



Exploring the pathway from seeking to sharing social support in e-learning: an investigation based on the norm of reciprocity and expectation confirmation theory

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Abstract

E-learning is increasingly evidenced as a conduit for social support exchange among students and protects them against mental health issues, however, the cognitive process of how social support is exchanged remains unclear. This study uses a cognitive theory approach to achieve a more nuanced explanation of students sharing or giving social support in e-learning. Specifically, we adopted the Norm of Reciprocity and Expectation Confirmation Theory to reveal the interconnection between students' perceived social support and giving social support in learning. The model is empirically validated based on survey data of 512 respondents from college students across China regarding their e-learning experience during the first wave of Covid-19. Our findings suggest that the relationship between perceived social support and giving social support is significant and positive, and this relationship is partially mediated by confirmation of social support. These findings imply that e-learning can foster a self-reliant environment for social support exchange among college students. Under such an environment, students' cognitive process in their seeking and sharing social support is majorly following the norm of reciprocity and secondary expectation confirmation theory.

Keywords Social support · E-learning · The norm of reciprocity · Expectation confirmation theory

Introduction

The uncertainty in the pandemic development, as well as a decreased face-to-face social interaction as a result of the social distancing policy, has raised concern for students' mental health issues (Dhawan, 2020; Hu et al., 2022b; Mailizar et al., 2021). E-learning seems an unlikely platform to protect students against psychological distress, however, an increasing number of studies have investigated the feasibility of leveraging e-learning to exert positive influences on the psychological well-being of students (Cong, 2020; McBrien et al., 2009; Song et al., 2004). Similar to social network

sites, e-learning encompasses interactive functions that can foster important channels for students to connect with others and feel a sense of community (Hu et al., 2022b). Such connection is extremely necessary for situations, such as Covid-19, where face-to-face interactions are not available or insufficient: it facilitates students' voicing fears, expressing emotions, and seeking companionship. Differently, the connecting relationship in e-learning are established on close social ties (e.g., with peers, with instructors) rather than uncertain social ties (e.g., with netizens), which can be properly controlled to attenuate the negative influence caused by social overload, the flooding of misinformation and negative emotions (Islam et al., 2020; Maier et al., 2015).

Despite the potential, empirical evidence on e-learning exerting positive influences on students' mental health issues is far less. While the prevailing literature on social support mainly revolves around social network sites (Li et al., 2015; Maier et al., 2015; Zhu et al., 2021), there is a need to investigate social support in the context of e-learning. This is because social interaction in e-learning differs from other social network sites in terms of interactive quantity

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and quality. Social support literature posits that the quality of social support is largely dependent on the frequency of social interactions (Shinn et al., 1984). Indeed, by comparison, e-learning platforms that were not initially designed for social interaction may encompass far less social interaction than other social network sites. Despite the less interaction frequency, e-learning may be more likely to form a conduit for quality social support provision. This is because social interactions in e-learning are established on strong ties (e.g. students with peers, students with instructors) rather than weak ties (e.g., with netizens), which according to social capital theory (Ellison et al., 2007), is more likely to “provide individuals with actual assistance or with a feeling of attachment to a person or a group that is perceived as caring or loving” (Hobfoll & Stokes, 1988). With the contradicting arguments above, it is intriguing to further probe into the formation of social support in e-learning to provide further empirical evidence on social support in e-learning.

Indeed, social support will not automatically occur (Cobb, 1976; Thoits, 1985). While the potential of e-learning in social support provision is confirmed in the literature (Cong, 2020; McBrien et al., 2009; Song et al., 2004), much less is known about whether or not the amount of social support in e-learning is sufficient (Bowling et al., 2005). Compared to non-crisis scenarios where the demand for social support might be sporadic, crisis scenarios such as the Covid-19 demand continued and reliable social support to cope with the prevailing psychological distress among students (Li et al., 2021). This means that e-learning not only needs to foster a mutual support community for social interactions like other social network sites do but also requires strong reciprocity relationships among individuals to provide quality social support. Scholars have attributed the unmatching or overloading of social support in social network sites to the weak ties in social interactions (e.g., with netizens) (Maier et al., 2015; Zarocostas, 2020). It is reasonable to assume that interaction in e-learning that is established on strong ties (e.g., with peers, with instructors) is prone to foster reciprocity and consequently lead to reliable social support provision however, requires empirical investigation.

To address this, we begin to connect the social support theory with cognitive theory to address this need. Specifically, the nature of connectedness to e-learning among students is investigated through the theoretical lens of social support, which according to Cobb (1976), is the provision of care, love, and protection to others. We then probe into the endogenous mechanism of social support in learning and examine the relationship between two constructs, namely perceived social support and giving using two cognitive theories, namely social exchange theory and expectation confirmation theory. The former emphasized the reciprocal relationship of the two constructs while the latter suggested the mediation effect of confirmation. The hypothesis model

is then empirically tested on 512 college students during the first wave of the COVID-19 pandemic. Findings reveal that perceived social support and giving social support are positively correlated, however, the mediating effect of confirmation is non-significant.

The remainder of this paper is structured as follows. The theoretical background is presented in the second section. The third and fourth sections describe the research hypotheses and method respectively. This is followed by analyzing the research results and discussing the practical and theoretical implications in the fifth and sixth sections. The conclusion, limitation, and scope for future research are summarized in the final section.

Theoretical background and hypothesis development

E-learning during the Covid-19 pandemic

The Covid-19 pandemic has dramatically disrupted college students' life. The sudden outbreak and the infectious virus have boosted the massive overnight adoption of e-learning in higher education. To avoid unnecessary social contact and limit the spread of the virus, universities worldwide have quickly launched online courses to make alternative education available for college students (Bao, 2020). While the lucrative side of e-learning in accessibility and flexibility has been exploited to retain college students' educational lives (Dhawan, 2020; Szopiński & Bachnik, 2022), students' psychological condition remains a major concern (Lee, 2020). For instance, Li et al. (2021) conducted a meta-analysis on the impact of the COVID-19 pandemic on mental health among college students and found that the rates for the prevalence of depression and anxiety were 39% and 36%, respectively.

Given that professional treatments such as outpatient visits are difficult and impractical (Shensa et al., 2020), scholars and practitioners (Apker, 2022; Li & Peng, 2021) started to investigate how to leverage the available resources in e-learning to fix or at minimum inhibiting the negative mental health impacts among college students. For instance, e-learning can form a community that enables social interactions which helps college students feel connected and emotionally supported (Li & Peng, 2021). These interactions that convey nurturance, reassurance, and guidance have a positive impact on college students' mental resilience (Wright et al., 2014). Further, Kaufmann et al. (2021) posited that appraisal and confirmation by peers or instructors are prone to increase college students' confidence, and self-efficacy, which further decreases their mental vulnerability during the Covid-19 pandemic. In spite of these sporadic arguments,

they are descriptive in nature: the theoretical background behind this remains unclear and requires further exploration.

Among many explanations, numerous scholars pointed out that the positive impact of e-learning on mental health could be explained through the theoretical lens of social support theory (Baloran, 2020; Elmer et al., 2020). A need, therefore, emerges to revisit the concept of social support.

Social support

Social support is broadly defined as the perception of the availability of care, love, and protection from other people (Cobb, 1976). The importance of social support has been repeatedly identified in the literature. In all, social support is considered to have a positive effect on buffering stress, psychical and psychological illness (Cohen & Wills, 1985), and elevating well-being (Thoits, 1985). Social support is a multifaceted construct (Lin et al., 2015). Many scholars provide a taxonomy of social support based on the content (Cohen & Syme, 1985; House, 1983). For instance, House (1983) classified social support into four types: informational, emotional, instrumental, and appraisal support. Existing social support literature is majorly revolving around the concept (Langford et al., 1997; Shumaker & Brownell, 1984), the taxonomy (Cohen & Syme, 1985; House, 1983), and its influence on psychological well-being (Hu et al., 2022a; Thoits, 1985), there are only a few studies investigated the formation of social support (Bowling et al., 2005; Li et al., 2015; Lin et al., 2015). For instance, Bowling et al. (2005) argued that the antecedents of the behavior in giving social support are two-fold: personability and reciprocity. The former dimension explains the influence of individual differences (e.g., extraversion, agreeableness, neuroticism) on behavior, while the latter dimension stresses the cognitive process of social support exchange. Specifically, numerous constructs are proposed, for instance, perceived social support, received social support, enacted social support, or giving social support (Bowling et al., 2005). In another study, Lin et al. (2015) investigated the social support exchange behavior by connecting different types of received social support received to the willingness to offer social support. Likewise, Li et al. (2015) examined the interaction in Facebook by connecting perceived social support with giving social support.

In line with Lin et al. (2015) and Li et al. (2015), the central motivation of this study is not to provide a holistic view of the antecedents of individuals' behavior in giving social support, but to emphasize the social support exchange behavior, or refers to reciprocity process by Bowling et al. (2005). Therefore, we major considered variables directly related to the social support exchange behavior. In literature, numerous constructs are proposed to reveal the psychological process of social support exchange, for instance, perceived social support, received social support, enacted

social support, or giving social support (Bowling et al., 2005). The present study deployed perceived social support and giving social support for investigating the formation of social support in e-learning for two main reasons. First, our central motivation resides in investigating the formation of social support in e-learning, it is necessary to examine the pathway from perceived to giving social support. Specifically, the perception of social support in e-learning is likely to reinforce students' belief in the usefulness of e-learning in facilitating them to cope with stress and anxiety, which, in turn, motivates their responsibility to pay back to those in need (Gouldner, 1960). Second, we choose the construct of perceived social support over received social support because the prevailing literature posits that perceived social support is more relevant to psychological well-being (Apker, 2022; Malecki & Demaray, 2003). Indeed, during Covid-19, the simple perception of the availability of companionship in e-learning would foster a sense of security and a sense of community, which is beneficial to cope with loneliness and fear of the virus (Apker, 2022; Hu et al., 2022a).

Social support in e-learning

Extensive studies have attempted to connect social support with e-learning. The availability of social support is confirmed in literature (Apker, 2022; Hsu et al., 2018; Tannert & Gröschner, 2021). Like any other online-based platform, e-learning encompasses interactive features that can serve as a conduit for the provision of care, love, information as well as advice (Shumaker & Brownell, 1984). For instance, Apker (2022) highlighted that e-learning encompasses close relationships (e.g., students-to-peers, students-to-instructors) that can manifest different types of social supports: companionship from peers and appraisal from instructors can be deemed as emotional support; tangible advice, appropriate guidance can be deemed as informational support. Another vein of scholars investigated the direct influence of social support on students' e-learning intentions. For instance, Hsu et al. (2009) posited that social support can exert positive influences on students' perceived gains, sense of community, and self-efficacy, which further instigated their intention in MOOC. Likewise, Tannert and Gröschner (2021) explore how different social support sources (e.g., support by family, support by the school, and student-teacher relationship) can benefit students' self-efficacy and general joy in e-learning. Further, recent studies argued that social support may impose a larger influence on addressing the mental health issues associated with e-learning than the education function itself. Further, the recent massive adoption of e-learning during Covid-19 has unprecedentedly highlighted the need to address mental health issues associated with e-learning. This is because students in e-learning are required to cope with different facets of mental health issues, such as uncertain in

the virus (Li et al., 2021), lacking face-to-face interactions (Szopiński & Bachnik, 2022), and online learning adaption (Fawaz & Samaha, 2021). Indeed, during Covid-19, the simple perception of the availability of companionship in e-learning would foster a sense of security and a sense of community, which is beneficial to cope with loneliness and fear of the virus (Apker, 2022; Hu et al., 2022a).

Hypothesis development

In this study, we would like to exploring the pathway from seeking to sharing social support in e-learning. In doing so, we considered three potential pathways, including (1) the reciprocity between perceived social support (Fig. 1a); (2) the mediation effect of confirmation social support between perceived and giving social support (Fig. 1b); and (3) the moderation effect of confirmation social support between perceived and giving social support (Fig. 1c). The detail hypothesis development is illustrated as follows:

Social exchange theory

Social exchange theory offers a theoretical ground to understand the cognitive process between perceived and given social support. SET posits that social behavior is an exchange process where individuals behave interdependent and contingent on the actions of others (Boz Semerci & Tayfur Ekmekci, 2020). The influence of others can be understood as social norms, which shape individuals' perceptions and behaviors (Ostrom, 2000). The complex

interactions between the perceived and giving aspects of social support can be explained by the norm of reciprocity, which assumes that individuals tend to feel an obligation to repay benefits in response to benefits conferred by others (Gouldner, 1960). In other words, when individuals perceive benefits from others, they feel indebted and try to reciprocate in a manner that is beneficial to the community. The reciprocity norm motivates the support recipient's intention to give an action that has a positive effect (Falk & Fischbacher, 2006).

In the context of e-learning, the sustaining of social support is dependent on the reciprocal behaviors among peer students. The norm of reciprocity implies that when a student perceives social support (i.e., nurturance, reassurance, and guidance) from their peers or instructors, they feel obligated to return social support to other peers as well. Thus, the more perceived social support available is likely to encourage students' greater intention to engage in social support exchange, leading to more behaviors of giving social support (Wu et al., 2019). On the other hand, the more students give, the more they expect from other students in return (Li et al., 2015). Therefore, we conjectured accordingly that:

Hypothesize 1: In e-learning, giving social support is positively related to perceived social support among college students.

Expectation confirmation theory

Another vein of scholars suggested that the relationship between giving social support and perceived social support is not linear. Expectation confirmation theory (Oliver, 1977) offers a theoretical basis to explain the influence of expectations on students' behavior in e-learning. Specifically, expectation confirmation theory highlights the importance of confirmation in determining satisfaction or behavior (Bhattacharjee, 2001). In particular, college students are most likely to participate in e-learning with certain expectations (e.g., informational support, and emotional support). Expectation confirmation theory explains that the perception of social support may not directly be converted to individuals' behavior of giving support back to the community, but only those perceptions that match the expectation would instigate individuals' behavior in giving social support back. when the perceived social support outperforms their expectations, or the confirmation is positive, it will motivate their act of providing support to others in need. On the opposite, when the perceived social support underperforms their expectations, or the confirmation is negative, students may be demotivated to participate in giving social support to those needs. We conjectured accordingly that:

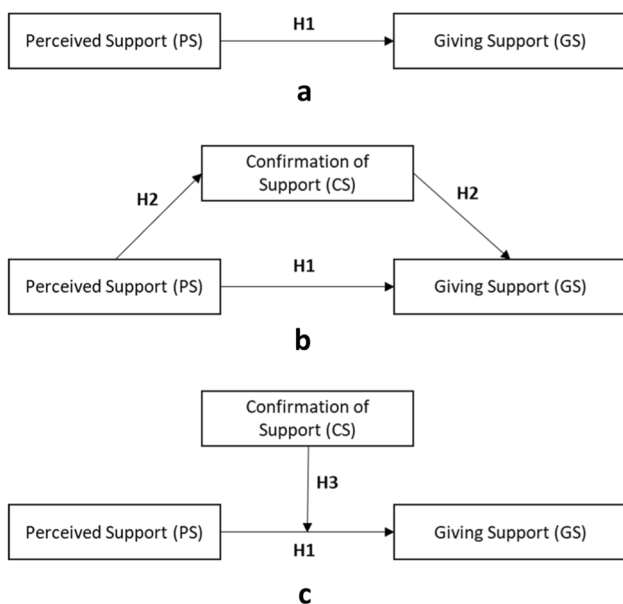


Fig. 1 Conceptual models

Hypothesize 2: In e-learning, confirmation of social support mediates the relationship between perceived social support and giving social support among college students.

In addition, psychology literature argued that individuals are also subjected to confirmation bias (Nickerson, 1998). This means that the confirmation would not exert direct influence on the behavior, but only reinforce individuals' belief in the already existing perceived-giving social support relationships. Particularly in e-learning, if students are aware that their needs can be fulfilled by the perceived social support in the e-learning community or the confirmation is positive, their beliefs in the usefulness of social support would be reinforced, which further motivates their acts of providing social support to others in need. On the other hand, if their needs are not confirmed, their beliefs in the usefulness of social support will be attenuated by the unsatisfied needs, further consequence in demotivating their act of giving social support back to those in need. Accordingly, we proposed:

Hypothesize 3: In e-learning, confirmation of social support moderates the relationship between perceived social support and giving social support among college students.

Methodology

Instrument and data collection

This study adopted a quantitative cross-section surveys approach as the main instrument for data collection. Specifically, a self-reported, well-structured questionnaire

was developed based on the literature. The questionnaire was then distributed to college students in China regarding their experience of e-learning during the first wave of the COVID-19 outbreak in China (spring semester of 2020). We selected six cities as the scope of this study, including Beijing and Qingdao in the north, Xiamen in the south, Wuhan in the center, Shanghai in the east, and Chongqing in west China, respectively. The link to the questionnaire was sent through WeChat to university students that have undergone e-learning during the spring semester of 2020. Besides, to cover areas, not in the abovementioned cities, we recruit respondents on the online (Weibo) platform. In the survey, all the participations were completely voluntary. In the survey, we explained the objective of this study and clarified that all the information in the survey is confidential and for research purposes only. Moreover, since the survey is in Chinese, this study followed the back-translation method (Bhalla & Lin, 1987). The wording, legibility, and suitability of the questionnaire were also checked by 4 graduate students and 2 undergraduate students before online delivery. In all, a total of 613 respondents were recruited and the survey yielded a total of 512 complete, valid responses (response rate 84%) for the data analysis. The descriptive statistics are represented in Table 1.

Dependent and independent variables

In this study, our central motivation resides in exploring the pathway from perceived to giving social support in e-learning. Thus, giving social support is considered the dependent variable. Giving social support is measured using four items, representing four dimensions of social support (House, 1983) - appraisal, emotional,

Table 1 Descriptive statistics for the sample

	N	%	Mean	S.D.
Gender				
Male	313	61.13%		
Female	199	38.87%		
School Year	512		2.04	1.19
Location				
Beijing	66	12.89%		
Chongqing	79	15.43%		
Shanghai	55	10.74%		
Qingdao	69	13.48%		
Xiamen	68	13.28%		
Wuhan	61	11.91%		
Weibo	114	22.27%		
Perceived Support (PS)	512		2.33	0.95
Confirmation Support (CS)	512		2.47	1.04
Giving	512		2.18	0.88

informational, and instrumental. The measurement scale for giving social support is adopted from Fan and Suh (2014) and adapted to the e-learning context (see Table 2). Specifically, the respondents were asked based on their experience; to what extent they are willing to give the four kinds of social support to others who are needed in e-learning. Each item was measured using a 5-point Likert-type scale anchored from strongly agree (1) to strongly disagree (5).

For the independent variables, perceived social support is considered as the antecedent for students giving social support. We again followed the taxonomy by House (1983) and separated the construct into four types (see Table 2). For each type, we further considered that the source of social support can be multiple, including peers and instructors (Bernard et al., 2009; Luo et al., 2017). Hence, for each type of perceived social support, two measuring items are developed. All the measures for the constructs were adopted from prior studies (Federici & Skaalvik, 2014; Malecki & Demaray, 2003; Weng et al., 2015) and adapted to suit the context of this study. Each item, was measured using a

5-point Likert-type scale anchored from strongly agree (1) to strongly disagree (5).

To explore the mediation effect of the confirmation, the construct confirmation of social support is considered as another independent variable. The measurement scale for the confirmation of social support is adopted from Fan and Suh (2014) and adapted to the e-learning context (see Table 2). Specifically, the respondents were asked whether the four kinds of social support they perceive in e-learning are beyond their expectations. Each item was measured using a 5-point Likert-type scale anchored from strongly agree (1) to strongly disagree (5). The detailed constructs and measurements are listed in Table 2.

Control variables

In the regression model, we controlled for the demographic variables including gender (1 = female and 0 = male), school year (1 = freshmen, 2 = sophomore, 3 = junior, 4 = senior), and respondent locations. Besides, given that the maturity of the student is prone to influence their seek and share

Table 2 Constructs and measurements

Constructs	Items	Measures	References
Perceived Support (PS)			
PS-Appraisal	PSA1	In e-learning, my peers nicely tell me the truth about how I do things	Malecki and Demaray (2003)
	PSA2	In e-learning, my instructors nicely tell me the truth about how I do on things	
PS-Emotional	PSE1	When I encounter difficulties during e-learning, my peers are willing to listen and provide the empathy, care, and other emotional support I need.	Weng et al. (2015)
	PSE2	When I encounter difficulties during e-learning, my instructors are willing to listen and provide the empathy, care, and other emotional support I need.	
PS-Informational	PSIF1	When I use e-learning, my peers will provide information, advice, and guidance.	Weng et al. (2015)
	PSIF2	When I am using e-learning, my instructors will provide the relevant information and help me improve my performance.	
PS-Instrumental	PSIT1	When there is something I do not understand during e-learning, I can always turn to my peers for tangible aid.	Federici and Skaalvik (2014)
	PSIT2	When there is something I do not understand during e-learning, I can always turn to my instructors for tangible aid.	
Confirmation of Support (CS)			
CS-Appraisal	DSA	The affirmation that I received is beyond my expectation.	Fan and Suh (2014)
CS-Emotional	DSE	The empathy, care, and other emotional support that I received are beyond my expectation.	
CS-Informational	DSIF	The informational advice and guidance I received are beyond my expectation.	
CS Instrumental	DSIT	The tangible aid that I received in e-learning is beyond my expectation.	
Giving Support (GS)			
GS-Appraisal	RSA	Based on my experience, I am willing to provide affirmation to others who are needed in e-learning.	Fan and Suh (2014)
GS-Emotional	RSE	Based on my experience, I am willing to provide empathy, care, and other emotional support to others who are needed in e-learning.	
GS-Informational	RSIF	Based on my experience, I am willing to provide information, advice, and guidance to others who are needed in e-learning.	
GS-Instrumental	RSIT	Based on my experience, I am willing to provide tangible aid to others who are needed in e-learning.	

behavior in e-learning, we also controlled for the maturity level. The school year was chosen over the age because we argued that education intervention in college could impose a larger effect than the age itself. Given that the maturity of the students is prone to influence their seek and share behavior in e-learning, we also controlled for the age. In terms of respondent locations, we considered four classifications: Beijing or Shanghai (representing the megacity), Wuhan (representing the most seriously affected area), Online, and other cities (e.g. Chongqing, Qingdao, Xiamen).

Analysis procedure

The present study followed a two-step approach. Because all dependent and independent variables are unobserved variables, to validate the reliability and validity, confirmatory factor analysis is conducted to validate the reliability and validity of all the measurement items. To better unravel the effect of the control variable and the mediation and moderation effect of the confirmation, we use a hierarchical multiple regression approach for hypotheses testing. Four models are proposed. The effects of control variables are tested in model 1. The main effect of perceived social support (H1) is tested in model 2 (Fig. 1a). In model 3, the confirmation of social support is added as a mediator between the perceived and giving social support and the mediation effect (H2) is tested (Fig. 1b). Finally, confirmation of social support is added as a moderator between the perceived and giving social support and the moderation effect (H3) is examined through model 4 (Fig. 1c).

Results

Confirmatory factor analysis

The reliability was assessed by indexes of the factor loading, Cronbach’s α , and composite reliability (CR). According to Hair (2010), outer loading for the indicators above 0.7 is considered good reliability while between 0.35 and 0.7 is considered acceptable. In this study, all factor loadings (Table 2) exceed 0.7 except for PSIF2 (0.670), indicating good indicator reliability. The internal consistency reliability

was measured using Cronbach’s α , composite reliability (CR). Referring to Urbach and Ahlemann (2010), the recommended value for both should be above 0.7. All composite reliability values Cronbach’s α values are larger than 0.7, suggesting a high level of internal consistency reliability.

Constructs	Items	Standardized factor loading	Composite reliability	Alpha
Giving Support (GS)	GSA	0.718	0.910	0.904
	GSE	0.906		
	GSIF	0.865		
	GSIT	0.886		
Confirmation of Support (CS)	CSA	0.807	0.923	0.923
	CSE	0.878		
	CS IF	0.880		
	CS IT	0.899		
Perceived Support (PS)	PSA1	0.837	0.936	0.943
	PSA2	0.844		
	PSE1	0.831		
	PSE2	0.818		
	PSIF1	0.779		
	PSIF2	0.670		
	PSIT1	0.824		
PSIT2	0.815			

The model is examined with different model fit indices, including the chi-square test statistic, the goodness of fit index (GFI), the non-normed fit index (NNFI), the comparative fit index (CFI), and the root-means-square-error of approximation (RMSEA), are examined. Table 3 listed the recommended value, and the reference for all the model fit indices. By comparison, the actual values of all the model fit indices met within the recommended value, indicating a superior level of model fit.

Hypothesis testing

The testing results for all models are depicted in Table 4. H1 posited that giving social support is positively related to perceived social support among college students in e-learning. In the main effect model (Model 2), the correlation coefficient between the perceived social support and giving social

Table 3 Model fit indices for the structural model

Model fit indices	Results	Recommended value	Reference
Chi-Square statistics χ^2/df	2.598	≤ 5	Hartwick and Barki (1994)
GFI	0.941	≥ 0.8	Hsu et al. (2018)
MNFI	0.967	≥ 0.9	Hartwick and Barki (1994)
CFI	0.979	≥ 0.9	Hartwick and Barki (1994)
RMSEA	0.058	≤ 0.08	Hsu et al. (2018)

Table 4 Hierarchical multiple regression analysis results

	Giving Social Support (GS)							
	Model 1		Model 2		Model 3		Model 4	
	Beta	S.E	Beta	S.E	Beta	S.E	Beta	S.E
Gender (Female = 1)	-0.015	0.074	-0.032	0.051	-0.015	0.050	-0.017	0.050
School Year	0.107*	0.030	-0.006	0.021	-0.005	0.021	-0.002	0.021
Respondent Location								
Online	-0.095	0.111	-0.008	0.077	-0.003	0.076	0.001	0.076
Beijing or Shanghai	0.079**	0.131	0.042	0.091	0.041	0.089	0.045	0.090
Wuhan	-0.052	0.126	-0.019	0.088	-0.033	0.086	-0.050	0.091
Others	-0.109*	0.117	-0.013	0.082	-0.009	0.080	-0.028	0.087
Perceived Support (PS)			0.720***	0.031	0.566***	0.046	0.562***	0.046
Confirmation Support (CS)					0.207***	0.039	0.207***	0.039
Interaction: PS*CS							0.029	0.019
Adjusted R^2	0.060		0.549		0.565		0.565	
R^2 Change	0.075***		0.483***		0.017***		0.001	

$N = 512$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

support is positive and significant ($\beta = 0.720, p < 0.001$), confirming that students' perception of the availability of social support is a major antecedent of their giving social support. Further, H2 posited that confirmation of social support mediates the relationship between perceived social support and giving social support. The main effect model (Model 2) and the mediation effect model (model 3) are compared to validate the hypothesis. Especially when the mediator is added to the model, the correlation between perceived social support and giving social support drops from $\beta = 0.720$ in model 2 to $\beta = 0.566$ in model 3 while the correlation between confirmation of social support and giving social support is significant and positive ($\beta = 0.207, p < 0.001$). This means that confirmation of social support does partially mediate the relationship in H1. Thus, H2 is partially confirmed. Last but not least, H3 posited that the confirmation moderates the relationship between social support and giving social support. The hypothesis is rejected by the insignificance of the interaction effect and the R^2 Change.

Discussion

Reciprocity of students seeking and sharing social support in e-learning

While extensive studies have argued that students are seeking social support in e-learning (Apker, 2022; Dhawan, 2020) and social support generally contributes to better coping with mental health issues (Cohen & Wills, 1985; Thoits, 1985), the sustainability of social support requires students not only to seek but also to share social support

in e-learning. Compared to the current studies that mainly focused on connecting different facets of social support to psychological well-being (Li et al., 2015), we argued that in turbulent times (e.g., Covid-19) that featured scarce resources, it is important to check if social support can be self-reliant before further discussing its potential influence (Balsari et al., 2020). Thus, our central motivation for this study is to use a cognitive theory approach to achieve a more nuanced explanatory framework of the underlying motivations for students sharing or giving social support in e-learning.

Our main effect model confirms the reciprocity relationship between students seeking and sharing social support in e-learning. Specifically, the perceived social support is positively and significantly related to their giving social support in e-learning with an effect size of 0.720, which is a large effect according to the guidance by Cohen (1992). This means when students are perceived social support from others, according to the norm of reciprocity (Gouldner, 1960), their feeling of indebtedness would most likely motivate them to give social support to those needed. This finding aligns with the work by Li et al. (2015) that the intention of giving social support is highly correlated with the perceived social support on Facebook. Unfortunately, the causality between perceived and giving social support cannot be validated because of the limitation of the survey-based method and the regression model we used in this study. Still, based on the strong positive relationship between students seeking and sharing social support, we argue that e-learning can form a self-reliant environment for social support exchange.

Moreover, compared to social network sites in a similar Chinese context such as Weibo ($\beta = 0.476, p < 0.001$) (Han et al., 2018), the effect size ($\beta = 0.720, p < 0.001$) in this

study is much larger. The much larger correlation implies that it is more likely to foster a reciprocity relationship in e-learning than in social network sites. This finding can be explained by the social capital theory (Putnam, 1995). Students in e-learning are bonding social capital emanating from strong ties, which are more likely to foster a close relationship for social support exchange, while on the other hand, netizens in social network sites are emanating from weak ties, which is less likely to form the reciprocal influence (Vitak & Ellison, 2013). In combination, we argued that the strong reciprocity of students seeking and sharing social support in e-learning suggests that e-learning could be an underestimated arena for social support provision than extensively explored social network sites.

The mediation effect of confirmation in students seek and share social support

Likewise, e-learning is a less explored area for social support provision, our second motivation is to probe into whether students realized or expected social support in e-learning. According to the Expectation Confirmation Theory, we posited that if social support is expected in e-learning, the confirmation of social support would have a mediation effect on the transaction of social support and vice versa. In social support literature, Thoits (1985) suggested that social support matching or confirming actual needs could impose a large effect on psychological well-being, it would be interesting to verify whether similar phenomena apply in the student's cognitive behavior in social support seek and share. Our finding implies that confirmation partially mediates the relationship between perceived social support and giving social support. In other words, in addition to the norm of reciprocity, Expectation Confirmation Theory can also explain the proportions of students' cognitive processes. This result is in line with studies (Hrastinski, 2008; Schworm & Gruber, 2012) that students are seeking help in e-learning. In addition, it implies that the disconfirmation of students' expectations in social support may demotivate their behavior in giving social support. According to the norm of reciprocity, if students' needs are not confirmed, they may feel less of a sense of indebtedness, which consequence in fewer payback behaviors payback.

The explanation for the partial mediation effect of the confirmation resides in the multi-dimension feature of social support: not all types of social support are expected similarly in e-learning. While the potential of e-learning in the provision of intangible social support (e.g., emotional support) is identified in the literature (Apker, 2022; Hu et al., 2022b), e-learning is still considered mainly as a learning paradigm even in Covid-19 (Dhawan, 2020; Mailizar et al., 2021). This is to say students may expect informational support (e.g., knowledge) but may not necessarily consider e-learning as

a conduit for companionship or voicing fear (emotional support). In turn, this finding implies that the full potential of e-learning in a different type of social support provision is not exploited in practice. The mediation effect would otherwise be stronger.

Practical implications

This study has three major implications for practitioners. First, the model depicts that the transaction of social support in e-learning follows the norm of reciprocity where the giving social support is positively and significantly related to the perceived social support. This suggests that universities and higher education institutes that would like to promote college students' mental health resilience can leverage the positive relationship to create a reciprocity environment for social support exchange: the more perceived social support contributes to the more giving behavior, and the more giving social support, in turn, adds to the more available of it in e-learning community. Further, the hypothesis that the confirmation of social support has a mediating effect on the transaction of social support is partially confirmed. This finding pointed out an important gap in the current e-learning practice: the potential of e-learning in transacting social support, especially emotional support, is not exploited. To address this, institutions can leverage e-learning as a conduit for the exchange of social support among college students, which could potentially support them to cope with not only their academic work but also anxiety and depression. Finally, the finding in this study implies that strong interpersonal (bonding) ties among students are not automatically transferred from offline to online. Put differently, face-to-face interactions cannot be replaced by online interactions. As such instructors should pay close attention to the subtle psychological changes among students and adapt the teaching paradigm accordingly to offer them opportunities for varied types of social interactions.

Theoretical implications

The theoretical implication of this study is three-fold. First, this study enriches the context of social support by arguing that e-learning can serve as a conduit for social support exchange, especially in turbulent times. We call for more research attempts to explore the potential of e-learning in social support exchange in normal settings as well as in turbulent times such as Covid-19. The second contribution revolves around the formation of social support. We use a cognitive theory approach to probe into the sustaining condition of social support. By integrating social exchange theory and expectation confirmation theory with social support theory, we explicitly built the relationship between perceived social support and giving social support, facilitating a

comprehensive understanding of how social support is generated in e-learning as well as social network sites. Finally, the cognitive model that we use in this study is expected not only to reveal the motivation of students seeking and sharing social support behavior but can also link to psychological distress coping behaviors, which contribute to the mental health literature.

Conclusions and limitations

The present study approaches how social support sustains e-learning from the perspective of students' cognitive process. Specifically, we connect social support literature with cognitive theory to explore motivations for students' behavior of giving social support. The proposed model examines the reciprocal relationship between students' seek and share behavior in social support exchange and the mediation effect of confirmation. The model is empirically validated using survey data from 512 students across China regarding their e-learning experience during the first wave of the Covid-19 pandemic. Empirical evidence in this study reveals that the perceived social support is significantly and positively related to the giving social support and this relationship is partially mediated by confirmation. These results suggest that e-learning can form a self-reliant environment for social support exchange where perceived social support is the primary motivation while confirmation can also partially contribute to students' behavior of giving social support.

This study is not without limitations. First, the proposed model is examined through empirical data from the sudden adoption of e-learning during the first wave of the Covid-19 pandemic where the social community is initially formed. It would be interesting to further investigate whether college students are expecting more social support when the e-learning community becomes mature. Therefore, future studies are encouraged to validate the proposed model by collecting multiple-wave data. Second, the study provides a prototype study on the motivation of giving social support in e-learning among college students. However, social support is a multi-fact construct that encompasses the different types of social support and students' cognitive process are likely to vary across different dimensions. Future studies are encouraged to separately investigate the four types of social support to provide a more comprehensive view. Finally, according to Bowling et al. (2005), there are two facets of influence mechanism on social support formation, namely personality, and reciprocity. Since the main focus of this study resides in identifying the reciprocity between individuals' perceived and giving social support in e-learning and its condition, we do not incorporate variables such as personal traits and external environments (Bowling et al., 2005; Langford et al., 1997). Yet, it is necessary to incorporate personality and

environmental variables into the cognitive models to provide a holistic review of the formation of social support in e-learning.

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Data availability The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Conflict of interest The authors have no conflicts of interest to declare.

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