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ORIGINAL

Designing a CSCL-Based Instructional Model in E-Commerce Education to Promote Academic Help-Seeking in Higher Education

Diseño de un modelo pedagógico basado en CSCL en la enseñanza del comercio electrónico para promover la búsqueda de ayuda académica en la educación superior

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ABSTRACT

The integration of Computer-Supported Collaborative Learning (CSCL) in E-Commerce education aims to address the challenges of fostering academic help-seeking behaviors, which are often hindered by traditional teaching methods. Help-seeking is essential for academic success, but factors such as fear of embarrassment and lack of peer interaction limit students' engagement. This study aims to design, implement, and evaluate a CSCL-based instructional model to encourage help-seeking behaviors and enhance collaborative competencies in E-Commerce education. A quantitative causal research design was employed, using a Likert-scale questionnaire to assess students' perceptions of academic help-seeking and collaborative competencies. The study found that behavioral, normative, and control beliefs, along with opportunity, significantly influence students' self-efficacy. However, higher self-efficacy showed a negative impact on learning outcomes, likely due to overconfidence leading to disengagement. The moderation analysis revealed that collaborative engagement negatively moderated the relationship between behavioral beliefs and learning outcomes, suggesting that excessive collaboration could weaken the positive effects of behavioral beliefs. The study concludes that while CSCL is an effective approach to enhancing engagement and learning outcomes, it requires careful structuring to prevent overconfidence and ineffective collaboration. Educators should focus on balancing self-efficacy with realistic self-appraisal and ensuring well-managed collaborative environments to maximize the benefits of CSCL in E-Commerce education. Further research should explore additional moderating factors to optimize CSCL implementation across different educational contexts.

Keywords: Computer-Supported Collaborative Learning; E-Commerce; Learning Outcomes; Help-Seeking; Education.

RESUMEN

La integración del Aprendizaje Colaborativo Asistido por Ordenador (CSCL) en la enseñanza del comercio electrónico tiene como objetivo abordar los retos de fomentar los comportamientos de búsqueda de ayuda

académica, que a menudo se ven obstaculizados por los métodos de enseñanza tradicionales. La búsqueda de ayuda es esencial para el éxito académico, pero factores como el miedo a la vergüenza y la falta de interacción entre compañeros limitan el compromiso de los estudiantes. Este estudio pretende diseñar, implementar y evaluar un modelo de enseñanza basado en CSCL para fomentar los comportamientos de búsqueda de ayuda y mejorar las competencias colaborativas en la enseñanza del comercio electrónico. Se empleó un diseño de investigación causal cuantitativo, utilizando un cuestionario de escala Likert para evaluar las percepciones de los estudiantes sobre la búsqueda de ayuda académica y las competencias colaborativas. El estudio encontró que las creencias conductuales, normativas y de control, junto con la oportunidad, influyen significativamente en la autoeficacia de los estudiantes. Sin embargo, una mayor autoeficacia mostró un impacto negativo en los resultados del aprendizaje, probablemente debido a un exceso de confianza que conduce a la falta de compromiso. El análisis de moderación reveló que el compromiso colaborativo moderaba negativamente la relación entre las creencias conductuales y los resultados del aprendizaje, lo que sugiere que un exceso de colaboración podría debilitar los efectos positivos de las creencias conductuales. El estudio concluye que, aunque el CSCL es un enfoque eficaz para mejorar el compromiso y los resultados del aprendizaje, requiere una estructuración cuidadosa para evitar el exceso de confianza y la colaboración ineficaz. Los educadores deben centrarse en equilibrar la autoeficacia con una autoevaluación realista y garantizar entornos de colaboración bien gestionados para maximizar los beneficios del CSCL en la enseñanza del comercio electrónico. Futuras investigaciones deberían explorar factores moderadores adicionales para optimizar la implementación del CSCL en diferentes contextos educativos.

Palabras Clave: Aprendizaje Colaborativo Asistido por Ordenador; Comercio Electrónico; Resultados del Aprendizaje; Búsqueda de Ayuda; Educación.

INTRODUCTION

The advent of the digital era has significantly reshaped the landscape of higher education, necessitating a re-evaluation of pedagogical strategies to foster both academic development and self-regulated learning behaviors among students.[1,2] The increasing complexity of educational domains, particularly in fields such as E-Commerce, has highlighted the importance of academic help-seeking behaviors. These behaviors, characterized by a student's proactive engagement in seeking assistance when encountering challenges, are crucial for knowledge acquisition and long-term academic success. However, despite their importance, numerous barriers, such as fear of embarrassment and limited access to supportive learning environments, may lead many students to underutilize available resources for academic support.[3,4]

Historically, educational practices have focused predominantly on content delivery in traditional lecture formats. This paradigm has resulted in a lack of encouragement for help-seeking behaviors, exacerbating students' feelings of isolation and hindering collaborative learning opportunities.[5,6] The literature indicates that environments conducive to collaborative learning facilitate greater engagement and reduce barriers to seeking help.[7,8] The implications of this traditional model are particularly pronounced in E-Commerce education where interdisciplinary knowledge is essential. E-Commerce combines elements of digital marketing, logistics, web development, and management, necessitating both theoretical understanding and practical problem-solving capabilities.[9,10]

With the rise of digital tools and platforms, innovative educational strategies have emerged, one of which is Computer-Supported Collaborative Learning (CSCL). CSCL emphasizes the value of collaboration among peers in a digitally mediated environment, encouraging mutual assistance and active engagement in the learning process.[11,12] This approach has been recognized as an effective method to promote academic help-seeking, enabling students to utilize digital tools for collaborative problem-solving and knowledge construction, although specific emphasis on fostering academic help-seeking behaviors remains inadequately explored within educational research, particularly in applied domains like E-Commerce.[3,8]

In the context of E-Commerce education, which presents a unique set of challenges for students, the failure to incorporate collaborative and technology-enabled strategies limits their ability to seek academic assistance effectively.[13,14] Research demonstrates that students often struggle with the practical application of theoretical concepts, a situation exacerbated by the solitary nature of traditional educational settings.[9,15] Therefore, there is a compelling need for instructional models that facilitate collaborative engagement while also addressing the underlying fears and barriers that impede help-seeking.[5,16,17]

The integration of CSCL principles into E-Commerce curricula offers promising avenues for enhancing academic support structures. By embedding collaborative learning tasks within digital platforms, educators can create environments that promote peer interaction, thereby reducing the stigma associated with help-seeking and fostering learner agency.[18,19] Such pedagogical frameworks not only contribute to cognitive development

but also cultivate the interpersonal skills necessary for success in the digital economy.[4,8]

To effectively harness the benefits of CSCL, structured instructional design frameworks like the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) provide a systematic approach for developing and assessing pedagogical interventions.[11,20] This model encourages educators to align learning objectives with collaborative activities that foster academic help-seeking behaviors, ultimately enhancing the overall educational experience for E-Commerce students.[21,22,23]

Moreover, the necessity of addressing the pedagogical limitations inherent in current E-Commerce educational practices is underscored by the increasing demands of the 21st-century workforce.[24] Employers consistently seek graduates who possess not only domain-specific knowledge but also the collaborative and communicative competencies that are fostered through CSCL.[3] By reframing academic frameworks to support these skills, higher education institutions can better prepare students for the complexities of the modern work environment.[25,26]

The empirical validation of CSCL strategies, particularly in relation to academic help-seeking behavior, remains insufficiently explored. Limited research has examined how structured collaboration influences students' willingness to seek academic assistance, especially within E-Commerce education.[21,27] This gap highlights the need for deeper investigation to inform evidence-based instructional practices that foster both engagement and academic support.

Understanding the mechanisms behind help-seeking behavior is essential for advancing pedagogical innovation.[28,29,30] Effectively integrating collaborative learning and technology can provide students with the necessary cognitive and social support to enhance their academic experiences.[31,32] Such integration not only facilitates knowledge acquisition but also promotes active engagement and smooth transitions within evolving educational environments.[33,34]

This study aims to design and evaluate a CSCL-based instructional model tailored for E-Commerce education, with a focus on promoting academic help-seeking behaviors. Using the ADDIE model, the research will systematically develop, implement, and assess a collaborative learning framework that addresses the cognitive and social needs of students in this field. By integrating technology and collaboration into the learning process, this study aims to provide a practical approach to overcoming the barriers to help-seeking, enhancing the overall academic experience, and better preparing students for the challenges of the digital economy. The findings will contribute to advancing pedagogical practices in E-Commerce education and help bridge the gap in research regarding the role of collaboration and technology in fostering academic success.

METHOD

Research Design

This study adopts a quantitative causal research design aimed at determining the causal effect of the CSCL-based instructional model on students' academic help-seeking behavior and collaborative competence. The development process follows the ADDIE model, comprising the stages of Analysis, Design, Development, Implementation, and Evaluation, ensuring a rigorous and iterative approach to instructional model development.[33] The model was then validated through a multi-layered process involving peer review, expert judgment, and student responses, ensuring a comprehensive evaluation of its feasibility and effectiveness.

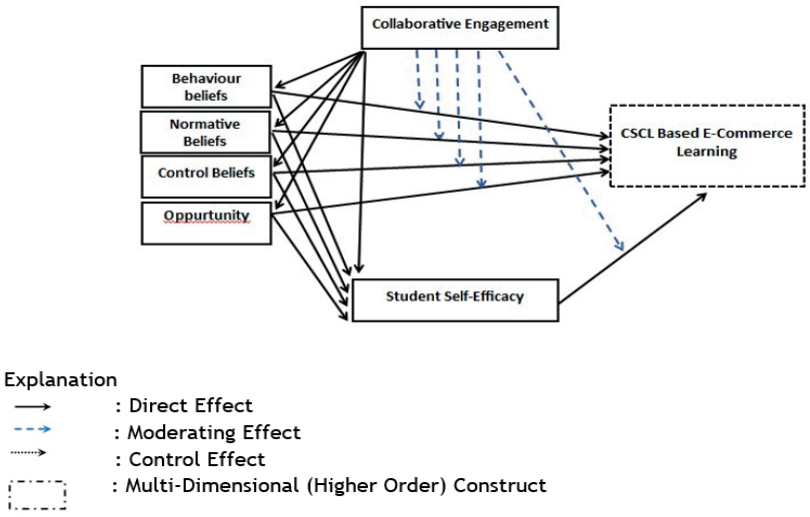

Figure 1. Research Design

During the implementation phase, the instructional model underwent validation through peer review from academic peers in the field of education, expert judgment from faculty specializing in instructional models in the Faculty of Hospitality and Tourism, and feedback from students. Student feedback was specifically gathered from 131 undergraduate students enrolled in the Beauty and Makeup program within the Faculty of Hospitality and Tourism. This validation process aimed to assess both the applicability and impact of the CSCL model on fostering academic help-seeking behaviors in an e-commerce course.

The research design is developed to examine the correlations between four independent variables, one mediating variable, one moderating variable, and one dependent variable. The independent variables include Behavioural Beliefs (X1), Normative Beliefs (X2), Control Beliefs (X3), and Opportunity (X4), while Student Self-Efficacy serves as the mediating variable. Collaborative Engagement is considered the moderating variable, and the dependent variable is CSCL-Based E-commerce Learning (Y). This design aims to analyze how these variables interact and influence the outcomes of e-commerce learning through the CSCL approach, providing insights into the dynamics of students' academic help-seeking behavior and collaborative competence [34]. The full research design can be observed in figure 1.

Computer-Supported Collaborative Learning (CSCL)

Computer-Supported Collaborative Learning (CSCL) is an instructional approach that promotes learning through social interaction, supported by technology. In the context of this research, the CSCL model is designed to enhance collaborative competencies within e-commerce education by integrating academic help-seeking principles. The model encourages students to engage in meaningful dialogue, share resources, and co-construct knowledge, with the aim of fostering an environment where students actively seek help from peers, instructors, and available resources.[11,12] This approach is expected to improve students' collaborative problem-solving skills, promoting deeper understanding and better learning outcomes in e-commerce education.

The CSCL model was developed using the ADDIE framework, with particular emphasis on selecting appropriate media and instructional strategies that support collaborative learning and academic help-seeking behaviors. The instructional design enables students to engage in peer-supported learning activities within a simulated e-commerce environment, fostering a culture where help-seeking is normalized. By creating an inclusive and psychologically safe learning environment, the model aims to encourage students to take initiative in addressing academic challenges and improve their overall collaborative competence.

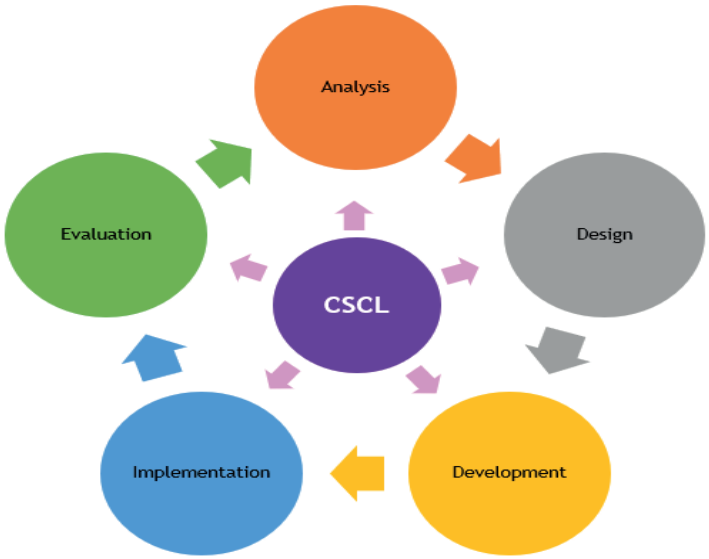

Figure 2. Computer-Supported Collaborative Learning (CSCL).

Data Collection Instrument

Data collection was conducted using a Likert-scale questionnaire, developed to measure students' perceptions of academic help-seeking behaviors and collaborative competencies. The questionnaire used a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), allowing for nuanced measurement of students' attitudes and experiences with the instructional intervention.

The instrument was developed and validated through expert review to ensure content validity. Items were designed to align with key constructs related to CSCL and academic help-seeking, and were pilot-tested to ensure clarity, reliability, and internal consistency. The final instrument captured data across several dimensions, including students' willingness to seek help, frequency of collaboration, perceived effectiveness of the CSCL model, and overall learning satisfaction.

Data collection was carried out using a questionnaire administered via Google Forms, which was completed by the 131 students participating in the study. The responses provided insights into the effectiveness of the CSCL-based instructional design within the e-commerce course, including the methods and technologies used, as well as the overall learning process. The analysis of the questionnaire responses highlighted the extent to which the CSCL model contributed to enhancing students' academic help-seeking behaviors and collaborative learning experiences.

Data Analysis Techniques

The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the aid of SmartPLS 4 software. This analytical method was chosen for its robustness in handling complex models with multiple latent constructs and its suitability for exploratory research in the social sciences. PLS-SEM enables simultaneous analysis of the measurement model (validity and reliability of the instruments) and the structural model (relationships between constructs).

The analysis process included checking for convergent validity, discriminant validity, and internal consistency reliability before evaluating the path coefficients and the significance of the hypothesized relationships. Bootstrapping procedures were used to test the statistical significance of the model's paths. This method provided comprehensive insights into the causal relationships between the instructional model and students' collaborative outcomes.

RESULTS

CSCL-Based Instructional Model in E-Commerce Education

The CSCL-based instructional model in e-commerce education integrates collaborative learning with digital tools, enhancing students' ability to seek academic help. This model, founded on the principles of Computer-Supported Collaborative Learning (CSCL), leverages technology to foster peer interaction, knowledge sharing, and collaborative problem-solving. In the context of e-commerce education, it specifically aims to reduce the barriers associated with help-seeking behaviors, such as embarrassment and isolation. By embedding structured collaboration and providing a supportive, digitally mediated environment, students are encouraged to engage with their peers and instructors, thereby enhancing their academic competence and collaborative skills.

Figure 3. CSCL-Based Instructional Model

Incorporating the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) with the Computer-Supported Collaborative Learning (CSCL) framework, this approach systematically addresses the academic and social needs of E-Commerce students, promoting a collaborative learning environment that supports academic help-seeking behaviors. By enhancing both theoretical understanding and practical problem-solving skills, the model creates an inclusive, interactive space within digital platforms where students are encouraged to actively seek help, fostering cognitive development and interpersonal growth. This model effectively meets the increasing demand for graduates who possess both technical expertise and collaborative competencies in the rapidly evolving digital economy. Furthermore, the integration of collaborative learning in E-Commerce education aligns with the need for adaptive pedagogical strategies in response to the changing landscape of higher education and workforce demands. The positive outcomes demonstrated in the data highlight the effectiveness of CSCL in promoting engagement, improving learning outcomes, and preparing students for real-world challenges. However, some redundant data points presented in the tables can be simplified to enhance

the clarity and impact of the instructional approach's effectiveness.

Data Analysis and Findings

The structural model testing results indicate that all exogenous constructs—behavioural beliefs (X1), normative beliefs (X2), control beliefs (X3), and opportunity (X4)—have a significant impact on self-efficacy (M), with high coefficient values (≥ 0,821) and p-values less than 0,05. This suggests that individuals' beliefs and perceptions regarding behavior, social norms, personal control, and access to resources consistently contribute to enhancing students' confidence in their ability to tackle CSCL-based e-commerce learning. These findings emphasize the role of these belief systems in shaping students' self-perception of their learning capabilities.

The effect of self-efficacy (M) on CSCL learning outcomes (Y) reveals a significant negative relationship (β = -0,246, p = 0,036). This suggests that an increase in self-efficacy does not necessarily lead to improved learning outcomes. In fact, the findings indicate that higher self-efficacy in the context of collaborative, technology-based learning may have detrimental effects. This could be attributed to the overconfidence effect, where students with high self-efficacy may feel overly confident in their abilities. Consequently, this overconfidence could lead to a reduction in effort during the learning process, ultimately undermining their performance in the CSCL-based e-commerce course. These results highlight the importance of balancing self-efficacy with a realistic assessment of one's abilities, as excessive confidence can hinder active engagement and the collaborative learning process. To further clarify, redundant data previously presented in the tables can be simplified to focus on the core finding that high self-efficacy, in this case, may not correlate positively with learning outcomes.

The moderation test further shows that collaborative engagement (Mo) significantly moderates the relationship between behavioural beliefs (X1) and CSCL learning outcomes (Y) (β = -1,066, p = 0,002). This negative moderation effect suggests that the positive influence of behavioural beliefs on learning outcomes weakens as collaborative engagement increases. In other words, while strong behavioural beliefs initially foster better learning outcomes, the increasing involvement in collaborative activities may disrupt or dilute this effect.

The moderation effect of collaborative engagement on the relationships between normative beliefs (X2), control beliefs (X3), self-efficacy (M), and learning outcomes (Y) is not significant (p > 0,05). This indicates that, in this context, collaborative engagement does not strengthen the impact of these belief systems or self-efficacy on learning outcomes. While collaborative engagement may influence students' behavioral aspects of learning, such as participation and interaction, it does not appear to enhance the broader cognitive and motivational factors that contribute to academic success in CSCL-based e-commerce education. These results suggest that collaborative engagement alone is insufficient to significantly alter or amplify the influence of normative and control beliefs, as well as self-efficacy, on students' performance. The data presented in the tables can be simplified to emphasize that the moderation effect of collaborative engagement, though expected to enhance learning, does not significantly affect the relationships under study.

The structural model derived from the Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis is presented, demonstrating the relationships between constructs such as Need for Belonging (NB), Classroom Belonging (CB), Belonging Behavior (BB), Class Engagement (CE), Opportunity to Participate (OPP), Engagement in Collaborative Learning (ECL), and Student Self-Efficacy (SSE). The blue circles represent latent constructs, while the yellow rectangles denote observed indicators. Each arrow indicates the direction of influence, with accompanying path coefficients displaying the strength and significance of these relationships. Figure 4 illustrates this model.

The model demonstrates strong outer loadings for the measurement items on their respective constructs, indicating good convergent validity. For instance, the NB construct shows high loadings on items NB1 through NB9, all exceeding the 0,70 threshold. Structural path coefficients are represented by solid lines for significant paths and dashed lines for non-significant ones. Notably, the NB construct has a strong influence on Belonging Behavior (BB) (β = 0,936) and Class Engagement (CE) (β = 0,987), while CE exerts a substantial positive effect on Engagement in Collaborative Learning (ECL) (β = 1,066). The R^2 values inside the blue constructs reflect the explained variance for each endogenous variable, with ECL (R^2 = 0,981) and Student Self-Efficacy (SSE) (R^2 = 0,937) showing high predictive accuracy. These findings validate the proposed hypotheses and theoretical model, highlighting a significant interplay between belonging, engagement, and self-efficacy within classroom settings. The visual representation underscores the robustness of the model as a framework for understanding the psychological and behavioral factors that contribute to effective collaborative learning environments. The data presented in the tables can be simplified to emphasize the most critical relationships and the overall explanatory power of the model.

The results of the outer model evaluation presented in table 1 indicate that all constructs meet the criteria for convergent validity and reliability. The Average Variance Extracted (AVE) values for all latent variables exceed 0,50, with values ranging from 0,721 (Control Beliefs) to 0,785 (Self-Efficacy), demonstrating acceptable levels of convergent validity. In terms of reliability, the Composite Reliability (CR) values for all constructs are

consistently above the threshold of 0,70, with the lowest being 0,905 (Control Beliefs) and the highest 0,940 (CSCL-Based Learning). These results confirm a high level of internal consistency across constructs. Additionally, Cronbach's Alpha values for all variables range from 0,861 to 0,913, surpassing the minimum required value of 0,70, which further supports the reliability of the instrument. Thus, it can be concluded that the measurement model used in this study is both valid and reliable, and suitable for use in the subsequent structural model analysis. Following this, we will examine the R-squared (R^2) values, as presented in table 2 below.

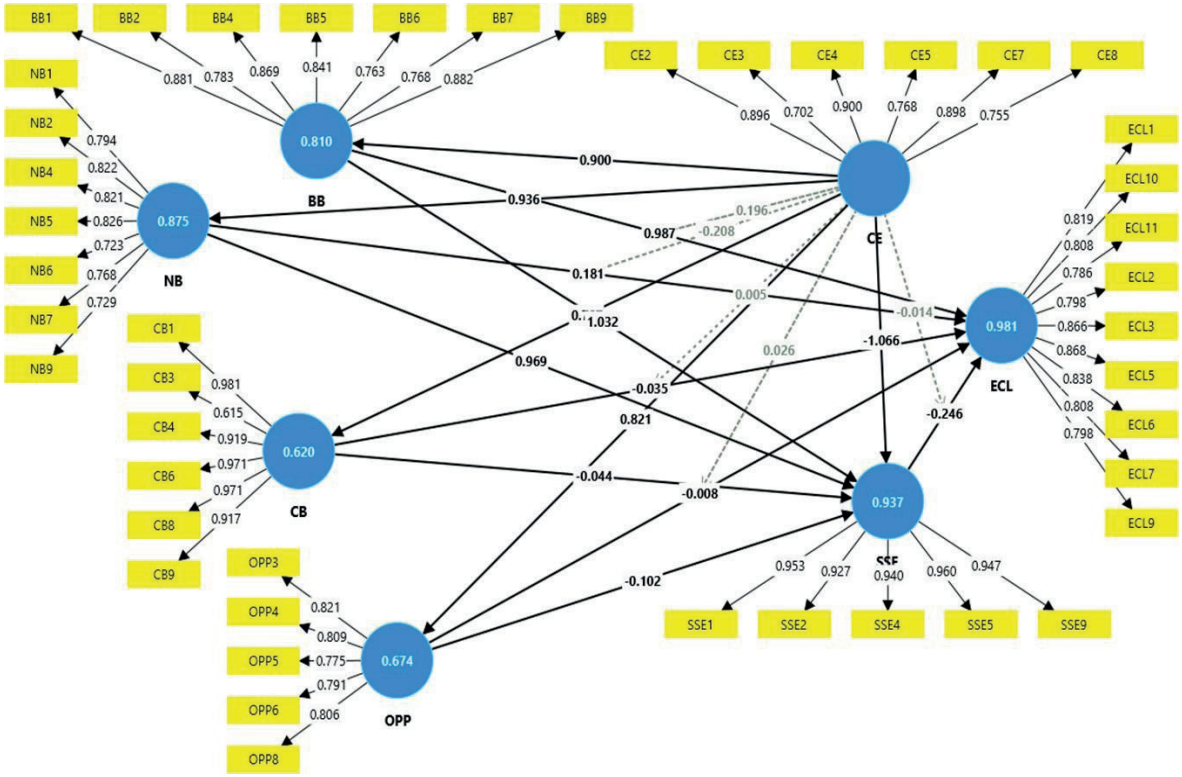

Figure 4. Structural Model Results of the Partial Least Squares (PLS) Path Analysis

Table 1. Outer Model Table (Convergent Validity and Reliability)

Variable	AVE	Composite Reliability	Cronbach's Alpha
X1 - Behavioural Beliefs	0,723	0,913	0,874
X2 - Normative Beliefs	0,756	0,927	0,895
X3 - Control Beliefs	0,721	0,905	0,861
X4 - Opportunity	0,742	0,910	0,870
M - Self-Efficacy	0,785	0,932	0,901
Mo - Collaborative Engagement	0,739	0,919	0,882
Y - CSCL-Based Learning	0,760	0,940	0,913

Table 2. R-Square (R^2)

Endogenous Variable	R^2	Description
Self-Efficacy (M)	0,810	Very Strong
CSCL-Based Learning (Y)	0,937	Very Strong

The R-Square (R^2) values, as shown in table 2, provide evidence of the model's explanatory power regarding the endogenous variables. The R^2 value for the variable Self-Efficacy (M) is 0,810, indicating that 81,0 % of the variance in Self-Efficacy is explained by its predictors within the structural model. Similarly, the CSCL-Based Learning (Y) variable yields an R^2 value of 0,937, suggesting that 93,7 % of the variance in this construct is

accounted for by the influencing variables. Both values fall into the "Very Strong" category, confirming the model's high predictive accuracy and relevance in explaining behavioral outcomes. These results validate the robustness of the proposed model and its capacity to explain substantial portions of variance in the targeted constructs. Subsequently, the influence test results for each of these variables were obtained, as presented in table 3 below.

Table 3. Influence Test Table

Path Relationship	Coefficient	t-statistic	p-value	Description
X1 → M	0,936	18,552	0,000	Significant
X2 → M	0,821	16,821	0,000	Significant
X3 → M	0,900	17,140	0,000	Significant
X4 → M	0,821	15,710	0,000	Significant
M → Y	-0,246	2,101	0,036	Negatively Significant
Mo*X1 → Y	-1,066	3,110	0,002	Negatively Significant
Mo*X2 → Y	0,026	0,983	0,326	Not significant
Mo*X3 → Y	-0,014	0,121	0,904	Not significant
Mo*M → Y	-0,008	0,074	0,941	Not significant

The results of the influence test, as shown in table 3, reveal several significant relationships within the structural model. All four predictors—Behavioral Beliefs (X1), Normative Beliefs (X2), Control Beliefs (X3), and Opportunity (X4)—demonstrate a statistically significant and positive influence on Self-Efficacy (M), with strong path coefficients ranging from 0,821 to 0,936 and p-values of 0,000. This indicates that these belief and opportunity variables have strong predictive power in shaping self-efficacy. In contrast, Self-Efficacy (M) negatively impacts CSCL-Based Learning (Y) (β = -0,246, p = 0,036), suggesting an inverse relationship between the two variables, where higher self-efficacy does not necessarily lead to improved learning outcomes in collaborative learning contexts.

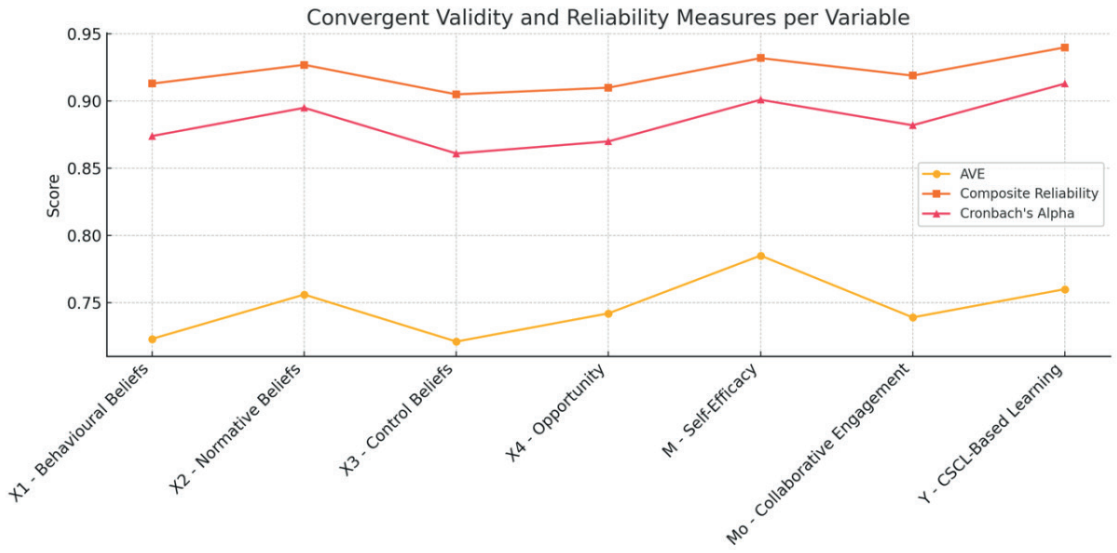

Figure 5. Convergent Validity and Reliability

Additionally, the moderating effect of Collaborative Engagement (Mo) on the relationship between Behavioral Beliefs (X1) and CSCL-Based Learning (Y) is significantly negative (β = -1,066, p = 0,002), indicating that increased collaborative engagement weakens the positive influence of behavioral beliefs on learning outcomes. However, the moderating effects for Normative Beliefs (MoX2), Control Beliefs (MoX3), and Self-Efficacy (Mo*M) are not statistically significant, as their p-values exceed 0,05. This suggests that, in this context, these factors do not play a meaningful moderating role in influencing CSCL-Based Learning. These findings underscore the importance of belief and opportunity variables in shaping self-efficacy and highlight specific interactions, such as the moderation by collaborative engagement, that warrant further investigation in collaborative learning environments. To simplify, the key results indicate strong predictors for self-efficacy, with a surprising inverse effect on learning outcomes and some moderating factors requiring deeper exploration.

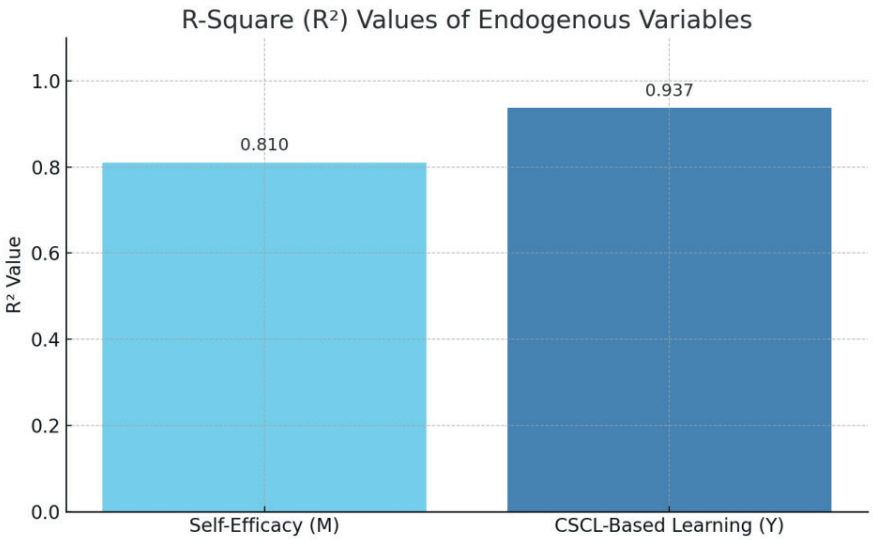

Figure 6. R-Square (R^2)

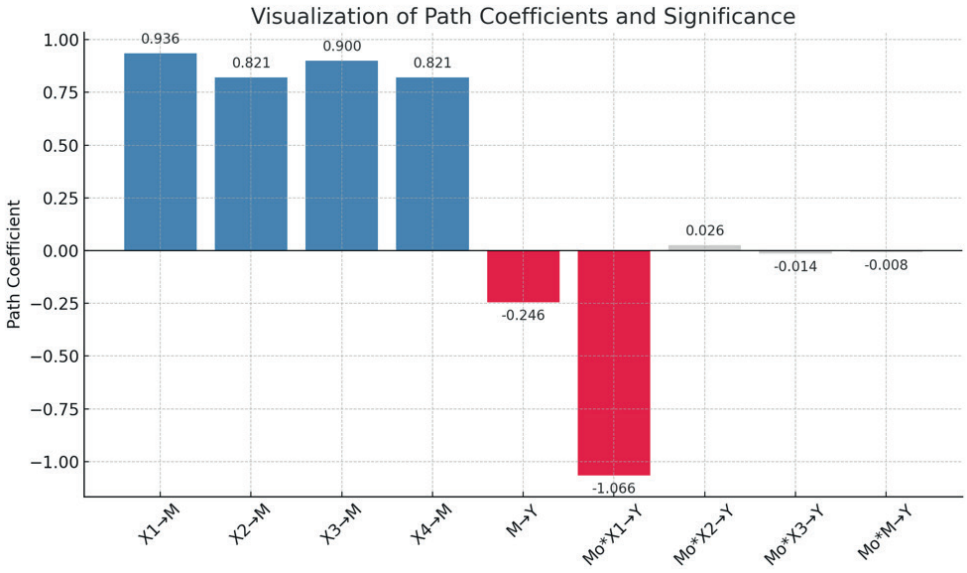

Figure 7. Path Coefficients and Significance

The bar chart visualizes the path coefficients from the influence test, with colors indicating statistical significance: blue for significant positive effects, red for significant negative effects, and gray for non-significant paths. It clearly shows that X1–X4 significantly influence Self-Efficacy (M), while M and Mo*X1 negatively and significantly impact CSCL-Based Learning (Y). The remaining moderating effects are statistically non-significant. This visualization helps highlight the strength and direction of each path in the structural model.

DISCUSSION

The findings of this study reaffirm the pedagogical potential of a CSCL-based instructional model in promoting academic help-seeking and collaborative competencies in the context of E-Commerce education. As elaborated in the Introduction, traditional pedagogical frameworks often neglect the cultivation of self-regulated behaviors, particularly help-seeking, due to factors such as embarrassment and lack of peer interaction. This is especially problematic in interdisciplinary fields like e-commerce, which demand both theoretical and practical engagement. These findings are consistent with prior literature by Martin-Arbos and Lin emphasizing that collaborative learning environments reduce psychological barriers and promote active academic support behaviors.[3,5]

Aligned with the ADDIE-based design described in the Methods, this research systematically structured a CSCL framework by analyzing learners' needs, developing collaborative tasks, and iteratively validating the model with experts and student participants. This process ensured instructional alignment and contextual relevance. Consistent with the framework proposed by Branch[35], such a design approach ensures not only content accuracy

but also pedagogical responsiveness. Moreover, the incorporation of structured peer collaboration within a digitally mediated environment further addressed critical gaps in existing instructional practices in technical and vocational education.[8,24]

The Results confirmed that all four exogenous constructs—behavioral beliefs, normative beliefs, control beliefs, and opportunity—had significant positive effects on students' self-efficacy. This empirically supports the core tenets of the Theory of Planned Behavior (TPB), which emphasizes the role of belief systems in shaping human behavior by Thomas.[29] Notably, the inclusion of the "opportunity" construct extends TPB theoretically by introducing a contextual variable that reflects situational affordances in online learning environments. This extension is critical in CSCL contexts, where access to collaborative tools and digital infrastructure directly influences student behavior and perception.

However, a noteworthy and unexpected finding was the significant negative effect of self-efficacy on CSCL-based learning outcomes. This result challenges the traditional assumption that high self-efficacy invariably leads to improved academic performance. As warned by Choi,[17] high self-efficacy in the absence of effective self-regulation can lead to overconfidence, reducing effort and engagement in collaborative activities. In this study, such overconfidence may have caused some students to disengage from peer collaboration, believing they could manage tasks independently, thereby diminishing the overall effectiveness of the learning experience.

Further complicating the dynamic, the moderation analysis revealed that collaborative engagement negatively moderates the relationship between behavioral beliefs and learning outcomes. This implies that excessive or poorly managed collaborative activities can dampen the positive influence of behavioral beliefs, perhaps by inducing group-related inefficiencies such as role ambiguity or social loafing. These findings reinforce earlier research suggesting that collaborative learning must be carefully scaffolded to prevent cognitive overload and maintain individual accountability.[11,19]

From a practical standpoint, these results offer significant implications for instructional designers and educators. It is not sufficient to simply raise students' self-efficacy; the success of CSCL in e-commerce education also hinges on implementing structured and well-managed collaborative systems. Interventions such as collaborative skill training, clear group role allocation, and continuous monitoring of interaction dynamics may help mitigate the risks of overconfidence and foster meaningful engagement. These strategies are supported by past findings emphasizing the importance of scaffolding in cooperative learning.[16,25]

Moreover, educators must remain vigilant to the potential risks of overconfidence in online learning environments, particularly as learners increasingly rely on self-guided digital tools. Encouraging self-reflection, integrating formative assessments, and providing timely feedback are essential strategies for sustaining engagement and promoting realistic self-appraisal. Such approaches are consistent with studies advocating for metacognitive interventions to enhance learning outcomes in digitally enriched environments.[35,36]

The high R^2 values (0,810 for self-efficacy and 0,937 for CSCL-based learning) further validate the structural integrity of the proposed model. This suggests that the belief constructs and their interactions account for a substantial proportion of the variance in learning outcomes, indicating both theoretical robustness and empirical reliability. These outcomes also strengthen the case for integrating CSCL into e-commerce curricula more broadly, particularly when informed by empirically tested instructional frameworks and robust data collection instruments such as those employed in this study.

However, the study has several limitations. First, the sample was limited to students from a single academic discipline, potentially limiting the generalizability of the findings. Second, the study did not incorporate variables such as individual learning strategies, digital literacy, or prior exposure to collaborative technologies, all of which could influence the observed relationships. Future research should adopt a longitudinal design, expand the sample across diverse programs, and explore additional mediating or moderating variables such as intrinsic motivation, perceived instructor support, or cross-platform digital interaction.

This study advances the understanding of how CSCL can be leveraged to promote academic help-seeking behavior in E-Commerce education. By confirming the role of belief-based variables and highlighting the dual-edged nature of self-efficacy, it offers a nuanced view of learner dynamics in collaborative environments. While CSCL holds great promise, its successful application depends on both theoretical alignment and practical implementation strategies that address individual, social, and technological dimensions of learning. This research provides insights into the complexities of collaborative learning in E-Commerce education and offers guidance for future instructional designs aimed at maximizing student engagement and performance.

CONCLUSION

This study highlights the effectiveness of Computer-Supported Collaborative Learning (CSCL) in enhancing student learning outcomes within E-Commerce education by fostering academic help-seeking behaviors and promoting collaborative competencies. It emphasizes the need for educators to create structured collaborative environments that balance self-efficacy with realistic self-appraisal and ensure continuous support to maximize student engagement. While self-efficacy plays a significant role in academic engagement, its potential negative

impact on learning outcomes calls for careful management of students' confidence levels. The study also underscores the importance of scaffolding collaborative activities to prevent inefficiencies and enhance learning results. Future research should explore additional moderating and mediating factors, such as intrinsic motivation and digital literacy, to refine CSCL implementation and further optimize its application across diverse educational settings, ultimately improving student performance and outcomes in collaborative learning environments.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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