Social media aids for business learning: A quantitative evaluation with the 5E instructional model

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Abstract

Social media use is widely accepted in higher education, connecting students' learning with daily life. Considering the potential of social media to revolutionize the whole spectrum of teaching and learning, this study examines social media usage of business school students of different majors and their perception of social media as learning aids through a quantitative online survey guided by the 5E instructional model, with 423 valid responses from students majoring in accounting, finance, and economics. Results indicated that respondents perceived social media as influential in helping them access study-related information. It facilitated comprehensive learning, information access, information sharing, and student communication with instructors. Significant differences in perceptions of using social media as aids for business learning were found among students of different demographics, including gender, education level, and residence, but not quite for different majors. While various studies have examined the use of social media in education, scant studies focus on business school students under the lens of the 5E instructional model, especially Asians.

1 Introduction

The Internet has recently become an irreplaceable part of life, notably transforming young people's way of life and becoming one of the most important means of entertainment and communication (Cheng et al., 2020; Chung et al., 2020; Vandeyar, 2020). Further, social media technologies allow users to connect, share information,

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and create contacts (Dong et al., 2021; Hrastinski & Aghaee, 2012; Yang et al., 2022), resulting in social transformations of communicational behavior among people of all demographics, especially among the young generation and those attending higher education (Parusheva et al., 2018; Yu, Tsoi, et al., 2022). New ways of seeking and acquiring knowledge, whether formal or informal, have emerged in this decade, particularly on social networks, further spread by ubiquitous mobile Internet access (Dong et al., 2021; Fong et al., 2020; Lau et al., 2020; Lei et al., 2021).

Formal learning refers to a structured educational system that is hierarchically organized in sequential periods. It begins from nursery and proceeds to high school after primary before proceeding to the university, where academic studies, specialized training, and vocational and technical learning programs occur for all ages. Social media have recently provided learning materials for formal education and even structured courses such as systematic language and music instructions on YouTube and other social media (Lei et al., 2021; Zhang et al., 2015). On the other hand, informal learning is the process by which learners acquire values, skills, attitudes, and knowledge directly from their daily experience and social environment (Zachos et al., 2018). In other words, it is learning based on interaction and practice (Dong et al., 2021; Lam et al., 2022; Lei et al., 2021). Further, formal and informal learning can be integrated into social media to engage in discussions and sharing, forming communities of practice (Alalwan, 2022; Lam et al., 2022; Lei et al., 2021).

In the 21st century, higher education faces significant socioeconomic and technological changes that dramatically change students' learning expectations and experiences (Dong et al., 2021; Wang et al., 2016; Yu, Tsoi, et al., 2022). Meanwhile, the educational community has raised concerns about social media and the allegations that it continuously distracts students' from educational activities rather than engaging them (Lam et al., 2022; Tsang & Chiu, 2022). By examining the use of social media in higher education, this study shed light on critical technological shifts, particularly using social media and student perceptions in higher education. In addition, scant studies have focused on business school students' usage of learning information on social media. To achieve the above goals and explore current problems, this research aimed to examine the social media usage of business school students majoring in accounting, finance, and economics and their perception of social media as learning aids through a quantitative online survey employing the 5E instructional model. Here are the three research questions (RQs) that guide this research:

RQ1 *How do business students use social media as learning aids?*

RQ2 *How are the relationships of business students with their instructors on social media?*

RQ3 *How is the perceived effectiveness of social media as business learning aids?*

The organization of the paper is outlined as follows. In the Literature Review section, related research on social media, relationships between social media and education, social media and student engagement, social media and business education

aids, and the 5E Instructional Model is reviewed in the sub-sections. Next, the Methodology section explains the target participants, research procedures, questionnaire design, and respondent demographics. The Results and Data Analysis section presents respondents' usage patterns of social media (RQ1), social media usage of communicating with their instructors (RQ2), and perceived effectiveness of social media as learning aids with the application of the 5E Instructional Model (RQ3). Then, the Discussion section discusses the results corresponding to the research questions and prior literature and proposes some practical suggestions. Finally, the limitations of the research and further work are highlighted in the Conclusion section.

2 Literature review

2.1 Social media

Aldahdouh et al. (2020) define social media as a group of internet-oriented apps that develop on the ideological and technological foundations of Web 2.0 and enable the development and exchange of User Generated Content. Therefore, social media refers to tools that include blogging, bookmarking, Wikis, and discussion forums. A similar definition by Manu et al. (2021) refers to social media as a collection of software and platforms within the Web 2.0 domain for connecting people from different parts of the world.

   Many studies today have resorted to illustrating how new technologies could play a role in the teaching and learning of higher education. Researchers in education have advanced their research by coming up with different and more profound concepts of innovation and adoption, including the use of social media (Anderson, 2019; Lam et al., 2022). Social media is one of these recent technological innovations that enhance communication and collaboration worldwide, which is essential for business students to face the globalized knowledge economy (Yu, Tsoi, et al., 2022; Zhang et al., 2020). Social media use is growing and integrated into people's personal and professional lives (Lei et al., 2021; Yang et al., 2022).

2.2 Social media and education

Nowadays, many social network sites are available, including Bilibili, QQ, Weibo, WeChat, YouTube, CC Talk, WhatsApp, Telegram, Facebook, LinkedIn, etc. (López-Carril et al., 2022). Facebook is said to have the potential of being an exciting instrumental tool considering that it is widespread and students are familiar with it, influencing students globally (Chan et al., 2020). For example, 80% of its 1.55 billion active users live outside the United States, making it a global, engaging information-sharing mechanism that enhances critical thinking and intercultural dialogue (Duncan & Barczyk, 2016). LinkedIn provides students with an option to build a professional profile and is frequently used during job searches (Aldahdouh et al., 2020). Further, Fresno Anabo and Elexpuru Albizuri (2017) suggested that LinkedIn is a valuable data source for evaluating the actual outcomes of some university programs when used together with more traditional approaches like document review and in-depth

interviews. YouTube also plays an integral role in education and transformational pedagogy, especially in providing educational materials and forming communities of practice (Jackman, 2019; Lei et al., 2021).

Bilibili is another social platform that has taken the Asian region by storm. The Shanghai Municipal Education Commission has recognized Bilibili as an official provider of online classes in Shanghai since March 2020 (Henan, 2020). QQ is one of China's most popular instant messaging social media apps, with over 899 million monthly active users, integrating social networking community, personal website, microblog, email, web browser, and online course across platforms (Lei & Maresova, 2018). WeChat is considered a more powerful and popular instant messaging app in China, mainly used on smartphones for accelerating the development of mobile learning (m-Learning), which is becoming a new learning revolution and the future of foreign language learning (Zhang et al., 2015). It also serves widely as a platform for student and instructor communication and scholarly knowledge exchange (Dong et al., 2021; Hrastinski & Aghaee, 2012; Yang et al., 2022).

Social media usage in higher education has been investigated more frequently in the recent decade. For example, Deil-Amen et al. (2011) acknowledged growing attention to the development and relevance of social media in higher education, which grows rapidly among all demographics, with heavy use among millennials. Parusheva et al. (2018) conducted an empirical study based on the Bulgarian learning experience and demonstrated an increased adoption of social media in education, especially on Facebook, where nearly every student has an account for daily use. Leading platforms used by universities in Bulgaria, including Moodle and Blackboard, also provide numerous integrated social media tools such as discussion forums, wikis, creating learning groups, chats, blogs, internal messaging, and collaboration tools. They concluded that using social media tools in higher education has evolved from innovation to daily practice.

Nevertheless, the quantitative survey study by Gaftandzhieva and Doneva (2021) noted that although teachers currently think negatively about incorporating social media into their teaching practices in terms of, such as but not limited to student engagement in classroom learning and student achievement, they still have a belief that social media can generally assist education and positively view the application of social media in education.

2.3 Social media and student engagement

Aldahdouh et al. (2020) also examined the use of technology and social media in higher education and how they influence individual innovativeness. They noted reports on the positive impacts of integrating social media sites into the technological resources of higher education institutions, both on students and staff members. Perceived benefits among staff members include establishing new connections, maintaining the existing ones, and widening connections. Besides, staff members agree that social media is valuable for facilitating collaboration and communication, developing oneself, and increasing visibility through disseminating one's work (Aldahdouh et al., 2020; Dong et al., 2021; Yang et al., 2022). However, Aldahdouh et al. (2020) also noted some barriers that hinder the adoption of social media in higher

education, such as privacy concerns and blurring the boundaries of leisure and profession (Wang et al., 2021). Also, many studies revealed a general doubt about the credibility and quality of materials posted on social media (Au et al., 2021; Ho et al., 2022; Lei et al., 2021; Zhang et al., 2015).

Manu et al. (2021) also explored students' engagement in social media in tertiary education, revealing that students used them as learning aids because of the alignment with their desires to be interactive. This study investigated different social media instruments like blogs and platforms like Facebook, Twitter, and YouTube and suggested that YouTube could enhance the value of classroom learning by sharing and discovering new content and sparking conversations and debates about classroom topics.

Social media like YouTube, Facebook, Twitter, and blogs allow universities to engage in discussion with students, faculty, members of the staff, parents, colleagues, alumni, and friends about what is essential (Alalwan, 2022; Fong et al., 2020). Facebook is the most dominant social network that positively contributes to students' communication and cooperation for educational purposes (Chan et al., 2020; Zachos et al., 2018). Most researchers accept online social media networks as valuable educational aids, especially in facilitating the formation of communities of practice that support successful educational action like cooperation, communication, and academic culture (Dong et al., 2021; Lei et al., 2021; Yang et al., 2022). Other studies reveal students' improvement in self-esteem and social acceptance (Fong et al., 2020), plus better memory management and results in language skills tests (Leung et al., 2022; Zhang et al., 2015).

2.4 Business students using social media for learning

Recently, a few studies focused on using social media in business education via various contexts and approaches (Alshuaibi et al., 2018; Bharucha, 2018; Khaola et al., 2022; López-Carril et al., 2022; Piotrowski, 2015; Young & Hinesly, 2014). Young and Hinesly (2014) discussed some possible applications of various social media for internal business communications in a business course at the University of Michigan. A similar study by López-Carril et al. (2022) quantitatively investigated the effectiveness of incorporating LinkedIn into a sports management course operated via blended learning and learning by doing methods as the major pedagogical component, noting significant results in professional profile establishment, connection with the sports professionals and professors and appropriateness of LinkedIn to the course.

Differently, Khaola et al. (2022) examined the influence of using social media on the academic performance of business students with student citizenship behavior via quantitative research, interestingly showing a positive and significant impact on students' academic performance by helping others using social media (student citizenship behavior) but not using social media solely. Alshuaibi et al. (2018) simply explored the relationship between social media and academic performance via structural equation modeling, expressing the potential of social media in education to promote students' cognitive engagement in both classes and academic performances.

Generally, some studies explored the students' perceptions of social media as learning aids for business education (Bharucha, 2018; Piotrowski, 2015). Bharucha

(2018) studied the use of social media in business education in India from the business students' perspectives via a mixed-method approach, resulting in the prevalent use of social media among young students and positive perceptions of social media in business education. Notably, the study showed that half of the respondents agreed with enhancing the learning experience using social media, and less than half used social media, for instance, Facebook, for educational purposes (Bharucha, 2018). The study also expressed some possible advantages, for instance, offering different learning approaches, providing a consistent connection with instructors, facilitating collaborative learning, connecting required answers, and possibly boosting employment opportunities. However, some potential drawbacks were found, such as the superficial use of social media in education and possible academic reduction from the business students' perspectives (Bharucha, 2018).

Similarly, a systematic review regarding the use of Web 2.0 technologies in business education from students' and faculty's perspectives by Piotrowski (2015) found that the eleven reviewed studies with partially positive students' attitudes towards the use of Web 2.0 technologies but also showed some drawbacks, for instance, privacy matters and data overload from students' perspectives, and too many social media platforms and lack of training support from the faculty's perspectives. The review also demonstrated the major social media tools for business education as Facebook, blogs, Twitter, and YouTube, with possible adoption in the class assignments (Piotrowski, 2015).

Although some studies investigated social media generally and specifically for students' perceived usage, usage patterns, pros and cons, and perceived effectiveness, they only explored the perspectives of general business students or students from a particular business subject. Yet, scant studies have investigated business students through their diverse demographic backgrounds, i.e., a demographic survey of business students' perceptions of using social media as learning supplemental tools.

2.5 The 5E instructional model

Developed by Bybee et al. (2006), the 5E Instructional Model is a constructivist learning theory initially for science education and subsequent application to varied disciplines. It comprises five learning phases: engagement, exploration, explanation, elaboration, and evaluation (Bybee et al., 2006).

In the engagement phase, instructors motivate students and draw their attention to the learning tasks and concepts or skills for learning with different approaches, such as asking questions related to the topic and connecting these to their precious experiences and possible misconceptions. In the exploration phase, students are guided by their instructors, acting as facilitators, to conduct self-exploration of the topic or the learning task, resulting in developing a concrete learning experience. In the explanation phase, instructors first encourage students to explain their explored findings and then offer direct and formal explanations of the concepts or skills related to the topic to the students, for instance, through terminology introduction. Students are encouraged to apply the learned concepts or skills to new situations via cooperative learning as an extension of knowledge in the elaboration phase. In the evaluation phase, informal evaluation throughout the whole learning process and formal evaluation after the

elaboration phase should be conducted to evaluate students' comprehension of the concepts or skills taught and their learning outcomes.

Although many studies employed the 5E Instructional Model as a learning theory to enhance students' learning experiences and outcomes, e.g., Hew et al. (2018) and Lai and Hew (2019), scant studies applied the model to evaluate the learning process. This research applied the 5E Instructional Model as an evaluation tool for investigating the students' social media usage and perceptions of social media as classroom support tools for learning from the business students' perspectives.

Some recent research has applied the 5E Instructional Model to examine the learning effectiveness of various sources in libraries and other contexts (Cheung et al., 2022; Lam et al., 2022; Tsang & Chiu, 2022; Tse et al., 2022). Tse et al. (2022) analyzed and recommended the reading program offered by a non-governmental organization with the 5E Instructional Model. Tsang and Chiu (2022) evaluated the virtual reference services of an academic library via qualitative semi-structured interviews, incorporating the 5E Instructional Model as part of the questions to investigate the effectiveness of the virtual reference services on students' learning. Cheung et al. (2022) quantitatively surveyed parents to evaluate their perceived teaching process of cultivating their children's interests in reading and learning and the perceived effectiveness of electronic resources in the cultivation and encouragement through five-point Likert scale statements based on the 5E Instructional Model. More importantly, Lam et al. (2022) applied the 5E Instructional Model to evaluate students' perceived effectiveness of the Instagram account of an academic library as a learning support tool toward students' learning via questionnaires by adapting the 5E Instructional Model into 7-point Likert scale statements. Still, scant studies have adapted the model to serve as an evaluation tool regarding students' perceived learning experiences and effectiveness, especially for business students.

2.6 Challenges and research gap

On the contrary, some instructors are reluctant to engage in social networks for education despite numerous studies encouraging them, as social networks also potentially influence students' personalities and cognitive behaviors, especially addiction (Wong et al., 2022). Further, chatting and online games often distract learning activities and may not relate to useful information searches and serious learning discussions (Zhang et al., 2015; Lei et al., 2021). However, prior research noted that while Facebook is a suitable tool for engaging students, its effects are also influenced by the students' ethnic background (Mathiyalakan et al., 2017).

Further, the inherent commercial bias of social media with a business model built on promoting the consumption of advertised goods and services may unintentionally extend to educational use. This claim could be unfair to social media, considering the predominance of advertising revenue in every mass media used in education, including academic journals, newspapers, and even television (Anderson, 2019) also mentions that social media is not conducive to education, has an explicit bias towards conviviality and homogeneity, and lacks critical components of discourse and disagreement. Besides, social media's algorithm may filter out opposing views, and its

information flow is self-segregated into the interaction between people with similar social and political opinions (Au et al., 2021; Ho et al., 2022).

In addition to challenges, research, as aforementioned, has been comparatively inadequate in studying student perceptions through comparisons between different demographic backgrounds and employing the 5E Instructional Model as an evaluation tool for academic business learning. Therefore, this quantitative study advocates an in-depth exploration of students' learning process to demographically evaluate the mechanism of social media to help business students' learning process with the 5E Instructional Model (Bybee et al., 2006).

3 Methodology

To compare the use of social media by business school students of different majors and their perception of social media as classroom support tools, an online survey based on the 5E instructional model was conducted via the the wjx.cn platform for target participants, i.e., mainland Chinese business school students studying in mainland China, Hong Kong, and overseas and majoring in accounting, finance, and economics. The online questionnaire link was distributed to potential participants through social media groups, including WeChat and QQ, which are very popular in mainland China.

The survey comprised four sections and 51 questions, requiring participants around ten minutes to complete. The first section covered demographic information, including age, gender, major, and educational level. The second section aimed to investigate the students' usage patterns of social media, responding to RQ1, including the frequencies of using social media, using social media as learning support tools, and the usage of various social media platforms. The third section asked for students' perceived usage of social media as learning supplementing tools by their instructors in the form of 7-point Likert scales, responding to the RQ2. This section was validated by obtaining a value of Cronbach's Alpha (Cronbach, 1951), which is 0.920, indicating a high internal consistency of responses (Creswell, 2012). The final section asked about students' perceived effectiveness of social media as aids for business education according to the 5E Instructional Model, responding to the RQ3. The questions in this section were adapted from prior literature (Lam et al., 2022; Tsang & Chiu, 2022). In addition, the research measured Cronbach's Alpha to test the internal consistency of the responses to the five aspects of this section, i.e., Engage, Explore, Explain, Elaborate, and Evaluate. All Cronbach's Alpha values of this section exceeded 0.90, demonstrating a high internal consistency in each aspect's responses to the questions (Creswell, 2012).

A total of 454 responses were collected, of which 423 responses were completed and valid. Table 1 shows the respondents' demographics, with an average age of 23.23, mostly undergraduate students (70.92%) and from Mainland China (61.23%). Our participants mainly majored in Accounting (28.13%), Economics (37.12%), and Management (31.44%).

Table 1 Demographics

Demographic (n=423)		Number
Gender	Male	165 (39.01%)
	Female	258 (60.99%)
Education Level	Bachelor's degree	300 (70.92%)
	Master's degree and equivalent	102 (24.11%)
	Doctoral and above	21 (4.97%)
Residence	Mainland China	259 (61.23%)
	Hong Kong	80 (18.91%)
	North America	30 (7.09%)
	Europe	31 (7.33%)
	Australia	21 (4.97%)
	Others	2 (0.47%)
Major	Accounting	119 (28.13%)
	Economic	157 (37.12%)
	Management	133 (31.44%)
	Others	14 (3.31%)

4 Results and data analysis

4.1 Usage statistics of social media (RQ1)

Table 2 reports participants' frequency of social media usage in general and for the study (on a 7-point Likert scale, 1=never; 7=always). Participants, on average, use social media for general purposes more often than for academic use. Notably, while female participants, on average, had a higher social media usage for general purposes (mean for female=5.78>mean for male=5.30, $p<0.001$), the trend was reversed for academic use (mean for female=4.69<mean for male=5.04, $p=0.027$). Also, the country of residency would impact social media usage for general purposes ($p<0.001$) but not academic usage.

As for social media habits of business school students, Table 3 presents that the three most popular social media among business school students are WeChat (72.85%), Weibo (63.16%), and BiliBili (49.04%). It also demonstrates the diversity of social media use by business school students for learning. Since most participants were Mainland Chinese students (See Table 1), fewer students used social media such as Facebook, WhatsApp, Telegram, and LinkedIn, as they were blocked there.

4.2 Social media usage for instructor communications (RQ2)

Table 4 presents the results of respondents' perceptions of their instructors using social media for academic exchanges and communication. As discussed in the Methodology section, Cronbach's Alpha (Cronbach, 1951) of these four items is 0.920.

Results showed no significant difference in these items' mean values based on gender types. Concerning educational background, instructors of graduate programs are less likely to use social media for academic exchanges and communications. Results also indicated a significant difference based on the residence. In particular, instructors from China are more likely to use social media to communicate with their students, but it is not the case in Australia. Notably, there was no significant difference in item

Table 2 Frequency of Social Media Usage in General and Academic	Demographic (Note 1)		General Usage (Mean=5.59)		Academic Usage (Mean=4.83)	
			Mean	*p*-value	Mean	*p*-value
	Gender	Male (n=165)	5.30	<0.001	5.04	0.027
		Female (n=258)	5.78		4.69	
	Education Level	Bachelor's degree (n=300)	5.54	0.513	4.78	0.566
		Master's degree and equivalent (n=102)	5.74		4.88	
		Doctoral and above	5.57		5.14	
	Residence (Note 2)	China (n=259)	5.85	<0.001	4.83	0.643
		Hong Kong (n=80)	5.38		4.81	
		North America (n=30)	5.70		5.13	
		Europe (n=31)	4.94		4.48	
		Australia (n=21)	4.00		4.91	
	Major	Accounting (n=119)	5.54	0.270	4.98	0.154
		Economic (n=157)	5.52		4.75	
		Management (n=133)	5.65		4.87	
		Others (n=14)	6.29		4.00	

Notes:

(1) On a 7-point Likert scale, 1=never; 7=always. ANOVA was used to compare the mean values of each category. The *p*-values are reported.

(2) The calculation of ANOVA for participants' country of residence does not include the cases for "Others" because only two participants fall into this category.

level at the major level, except for Item I3, i.e., "Your instructors communicate with students outside the classroom via social media for learning-related matters." Indeed, post hoc test results showed that business students outside the three main business majors differ from the others. They perceived a lower level of their instructors for using social media for academic exchanges and communication.

4.3 Effectiveness of social media as business learning aids and the 5E instructional model (RQ3)

To better understand the purpose of using social media for learning by business students, this research employs the 5E Instructional Model as the analysis framework. Table 5 shows the descriptive statistics of the 5E Instructional Model and the results of the internal consistency test using Cronbach's Alpha for the responses to the five aspects of this study. As discussed in the Methodology section, all Cronbach's Alpha values exceeded 0.90. Thus, the average of the items within the same construct is valid for testing the effect of various demographic factors using ANOVA.

Further, each "E" phase of the 5E Instructional Model was analyzed by ANOVA (see Table 6). Generally, the participants slightly agreed on social media as an effective learning support tool in all phases, with all means between 5 and 6. Remarkably, the study results showed that education level and residence were the most significant factors

Table 3 Social Media Platforms Used in Studies

Usage	QQ	Weibo	WeChat	BiliBili	YouTube	CCtalk	WhatsApp	Telegram	Facebook	LinkedIn	Other
Used	198 (46.81%)	267 (63.12%)	303 (71.63%)	208 (49.17%)	133 (31.44%)	62 (14.66%)	60 (14.18%)	28 (6.62%)	49 (11.58%)	33 (7.80%)	6 (1.42%)
Non-used	225 (53.12%)	156 (36.88%)	120 (28.37%)	215 (50.83%)	290 (68.66%)	361 (85.34%)	363 (85.82%)	395 (93.38%)	374 (88.42%)	390 (92.20%)	417 (98.56%)

Table 4 Business students' perceptions of their instructors for using social media as learning aids

Items (Note 1)	Overall	Gender	Education Level	Residence (Note 2)	Major
I1: Your instructors share learning materials through social media.	5.38	Male: 5.33 Female: 5.41 *p*-value: 0.649	Bachelor's: 5.73 Master's: 4.62 Doctoral: 4.10 *p*-value: < 0.001	China: 5.61 Hong Kong: 4.96 North America: 5.07 Europe: 5.42 Australia: 4.48 *p*-value: 0.001	Accounting: 5.44 Economics: 5.33 Management: 5.47 Others: 4.57 *p*-value: 0.246
I2: Your instructors use social media as an aid in the classroom.	5.24	Male: 5.13 Female: 5.32 *p*-value: 0.234	Bachelor's: 5.63 Master's: 4.40 Doctoral: 3.81 *p*-value: < 0.001	China: 5.50 Hong Kong: 4.75 North America: 4.73 Europe: 5.16 Australia: 4.71 *p*-value: < 0.001	Accounting: 5.13 Economics: 5.22 Management: 5.39 Others: 5.07 *p*-value: 0.599
I3: Your instructors communicate with students outside the classroom via social media for learning-related matters.	5.25	Male: 5.21 Female: 5.28 *p*-value: 0.657	Bachelor's: 5.62 Master's: 4.47 Doctoral: 3.71 *p*-value: < 0.001	China: 5.51 Hong Kong: 4.81 North America: 5.03 Europe: 5.00 Australia: 4.43 *p*-value: < 0.001	Accounting: 5.14 Economics: 5.13 Management: 5.56 Others: 4.57 *p*-value: 0.040
I4: Your instructors communicate with students outside the classroom via social media for personal development matters.	5.19	Male: 5.24 Female: 5.16 *p*-value: 0.630	Bachelor's: 5.56 Master's: 4.39 Doctoral: 3.91 *p*-value: < 0.001	China: 5.41 Hong Kong: 4.90 North America: 4.90 Europe: 5.19 Australia: 4.14 *p*-value: 0.003	Accounting: 5.13 Economics: 5.19 Management: 5.31 Others: 4.71 *p*-value: 0.578

Notes:

(1) On a 7-point Likert scale, 1=never; 7=always. ANOVA was used to compare the mean values of each category. The *p*-values are reported.

(2) The ANOVA calculation for participants' country of residence does not include the cases for "Others" as only two participants fall into this category.

(3) Cronbach's Alpha=0.920

Table 5 Descriptive statistics of the 5E Instructional Model

Items	Mean	SD
Engage Phase (Cronbach's α=0.928)		
1. Social media stimulated my interest in learning	5.21	1.51
2. Social media arouses my attention to view learning information	5.15	1.40
3. Social media provides me with an interesting platform for learning.	5.24	1.40
4. Social media provides me with a convenient platform for interacting with my instructors.	5.31	1.51
5. Social media provides me with a convenient platform for interacting with my classmates	5.47	1.48
6. When I have a study-related question, I can use social media to help me answer it.	5.50	1.47

Table 5 (continued)

Items	Mean	SD
Average:	5.31	1.25
Explore Phase (Cronbach's α=0.939)		
1. Social media allows me to ask questions and obtain responses quickly	5.45	1.44
2. Social media allows me to browse more learning resources	5.50	1.44
3. Social media provides the information I need.	5.39	1.44
4. Social media helps me learn more in general.	5.35	1.41
5. I am good at using social media to search for learning information.	5.40	1.46
Average:	5.42	1.29
Explain Phase (Cronbach's α=0.928)		
1. Social media provides information to solve my inquiries.	5.54	1.40
2. When I have study-related questions, I can use social media to help myself answer them	5.46	1.41
3. Social media is an effective platform to solve my learning problems.	5.29	1.40
4. Social media provides resource links to solve my inquiries.	5.47	1.37
5. People on social media provide answers to my inquiries.	5.31	1.48
6. Social media allows me to share my ideas and learning outcomes.	5.28	1.45
7. I like to communicate with my peers on social media	5.26	1.51
8. I like to communicate with instructors on social media	4.98	1.51
9. Social media helps me explain what I have learned.	5.36	1.36
10. I think the question that social media helps me answer is more reliable than the instructors' answer	4.86	1.59
Average:	5.28	1.20
Elaborate Phase (Cronbach's α=0.953)		
1. Social media is a good platform for revisiting my existing knowledge and building new knowledge.	5.37	1.48
2. The comment function of social media is convenient for me to understand more and expand my knowledge.	5.37	1.40
3. Social media encourages me to know more about learning.	5.37	1.38
4. Social media provides the platform to demonstrate my new knowledge.	5.48	1.34
5. Social media helps me fill my knowledge gap.	5.42	1.40
6. Social media presents new learning information to me effectively.	5.34	1.39
7. Social media reconstructs and extends explanations and understanding of learning by using different ways, such as videos, photos, infographics, etc.	5.40	1.45
Average:	5.39	1.24
Evaluate Phase (Cronbach's α=0.956)		
1. Social media is a good way to receive instant help for my learning in general.	5.44	1.43
2. Social media is a good way to help me learn in general.	5.29	1.39
3. Social media is easy to use in general	5.45	1.45
4. Social media helps me improve my examination results.	4.98	1.47
5. Social media helps me improve my group projects.	5.37	1.47
6. Social media helps me improve my research.	5.27	1.41
7. Social media helps me attain the learning outcomes of my study.	5.30	1.43
8. Social media helps improve my overall academic results.	5.18	1.46
Average	5.29	1.26

Table 6 ANOVA results of 5E constructs

Construct	Overall (Note 1)	Gender	Education Level	Residence (Note 2)	Major
Engage	5.31	Male: 5.23 Female: 5.37 p-value: 0.248	Bachelor's: 5.57 Master's: 4.81 Doctoral: 4.07 p-value: < 0.001	China: 5.62 Hong Kong: 4.98 North America: 4.91 Europe: 4.80 Australia: 4.18 p-value: < 0.001	Accounting: 5.24 Economics: 5.36 Management: 5.35 Others: 5.06 p-value: 0.735
Explore	5.42	Male: 5.29 Female: 5.49 p-value: 0.118	Bachelor's: 5.69 Master's: 4.94 Doctoral: 3.84 p-value: < 0.001	China: 5.79 Hong Kong: 4.96 North America: 5.01 Europe: 4.75 Australia: 4.10 p-value: < 0.001	Accounting: 5.33 Economics: 5.46 Management: 5.45 Others: 5.30 p-value: 0.830
Explain	5.28	Male: 5.25 Female: 5.30 p-value: 0.635	Bachelor's: 5.56 Master's: 4.69 Doctoral: 4.20 p-value: < 0.001	China: 5.51 Hong Kong: 5.01 North America: 5.03 Europe: 4.92 Australia: 4.45 p-value: < 0.001	Accounting: 5.20 Economics: 5.36 Management: 5.31 Others: 4.89 p-value: 0.426
Elaborate	5.39	Male: 5.26 Female: 5.48 p-value: 0.082	Bachelor's: 5.68 Master's: 4.81 Doctoral: 4.15 p-value: < 0.001	China: 5.71 Hong Kong: 4.89 North America: 5.14 Europe: 4.87 Australia: 4.54 p-value: < 0.001	Accounting: 5.33 Economics: 5.48 Management: 5.37 Others: 5.30 p-value: 0.742
Evaluate	5.29	Male: 5.20 Female: 5.34 p-value: 0.248	Bachelor's: 5.53 Master's: 4.79 Doctoral: 4.21 p-value: < 0.001	China: 5.59 Hong Kong: 4.90 North America: 5.08 Europe: 4.79 Australia: 3.99 p-value: < 0.001	Accounting: 5.11 Economics: 5.41 Management: 5.32 Others: 5.07 p-value: 0.242

in using social media by business school students for learning purposes. In each phase of the 5E Instructional Model, education level and residence had $p < 0.001$. One possible reason for this result is that there is a difference in using social media for academic purposes among students with different educational levels and in different locations.

5 Discussion

5.1 The impact of social media on business students' learning (RQ1)

The findings indicated that business students typically use social media to support their academic life, while most literature focuses on integrating social media sites into classrooms (Piotrowski, 2015). Still, students' use of social media to gain academic knowledge can have a much broader impact. Our findings indicated the essential effects of social media in helping improve students' academic performance and increase their understanding through information and knowledge sharing. Students collect information through various online platforms to find solutions to problems. Research from Lahiry et al. (2019) demonstrated that most students used social

media for educational purposes and believed social media positively impacted their academic performance. This result echoes the conclusion reached in this study that business school students believe that social media helps improve their academic results. Yet, it is the opposite of Azizi et al. (2019) and Fries and Dietz (2007), which suggested that using social networks reduces academic engagement and negatively affects students' academic performance.

These findings suggest that business students pay attention to time management when using social networks, especially cost-benefit analysis, when deciding whether to use social media in learning (Wong et al., 2022). In the short term, social media use may help most business school students improve their academic performance. However, if they are addicted to social media, such as excessively using the Internet (Upadhayay & Guragain, 2017; Wong et al., 2022), their academic performance may be adversely affected. They may be unable to concentrate during their studies. Our results also showed that business students heavily used social media in general but were less likely to use it for academic purposes (see Table 2). Nwazor and Godwin-Maduike (2015) also showed that business students were more likely to be tempted to surf the Internet, chat with friends, and browse various social networking sites than to focus on browsing study-related content via social media.

Further, Azizi et al. (2019) mentioned that the decrease in academic performance is one of the most critical consequences of students' excessive social network use. In addition, Fries and Dietz (2007) confirmed that social media temptation reduces students' motivation to learn, leading to a more negative learning experience, reduced study time, and decreased quality of learning. Moreover, excessive social media use can cause students to lack sleep time and make them harder to concentrate on their studies (Li et al., 2015), potentially causing a reduction in grades and overall academic performance (Bharucha, 2018). Therefore, students need to do a mental calculation before using social media to reduce excessive use of social media to eliminate all the distractions that affect their study time, physical health, and emotions.

Our findings indicated differences in social media preferences regarding genders, residences, and educational backgrounds. Regarding gender differences, female students may have a higher general social media usage while male students could use social media more frequently for academic purposes. The countries of residence could affect students' general usage of social media, integration of social media for academic communication and knowledge exchange in classes, and students' perceptions of social media as effective learning support tools. Such differences are probably due to cultural and technological differences and curriculum design differences in different countries (Ko et al., 2015; Liu et al., 2019; Yip et al., 2020). For instance, social media and communication cultures (Ji et al., 2010), instructors' knowledge of social media, and Internet connection quality, availability, and costs may influence the use of social media in different countries (Ko et al., 2015).

Concerning the educational level, social media may be less likely to be integrated into postgraduate programs, while it is more common to share learning materials with undergraduate students (Lau et al., 2017). But for academic communication and knowledge exchange, probably due to class size issues, most undergraduate courses generally have more students, and social media would be a convenient tool for engaging students (Cheng et al., 2020). As for postgraduates, the class, particularly at

the doctoral level, is usually small, resulting in relatively close relationships between students and instructors and thus more personal and diversified communication channels (Dong et al., 2021). As a result, undergraduate students may perceive social media as effective learning support tools for their academic studies and performances instead of postgraduate students.

5.2 The relationships of the business students with their instructors on social media (RQ2)

The convenience of social media facilitates the further development of the instructor-student relationship. It is essential to establish an excellent instructor-student relationship (Dong et al., 2021). Through social media, instructors can enhance interactions among students, students and instructors, and people and resources outside the classroom. With the emergence of social media, the classroom is no longer the only way for instructors to interact with students. Instructors can use social media to interact with students to learn.

Most instructors use different forms of social media for professional purposes, such as sharing academic information, creating a better learning environment, and establishing communities of practice (Lei et al., 2021). However, instructors should have a standard when using social media to communicate with students. Camas et al. (2021) argued that social media use in education helps break down traditional hierarchical relationships but depends on the differences between cultures, policies, countries, etc. The instructor-student relationship should resemble a friendship but be kept at a distance when considering ethical boundaries.

However, it is undeniable that social media helps build the concept of intimacy and trust between instructors and students (Dong et al., 2021; Lei et al., 2021). Social media allows shy or quiet students to become more open and communicate better with their instructors. Keasberry's (2018) research concluded that group chats provide a group learning environment for each lesson, while the one-on-one chat option allows students to seek help directly from the instructor if they want to avoid the gaze of their peers. Increasingly, instructors communicate with students through social media groups or one-on-one chats. Social media can act as an intermediary to alleviate this awkwardness when face-to-face communication may be awkward for students (Tatnall, 2020). Email is the most common method of communication between students and instructors, while respondents prefer to use social media such as WeChat and QQ. Instructors can create online discussion groups and mentor students, and providing students with instant feedback through social media interaction can help improve the teaching relationship. Although Antoine et al. (2019) also concluded that there is currently no evidence of a correlation between social media use and instructor-student relationships, it is undeniable that communicating with instructors through social media positively affects students' academic performance and pulls in the instructor-student relationship.

5.3 Perceived effectiveness of social media as business learning aids (RQ3)

The 5E Instructional Model in the survey shows that business students are generally comfortable using social media as business learning aids. The results indicated

that respondents of the three majors considered the content and quality of the results obtained from the information about learning brought by social media and social media search helpful, encouraging, and satisfactory. Moreover, when business students had a study-related question, they were more likely to use social media to help answer it. The positive and significant impact of social media on academic achievement was mentioned in the previous discussion, which also explored the relationship between social media use and communication with instructors through social media and academic achievement. How to better apply social media in business students' learning has also become a topic discussed in depth.

Many aspects of social media are helpful for learning, such as collaborative learning, interaction with peers, and online knowledge sharing (Dong et al., 2021; Fong et al., 2020; Lei et al., 2021; Prabu, 2015). Prabu (2015) mentioned the increasing importance and role of social media in students' learning. Research indicates that when students use social media as a learning aid, they are collaboratively engaged with their peers and instructors in the learning process (Lei et al., 2021; Mahdiuon et al., 2020). This allows students to interact with more people and engage with multimedia content, thus increasing engagement. Especially business students, who need to communicate more with their classmates and instructors concerning global business knowledge and the culture of individual countries, need to use social media for study-related content (Zhang et al., 2015). Therefore, social media has become a platform for business school students to interact and communicate. According to Ansari and Khan (2020), social media helps students retrieve information in real-time, interact with others about shared materials' content, and increase student engagement. Integrating social media into business school student learning will become more common. For some students who have barriers to face-to-face communication, this may be a preferable solution. At the same time, it will allow more students to get involved.

5.4 Practical and managerial suggestions

Although the studies mentioned above indicated several benefits of employing social media as learning support for business students, they also indicated some drawbacks, for instance, the blurry boundary between leisure and learning, privacy issues, parent-children conflict, possible academic reduction of students, and lack of staff training support for social media application to student learning (Aldahdouh et al., 2020; Bharucha, 2018; Piotrowski, 2015).

As for blurry boundaries of leisure and learning, it may result in a possible reduction in grades (Bharucha, 2018) and even addiction (Wong et al., 2022) when students are obsessed with social media for leisure and gossiping rather than learning, as aforementioned in RQ1. Although social media can potentially suit students' information needs for learning and enhance learning performance through communication and interaction with instructors, classmates, and others, students' academic performance may be weakened when they spend more time leisurely on social media. Accordingly, they should set a schedule for using social media for leisure and learning and train themselves to be self-regulated. University student services and academic libraries should include such warnings and education in digital literacy training and provide consultation services to combat social media addiction (Zhang et al., 2020).

Although the blurry boundary issues may help foster interpersonal relationships among instructors and students (Dong et al., 2021), this may also trigger privacy issues. For instance, students and instructors may expose their personal accounts or information when social media are integrated into student learning and may use social media tools, e.g., WhatsApp, QQ, or WeChat with personal mobile numbers and Facebook and Twitter with personal email accounts for communication with instructors or students (Wang et al., 2021). Accidental sharing of personal photos or messages to instructors or students may occur and thus adversely affect their reputation or image from others. Therefore, students and instructors may create a new account with a specific mobile number solely for academic purposes to prevent the blurring of personal and academic usage of social media for communication and interaction. University student services and academic libraries should also include education on social media privacy in digital literacy training.

Since the lack of training support for instructors may cause reluctance or refusal of instructors to adopt social media tools to enhance business students' learning (Piotrowski, 2015), it may similarly affect the adoption of social media tools for virtual learning. Especially during the COVID-19 pandemic, social media is increasingly popular when face-to-face communication has been largely interrupted (Tse et al., 2022; Yu, Lam & Chiu, 2022). During the pandemic, instructors may face challenges to re-embody the course (Aroles & Küpers, 2021), where social media may help enhance students' engagement in learning. Therefore, universities should offer adequate training and IT support to instructors, in addition to COVID-related training and funding (Earle & Leyva-de la Hiz, 2021; Huang et al., 2021; 2022), especially for those preferring traditional teaching approaches to engage them in using social media tools as aids to effectively and efficiently for better class communication and interaction (Lei et al., 2021).

Our results also provide insights into social media platforms and their app developers, as there are business opportunities for developing apps for enhancing instructor-student learning communication and apps for engaging instructors and learners in learning through social media platforms (Tsang & Chiu, 2022; Guo et al., 2022). Further, online educators (Yao et al., 2023) and MOOC providers (Cheng et al., 2022) should consider using social media to promote their courses, augment their teaching, and facilitate student-instructor communication. Besides, enterprises should also consider using social media aids for vocational training so that employers can exchange their knowledge and learn flexibly across time and space (Chan et al., 2022).

6 Conclusion

With the development of information technology, social media has become part of the daily life of business students, and they are proficient in using social media to search for what they need. The study indicates business students believe that social media is influential in helping them access study-related information. The use of social media can facilitate comprehensive learning. Moreover, social media allow students to communicate with their instructors better. Due to the high frequency of using social media in business schools' pedagogy, students have more channels for

accessing learning information. By integrating the business school students' perceptions of using social media in education, it was concluded that the impact of social media in educational applications is beneficial, and its use is essential.

Although our study contributes to a better understanding of the impact of social media use on the academic experience of business school students, some limitations remain. First, in terms of data sources, this study only uses online surveys to collect data, which cannot ensure the authenticity and validity of each sample. Future research may invite business school students to conduct in-depth interviews to explore further business school students' views and experiences using social media in their studies. The resulting survey results can serve as a reference. Second, most of the data on business school students collected in this survey comes from mainland China. Therefore, extending the study of business students from different regions for more comparative results is also recommended.

Data Availability Data of this research are available upon email request to the corresponding author.

Declarations

Ethical approval was granted from the Faculty Research Ethics Committee, Faculty of Education, HKU.

Competing Interest Authors declare no potential conflict of interest.

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