Analyses

All analysis was done using SPSS. First, we used the hierarchical multiple regression analyses, and PROCESS macro to establish the basis for using multiple mediation analysis to help us estimate indirect effect of the study variables. At the preliminary stage, we tested hypotheses 1 to 6 using four different hierarchical multiple regression analyses. At each stage of the four analyses conducted, different control variables were introduced to control for their impacts on the dependent variables studied (see Table 2). At the second step of the analysis, we introduced IBL and EBL ratings by students. In the third step, we

introduced self-efficacy and in the fourth level, intrinsic motivation was introduced. The drive was to determine the extent to which these variables can predict skills development among the students. Furtherance to this, we conducted two more regression analysis, using Self-efficacy and intrinsic motivation as dependent variables in each of the regressions (see Table 3). We introduced IBL and EBL in the Hierarchical Multiple Regressions at the second and third level of the analysis and also used 5000 re-samples BC bootstrapping method using PROCESS macro program to determine the total, direct, and indirect effects of IBL AND EBL on the students (Preacher & Hayes, 2008).

Results

Preliminary Investigations/Analysis

Result of the bivariate analyses presented in Table 2 revealed that both IBL ($r = 0.811$, $p < .05$) and EBL ($r = 0.730$, $p < .05$), self-efficacy ($r = 0.735$, $p < .05$), and intrinsic motivation ($r = 0.811$, $p < .05$)

showed statistically significant and are positively linked to Accounting Students Engagement in Critical Skills Acquisition (ASECSA). Thus, substantiating the need to conduct mediation analysis as proposed in the study model (Hayes, 2013).

Table 2: Descriptive Statistics, Cronbach's α Coefficients and Correlations of the Study Variables

Variables	1	2	3	4	5	6	7	8	9	
Gender	(.839)									
Age	.25	(.783)								
Students' Academic Level	.068	.077	.087*							
Study Duration/Hour	.253*	.274*	.288*	.280*						
IBL Experience	.134	-.024	-.216	-.209	(.867)					
EBL Experience	.142	-.039	-.311	-.240	-.262	(.858)				
ASECSA	-.028*	.120	.011	.025	.499**	.671**	(.892)			
Self-efficacy	.077	.148	-.131	-.153	.503**	.614**	.707**	(.857)		
Intrinsic Motivation	.126	.130	-.122	-.215	.625**	.659**	.760**	.805	.773**	
Knowledge Retention	.133	.142	-.103	-.195	.762**	.614**	.781**	.834	.763**	.729**

Note: Values for the Cronbach's Alpha are presented in diagonal parentheses while α values are shown along the parenthesis, * $p < .05$ (2-tailed), ** $p < .01$ (2-tailed), *** $p < .001$ (2-tailed). Gender: (0 = male, 1 = female).

Table 3: Summary of Hierarchical Multiple Regression (HMR) for Accounting Students' Engagement in Critical Skills Acquisition (ASECSA)

Variables	Study Model (Steps)			
	M 1	M 2	M 3	M 4
	B	β	β	β
Control Variables				
Gender	-.022	-.171	-.169	-.183*
Age	-.017	-.165	-.184	-.187*
Study Duration (hour)	-.019	.192	.204	.246*
Academic Level	.121	.097	-.084	-.058
Predictors (Independent Variables I)				
IBL		.702**	.536**	.368**
Mediator Variables				
Self-efficacy			.668**	.461**
Intrinsic Motivation				.337**
Knowledge Retention				.690**
Adjusted R^2	.041	.616	.677	.703
ΔR^2	.039	.564	.374	.084
F-Value	$F(3, 73) = 3.51$	$F(4, 72) = 21.14^{**}$	$F(5, 71) = 36.173^{**}$	$F(6, 70) = 37.058^{**}$
ΔF	$\Delta F(3, 73) = 3.51$	$\Delta F(1, 72) = 63.28^{**}$	$\Delta F(1, 71) = 51.680^{***}$	$\Delta F(1, 70) = 16.530^{**}$
Predictors (Independent Variables II)				
EBL		.692**	.610**	.299**
Mediator Variables				
Self-efficacy			.596**	.447**
Intrinsic Motivation				.393**
Knowledge Retention				.583**
Adjusted R^2	.038	.552	.658	.684
ΔR^2	.038	.480	.337	.079
F-Value	$F(3, 53) = 3.22$	$F(4, 52) = 19.62^{**}$	$F(5, 51) = 34.266^{***}$	$F(6, 50) = 34.161^{**}$

ΔF	$\Delta F(3, 53) = 3.22$	$\Delta F(1, 52) = 60.08^{**}$	$\Delta F(1, 51) = 49.523^{**}$	$\Delta F(1, 50) = 14.418^{**}$
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* = $p < 0.05$; ** = $p < 0.001$; IBL = Inquiry-based learning, EBL = Evidence-based learning, M = Model.

We determined whether IBL and EBL would predict ASECSA, self-efficacy, and intrinsic motivation of the accounting students. Table 3 depicts the results of the analysis based on the participants' demographic characteristics, predictors, and mediating variables and their interactions across models (M1 - M4). The summary results of the Hierarchical Multiple Regression on the demographic characteristics in M 1 revealed 4.1% variance in accounting students' engagement in critical skills acquisition (ASECSA),

Adjusted R² .041, ΔR^2 0.39, $\Delta F(3, 73) = 3.51, p = 863$. However, in M2 IBL was introduced which resulted to 56.4% variance in the ASECSA, Adjusted R² 58.4, $\Delta F(1, 72) = 63.28, p < 0.001$. Thus, predicting accounting students' ASECSA ($\beta = .702, p < 0.001$). Similarly, in M 2 EBL accounted 48.0% variance in the ASECSA with Adjusted R² 55.2, ΔR^2 .480, $\Delta F(1, 53) = 3.22, p < 0.001$. Thus, implying that EBL also significantly predicted the students ASECSA ($\beta = .692, p < 0.001$) (see Table 3).

Table 4: Summary of Hierarchical Multiple Regression (HMR) for Self-efficacy and Intrinsic Motivation, and Knowledge Retention in Cost accounting

Variables	Study Model (Steps)					
	Self-efficacy		Intrinsic Motivation		Knowledge Retention	
	M 1	M 2	M 1	M 2	M 1	M 2
	β	β	β	β	β	β
Control Variables						
Gender	.091	-.036	.137	.003	.054	.001
Age	.076	-.125	.152	.001	.168	.003
Study Duration (hour)	-.066	.094	-.203	-.050*	-.182	-.076*
Academic Level	.185	.167	-.183	.174	-.193	.166
Predictors (Independent Variables I)						
IBL		.730**	.	.881**	.	.902**
Mediator Variables						
Adjusted R ²	.036	.552	.024	.420	.027	.455
ΔR^2	.036	.308	.057	.385	.060	.371
F-Value	$F(3, 73) = .962$	$F(4, 72) = 8.162^{**}$	$F(3, 73) = 1.663$	$F(4, 72) = 13.58^{**}$	$F(3, 73) = 1.572$	$F(4, 72) = 15.38^{**}$
ΔF	$\Delta F(3, 73) = .962$	$\Delta F(1, 72) = 31.18^{**}$	$\Delta F(3, 73) = 1.663$	$\Delta F(1, 72) = 53.44^{**}$	$\Delta F(3, 73) = 1.572$	$\Delta F(1, 72) = 61.09^{**}$
Predictors (Independent Variables II)						
EBL		.716**		.860**		.885**
Mediator Variables						
Adjusted R ²	.034	.539	.021	.398	.026	.418
ΔR^2	.034	.275	.053	.376	.057	.364
F-Value	$F(3, 53) = .928$	$F(4, 52) = 7.864^{**}$	$F(3, 53) = 1.557$	$F(4, 52) = 12.64^{**}$	$F(3, 53) = 1.565$	$F(4, 52) = 13.81^{**}$
ΔF	$\Delta F(3, 53) = .928$	$\Delta F(1, 52) = 30.46^{**}$	$\Delta F(3, 53) = 1.557$	$\Delta F(1, 52) = 51.82^{**}$	$\Delta F(3, 53) = 1.611$	$\Delta F(1, 52) = 59.66^{**}$

* = $p < 0.05$; ** = $p < 0.001$; IBL = Inquiry-based learning, EBL = Evidence-based learning, M = Model.

Result presented in Table 4 for the IBL group showed that the demographic variables of the students in M1 accounted for 3.6% discrepancy in the ability derive/beliefs, Adjusted R² .036, $\Delta F(3, 73) = .962, p = 538$. In M2, the introduced of student' IBL experience accounted for 30.8% variance in self-efficacy Adjusted R² .036, $\Delta F(4, 72) = 8.162, p < .001$, implying that students' IBL experience predicts self-efficacy ($\beta = .730, p < 0.001$) (see Table 3). Similarly, in M2, the addition of student' EBL

experience accounted for 27.5% variance in self-efficacy Adjusted R² .0275, $\Delta F(4, 52) = 7.864, p < .001$, indicating that the students' EBL experience also predicts self-efficacy ($\beta = .716, p < 0.001$).

In testing for intrinsic motivation for the students exposed to IBL, we found that at M1, the students' demographic variables accounted for 2.4% variance Adjusted R² .024, $\Delta F(3, 73) = 1.663, p = 316$. The introduction of IBL experience in M2 gave rise to a significant 38.5% variance in students'

intrinsic motivation, Adjusted R^2 .0385, ΔF (1, 72) = 53.44, $p < .001$. Thus, we inferred that the students IBL experience predicts intrinsic motivation ($\beta = .881$, $p < 0.001$). Furtherance to this we tested for the EBL group to determine if EBL experience would predict intrinsic motivation. At M1 the students' demographic variables accounted for 2.1% variance Adjusted R^2 .021, ΔF (3, 53) = 1.557, $p = 284$. However, when we introduced EBL experience in M2, there was 37.6% significant variance in intrinsic motivation Adjusted R^2 .0376, ΔF (1, 52) = 51.82, $p < .001$. Based on the above outcome, we inferred that the students EBL experience in cost accounting predicts intrinsic motivation ($\beta = .860$, $p < 0.001$).

Again, we tested for knowledge retention for the students exposed to treatments (IBL and EBL), and result revealed that at M1, the students' demographic variables accounted for 2.7% variance Adjusted R^2 .027, ΔF (3, 73) = 1.572, $p = 306$. The addition of IBL experience in M2 accounted to a significant 37.1% variance in students' knowledge retention, Adjusted R^2 .0371, ΔF (1, 72) = 61.09, $p < .001$, implying that the students IBL experience predicts knowledge retention in cost accounting ($\beta = .902$, $p < 0.001$). We also determined if EBL experience would predict knowledge retention. First at M1 the students' demographic variables showed 2.6% variance Adjusted R^2 .026, ΔF (3, 53) = 1.611, $p = 266$. However, in M2 the introduction of EBL experience, revealed a significant variance of 36.4% in knowledge retention Adjusted R^2 .0364, ΔF (1, 52) = 59.66, $p < .001$. Therefore, we inferred that the students EBL experience in cost accounting predicts knowledge retention ($\beta = .885$, $p < 0.001$).

As revealed in M 3 of the preliminary Hierarchical Multiple Regression in Table 2, self-efficacy gave rise to an additional significant 37.4% variance in ASECSA, Adjusted R^2 .374, ΔF (1, 71) = 51.680, $p < 0.001$, thus significantly predicting ASECSA ($\beta = .536$, $p < 0.001$). However, the intrinsic motivation was introduced in M4 in the same Hierarchical Multiple Regression which accounted for 8.4% additional significant variance in ASECSA Adjusted R^2 .084, ΔF (1, 70) = 16.530, $p < 0.001$. Inferring from the above outcome we established that IBL significantly and positively predicts ASECSA ($\beta = .337$, $p < 0.001$). It was also found that IBL experience predicts knowledge retention and ASECSA ($\beta = .690$, $p < 0.001$) (see Table 2).

We also tested for the EBL group and as shown in M 3 of the preliminary Hierarchical Multiple Regression in the same Table 3, self-efficacy accounted for an additional significant 33.77% variance in ASECSA, Adjusted R^2 .337, ΔF (1, 51) = 49.523, $p < 0.001$, thus significantly predicting ASECSA ($\beta = .610$, $p < 0.001$). Furthermore, when the intrinsic motivation was added in M4, it accounted for 7.9% additional significant variance in ASECSA Adjusted R^2 .079, ΔF (1, 50) = 14.418, $p < 0.001$. The above outcome implies that the EBL positively and significantly predicts ASECSA ($\beta = .393$, $p < 0.001$). It was established that EBL experience and intrinsic motivation predicts knowledge retention and ASECSA ($\beta = .583$, $p < 0.001$).

Table 5: Total and Direct Effects of IBL and EBL on Accounting students' Engagement in Critical Skills Acquisition (ASECSA)

Effects	Treatment	Estimate	SE	T	95% CI		Decision
					Lower	Upper	
Total		.774	.093	9.6254	.610	.916	Significant
Direct	IBL	.301	.087	4.5228	.195	.528	Significant
Indirect		.417	.088	-	.285	.620	Significant
Total		.843	.082	8.7914	.590	.867	Significant
Direct	EBL	.286	.077	4.4918	.182	.473	Significant
Indirect		.429	.071	-	.276	.611	Significant

Table 5 presented the result of unmediated total and indirect effects of the treatments (IBL and EBL) on ASECSA. Results showed that the unmediated total effect determined via PROCESS macro was

statistically significant, IBL: $\beta = .774$, $SE = .093$, $t = 9.6254$, $p < .001$, while EBL showed $\beta = .843$, $SE = .082$, $t = 8.7914$, $p < .001$. This outcome is congruent with the model of this study.

Table 6: Indirect Mediation 5000 Re-samples BC Bootstrap Test Effects of Self-efficacy and Intrinsic Motivation of Accounting students.

Hypotheses	Estimate	SE	95% CI		Mediation Remark
			Lower	Upper	
IBL → ASECSA → AD/B	.187	.067	.074	.348	Partial
EBL → ASECSA → AD/B	.087	.045	.081	.316	Partial
IBL → Intr.M → ASECSA	.114	.048	.039	.253	Partial
EBL → Intr.M → ASECSA	.120	.042	.036	.247	Partial
IBL → AD/B → IntrM → ASECSA	.117	.044	.029	.230	Partial
EBL → AD/B → IntrM → ASECSA	.088	.039	.035	.172	Partial
IBL →					

* PM = Partial Mediation

Table 6 presented the result of indirect mediation 5000 re-samples BC bootstrap test effects of self-efficacy and intrinsic motivation of accounting students. Results on self-efficacy on IBL and ASECSA relationship showed significant indirect effect (CI = .074 to .348, $p < .001$) on the IBL group and (CI = .081 to .316, $p < .001$) for the EBL group. From the above result, we established that self-efficacy has partial mediation between both IBL and EBL experience and ASECSA. Again, we tested to determine if intrinsic motivation could mediate between treatments (IBL and EBL) and ASECSA and result showed statistical significance, IBL: (CI = .039 to .253, $p < .001$); EBL: (CI = .036 to .247, $p < .001$). The result depicts that intrinsic motivation had partial mediation relationship between treatments (IBL and EBL) experience and ASECSA.

Finally, we tested to ascertain whether self-efficacy and intrinsic motivation will mediate the relationship between treatment (IBL and EBL) and ASECSA. The result of the indirect effect showed statistically significant across the groups, IBL: (CI = .029 to .230, $p < .001$), EBL: (CI = .035 to .172, $p < .001$).

Discussion

The study examined the relationship between treatments (IBL and EBL) and ASECSA, as well as the total and indirect multiple mediation effects of intrinsic motivation, self-efficacy, and knowledge retention in cost accounting. The findings revealed a significant relationship between treatments (IBL and EBL) and ASECSA. Similarly, the students' level of ASECSA was directly influenced by treatment procedures, instructional methods (IBL and EBL), and the learning environment. Critical skills were essential for securing and sustaining employment in today's knowledge-driven economy. Within an innovative pedagogical instructional environment such as IBL and EBL, students were guided by lecturers to identify and formulate probing research questions and

hypotheses before seeking solutions within real-life contexts and establishing evidence to support their claims. This aligned with previous studies that found that the more students engaged in solving real-world problems, the more committed they became to learning activities and the more they developed critical and reasoning skills (Kairisto-Mertanen & Penttila, 2019; Masters, 2018; Butler et al., 2017; Wang, Zhang, Clarke & Wang, 2014). Likewise, the findings were consistent with Azmi et al 2024; and Mynbayeva, Sadvakassova, and Akshalova (2018), who reported a significant relationship between EBL experience, students' engagement in academic activities, and improvements in knowledge retention and critical thinking skills.

The study further examined whether treatments (IBL and EBL) were positively associated with self-efficacy and learners' intrinsic motivation. The results indicated that both IBL and EBL were interactive and sustained students' attention during knowledge-seeking activities. These instructional methods encouraged students to actively and enthusiastically engage in learning, thereby fostering the acquisition of critical skills within the scope of cost accounting. This finding supported Kang (2017), who emphasized that students exposed to innovative instructional methods such as IBL and EBL were more likely to develop confidence and self-efficacy, enabling them to exhibit positive learning behaviors that enhanced their critical and reasoning skills through continuous academic engagement. Similarly, the findings reinforced Kang's (2017) assertion that student engagement in a course improved when lecturers employed innovative teaching methods that placed learners and content at the center of the learning process while incorporating engagement strategies that built students' confidence in generating their own ideas.

Furthermore, the study investigated whether self-efficacy and intrinsic motivation positively predicted ASECSA. The results revealed that students

with high self-efficacy and intrinsic motivation actively pursued academic activities that enriched their performance and higher-order thinking skills, irrespective of immediate rewards. This intrinsic motivation was self-driven and associated with students' positive attitudes toward acquiring essential skills for career development. These findings aligned with previous studies that established a significant relationship between self-efficacy and academic achievement (Mwangi, 2018; Sheldrake et al., 2015). Additionally, the results supported Talmi, Hazzan, and Katz (2018), who emphasized a mutual relationship between intrinsic motivation and the acquisition of critical skills, arguing that active participation in academic projects allowed students to develop the 21st-century competencies required for employment. The study also corroborated Talmi, Hazzan, and Katz (2018), who asserted that acquiring critical skills enhanced students' psychological competence and autonomy, both of which were rooted in intrinsic motivation.

The study also assessed whether IBL and EBL predicted accounting students' knowledge retention, self-efficacy, and intrinsic motivation in cost accounting. The findings confirmed a positive relationship between IBL and EBL experiences and knowledge retention. Moreover, the results were consistent with the finding of Ome, who posited that inquiry-based learning methods integrated problem-solving, critical thinking, innovation, creativity, collaboration, and effective communication into the instructional process (Hosseini et al., 2024; Pollitt et al., 2015). Pollitt et al. (2015) further emphasized that these approaches provided students with increased opportunities for project-based learning, fostering critical thinking, collaborative skills, and long-term knowledge retention.

Implications for institution administrators and researchers

The findings of this study have significant implications for university administrators. Administrators should motivate lecturers through training programs and by implementing policies that promote innovative pedagogies in teaching and learning. These measures can better prepare students by equipping them with the necessary skills for employment in today's workforce. The confidence and performance levels of lecturers can be enhanced if they receive effective training in modern teaching methods, instructional techniques, and the application of technological tools in instructional delivery. University administrators should focus on strategies that empower their teaching staff psychologically while also balancing their professional skills to address the

Additionally, the test of the mediating effects of intrinsic motivation and self-efficacy indicated partial mediation. This confirmed that accounting students' intrinsic motivation and self-efficacy had a positive partial mediation effect, signifying a partial relationship between the treatments (IBL and EBL) and ASECSA. The findings also revealed that accounting students exposed to IBL and EBL attributed their active ASECSA not only to instructional methods but also to their interest in learning new skills and their belief in their ability (intrinsic motivation) to engage in practical activities that developed critical skills through problem-solving approaches in IBL. This finding was in agreement with LaForce et al. (2017), who observed that self-efficacy and intrinsic motivation positively mediated the relationship between IBL and students' interest in pursuing STEM-related careers in the future.

Furthermore, the study examined whether self-efficacy and intrinsic motivation mediated the relationship between treatment (IBL and EBL) experiences and ASECSA. The results demonstrated partial mediation across the studied groups. The variations observed in the study were attributed to the combined effects of intrinsic motivation and self-efficacy. This study contributed to the existing literature by integrating two innovative pedagogical approaches using two independent groups. It also expanded knowledge on intrinsic motivation, self-efficacy, and accounting students' ASECSA, establishing the originality of this research. Additionally, the study was one of the few to investigate the multiple mediating effects of IBL, EBL, intrinsic motivation, self-efficacy, and ASECSA relationships within the context of cost accounting education.

challenges of poor educational performance and quality.

This study also has valuable implications for future researchers. Researchers should incorporate multiple mediation approaches when studying the effects of instructional methods, intrinsic motivation, and self-efficacy. Multiple mediation provides a broader perspective on the underlying mechanisms that enhance instructional delivery and teaching techniques, ultimately improving lecturers' productivity and performance. Future researchers are encouraged to explore other innovative teaching and learning methods and examine the combined effects of mediating variables in the relationship between independent and dependent variables.

Theoretical contribution of the study

This study contributed to Jean Piaget's Constructivist Theory by advancing strategies that utilize interactive and collaborative instructional approaches to promote knowledge and skills acquisition. Constructivist theory posits that students should be both physically and mentally active in the dynamic process of learning. Through the IBL and EBL methods employed in this study, lecturers functioned as facilitators and co-constructors of knowledge in inquiry- and evidence-based learning classrooms. By generating intuitive research questions and hypotheses, lecturers guided students in connecting new experiences to their existing cognitive structures, thereby enhancing their critical thinking and problem-solving skills.

Limitations of the study

Although, the study made enormous contributions especially in the teaching and learning process of the accounting students, we used only the 400 level students as participants across the universities studied. This may be seen as a limitation, and may influence the generalization of the findings beyond the contextual environment. However, we employed 5000 re-samples BC bootstrapping method using PROCESS macro package for SPSS to determine the total, direct and indirect effects of the study variables (Hayes, 2013). This serves as a strength to the study. We suggest that further studies should be conducted using other students in other levels of education and tertiary institutions such as colleges of education

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and polytechnics.

Conclusion

The study affirmed that IBL and EBL positively predicted accounting students' engagement in critical skills acquisition (ASECSA). Based on the findings, the association between IBL and EBL experiences and ASECSA could be attributed to the impact of these instructional methods on students, as well as the inclusion of intrinsic motivation and self-efficacy, which further enhanced students' engagement in critical skills acquisition. The study's findings deepened our understanding of how students' active engagement can be improved through interactive instructional methods such as IBL and EBL.

This study contributed to the existing literature on critical skills engagement. It not only established a connection between IBL and EBL experiences and ASECSA but also expanded the scope of previous studies by integrating intrinsic motivation and self-efficacy and demonstrating their mediating roles in ASECSA. Furthermore, the study confirmed that students who believe in their self-efficacy and abilities and are intrinsically motivated can more easily acquire knowledge and develop critical skills essential for securing employment upon graduation.

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