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Research article

Beyond User Decline: Investigating the Effects of Social Presence and the Dual Role of Social Connectedness in Sustaining Engagement on Social Networking Platforms

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ABSTRACT

Social media platforms are currently grappling with unforeseen difficulties that have hindered their expansion. Previous studies have disclosed that Facebook, one of the most prominent social media sites, has encountered a reduction in its user base. Similarly, other social media platforms have also reported a substantial decline in user numbers and engagement levels, indicating a significant downturn in their popularity. The primary objective of this research is to gain a more comprehensive understanding of the role played by the social presence in human-computer-mediated interactions, specifically in the context of social media. Data from 473 college students from their second to tenth semesters were collected through an online survey. Amos 25 was utilized to test the constructs of the variables of social presence, social connectedness, attitude, and intention to continue using social media. The Hayes Macro Process version 3.5 was used to test the proposed model. The results showed that social connectedness (Con) moderates the effect of social presence and attitude on user intention to continue using social networks. This result extends the body of research on human-computer-mediated interactions by uncovering the role of connectedness in human-computer-mediated interactions and technology adoption.

1. Introduction

Social media platforms have gained widespread popularity as communication channels. These platforms rely on the connections among users [24] and offer a variety of features and facilities to users through different media such as voice, text, pictures, or videos. In addition, social networking sites provide users with the ability to display their profiles, including their biographies, careers, and areas of expertise, which can be viewed by other users. These features enable users to socialize and develop close relationships with others, whether within or outside their social circles [3, 14, 24].

However, Xie and Tsai [60] pointed out that social media platforms currently face unforeseen challenges that may slow down their growth. They revealed that one of the largest social media sites, Facebook, has encountered user shrinkage. According to Li et al. [44], both Facebook and other social media platforms have indicated a sharp decrease in the number of users and experienced a drop in the amount of user engagement. Numerous studies have explored the factors that impact users' intention to continue using social media [12, 13, 15, 21, 24, 25, 28, 31, 32, 33, 35, 37, 41, 44]. It is widely recognized that the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Theory of Reasoned Action (TRA) are the primary models utilized by

researchers in this field. As suggested by Wijaya, Triandini, Kabnani, & Arifin [59], TAM has also been employed to assess user satisfaction. The findings of these studies indicate that all these models possess a considerable ability to predict user intentions to continue using social media. Despite this, recent trends suggest that users' intention to continue using social media is declining.

Social media platforms facilitate communication among users, but the interactions that occur on these platforms do not always involve direct or real-time communication (Han et al., 2016). Instead, users often communicate through the features and facilities provided by the platform, such as text, emoticons, images, and videos. As a result, Biocca [8] classified social networking site interactions as a form of human-computer interaction. It is important to note that human-computer interaction differs from face-to-face communication, as pointed out by Hassanein and Head [30]. In human-computer interaction, there may be a delay in the transmission and receipt of information, and the communication channel may lack human touch due to the use of emoticons, images, or videos [30].

According to a study by Biocca et al. [8], social presence is becoming increasingly crucial in communication channels, utilizing features, such as emoticons or videos to enhance user interaction. They emphasized that the ability to establish a social presence for users is a key determinant in their decision to use a particular communication channel. This notion is supported by Hassanein and Head [30], who argued that the social presence embedded in online technology plays a significant role in shaping user perception of that technology. Additionally, previous research has shown that users' perceptions of social presence can enhance trust in online services [23, 40]. Furthermore, Han et al. [29] found that social presence can affect users' motivation to interact with others on a social media platform. However, Hassanein and Head [30] noted that the impact of customers' perceived social presence on their intention to use e-commerce through attitudes was insignificant. This finding underscores the intricate and fascinating nature of perceived social presence as a factor affecting technology adoption. Previous studies on the effects of social presence on user intention have produced mixed results, with Al-Ghaith [3] noting a scarcity of research in this area. There have been a few studies investigating the role of social presence in the intention to continue using networking sites.

The primary objective of this research is to gain a more comprehensive understanding of the role played by social presence in human-computer-mediated interactions, specifically in the context of social media. This study sought to answer the following research question: How does users' perceived social presence influence their intention to continue using social network platforms? The study also explored the direct and indirect effects of social connectedness and user attitudes on users' intention to continue using social media. It follows Ye, Lei, Shen, and Xiao's [61] suggestion that social presence is a complex attribute, and it can be influenced by many factors that should be carefully investigated. This study endeavored to explore the influence of social presence on users' persistent intention to utilize social networking sites, aiming to address the issue of a declining user base. By providing novel insights, this study bridges the gap in the relevant literature.

2. Materials and methods

2.1 Factors Affecting Intention to Use Social Networking Sites

It is well known that social networking sites can help users stay connected with their families, friends, or other users, as well as share their experiences and ideas. However, the value of this platform is contingent on users' willingness to use it. Therefore, it is essential to consider users' intentions to continue using the platform in order to maintain its value. Users' intention to continue using social networks has become a crucial issue due to the multitude of social networking sites available for users to choose from [44].

When a user decides to continue using a particular social media platform, it indicates that the platform has successfully fulfilled the user's needs. Moreover, scholars believe that the intention to continue using social media is not the same as the intention to use them. The intention to continue to use can only be observed after the initial usage. According to Chiang [13], the intention of a user to continue using a social network denotes their level of enthusiasm to further engage with a specific social network platform. Therefore, continued usage is considered a post-adoption phenomenon.

Many studies have investigated the factors contributing to the intention to continue using networking sites. However, recently, scholars have increasingly explored user continuance in using social media through the lenses of technology gratification theory and social value theory. These

theories have become the most popular theories for investigating users' intentions to continue using social networking sites. This is because previous theories such as TAM, Expectation-Confirmation Theory (ECT), or UTAUT are considered to underestimate the social aspect of using a particular information system [36].

The uses and gratification theory explains a user's behavioral intention to use a particular communication medium. This theory was introduced by Blumler and Katz [9]. According to this theory, users are willing to use a particular information system as a communication medium because they believe it can satisfy their needs [36]. In general, according to Gan and Li [21], the uses and gratification theory is applied because scholars want to understand why people use a particular social media platform based on social and psychological aspects. Gan and Li [21] found that technological gratification and hedonic gratification significantly impact users' decisions to continue using WeChat. Lu and Yang [45] also found that the social technology fit, which represents the sense of gratification of the user on social necessity, has a strong relationship with social media use.

On the other hand, perceived value theory relates to an information system's ability to generate value perception for the user compared to the effort required to use it. User value can be delivered by social networking features, such as communication and networking facilities [12]. Ifinedo [36] noted that entertainment, social, and connection values strongly influence users' intention to continue using social networking sites. This idea is supported by Zhang, Li, Wu, and Li [62], who identified two significant aspects affecting user intention to continue using social media: the hedonic aspect and social value. Within the perceived value theory, information seeking, self-presentation, and socialization are recognized to play an essential roles in users' intention to continue using social networking platforms [33].

2.2 Social Presence

Although each social networking platform has its own features and specialties, the popularity of a particular social network site relies on its ability to support interactions among users [11]. Hongxiu Li [44] pointed out that while a particular networking site may not satisfy user amusement needs, as long as the platform can provide good support for users to interact with others, it can be a crucial factor for retaining users using a social networking platform. Scholars in the human-computer-mediated interaction field of study have been concerned about social presence as a factor that may directly or indirectly affect the user's behavior [8]. According to Park and Lee [49], social presence is a factor that needs to be given special consideration because it may significantly impact user behavior when using social network sites.

Short Williams and Christie [52] define social presence as the "degree of salience of the other person in a mediated communication and the consequent salience of their interpersonal interactions." They relate social presence to theories of immediacy [58] and intimacy [5]. Immediacy indicates psychological distance, and immediate actions such as smiling and nodding increase intimacy and nonverbal communication. Argyle and Dean [5] used the concept of intimacy to interpret interpersonal interactions; the level of intimacy is indicated by both verbal and nonverbal actions, such as eye contact, and is unconsciously maintained by individuals at an appropriate level. Several scholars have defined social presence as an information system's ability to convey users' non-verbal cues [30]. According to Tu and McIsaac [55], in the context of computer-mediated communication, social presence is the degree of feeling, perception, and reaction to another intellectual being.

In general, Biocca et al. [8] stated that the basic concept of social presence is the feeling of being connected to another during interaction and communication activities. Furthermore, Biocca [8] pointed out that social presence is a psychological aspect resulting from interaction. This idea is supported by Algharabat, Rana, Dwivedi, Alalwan, and Qasem [4], who believe that social presence is an emotion or feeling of closeness while users communicate with others through a particular communication medium.

There are many different definitions of social presence in the current literature; however, most of them are related to user interactions in computer-mediated communication [17]. This is why users prefer to use a platform with many features that can generate a social presence that they can use to interact with various activities, such as brainstorming with a team, developing social networks, engaging in decision-making processes, and conducting conflict resolution [8].

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2.3 Effects of Social Presence

Today, many scholars have investigated the effects of social presence on social media. Research on the contributions of social presence in human-computer-mediated communication has yielded many interesting results. Hassanein [30] found that users perceive social presence as essential to technology adoption. This study revealed that more users are willing to use an online shopping website when an e-commerce site can generate a higher perceived social presence. According to Hassanein and Head [30], social presence can be added to a website through features such as image viewing, emoticons, or video conferencing facilities.

Cui et al. [16] investigated the impact of cognitive and affective social presence on user interaction. In their research, they found that users perceive control, synchronicity, and responsiveness to a particular website are affected by user-perceived social presence. They suggested that an online store or e-commerce site should embed social presence to give users the feeling that they are not communicating with computers. By doing so, it increases users' intention to interact with websites.

The effects of social presence on user interactions have also been noticed by Wei, Chen, and Kinshuk [56]. In their research, Wei et al. found that social presence directly affects student interactions in an e-learning environment. They also pointed out that a high social presence in an e-learning site can reduce student anxiety and improve students' attitudes toward the learning process.

Social presence has also been found to contribute to the creation of user trust when interacting with a company's customer service through a social network site [29]. Han, Min, and Lee [29] found that social presence is embedded in social network features that support the interaction process through trust. Social network sites with a high social presence can increase users' trust and perceived usefulness of social network sites as a communication medium. Research on consumer behavior has also found that social presence indirectly affects purchase intention through perceived trust, enjoyment, and sociability [61]. Ye et al. [61] concluded that an e-commerce site with a high social presence can increase consumers' intention to buy.

Park and Lee [49] also observed the effects of social presence on users' intention to continue using social networks. They found that users' perceived social presence directly and indirectly affected their intention to continue using social networks. Meanwhile, perceived enjoyment and ease of use mediated the effect of social presence on the intention to continue using social networks. According to Park and Lee, a higher perceived social presence leads the user to commit to using a particular website. They also pointed out that e-commerce websites can enhance their facilities to generate a high social presence and improve customer loyalty.

Furthermore, Cheikh-Ammar and Barki [11] also investigated the indirect effect of social presence on user intention to continue using a social network site. They discovered that users' perception of social presence indirectly affects their intention to continue using social networks through attitude, perceived usefulness, and enjoyment. Cheikh-Ammar and Barki argued that social network sites can increase users' perceived social presence by providing a feature on the platform that supports users in writing feedback. Therefore, if the platform cannot generate a social presence, it may reduce their willingness to continue using social media. This idea is supported by Li et al. [44], who suggest that the decision to continue using social media is based on users' experiences. Whenever users have a good experience, they may continue to use it, whereas if they have an unpleasant experience, they may decide to stop using it.

However, Gan and Li [21] found that social presence did not exert a significant influence on users' intention to continue using WeChat. Their study also found that social interaction, self-presentation, and information documentation did not significantly influence users' intention to continue using WeChat. According to Gan and Li, this lack of influence could be attributed to the extensive use of WeChat. Over time, users might have become overstimulated and fatigued, leading to a deterioration in their social relationships. A similar result was reached by Gordon [25], who studied the use of enterprise social networks in Finland. His results revealed that social networks do not affect users' intention to continue using enterprise social network sites. Thus, based on these findings, this study proposes the following hypothesis:

H1. *Perceived social presence has a positive effect on users' intention to continue using social networking sites.*

2.4 Attitude

According to Fishbein and Ajzen [20], attitude can be defined as human beliefs about something that can be formed through an accumulation of information or experience. Attitudes can be either positive or negative, depending on the information or experiences individuals encounter. In the information systems (I.S.) field of study, an attitude is mostly considered as a human's positive or negative feelings or beliefs toward a particular information system, which will affect one's intention to use the system [11]. This concept is similarly articulated by Chiang [13] and Khraim [38], who define attitude as a human behavioral aspect representing their interest in utilizing information systems.

Existing research has provided substantial evidence on the role of attitude in the adoption and utilization of information systems. Cheikh-Ammar and Barki [11] demonstrated that attitudes positively affect technology adoption, indicating that users' positive attitudes toward information system adoption encouraged them to continue using the technology. Additionally, attitude has been shown to exert a strong positive direct effect on the intention to continue using Facebook [13]. According to Chiang, users' positive attitudes toward Facebook are influenced by several factors such as playfulness, informativeness, and social interactivity, all of which contribute to users' favorable perceptions of the platform.

Attitude has also been found to positively affect users' intention to use an information system. Although the intention to use is not identical to the intention to continue using an information system, it is strongly related to the continuation of information system utilization, as confirmed by Dixit and Prakash [19]. Attitude positively affects users' intentions to use social networking sites. In this study, the technology acceptance model (TAM) was utilized to examine the effects of attitude on the intention to use. However, Dixit and Prakash noted that users' perceptions of ease of use and usefulness did not significantly affect attitude. Instead, this study found a direct impact of perceived usefulness and ease of use on the intention to use.

Recent research has further substantiated the effects of attitude on the intention to adopt various information systems. For instance, Matikiti [46] discovered that attitude positively affects users' intention to continue using social media marketing. Additionally, Matikiti explored the moderating effect of technical knowledge on the relationship between attitude and intention to continue using social media marketing, finding that technical knowledge increases the effect of attitude on the continued use of social media. Consequently, users with high technical knowledge are more likely to engage and have a higher probability of utilizing social media marketing than those with low technical knowledge.

Meanwhile, Hiele et al. [32] investigated the effects of student attitudes on the continuation of online learning. Their findings indicated a positive relationship between attitude affected students' intention to use social media for online learning purposes. This study also revealed that internal aspects of social media, such as usefulness, ease of use, and risk, are dominant factors in determining students' attitudes toward social media to support online learning activities.

Numerous studies have explored the indirect impact of social presence on the intention to continue using various information systems, including social networking sites. For instance, Hassanein [30] revealed that customers' perceived social presence indirectly impacts their intention to use e-commerce through attitude. Nevertheless, this effect was insignificant when more variables were added to mediate the relationship between perceived social presence and attitude. This finding shows that perceived social presence is a complex and interesting factor in technology adoption. A similar result was also found by Cheikh-Ammar and Barki [11]. In their study, social presence was found to positively affect attitudes and perceived usefulness. Cheikh-Ammar and Barki argued that social presence is an essential variable influencing user perception of social networks. They pointed out that social network features such as feedback can enhance user experience, which impacts user attitude. Thus, based on these findings, the present study proposes the following hypothesis:

H2. *Attitude has a positive effect on users' intention to continue using a social network site.*

H3. *Perceived social presence has a positive effect on users' intention to continue using a social networking site through the mediation of attitude.*

2.5 Social Connectedness

Scholars have proposed various definitions for social connectedness. According to Riedl, Köbler, Goswami, and Krcmar [51], the concept of social connectedness is a psychology-related concept that

refers to human behavior like intimacy and sharing. They point out that social connectedness can measure the strength of an individual's bond to a particular social group or community. Köbler, Riedl, Vetter, Leimeister, and Krcmar [51] defined social connectedness as an expression of an individual's positive feelings toward relationships with individuals within one's circle. Moreover, Köbler et al. [39] explained that exchanging information activities catalyses the unifying feelings of group members. A similar idea was also suggested by Ahn and Shin [1] that social connectedness is a feeling of happiness caused by a relationship.

Therefore, social connectedness can be considered as a factor that reflects individual feelings of belonging to a social group. A high level of social connectedness indicates that an individual has a strong relationship with others in a group. This can also be observed through the number of interactions between individuals and their close contacts. Accordingly, in the field of information systems, social connectedness is recognized as a robust theory for studying issues related to human-computer-mediated communication [51]. Moreover, Grieve et al. [27] argued that social connectedness derived from social networking sites differs from that derived from face-to-face communication, highlighting the complexity of social connectedness on social networking sites.

Grieve et al. [27] found a strong relationship between the perceived social connectedness that the users obtain from social network sites and their mental activity. Köbler et al. [39] argued that users' status on social network sites can be seen as representing their feelings. When users frequently post status updates, it indicates that they have an intimate relationship with other members of the social network. Furthermore, Köbler et al. believe that social connectedness is more profound than social presence. In online communication activities, users can feel connected simply by knowing that their peers are online.

A detailed study on the relationship between social presence and social connectedness was conducted by Riedl et al. [51]. They discovered that social awareness and presence positively affected social connectedness. This study also found that the relationship between social awareness and social connectedness is mediated by social presence. They pointed out that a higher social presence can improve users' emotional bonds and will increase their social connectedness. On the other hand, Neves et al. [48] reported that an increase in social interactions does not necessarily lead to higher social connectedness. They believe that the important aspect in computer-mediated communication is not the intensity of the communication but rather the quality of the communication that determines the level of connectedness.

Furthermore, researchers have found that social connectedness positively affects the perceived ease of use, usefulness, and enjoyment of using e-commerce [14]. This study also revealed that perceived ease of use was the most affected variable. According to Cho and Son [14], this result indicates that users with a high level of social connectedness when using an e-commerce site will have a positive attitude toward e-commerce and enjoy using the e-commerce site. Rahman et al. [50] supported this finding. Their study found that user engagement in e-commerce social media significantly impacted customers' intention to buy. This relationship is mediated by social connectedness. This finding shows that inactive users on e-commerce social media have a low level of connectedness with other users, thus reducing their intention to make transactions online. Thus, this study proposes the following hypotheses:

H4. A high level of social connectedness enhances the relationship between social presence and the intention to continue using a social network site.

The association between social presence and social connectedness differs from that of attitude and social connectedness. While there is significant evidence supporting a link between social presence and social connectedness, scholars have found scant evidence supporting a connection between attitudes and social connectedness. Grieve and Kemp [26] observed that a positive attitude toward a social network site is associated with increased social connectedness. In essence, when users hold a more favorable perception of a social network site, their sense of connectedness intensifies.

Moreover, Grieve and Kemp [26] suggest that attitudes and social connectedness may have a reciprocal relationship. Sun, Dong, and McIntyre [53] believe that the relationship between attitude and social connectedness is complex, as there are indications that connectedness may influence users' attitudes toward a social networking site. Through perceptions of social commerce's utilitarian (i.e., ease of use and usefulness) and hedonic (i.e., enjoyment) aspects, social connectedness indirectly influences

attitudes towards it [14]. Few empirical studies have examined the relationship between social connectedness and user attitudes. Thus, this study proposes the following hypothesis:

H5. *A high level of social connectedness enhances the relationship between attitude and intention to continue using a social networking site.*

Based on the 5 (five) hypotheses, the research framework can be described as follows in Fig 1:
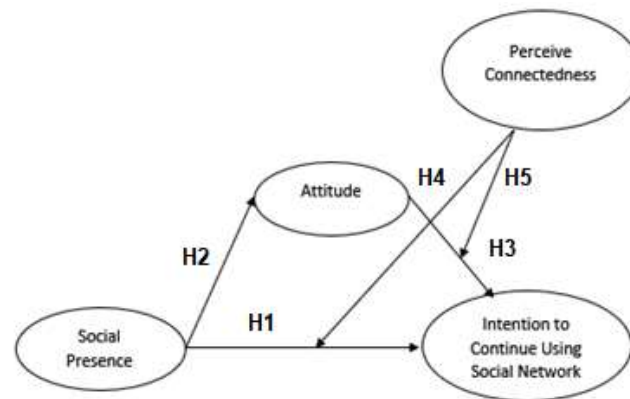

Fig. 1. Research Framework

2.6 Methodology

This study employed a quantitative research method And used convenience sampling. A link was sent to potential participants asking for their willingness to participate in this study. The online survey period was from June 2020 to April 2021 during their online lectures during the COVID-19 pandemic and the large-scale social restriction period in Indonesia.

The population of this research comprised active students at BINUS University (Universitas Bina Nusantara) in the odd and even semesters of 2020, totaling 28,437 students. It was assumed that all students had access to network sites. To determine the sample size using known population figures, the Slovin formula was employed: $n = N/(1+Ne2)$, where *'n'* represents the sample size, *'N'* signifies the population size, and *'e'* denotes the margin of error set at 5% to attain a minimum sample size of 395.

Confirmatory factor analysis was used to assess the fit of the proposed theoretical model with the observed data. utilizing AMOS 25 is considered a reliable statistical software to do the test. To examine the effects of social presence on users' intentions and the moderating effect of perceived social connectedness, IBM SPSS 25 with the process macro was employed. This approach enabled the comprehensive analysis of a complex model involving moderating and mediating variables simultaneously.

2.7 Measurement

This study utilized the construct of social presence, which was defined by Biocca et al. [7], which consists of three dimensions: co-presence, intimacy, and immediacy [3, 8, 56]. The measurement of social connectedness utilized a scale developed by Lee, Draper, and Lee [43], which assesses interpersonal behaviors on social network sites. Specifically, the study used 20 items adopted from Lee and Robbins [42] and Lee, Draper, and Lee [43] to measure social connectedness (SC).

For the attitude variable, three items were adopted from Davis, Bagozzi, and Warshaw [18]; Ajzen and Fishbein [20]; as well as Al-Debei, Al-Lozi, and Papazafeiropoulou [2]. This construct, widely used in previous studies, has been shown to effectively measure attitude. User intention to continue using social networks was measured using 2 (two) items adopted from Taylor and Todd [54]; Moore and Benbasat [47]; Gardner and Amoroso [22]; and Al-Debei, Al-Lozi, and Papazafeiropoulou [2]. All measurements were rated on a five-point Likert-type scale (1 = strongly disagree to 5 = strongly agree).

3. Results and discussion

3.1 Respondent Demography

The study collected data from 514 participants, with 41 pieces of information excluded because of redundancy or insufficient attention to the questions. Among the remaining 473 participants, 18% were female, and 82% were male. Regarding social network usage, 5% of the students reported using a social network for less than an hour, 41% used it for one to three hours, and 54% claimed to use it for more than three hours. The top four social networks used by respondents for communication with friends or

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family were Line (21.04%), Instagram (19.94%), YouTube (18.23%), and WhatsApp (17.86%). Facebook (7%), Twitter (6.49%), Telegram (3.64%), LinkedIn (3.31%), and Pinterest (2.49%) were considered as secondary options. On average, the respondents owned four social network accounts.

3.2 Variable Measurement

Accurate measurement of variables is crucial for a reliable statistical analysis. To ensure this, a Confirmatory Factor Analysis (CFA) was conducted to assess the validity of the variable constructs before the primary analysis. The analysis, performed using AMOS 25, indicated that all indicators for social presence (SP) were valid, with no loading factors below 0.5. However, only seven out of the 20 indicators for social connectedness (Conn) were included in the analysis, as 13 indicators with a factor loading below 0.5 were excluded. All indicators for attitude (Att) and continued use (C-Use) were found to be valid, and none were removed. These results suggest that the constructs fit the data well, with all indicators having p-values of less than 0.05, as shown in Table 1.

The results of the CFA analysis also indicated a CMIN/DF value of 2.623. This result suggests a good fit, as it is below five (Wheaton et al., 1977). Additionally, the model fit statistics showed a CFI of 0.926, TLI of 0.911, and RMSEA of 0.059. These values indicate that the variable constructs fit the data well [6, 10, 34].

Table 1: *Standardized Item Estimates*

Standardized Regression Weigh

			Estimate	S.E.	C.R.	P
IN01	<---	Intimacy	0.74			
IN02	<---	Intimacy	0.795	0.069	16.216	***
IN03	<---	Intimacy	0.788	0.073	16.121	***
IM01	<---	Immediacy	0.681			
IM02	<---	Immediacy	0.738	0.083	13.199	***
IM03	<---	Immediacy	0.733	0.085	13.134	***
CP01	<---	Co_Presence	0.693			
CP02	<---	Co_Presence	0.511	0.077	9.455	***
CP03	<---	Co_Presence	0.761	0.091	12.807	***
SC19	<---	Social_Closeness	0.524			
SC17	<---	Social_Closeness	0.549	0.15	8.905	***
SC16	<---	Social_Closeness	0.604	0.167	9.45	***
SC14	<---	Social_Closeness	0.626	0.134	9.626	***
SC13	<---	Social_Closeness	0.635	0.13	9.706	***
SC12	<---	Social_Closeness	0.613	0.138	9.54	***
SC11	<---	Social_Closeness	0.524	0.12	8.636	***
SC07	<---	Social_Closeness	0.604	0.141	9.455	***
AT01	<---	Attitude	0.65			
AT02	<---	Attitude	0.796	0.097	13.354	***
AT03	<---	Attitude	0.785	0.097	13.265	***
BI02	<---	Behavioral_Intention	0.911			
BI01	<---	Behavioral_Intention	0.829	0.061	15.383	***

Direct and Indirect Effects

In addition to testing the direct impact of social presence on users' intention to continue using social networks, Hayes' Process macro for SPSS was employed to examine its indirect impact of social presence on user intention to continue using social media. This study utilized Hayes' moderating and mediating model (model number 15) to analyze the mediating and moderating effects of attitude and perceived connectedness, as illustrated in Fig 2.
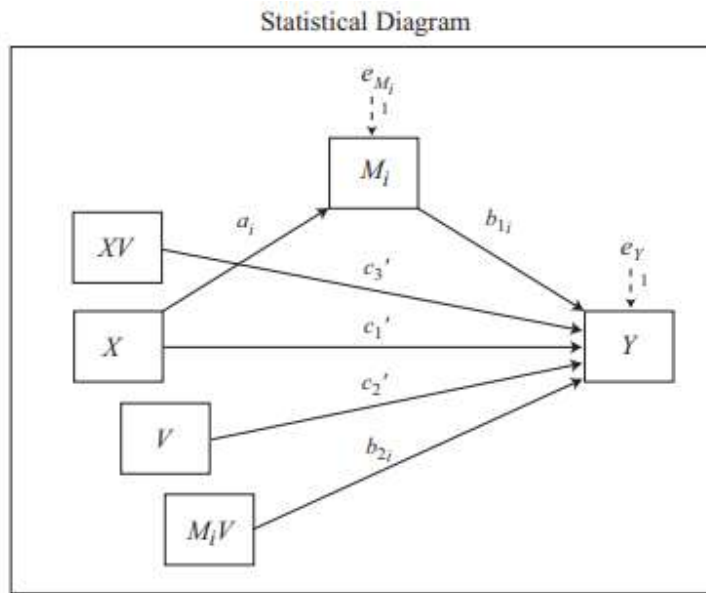
Statistical Diagram

Fig. 2. Hayes Interaction Model 15

Sources: Hayes, A. (2013). Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach. (T. Little, Ed.). New York: The Guilford Press

X = Social presence (SP)

M = Attitude (Att)

V = Social connectedness (Conn)

Y = Intention to continue using social networks (C-Use)

The results indicate a significant positive influence of social presence (SP) on users' intention to continue using (C-Use) a social network (t=2.418; p=0.016). This finding confirms Hypothesis 1, which suggests that SP directly affects C-use. It was also found that attitude positively affected C-use (t=9.57; p=0.000), From this result, Hypothesis 3 was also confirmed. The significant effect of SP on attitudes (t=12.36, p=0.000) also confirms Hypothesis 2. Both Social Presence and attitude are important aspects influencing a user's decision to continue using a particular social network. The direct effect of SP on C-Use was 0.1717, while the indirect effect was 0.2814 (Table 3). Therefore, the total effect of SP on C-Use was 0.453.

Table 2. Interaction Model Output

Model : OUTCOME VARIABLE: C_Use

	coeff	se	t	p
constant	4.0703	.0317	128.4242	.0000
SP	.1717	.0710	2.4185	.0160
Att	.5297	.0553	9.5751	.0000
C_Use	.0405	.0766	.5286	.5974
Int_1	.4051	.0844	4.7969	.0000
Int_2	-.3738	.0901	-4.1511	.0000

Product terms key:

Int_1	:|	SP	x	Conn
Int_2	:	Att	x	Conn

Table 3. Indirect Effect

INDIRECT EFFECT:

SPren -> Att -> C_Use

Conn	Effect	BootSE	BootLLCI	BootULCI
-,5343	,3875	,0544	,2898	,5016
,0000	,2814	,0406	,2085	,3673
,5343	,1753	,0483	,0877	,2781

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3.3   Moderating and Mediating Effects

The interaction analysis also indicated that social connectedness (Conn) moderates the effects of SP and attitude on user intention to continue using social networks. The results reveal that social connectedness moderates the effect of SP on C-Use (Int_1) with t=4.7969 and p=0.000 (Table 2). Moreover, social connectedness was found to affect the relationship between attitude and C-use (Int_2) with t=-4.15 and p=0.000. In other words, social connectedness moderates the mediating effect of attitude on users' intention to continue using social networks. Therefore, Hypotheses 4 and 5 are confirmed.

Table 4. Conditional Effect of Connectedness on the Relationship between SP and C-Use

Focal predict: SP   (X)
         Mod var: Conn   (W)

Conn	Effect	se	t	p
-,5343	-,0447	,0820	-,5450	,5860
,0000	,1717	,0710	2,4185	,0160
,5343	,3882	,0862	4,5032	,0000

The conditional effect of social connectedness on the relationship between SP and C-use is presented in Table 4. At lower levels of social connectedness, the moderating effect was not significant (p=0.5860). However, at medium to high levels of social connectedness, the moderating effect was found to significantly influence the relationship of SP on C-Use (p=0.0160 and p=0.0000).
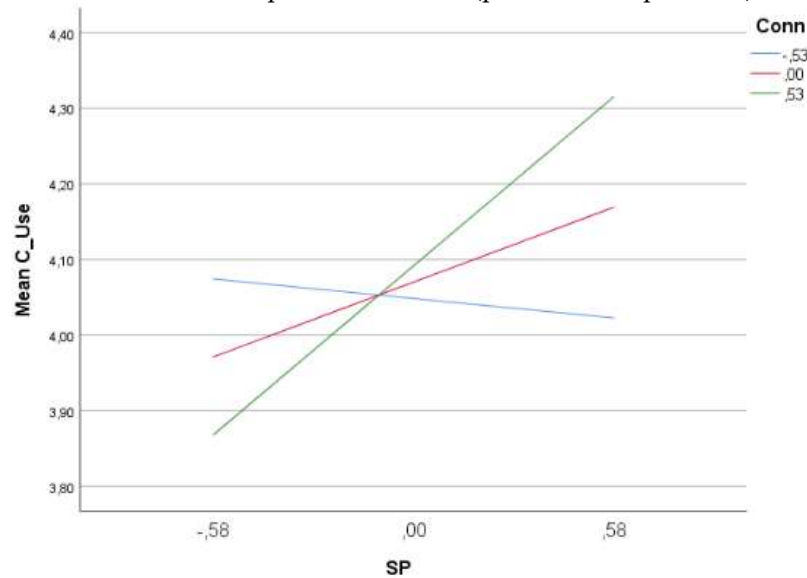

Fig. 3. Conditional Effect of Perceived Connectedness on the Relationship between SP & C-Use

Fig 3 illustrates that among users with low levels of social presence, those with a medium level of social connectedness (red) exhibit a higher intention to continue using social networks compared to those with a high level of social connectedness (green). Conversely, among users with a high level of social presence, those with a high level of social connectedness (green) demonstrated a greater intention to continue using social networks than those with a medium level of social connectedness (red).

Table 5: Conditional Effect of Connectedness on the Relationship between Attitude and C-Use

Focal predict: Att   (M)
         Mod var: Conn   (W)

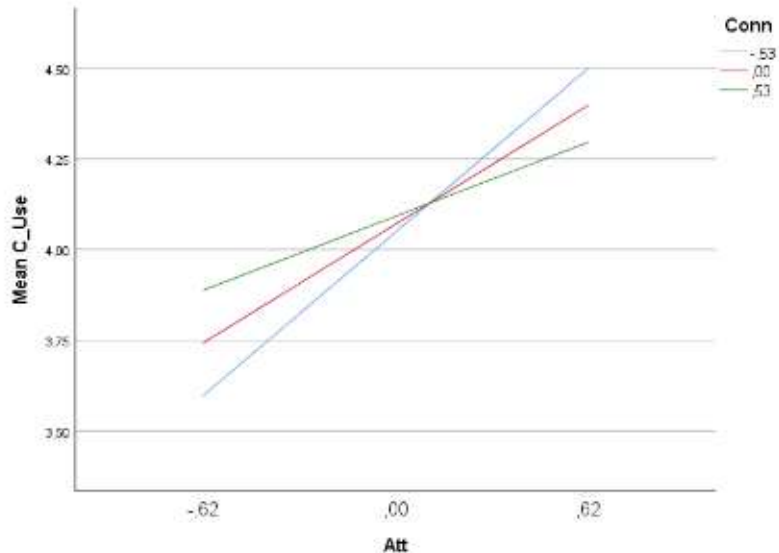| Conn	Effect	se	t	p
-,5343	,7294	,0696	10,4846	,0000
,0000	,5297	,0553	9,5751	,0000
,5343	,3300	,0769	4,2917	,0000

Fig. 4. Conditional Effect of Perceived Connectedness on Attitude as the Moderating Variable toward C-Use

Table 5 indicates that the conditional effect of social connectedness on attitude, acting as a mediating variable between social presence and C-use, is significant across all levels of user social connectedness (low, medium, and high). Furthermore, Fig 4 illustrates that among the users with low (negative) attitudes, those with high social connectedness (green) demonstrate a greater intention to continue using social media than those with medium and low social connectedness (red and blue). However, the scenario is different for high-level (positive) attitudes, in which users with low social connectedness exhibit a greater intention to continue using social media than those with medium and high social connectedness.

3.4. Discussion

Social presence can be defined as a psychological aspect resulting from human interaction activities, manifesting as a feeling of connectedness or emotional intimacy. Despite its significance, few studies have investigated the role of social presence in technology adoption. This study contributes to this limited body of research by exploring the impact of social presence and perceived connectedness on users' intention to continue using social networks.

This finding affirms that social presence indeed affects users' intention to continue using social networks. This result aligns with the findings from Park and Lee's [49] study, which found that social presence directly relates to user continuance in using social networks. Notably, among three previous studies that investigated the direct effect of social presence [49, 21, 25], only Park and Lee's (2010) study established this direct impact on the intention to continue using social networks. Therefore, this study provides recent support for the findings of Park and Lee.

These results suggest that in computer-mediated communication, social network sites play a crucial role in providing users with the feeling that they are interacting with other humans, not with computers [16]. To achieve this, social network sites must develop information systems that can convey human reactions. Features such as image viewing and emoticons can enhance social presence [30], potentially reducing user anxiety. Wei, Chen, and Kinshuk [56] found that users who feel comfortable communicating through social media tend to interact more frequently with their peers in their circle.

Several scholars have explored the indirect effect of social presence on the intention to continue using social media. This study confirms that social presence indirectly influences the intention to continue using social networks through attitudes, aligning with the findings of Cheikh-Ammar and Barki [11]. Furthermore, this study has established the positive impact of attitude on the intention to continue using social networks. It was found that attitude had a positive effect on the intention to continue using social networks, consistent with the conclusions of Chiang [13], Cheikh-Ammar and Barki [11], and Dixit and Prakash [19]. Therefore, this study provides robust evidence of the enduring influence of attitude on intention, which is consistent over time.

The most interesting finding of this study was the conditional effect of social connectedness. When the social connectedness variable was introduced to the model as a moderating variable between social presence and the intention to continue using social networks, the results revealed that among

users with low social presence (those who perceive social media as lacking the ability to effectively convey human interaction), those with high social connectedness had less intention to continue using social networks. Conversely, users with low and medium levels of social connectedness showed a high intention to continue using social networks. This difference could be attributed to the expectations of users with high connectedness not being met by social networks, leading to a decrease in their intention to continue using social networks. On the other hand, users with low and medium social connectedness have higher intentions to continue using social media as the platform meets their expectations.

Among the users who perceived that social networking sites can provide a satisfactory sense of human interaction or those with a high social presence, those with high social connectedness exhibit a greater intention to continue using social networks compared to those with low social connectedness. This finding can be attributed to the fact that users with low social connectedness typically do not seek to develop personal relationships with other users when using social networks. They may be hesitant to expose their identities or share their contact information. They only want to enjoy the features or facilities provided by the social networks. They use social networks for entertainment purposes. Therefore, if a social network offers more connectivity features or requires users to provide their personal information before use, those with low social connectedness are less likely to continue using the social network.

This study aligns with Grieve et al. [27], who argued that social connectedness in social networks is complex. Additionally, it corroborates the findings of Rahman et al. [50], who established that a lack of social connectedness leads users to abandon e-commerce sites. However, to the best of our knowledge, there is no evidence from previous studies regarding the moderating effects of social connectedness on the relationship between social presence and the intention to continue using social networks.

This finding is particularly intriguing as it highlights that social network users have different expectations and needs on social network sites. Moreover, the finding aligns with Lu and Yang's [45] research, indicating that users are likely to remain engaged with a social network site if it effectively meets their requirements for social interaction, connection, or communication. There seems to be a shift in social network site usage behavior, where previously, a majority of users concentrated on communication and relationships, but are now prioritising leisure and entertainment. When utilizing social networks that offer more entertainment options, there is an indication that, although users still wish to learn about other users, they do not necessarily desire close relationships or share their personal information. This finding expands the field of human-computer interaction, as previous studies have mainly explored the impact of entertainment features on users' decisions to continue using social networks [36].

Furthermore, this study also discovered that social connectedness moderates the relationship between attitude and intention to continue using social networks. Among users with low-attitude toward social networks, those with high social connectedness have a strong intention to continue using them. This suggests that even if users have an overall negative attitude toward social media, feeling highly connected to others on these platforms may still provide value or enjoyment. However, the situation changes when considering users with a high attitude toward social networks. Among users with positive attitudes toward social networks, those with high perceived connectedness have less intention to continue using them. This implies that users who already have a positive attitude toward social media may not rely as much on social connections to motivate their usage; instead, they may be more attracted to the platform's content or features, regardless of their social connections. This finding supports Cheikh-Ammar and Barki [11], who revealed that attitudes significantly impact technology adoption.

Overall, this study suggests that the relationship between social connectedness, attitude, and intention to continue using social media is complex, and varies depending on users' levels of social connectedness and attitudes toward social media. The results demonstrate that user connectedness can either enhance or diminish the influence of attitude on the intention to use, providing valuable insights into the dynamics of social network usage. Users with varying levels of social connectedness and attitudes are likely to exhibit distinct motivations and preferences regarding their uses of social media platforms.

4. Conclusion

Based on the findings presented in the excerpt, several conclusions can be drawn regarding the relationship between social presence, social connectedness, attitude, and the intention to continue using social networks. First, it reveals that the interplay between social presence, social connectedness, attitude, and intention to continue using social networks is multifaceted and dynamic. It involves various moderating and mediating factors, rather than a simple direct relationship. Second, social presence significantly influences users' intention to continue using social networks. Users perceive the social presence of social networking differently, and this perception can affect their attitudes and intentions toward social media platforms. Third, social connectedness moderates the relationships between social presence, attitude, and intention. Users' levels of social connectedness shape their attitudes and intentions toward social networks, with varying effects depending on their perception of social presence. Fourth, attitudes toward social networks significantly influence users' intentions to continue using them. Users with positive attitudes are more likely to continue using social networks, whereas those with negative attitudes may still be influenced by factors such as social connectedness. Fifth, users have diverse expectations and needs when using social networks, ranging from communication and relationship-building to leisure and entertainment. Sixth, the study highlights a shift in user behavior toward more leisure- and entertainment-oriented usage, with implications for platform design and features. There is evidence of a behavioral shift in social network usage, where users are less focused on communication and relationships and more focused on entertainment. This has implications for how social networks are designed and the features they offer to cater to the evolving needs and preferences of users. Finally, the findings contribute to the literature on human-computer interaction by providing insights into the complex dynamics of social network usage and the factors that influence users' attitudes and intentions.

This research highlights the importance of understanding the intricate relationship between social presence, social connectedness, attitudes, and the intention to continue using social networks. Considering these factors, businesses and platform developers need to grasp the complex interconnections between social presence, social connectedness, and user intentions to enhance user experience and engagement. Thus, developers should offer customizable connectivity features, allowing users to tailor their social interactions based on their preferences and comfort levels, whether they seek casual interactions or deeper social connections. Given the shift towards leisure and entertainment-oriented usage, developers should strike a balance between entertainment features with tools to foster meaningful relationships. Platforms should provide diverse content and activities that cater to both aspects, ensuring that users find value beyond mere entertainment. Moreover, platforms should dynamically adapt user experiences based on individual preferences, attitudes, and levels of social connectedness. This may involve leveraging machine learning algorithms to personalize content recommendations, communication suggestions, and platform interactions to align with the evolving needs and expectations of users.

The findings of this study enrich the field of human-computer-mediated interactions by revealing the complex dynamics and multiple aspects of social presence, social connectedness, attitude, and the intention to continue using social networks. Specifically, this study highlights the moderating role of social connectedness in shaping the relationship between social presence, attitude, and user intentions. Future research could explore additional moderating factors, such as cultural differences, personality traits, and situational factors, that influence user behavior in online social contexts. By investigating user perceptions and attitudes toward privacy-enhancing technologies and social networking features, researchers can develop design guidelines that balance the desire for social connectivity with privacy and identity management concerns. Furthermore, researchers can utilize the findings from this study to develop personalized and adaptive user interfaces by incorporating machine-learning algorithms and data analytics techniques. These interfaces can be tailored to individual preferences, behaviors, and social connections, potentially resulting in more engaging and relevant interactions that resonate more profoundly with users.

However, future studies should address several limitations to produce more rigorous results. Firstly, the respondents in this study were predominantly students with particular characteristics, which may limit the generalizability of the findings to other populations. Secondly, the results of this

study may not be applicable tp different social networking platforms or contexts due to factors such as platform features, user demographics, and cultural differences, which can influence the relationships between variables in diverse settings. Thirdly, this study was conducted during the COVID-19 pandemic, when all students were studying from home. During this time, all students had increased interaction with their friends through social media. This condition may potentially also influence their emotions towards social media. Fourthly, the Confirmatory Factor Analysis (CFA) resulted in the exclusion of 13 items from the perceived connectedness variable construct out of the 20 items initially considered. Therefore, future studies may consider using different constructs to measure perceived connectedness. Additionally, this study utilized variables from the fields of human-computer interaction and technology adoption. Future research could focus on human-computer-mediated interactions to uncover the relationship mechanisms between social presence and perceived connectedness.

Author Contributions
V. Vidayana: Conceptialization, formal analysis, funding acquisition, investigation, methodology, project administration, resources, supervision, validation, visualization, writing – original draft, and writing – review & editing. B. Burhanudin: Conceptialization, data curation, formal analysis, investigation, methodology, project administration, resources, software, supervision, validation, and writing – review & editing. I. Lokaadingroho: Data curation, project adminstration, and resources. M. S. Mansuan: Data curation.

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Declaration of Competing Interest
We declare that we have no conflict of interest.

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