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The Impact of Interactive Teaching Methods on Students' Learning Outcomes in Blended Learning Environment at Higher Education Institutions

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Abstract

Due to the importance of teaching methods for critical outcomes of students, this study investigates the effects of interaction teaching methods on student satisfaction and learning outcomes in blended learning environment at Vietnamese higher education institutions. This study used the Structural Equation Modeling to assess the correlation among the latent constructs based on using survey data of 289 students at Vietnamese universities. The findings revealed that three specific dimensions of interactions in terms of student-student, student-instructor and student-content interactions positively affect satisfaction and learning outcomes of students in blended learning environment. Specifically, student-content interaction creates a greater effect on student satisfaction and learning outcomes in comparison with the effects of student-student and student-teacher interactions on student satisfaction and learning outcomes in universities. The paper provides theoretical initiatives on teaching methods that highlight the importance of teaching interaction practices to foster student's satisfactions and learning outcomes in blended courses in higher educations.

Keywords: *Teaching Methods, Teaching Interaction, Blended Learning, Student Satisfaction, Learning Outcomes.*

Introduction

Today's university faces constant change in the educational environment that requires principals, managers and teachers in higher institutions to focus on innovating teaching methods of lecturers to improve the quality and effectiveness of teaching work to bring good training products to the labor market (Michel et al., 2009; Kerby et al., 2011; Li et al., 2022). Learning satisfaction and outcomes of students is critical to the university's competitiveness and survival in today's competitive environment. Therefore, it has become a topic of great interest among scholars and practitioners to figure out which factors influence learning outcomes and satisfaction, thereby proposing appropriate steps to initiate them (Kerby et al., 2011; Isusi-Fagoaga et al., 2023; Daniel et al., 2024).

Due to the convenience of communicating and acquiring knowledge without the barriers of geographical distance and space, online and blended learning is becoming increasingly popular and is being chosen as an alternative to direct instructions. In particular, the number of online learning users has skyrocketed during the COVID-19 pandemic (Nikou & Maslov, 2021). Blended and online learning is a type of education that exploits the Internet and information technology (Li et al., 2022). Previous studies indicated that in the educational model of blended learning, e-learning, mutual interaction, timely communication, independent learning, and

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resource optimization are the most important teaching organization activities (Garrison, 2009; Li et al., 2022; Luo & Zhou, 2024; Amarathunga, 2025). Interactive teaching method also known as instructional interactions refers to the interactive and communicative processes between students and the learning environment during the teaching process that helps to achieve learning objectives (Wang, 2016; Asad et al., 2021). Therefore, studying the current situation and evaluating the impact of instructional interactions on students' learning outcomes plays a crucial role in helping lecturers and administrators evaluate the level of influence and importance of each interactive method, thereby building appropriate activities to improve student satisfaction and learning outcomes.

Interactive teaching methods are acknowledged as the primary factor influencing learning outcomes in online education and are crucial to improving learning support services (Kang & Im, 2013; Lin et al., 2017). Previous studies have therefore attempted to study and explain the direct relationships between instructional interactions and learning outcomes, however very few existing studies have paid attention to the allocation of instructional interaction resources in the classroom, and the internal mechanism of the above direct relationships (Li et al., 2022). In addition, the existing literature indicates that studies on the impact of interactive activities in blended learning or online courses on learning outcomes show that the types of interactions are influencing the outcomes of learners (Eom & Ashil, 2016; Kent et al., 2016). However, to date, there have been few studies that clearly identify the impact of different forms of interactive methods on learning outcomes and student satisfaction. This limits the understanding of researchers and lecturers in identifying influencing factors, design guidelines, and implementing interactive activities to most effectively affect learning outcomes. To fill the research gap, the study was conducted to answer two research questions:

1. Do different types of interactive teaching methods have a positive impact on student satisfaction and learning outcomes in blended learning courses?

2. Which form of interaction teaching has the most significant impact on student satisfaction and learning outcomes?

To address research questions above, the paper applied structural equations modeling (SEM) to evaluate the extent of the effects of interactive methods on learning outcomes using the data of 289 students in blended learning courses at higher educations in Vietnam. The findings of this study are expected to bring specific initiatives and effectual directions for lectures and administrators in universities to foster learning outcomes of students in their organizations.

Literature Review

Blended Learning

Blended learning is defined as a form of education in which e-learning is combined with traditional classroom learning in one framework. E-learning can be asynchronous computer-based sessions, self-access materials, online face-to-face sessions. Previous studies describe blended learning as an educational approach that combines online and face-to-face classroom components with online learning sessions outside the classroom (Khachatryan, 2020). As noted by Milheim (2006), blended learning combines features of both traditional classroom education and online education in an integrated development. Andriotis (2018) suggests that blended learning techniques can be self-paced learning, in which individuals learn using web-based learning modules, online resource links, simulations, online self-assessments or workbooks.

According to Bliuc et al. (2007), blended learning is described as "the mix of traditional methods of teaching, such as face-to-face teaching and online teaching" (p.233).

Although there are many approaches to blended learning, most studies concur that blended learning is achieved by integrating multiple delivery modes, i.e. traditional face-to-face delivery, e-learning and self-access materials, and others that involve a shift in the role of the traditional teacher (Ayob et al., 2023). In the context of higher education, blended learning may be the most appropriate way to equip learners with the skills to continue learning, allowing learners to self-diagnose their educational needs and seek out appropriate educational resources.

Interactive Teaching Method

Interactive teaching methods are widely accepted as effective pedagogical approaches to improving student learning outcomes in university settings. According to Taat et al. (2020), interactive teaching is an active teaching method that aims to create interaction in the classroom and learning. In this approach, the instructor or lecturer intends to have periods of time to engage students in activities that allow them to interact directly with the learning materials and content. Interactive teaching methods involve exchanges and increased interactions between the lecturers, students, and the learning content. The use of interactive lectures can promote active learning, enhance attention and motivation, provide feedback to both lectures and students, and increase satisfaction for both (Taat et al., 2020; Li et al., 2022).

Interactive teaching methods are often divided by researchers into three types: student-student interaction, student-teacher interaction, and student-content interaction (Moore, 1989; Wang, 2016). In which, student-student interaction refers to the process in which learners exchange knowledge, ideas, or opinions about course content regardless of the presence of the teacher; student-teacher interaction refers to two-way communication between teachers and learners during the learning process; student-content interaction refers to the process in which learners themselves explain and reflect on the topic or learning content. Previous studies have a consensus that all three types of interactions are indispensable to ensure the success of online education and all need to be continuously improved to ensure maximum effectiveness of each type of interaction in relation to student learning outcomes (Li et al., 2022; Quadir et al., 2022).

Student Satisfaction

Indicators measuring online learning outcomes mainly include learning achievement, learning satisfaction, continuous learning behavior, or readiness (Li et al., 2022). Researchers have argued that student attitudes are worth investigating and are considered a good source of information about the quality of blended learning, online learning, and distance learning courses (Ekwunife-Orakwue & Ten, 2014; Kuo et al., 2014). Among these attitudinal constructs, student satisfaction should be considered (Li et al., 2022). Student satisfaction is an important indicator of the effectiveness of a course and is crucial to the success of blended learning programs (Li et al., 2022; Amarathunga, 2025).

Elliott and Shin (2002) considered student learning satisfaction as the feeling of well-being that an individual feels when their needs and desires are met in the learning process. It is the state that an individual feels when they have experienced a performance and evaluated the extent to which it has met their expectations (Arif & Ilyas, 2013). Students with high levels of learning satisfaction are likely to have positive perceptions, attitudes, and performance in various aspects, such as student retention (Elliott & Healy, 2001). More importantly, student satisfaction reflects a potential indicator for assessing the service quality of higher education providers (Barnett,

2011). According to Cole et al. (2014), student learning satisfaction plays a key role in improving learning outcomes in the context of blended learning and online courses.

Learning Outcomes

Learning outcomes refer to the extent to which learners can understand and demonstrate their own behaviors and achievements after completing a learning program (Biggs et al., 2022). It is considered as a manifestation of the quality of understanding, skills and attitudes expected of learners after a period of instruction through a case, lesson, module or learning program (Murtonen et al., 2017). Therefore, designing the learning process, facilitating the development of students' abilities, helps universities provide more personalized learning paths for diverse groups of learners, supporting economic and labor market needs, thereby improving the quality of higher education and supporting the implementation of learner-centered learning models. As argued by Brooks et al. (2014), learning outcomes can be a useful aid for both teachers and learners to achieve their personal goals. There are several factors that influence student learning outcomes, such as the quality of education, interactive teaching, and student engagement (Duque & Weeks, 2010).

Influence of Interactive Teaching Methods on Student Satisfaction

Interactive teaching has long been considered a key driver of student satisfaction depending on the extent to which students interact with elements of the teaching process such as interactions with instructors, course content, and interactions with peers and relationships during the learning process (Yousaf et al., 2023; Zhou et al., 2024; Daniel et al., 2024; Zhang et al., 2025). According to Social Learning Theory (Bandura & Walters, 1977), the indirect experience that learners achieve through observing the behavior of friends or teachers during the learning process can act as a substitute reinforcer for learners and thus facilitate their acquisition of corresponding behaviors. Specifically, previous studies have indicated that if the level of interpersonal interaction such as student-student or student-teacher interaction meets expectations, students will be more motivated and engaged in the learning process, feel more psychologically cooperative and socially connected, increase their interest in learning, and thus promote learning satisfaction (Kuo et al., 2014; Li et al., 2022; Yousaf et al., 2023). Regarding the relationship between student-content interaction and student satisfaction, Li et al. (2022) justified that online education's "separation" of time and space characteristics in blended learning requires students to actively study to acquire knowledge. They are more likely to observe and learn by browsing the content on the platform, which leads to the learning quality depending largely on the interaction level between students and the platform content. Consequently, effective interaction content design can reduce network losses, improve learning satisfaction and academic performance of students (Li et al., 2022; Yousaf et al., 2023). The findings of recent studies also provided evidence that support the positive impacts of aspects of interactive teaching methods on student satisfaction (Li et al., 2022; Yousaf et al., 2023). These discussions support the significant and positive impacts of interactive teaching methods on student satisfaction. So, the following hypothesis is posed:

H1a: Student-student interaction is positively associated with student satisfaction.

H1b: Student-teacher interaction is positively associated with student satisfaction.

H1c: Student-content interaction is positively associated with student satisfaction.

Influence of Interactive Teaching Methods on Learning Outcomes

Regarding the relationship between interactive teaching methods and learning outcomes, previous studies pointed out that interactive teaching methods focus on forming interactive activities, connections and teamwork, offering students the direction, concentration and energy to operate the process of learning (Taat et al., 2020; Zhang et al., 2025). This allows students to learn through experimentation, exploration, communication and dialogue, thereby fostering their learning outcomes (Taat et al., 2020; Quadir et al., 2022). More specifically, learner-learner interaction is a form of communication defined as "interaction between learners, between one learner and other learners, alone or in a group setting, with or without the real-time presence of an instructor" (Moore, 1989, p. 4). Several studies have identified the potential and positive effects of learner-to-learner interaction on learning outcomes (e.g., Klisc et al., 2017; Quadir et al., 2022). For example, according to the findings of Klisc et al. (2017), online student-student discussions help learners engage in critical thinking and more constructive interactions due to their socially structured information exchange. Quadir (2022) argued that by learning in a supportive manner, learners can interact with their classmates to acquire knowledge, meet common learning goals, and enhance their deep learning abilities.

Regarding the impact of teacher-student interactions on learning outcomes, Garrison and Akyol (2013) argued that due to educational needs and learning goals, the role of teachers in course design and facilitation, students' sense of community and belonging, and their cognitive engagement with course content are all important. Good teacher-student interactions will help improve students' motivation and make learning tasks cognitively engaging (Huang et al., 2019; Quadir et al., 2022). Furthermore, current literature also suggests that in an environment with attentive instructors and active teacher-student interactions, students will have more opportunities to listen attentively, contribute verbally to interesting and engaging discussions, take notes, and ask questions to instructors, thus making learning more enjoyable and beneficial to students' learning and academic performance (Mazer et al., 2013; Quadir et al., 2022).

In terms of the relationship between student-content interaction and learning outcomes, Moore (1989) stated that learner-content interaction is a process of "intellectual interaction with content to bring about changes in the learner's understanding, perspective, or cognitive structure" (p. 2). Providing an interactive learning environment between learners and content can help learners understand text, share knowledge, and create information, and can also motivate them to learn (Alqurashi, 2019; Quadir et al., 2022). Effective learner-content interaction can occur when learners use interactive tools such as audio, video, text, and graphic representations during coursework (Hirumi, 2006). Researchers emphasize that learner-content interaction occurs more in multimedia-based e-learning environments, where learning performance can be enhanced (Zhang, 2005; Quadir et al., 2022).

The above arguments support positive relationship between interactive teaching methods and learning outcomes. To clarify the influences of specific aspects of interactive teaching methods on learning outcomes, the following hypotheses were posed:

H2a: Student-student interaction is positively associated with student satisfaction.

H2b: Student-teacher interaction is positively associated with student satisfaction.

H2c: Student-content interaction is positively associated with student satisfaction.

Research Methodology

Sample and Data Collection

The paper used a convenient sampling method to collect data during the period from June to September 2024. The research survey was conducted with second- and third-year students who completed blended learning modules in different fields of study at universities in Vietnam, including tourism, hospitality management and business administration to increase diverse responses and to ensure full understanding on the constructs in the research. The authors have interacted with representatives of 15 universities through the phone and making personal visits to explain and request for their support for gathering the questionnaires. Measurement scales are collected from current literature to develop the initial list of items. 475 questionnaires were sent to participants and received 362 ones. After removing invalid questionnaires, there were 289 valid ones, with a 60.8 % validity rate.

Variable Measurement

All the variables in this research are measured by multiple items. There items are calculated through five-point of Likert which range from "1" to "5" (from strongly disagree to strongly agree).

Interactive teaching methods. This study used 17 measurement items adopted from the research of Quadir et al. (2022) to measure the three main dimensions of Interactive teaching methods namely student-student interaction (eight items), student-teacher interaction (three items), and student-content interaction (six items). *Student satisfaction.* This study used four items adapted from the research of Kuo et al. (2014) to measure Student satisfaction. Finally, *Learning outcomes.* This study used four measurement items adopted from the research of Darawong et al. (2022) to measure learning outcomes of students.

Data Analysis and Results

Measurement Model

The paper first examined the reliability of the measures for the constructs by examining the individual Cronbach's alpha coefficients (Cα), with the result's statistics ranging from 0.92 to 0.95, which were all higher than the recommended level of 0.7 (Nunnally & Bernstein, 1994).

The paper then performed confirmatory factor analysis to assess the convergent and discriminant validity. The results show that all factor loadings are greater than 0.6; CR values exceed 0.7; and the AVE values are greater than 0.5 (see Table 1). Overall, all the measurements showed adequate convergent validity.

Construct	Mean	SD	AVE	CR	Cα
Student-student interaction (SSI)	3.26	0.61	0.76	0.94	0.94
Student-teacher interaction (STI)	3.46	0.70	0.81	0.92	0.92
Student-content interaction (SCI)	3.79	0.72	0.83	0.95	0.95
Student satisfaction (SS)	3.48	0.71	0.79	0.94	0.94
Learning outcomes (LO)	3.79	0.73	0.88	0.95	0.95

Table 1. Convergent Validity and Reliability

Notes: Cα ≥ 0.7; composite reliability ≥ 0.7; average variances extracted ≥ 0.5.

The authors continue using the measure of AVE as suggestion of Fornell and Larcker (1981) to examine the discriminant validity by comparing the AVE's square root and the correlations among the latent constructs (Table 2).

Constructs	SSI	STI	SCI	SS	LO
Student-student interaction (SSI)	**0.87**				
Student-teacher interaction (STI)	0.53	**0.90**			
Student-content interaction (SCI)	0.66	0.71	**0.91**		
Student satisfaction (SS)	0.70	0.70	0.76	**0.89**	
Learning outcomes (LO)	0.67	0.68	0.73	0.75	**0.93**

Table 2. Correlations and Average Variance Extracted

Note: Diagonal elements in bold are the square root of the AVE and Off-diagonal elements are the correlations among constructs.

Fit index	Scores	Recommended threshold value
Absolute fit measures		
CMIN/df	1.183	$\leq 2^a$; $\leq 5^b$
GFI	0.911	$\geq 0.90^a$; $\geq 0.80^b$
RMSEA	0.026	$\leq 0.08^a$; $\leq 0.10^b$
Incremental fit measures		
NFI	0.960	$\geq 0.90^a$;
AGFI	0.893	$\geq 0.90^a$; $\geq 0.80^b$
CFI	0.994	$\geq 0.90^a$;
Note: a Acceptability: acceptable; b Acceptability: marginal		

Table 3. Overall Fit Index of the CFA Model

Table 2 indicated that AVE's square root of each factor (diagonal elements in bold) is higher than the correlations of the other factors in the research model. In other words, the results strongly support the construct reliability, convergent and discriminant validity of the scales.

To assess the measurement model fit, this study evaluates the fit indicators of the CFA model. Table 3 indicated that all fit indices met satisfactory levels. Therefore, we can state that the model fits the data which can interpret the research hypotheses.

Analysis of the Impacts of Interactive Teaching Methods

Figure 1 and Table 4 report that all the direct influences of aspects of Interactive teaching methods on student satisfaction and learning outcomes are quite large and statistically significant. So, all the proposal hypotheses are confirmed. Specifically:

For hypothesis H1a.b.c, the results showed that the influences of three dimensions of interactive teaching methods on student satisfaction are very strong and significant. Specifically, the impact of student-student interaction, student-teacher interaction and student-content interaction on student satisfaction have coefficient values of 0.291 ($p < 0.001$), 0.245 ($p < 0.001$) and 0.425 ($p < 0.001$), respectively. So, hypotheses H1a.b and H1c are supported. The results indicated that student-content interaction has a greater effect on student satisfaction in comparison with the effects of student-student interaction and student-teacher interaction on student satisfaction.

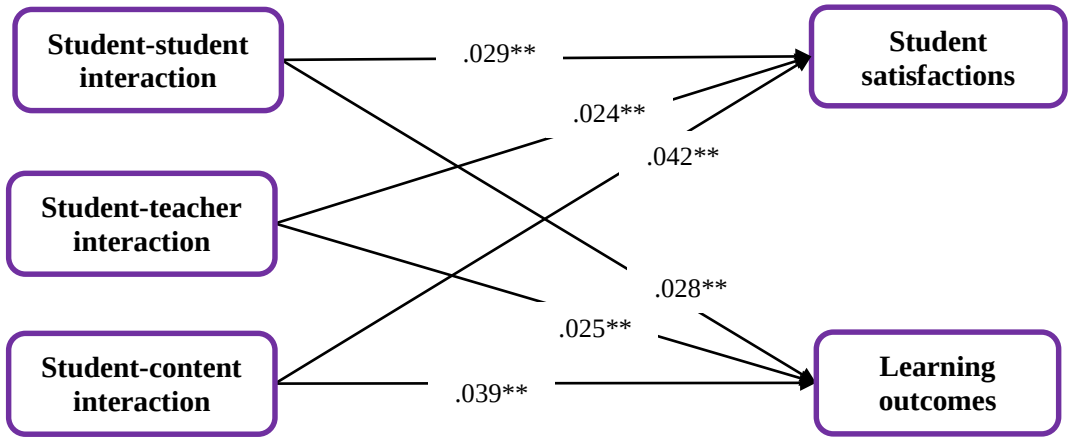

Figure 1. Path Coefficients of the Structural Model

Note: ****P < 0.001*

For hypothesis H2a.b.c, relating to the interactive teaching methods' effect on learning outcomes. The results showed that student-content interaction has a greater effect on learning outcomes ($\beta = 0.392$; $p < 0.001$) in comparison with the effects of student-student interaction ($\beta = 0.283$; $p < 0.001$) and student-teacher interaction ($\beta = 0.254$; $p < 0.001$) on learning outcomes. Hypotheses H2a, H2b and H2c are also supported.

Effects	Hypothesis	Proposal effect	Estimate	*t*-value	Results
Student-student interaction→ SS	H1a	+	0.291***	*5.730*	Supported
Student-teacher interaction→ SS	H1b	+	0.245***	*4.410*	Supported
Student-content interaction→ SS	H1c	+	0.425***	*6.719*	Supported
Student-student interaction→ LO	H2a	+	0.283***	*5.330*	Supported
Student-teacher interaction→ LO	H2b	+	0.254***	*4.336*	Supported
Student-content interaction→ LO	H2c	+	0.392***	*5.959*	Supported

Table 4. Structural Model Results

*Notes: *** Significant at p < 0.001.*

Discussions and Implications

This study investigated the effects of interactive teaching methods in terms of student–student, student–teacher and student–content interactions on student satisfaction and learning outcomes in blended learning environments. Although the students perceived interactions differently, the

study results indicate that interactive teaching methods are pedagogically meaningful and play an important role in improving student satisfaction and learning outcomes. In the context that many Vietnamese Universities are attempting to explore and invest a lot of resources to have effective solutions in blended learning to improve student satisfaction and learning outcomes (Vo et al., 2020; Le et al., 2022; Tuan et al., 2022), hypotheses that were developed in our study significantly contribute to both practical and theoretical initiatives on interactive teaching by following key points.

First, much prior research puts more effort into exploring the factors which foster student satisfaction and learning outcomes to create competitive advantage for universities in attracting learners as well as creating competitive training products in the labor market (Kim et al., 2021; Darawong & Widayati, 2022; Zhang et al., 2025). The empirical findings of this study provide evidence that interactive teaching methods might be one of most appropriate approaches that increases student satisfaction and learning outcomes in the context of blended learning in higher education.

Second, the empirical results show that student-content interactions have significantly higher contributions to student satisfaction and learning outcomes than student-student and student-teacher interactions. This result is quite similar to the study by Quadir et al. (2022) on the impact of interaction types on learning outcomes in a blog-based interactive learning environment. The explanation for the significant impact of student-content interactions on student satisfaction and learning outcomes comes from the importance of digital learning content for cognitive relationships and cognitive transformation in blended environments learning and distance learning courses (Er & Mustafa, 2016; Owusu-Agyeman & Larbi-Siaw, 2018).

Third, the research findings imply that the quality of online learning content plays a decisive role in interactive teaching methods and is a driving force in promoting students' active engagement in blended learning environments. Therefore, well-prepared content, informing learners about learning outcomes as well as providing them with appropriate learning materials (Anderson, 2008; Owusu-Agyeman & Larbi-Siaw, 2018) will help them feel satisfied and positively acquire the necessary knowledge and skills to improve learning outcomes for their personal and professional development. The findings of this study encourage principals and teachers at universities to focus on designing and creating more interactive and effective learning content in blended learning environments. Accordingly, providing appropriate options and designs for selecting interactive web/network tools, forms and activities can help create better understanding, engagement with content, facilitate interactions between students and content aimed at improving their satisfaction and learning outcomes.

Besides the significant contributions, our study also has some limitations. First, this study uses cross-sectional design, so causal relationships may have some differences in other contexts or may change in the long term. A longitudinal study is needed to overcome this limitation and consolidate the results. Second, this study has not explained the effect of interactive teaching methods on student satisfaction and learning outcomes when considering the impact of control or moderating variables. So, future research may explore more deeply the relationship between latent variables in the research model by adding control variables such as university size, type of university (public and private university), gender of students, and students from different majors to provide more detailed implications for interactive teaching practices.

Conclusions. This study explores how dimensions of interactive teaching methods affect student satisfaction and learning outcomes. The results show that all three types of interactions,

student– student interaction, student–teacher interaction and student–content interaction were found to have a significant influence on student satisfaction and learning outcomes. Especially, this study also found that student–content interactions create the most meaningful effects on student satisfaction and learning outcomes in universities. It is recommended that principals and instructors/teachers could design different interactive teaching activities while paying special attention to the importance of online learning content to promote student satisfaction and learning outcomes in higher education. Overall, this study is unique in the attempts to expand understanding of the determinants of interactive teaching methods in promoting student satisfaction and learning outcomes associated with the context of higher education institutions.

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