



Online Learning at Higher Education

The Mediating Role of the Fear of COVID-19 Between Students' Sustainable Engagement and Their Social Presence

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Abstract. Students' engagement and social presence are the most critical components for effective online learning. Despite all technological advancements online teaching and learning is still a challenge, especially during emergencies. The pandemic COVID-19 situation has unlocked new dimensions of research in online teaching and learning to explore better engagement and interaction strategies, especially at higher education. Therefore, keeping in consideration the significance of the area this cross-sectional quantitative study was conducted through simple random sampling of a total of 422 university students by using the explanatory research design to explore the relationships between student engagement (SE) and social presence. The findings of this study revealed that the six dimensions of students' engagement is significantly associated with the social presence in online learning. Teacher-student interaction enhances social presence and student engagement, accumulates trust and associations, and communication through teachers' answers in online learning. While fear of COVID-19 has insignificant mediated effects on students' engagement as well as on their social presence in online learning.

Keywords: Online Learning · Students Engagement · Social Presence · Fear of COVID-19

1 Introduction

The effective method of learning and teaching online has become critical in the era of uncertainties and emergencies. The sudden breakout of COVID-19 has made all sectors take paradigmatic alterations in workplace practices for smooth and least interrupted functioning. This situation of pandemic not only caused fear but also instigated several challenges for students, teachers, and higher educational institutions all over the world [1]. Among these crises, students' engagement and their social presence in online learning were few of them.

With the increased significance of online learning especially during emerging, uncertainties, emergencies, low resources [2] and lockdowns, it has become inevitable to explore how online learning can be made effective by increasing students' engagement

[2] and their social presence. The engagement of students in online learning is influenced by several factors, including interactive content [3], audio-visual and text-enabled virtual classroom features, visibility of learners to each other in real-time, instant feedback, motivation to participate in learning activities, easy access to learning materials, and community learning. [4]. Similarly, [5] found that students who perceived a high level of social presence and experience active learning were satisfied with their instructor. Sufficient reach data is available on how social presence is associated with effective online student engagement but how it is affected during uncertainties, lockdowns and the most recently emerged situation of fear of COVID-19 pandemic is in the research gap. Therefore, this study is planned to see how fear of COVID-19 mediates between students' engagement and social presence in online learning.

1.1 Objectives of the Study

- 1 To investigate the relationship between students' engagement and social presence in online learning.
2. To get a deeper understanding about the mediating relationship of fear of COVID-19 between students' engagement and social presence in online learning.

2 Literature Review

2.1 Students' Engagement in Online Learning

Students engagement is critical almost at all level of education but at higher education its significance multiplies because of its significance for developing higher-order thinking skills which leads the learners to become self-regulated learners and solve problems in their practical life on the basis of the previous knowledge [6]. Students' engagement both in physical and online learning environments is a challenge for teachers at almost every level of education all over the world. The sudden hit of the pandemic COVID-19 altered the teaching and learning style from physical to online, which caused frustration in the education sector as teachers were observed not prepared with pedagogical transition and students were not equipped with the learning strategies or use of technological resources [7]. The situation becomes more stressful in developing countries where the availability and quality of resources were the challenge [8]. This affected students' engagement [2, 9] as well as their social presence in online learning.

Student engagement can be characterized as the extent to which students display attentiveness, inquisitiveness, fascination, positivity, and enthusiasm during their learning experiences. This encompasses their level of motivation and drive to acquire knowledge and advance in their educational journey [10]. The general expression of "student engagement" is understood when the students are "inquisitive", "interested", or "inspired", their learning is improved and when they are disengaged when "bored", "dispassionate", their learning is suffered. Students' engagement is appraised by the interaction with other students in an online discussion forum [11]. It is assumed more critical when the mode of teaching is online and the environment is fearful because of COVID-19.

Several other expressions of engagement in the physical learning environment are observed to inform students' determination to learn, interest in learning, interest in learning the subjects, feeling of inclusion to a class, deep learning, self-regulation, and interpersonal connections with others [12, 13], communication with instructors, knowledge construction, application, and understanding [12]. Whereas [14] identified that in online learning students express their engagement by discussing their learning with peers, motivation to learn, devoting a suitable amount of time, and can apply the technology to take online classes. Since online learning has become a frequently practiced paradigm of teaching and learning, therefore, it is required to explore the dimensions of students' participation in an online learning environment. This will help not only in improving the students' experience with online learning but also will help in reducing the high dropout rate of the students in an online learning system as it is validated in several researches that low student's engagement is the cause of high dropout rate in online learning [15].

[16] found student engagement as a combination of behavioral engagement, cognitive engagement, and emotional engagement. Behavioral engagement is the basic form of engagement, is explicit and observable, and mainly includes student's specific behaviors in the learning process such as attention, asking questions, and participating in class discussion [17]. Cognitive engagement mainly refers to the use of learning strategies, that is, students grasp and control mental effort in learning, and the use of different learning strategies will lead to different levels of thinking. It is demonstrated in form the kind of efforts students spend on the assigned classroom tasks, self-regulation and motivation [18]. Emotional engagement mainly refers to students' emotional reactions, including interest, boredom, happiness, sadness, and anxiety [19].

Online teaching and learning have controversial debates about its effectiveness and students engagement. Some studies support online learning saying, it increases the student's engagement and motivation [20]. While others argue about its ineffectiveness [21]. Students' active participation in online learning is well explore and many associated factors are reported that learning material, generous amount of preparation time and role of the instructor are few significant factors associated with their effective engagement in online learning. Several factors have been explored for students effective engagement but in this study, the framework developed by [6] is taken as it looks more comprehensive one and relevant to the current situation of COVID-19 when students' intrinsic motivation, analytical problem-solving skills, peer collaboration, teacher-student communication, community support and learning management system (LMS) [6] were observed as ineffective due to life-threatening fear of COVID-19.

2.2 Social Presence in Online Learning

Social presence is described as the "quality of medium through which an individual can interact" in a mediated environment [22]. Students' successful engagement in learning is the reflection of effective teaching and their social presence is a key the factor of digital learning [23]. Although, several factors are associated with effective online learning, social presence is frequently reported [24]. It is described as the connection between students and instructors and the absence of this connection in online learning can lead to feelings of social disconnection, dissatisfaction, and monotony [25] which can lead to

student turnover [26]. It is shared by the researchers that the degree of this connectedness can increase the students' deeper learning and academic achievement. [23] also increases their engagement and satisfaction. Social presence is directly proportional to students' engagement [27]. The peer-to-peer interaction is considered a fundamental aspect of student engagement, whether in virtual or physical environments [28]. A number of factors have been investigated during COVID-19 in regard to online learning effectiveness, including internet access [29], using new technologies for learning, anxiety, sharing content in the target language [30], and choosing the right Learning Management System (LMS) to meet the needs of students [31]. [32] also discovered that engaging students in expressive collaborative online learning stimulates their feelings of belonging and therefore enriches their learning process.

2.3 Mediating Role of Fear of COVID-19 in Online Learning

Fear is defined as an unpleasant state of emotions caused by a perceived threat and arouses our natural physical defense mechanism to react and strive for survival [33]. Fears are normal in human life [34] but a constant and prolonged state can cause damage to our physical as well as mental health. The recently emerged fear of COVID-19 has caused generalized anxiety [35], especially among the adult learners experiencing social distancing and isolation [36]. Few researches have validated that fear and learning are closely associated and affect relationship development and responsiveness.

Many researches are available on the associated fears of learners in traditional classrooms [37] while few are available in online learning environment. Fear is expressed in many ways by the students e.g; avoiding participation, excessive talking, repeatedly asking off-topic questions, consistent absenteeism, and ignorance of the topic [37].

It has also been observed that the fear of COVID-19 is less physical and more psychologically based [38]. The current study aims to examine factors associated with extreme fear in a specific context and how this life-threatening fear has mediated between the students' engagement and their social presence in online learning which has become the most preferred mode for the smooth functioning of education system almost at all levels.

3 Methodology

Through simple random sampling, a cross-sectional survey of 422 students was conducted using an explanatory design, which sought to determine if there was a relationship between Student Engagement (SSE) and Social Presence (SP), with Fear of COVID-19 serving as a moderator. The scale of Students Sustainable Engagement in Online Learning measures on six major dimensions comprised of Psychological Motivation (PM) with 6 items, Peer Collaboration (PC) with 5 items, Cognitive Problem-Solving Skills (CPSS) with 5 items, Interaction with the instructor (IWI) along 2 items, Community Support (CS) with 3 items and Learning Management has 3 items were adopted from [6] the instrument of Social presence was adapted from Strong, (2012) with 14 items as well as Fear of COVID-19 scale was adapted from [39] with 7 items rated on Five points Likert scale (1 = strongly disagree and 5 = strongly agree) by analyzed on SPSS version 21.

Table 1. Results of Demographic Section

Sr. #	Demographic Items	Freq.	%
1	Sector		
	Public	244	58%
	Private	178	42%
1	Gender		
	Female	228	54%
	Male	194	46%
3	City		
	Lahore Others	273	65%
		149	35%
	Total (N)	422	100%

4 Results and Interpretation of Demographic

Survey-based quantitative data were collected from a total of 422 respondents from various Public and Private sector universities across the Punjab region. The demographic results revealed that approximately 58% of the total participants/students belonged to Public sector universities whereas the remaining 42% comprised of participants representing Private universities. Male respondents represented 46% of the total sample whereas females made 54% contribution to the data collection process. It was also found that 65% of the students belonged to Lahore city, however, 35% of the participants made the representation of cities of Punjab region other than Lahore. These demographic results have been summarized in Table 1.

4.1 Descriptives, KMO Validity, Construct Reliability, and Correlation Analysis Descriptives

The findings Table 2, MSD values of the predictor construct were recorded as follows: Psychological Motivation ($\mu = 2.7295$, $\sigma = 1.01769$); Peer Collaboration ($\mu = 3.3427$, $\sigma = 0.84473$); Cognitive Problem Solving ($\mu = 3.1808$, $\sigma = 0.89646$); Interaction with Instructor ($\mu = 3.0308$, $\sigma = 0.94705$); Community Support ($\mu = 3.0695$, $\sigma = 0.96681$); Learning Management ($\mu = 3.3667$, $\sigma = 0.86509$). Fear of Covid-19 was found with mean of $\mu = 2.9831$ and standard deviation value $\sigma =$ of 0.98044. The final construct Social Presence showed a mean value equal to $\mu = 3.5060$ and Std. deviation i.e. $\sigma = 0.71669$.

4.2 KMO Indexes for Sample Appropriateness

Table 2 shows the outcome of EFA based on composed data sets from universities' participants. Accordingly, 1 item was removed from the formerly developed measurement scale of Social Presence given its factor loading exhibited a value less than 0.5. Likewise, for KMO indexes of Psychological Motivation was approached to 0.908 ($p < 0.05$); Peer Collaboration with KMO value of 0.840 ($p < 0.05$); Cognitive Problem Solving with KMO value of 0.871 ($p < 0.05$); Interaction with Instructor having a KMO index of 0.500 ($p < 0.05$); Community Support recording the KMO index of 0.714 ($p < 0.05$) and the KMO value for Learning Management was found to be 0.794 ($p < 0.05$).

4.3 Reliability Analysis

In the reliability, findings confirmed that Social Presence construct's reliability coefficient was $\alpha = 0.834$. For Fear of COVID-19, it was reported as $\alpha = 0.894$. The reliability value for Psychological Motivation was recorded as $\alpha = 0.930$. For Peer collaboration, the coefficient of reliability was approached to $\alpha = 0.825$. The Alpha reliability of Cognitive Problem Solving was $\alpha = 0.893$ and for Interaction with Instructor, it was found as $\alpha = 0.690$. Likewise, the Cronbach's Alpha indexes for Community Support and Learning Management were $\alpha = 0.714$ and $\alpha = 0.794$ respectively.

4.4 Correlation Analysis

Correlation analysis was directed among all the three variables considered for the intended research study. Accordingly, Psychological Motivation, Peer Collaboration, Cognitive Problem Solving, Interaction with Instructor, Community Support and Learning Management held significantly positive relationships with Social Presence of these university students i.e. $r(\text{PM}) = 56.9\%$, $r(\text{PC}) = 46.2\%$, $r(\text{CPS}) = 57.7\%$, $r(\text{IWI}) = 40.9\%$, $r(\text{CS}) = 56.7\%$, and $r = 48.1\%$ respectively at significance p -value < 0.01 . It means a strong positive association of PM, PC, CP Solving, Interaction with the Instructor, Community Support, and LM of the university students studying with their Social or collective existence. Likewise, Fear of COVID-19 consisted of slightly significant and moderately positive relationships with Psychological Motivation ($r = 12.9\%$) Peer Collaboration ($r = 14.8\%$), Cognitive Problem Solving ($r = 13.9\%$), Interaction with Instructor ($r = 13.4\%$), Community Support ($r = 16.9\%$) and Learning Management ($r = 21.6\%$).

This showed that students' fear of COVID-19 was related to their collaboration at a peer level, cognitive problem solving, and interaction with their instructor, community support, and learning management. Moreover, there was an insignificant association between the Fear of COVID-19 and Social Presence. This led to the idea that the community presence and social interactions of the university students across Punjab remain unaffected and unaltered even in face of having a strong Fear of the COVID pandemic. The correlation analysis's findings have also been summated in the Table 2.

Table 2. Correlations between Fear of COVID-19, Students Engagement, and Social Presence in Online Learning

Constructs	PM	PC	CPS	IWI
PM PC CPS IWI	---- 55.9%**			
CS LM	71.5%**	---- 68.5%*		
F_COVID SP	45.8%**	* 51.7%*	----	
	59.3%**	* 64.3%*	54%**	
	52.8%**	* 58%**	66.1%*	---- 51.0%*
	12.9%**	14.8%*	* 64.6%*	* 51.3%*
	56.9%**	* 46.2%*	* 13.9%*	* 13.4%*
		*	* 57.7%*	* 40.9%*
			*	*
N	422	422	422	422
Mean	2.73	3.34	3.18	3.03
Std. Deviation	1.01	0.84	0.89	0.94
Reliability	.930	.825	.893	.690
KMO Index	.908	.840	.871	.500

4.5 Mediated Regression Analysis

Mediation regression analysis was applied to examine the hypotheses considering the mediating role of fear of COVID-19 between the six independent dimensions of sustainable student engagement i.e. psychological motivation, peer collaboration, cognitive problem solving, interaction with the instructor, community support, learning management and social presence of the students.in the universities.

The results of the analysis of *mediating role of fear of COVID-19 between psychological motivation of students and their social presence* indicated that psychological motivation was a momentous predictor of students’ social presence at the university with $\beta = .124$, $SE = .05$, 95% CI [LLCI = .021, ULCI = .227], $p = .012 < .05$, and that fear of COVID-19 came out to be a insignificant predictor or determinant of students’ social presence at the university, $B = .001$, $SE = .032$, 95% CI [LLCI = -.0534, ULCI = .0724], $p = .767 > .05$. This result does not support the presence of mediational effect of fear of COVID-19 in relationship between PM and SP. It could be found that psychological motivation was a significant determining factor of social presence of the students after regulating the mediating variable, fear of COVID-19, $\beta = .400$, $SE = .0315$, 95% CI [LLCI = .338, ULCI = .462], $p = .000 < .05$, inconsistent with the full mediation effect. Approximately, 32% of the total variance in the social presence was reported for by predictor variable psychological motivation ($R^2 = .32$). An indirect effect was verified using percentile bootstrap valuation approach based on 1000 samples, executed by ‘PROCESS macro’ Mediation with Version 3 by [40]. These results indicated the indirect coefficient was insignificant, $\beta = .001$, $SE = .004$, 95% CI [LLCI = -.006, ULCI = .011], the partially standardized coefficient was $\beta = .002$ such that having higher psychological motivation was not associated with students’ social presence having negligible score of .001 such that the relationship of PM and SP was not mediated by fear of COVID-19 among the students.

The results of the *analysis of mediating role of fear of COVID-19 between peer collaboration students and their social presence* indicated that peer collaboration was also a crucial predictor of students' social presence at the university with $\beta = .172$, $SE = .065$, 95% CI [LLCI = .045, ULCI = .300], $p = .01 < .05$, and that fear of COVID-19 came out to be an insignificant predictor or determinant of students' social presence at the university, $\beta = .013$, $SE = .036$, 95% CI [LLCI = -.051, ULCI = .077], $p = .701 > .05$. This result also does not support the presence of mediational effect of fear of COVID-19 in relationship between PC and SP. It could be found that peer collaboration was a significant determining factor of social presence of the students after regulating the mediating variable, fear of COVID-19, $\beta = .391$, $SE = .042$, 95% CI [LLCI = .308, ULCI = .472], $p = .000 < .05$, inconsistent with the full mediation effect. Approximately, 21% of the total variance in the social presence was reported for by predictor variable peer collaboration ($R^2 = .21$). An indirect effect was verified using percentile bootstrap valuation approach based on 1000 samples, executed by 'PROCESS macro' Mediation with Version 3 by [40]. These results indicated the indirect coefficient was insignificant, $\beta = .002$, $SE = .006$, 95% CI [LLCI = -.007, ULCI = .018], the partially standardized coefficient was $\beta = .002$ such that having higher peer collaboration was not associated with students' social presence having negligible score of .002 such that the relationship of PC and SP was also not mediated by fear of COVID-19 among the students.

The results of the analysis of *mediating role of fear of COVID-19 between cognitive problem solving of the students and their social presence* indicated that cognitive problem solving was also a moderate predictor of students' social presence at the university with $\beta = .152$, $SE = .614$, 95% CI [LLCI = .031, ULCI = .272], $p = .01 < .05$, and that fear of COVID-19 came out to be an insignificant predictor or determinant of students' social presence at the university, $\beta = .004$, $SE = .031$, 95% CI [LLCI = -.056, ULCI = .065], $p = .887 > .05$. This result also does not support the presence of mediational effect of fear of COVID-19 in relationship between CPS and SP. It could be found that cognitive problem solving was the only significant determinant of social presence of the students after regulating the mediating variable, fear of COVID-19, $\beta = .461$, $SE = .041$, 95% CI [LLCI = .384, ULCI = .537], $p = .000 < .05$, inconsistent with the full mediation effect. Approximately, 33% of the total variance in the social presence was reported for by predictor variable cognitive problem solving ($R^2 = .33$). An indirect effect was verified using percentile bootstrap valuation approach based on 1000 samples, executed by 'PROCESS macro' mediation with Version 3 by [40]. These results indicated the indirect coefficient was insignificant, $\beta = .001$, $SE = .005$, 95% CI [LLCI = -.008, ULCI = .012], the partially standardized coefficient was $\beta = .001$ such that having higher cognitive problem solving of the students was not associated with their social presence having negligible score of .001 such that the relationship of CPS and SP was also not mediated by fear of COVID-19 among the students.

The results of the analysis of *mediating role of fear of COVID-19 between interaction with the instructor of the students and their social presence* indicated that interaction with instructor was also a significant predictor of students' social presence at the university with $\beta = .139$, $SE = .058$, 95% CI [LLCI = .024, ULCI = .253], $p = .02 < .05$, and that fear of COVID-19 came out to be an insignificant predictor or determinant of students' social presence at the university, $\beta = .023$, $SE = .034$, 95% CI [LLCI =

-.044, ULCI = .091], $p = .500 > .05$. This result also does not support the presence of mediational effect of fear of COVID-19 in relationship between IWI and SP. It could be found that interaction with instructor was the only significant determinant of social presence of the students after regulating the mediating variable, fear of COVID-19, $\beta = .306$, $SE = .036$, 95% CI [LLCI = .235, ULCI = .377], $p = .000 < .05$, inconsistent with the full mediation effect. Approximately, 17% of the total variance in the social presence was reported for by predictor variable interaction with instructor ($R^2 = .17$). An indirect effect was verified using percentile bootstrap valuation approach based on 1000 samples, executed by 'PROCESS macro' Mediation with Version 3 by [40]. These results indicated the indirect coefficient was insignificant, $\beta = .003$, $SE = .005$, 95% CI [LLCI = -.004, ULCI = .019], the partially standardized coefficient was $\beta = .005$ such that having higher interaction of students with instructor was not associated with their social presence having negligible score of .001 such that the relationship of IWI and SP was also not mediated by fear of COVID-19 among the students.

The results of the analysis of *mediating role of fear of COVID-19 between community support among the students and their social presence* indicated that interaction with instructor was also a significant predictor of students' social presence at the university with $\beta = .172$, $SE = .057$, 95% CI [LLCI = .059, ULCI = .284], $p = .002 < .05$, and that fear of COVID-19 came out to be a highly insignificant predictor or determinant of students' social presence at the university, $\beta = -.001$, $SE = .031$, 95% CI [LLCI = -.069, ULCI = .054], $p = .809 > .05$. This result also does not support the presence of mediational effect of fear of COVID-19 in relationship between CS and SP. It could be found that community support was the only significant determinant of social presence of the students after regulating the mediating variable, fear of COVID-19, $\beta = .422$, $SE = .031$, 95% CI [LLCI = .360, ULCI = .483], $p = .000 < .05$, inconsistent with the full mediation effect. Approximately, 32% of the total variance in the social presence was reported for by predictor variable community support among the students ($R^2 = .32$). An indirect effect was verified using percentile bootstrap valuation approach based on 1000 samples, executed by 'PROCESS macro' Mediation with Version 3 by [40]. These results indicated the indirect coefficient was insignificant, $\beta = -.001$, $SE = .006$, 95% CI [LLCI = -.013, ULCI = .009], the partially standardized coefficient was $\beta = -.001$ such that having higher community support among the students was not associated with their social presence having negligible score of -.001 such that the relationship of CS and SP was also not mediated by fear of COVID-19 among the students.

The results of the analysis of *mediating role of fear of COVID-19 between learning management system of the students and their social presence* indicated that learning management system was also a significant predictor of students' social presence at the university with $\beta = .245$, $SE = .066$, 95% CI [LLCI = .114, ULCI = .375], $p = .000 < .05$, and that fear of COVID-19 came out to be an insignificant predictor or determinant of students' social presence at the university, $\beta = -.014$, $SE = .034$, 95% CI [LLCI = -.081, ULCI = .054], $p = .689 > .05$. This result also does not support the presence of mediational effect of fear of COVID-19 in relationship between LMS and SP. It could be found that learning management system was the only significant determinant of social presence of the students after regulating the mediating variable, fear of COVID-19, $\beta = .402$, $SE = .043$, 95% CI [LLCI = .317, ULCI = .486], $p = .000 < .05$, inconsistent

Table 3. Empirical Results of the Analyses

Path	t-values (Standardized β Coefficients)		
	<i>Total Effect</i>	<i>Direct Effect</i>	<i>Indirect Effect</i>
PM SP	0.40(12.74*)	0.40(12.69*)	0.00(0.30)
PC SP	0.39(9.37*)	0.39(9.35*)	0.00(0.40)
CPS SP	0.46(11.78*)	0.46(11.79*)	0.00(0.14)
IWI SP	0.31(8.50*)	0.31(8.44*)	0.00(0.67)

with the full mediation effect. Approximately, 23% of the total variance in the social presence was reported for by predictor variable learning management system ($R^2 = .23$). An indirect effect was verified using percentile bootstrap valuation approach based on 1000 samples, executed by 'PROCESS macro' Mediation with Version 3 by [40]. These results indicated the indirect coefficient was insignificant, $\beta = -.003$, $SE = .009$, 95% CI [LLCI = $-.023$, ULCI = $.013$], the partially standardized coefficient was $\beta = -.005$ such that having a robust learning management system with instructor was not associated with their social presence having negligible score of $-.003$ such that the relationship of LMS and SP was also not mediated by fear of COVID-19 among the students.

Henceforth, it can be finally inferred that in Universities, PM, PC, CPS, IWI, CS and LM of the students directly stimulated and increased the social presence or communal presence of university students. Moreover, the intervention or mediation of fear of COVID-19 among students remained inconsequential intruder such that despite intervened or mediated by the fear of COVID-19 pandemic prevailing among them, their social interaction or communal presence and gathering remained unchanged. The empirical results of the analyses can be viewed in Table 3.

5 Discussion

Drawing upon the Social Constructivism theory of learning, the current study aims to investigate the between Student sustainable Engagement (SE) with six dimensions (psychological motivation, peer collaboration, cognitive problem solving, interactions with the instructor, community support, and learning management system) and Social Presence (perspectives), keeping the mediating role of fear COVID-19 among Pakistani university students in the online mode of learning. During the closure of educational institutions due to COVID-19, remote learning gives opportunity to students to continue to learn. In this way, students are more likely satisfied and their level of engagement is highly reported due to digital support strategies [41]. This mode of learning and teaching has posed challenges for the educational sector. it is a high level of stress and

anxiety among students because of remote learning has been reported. But not all the students have the same capacity to benefit from the digital mode of learning, some have reported continuous struggle to keep up with study and stay engaged and motivated [42]. Indeed, students required motivation especially when they are in stressful conditions. Without immediate instructor help in remote learning, students cannot build significant meaning through assuming agency in learning, and to foster conceptual comprehensive understanding through dynamic engagement with digital resources [43]. It is a fact that digital learning is challenging the environment for creating self-regulated capacities of the learners, students who do not self-regulated in learning will confront trouble in engaging learning. Consequently, it has been accounted for that an essential purpose behind this high drop rate of students' low engagement levels [44]. When learners are exceptionally engaged with their learning, consequently they can enhance their critical thinking and grades [45].

Despite the outbreak of COVID-19 has impacted the engagement of the students and teachers in the online learning environment [42]. The statistics of this study has shown social presence, psychological motivation, peer collaboration, problem-solving skills, interaction with an instructor, community support and learning management are highly reliable coefficient. Student motivation and commitment are impacted by a contextual-oriented component like a teacher and peer support [46]. Support of the instructor is a significant factor, as instructors assume an essential part in fostering student's motivation [47–49]. In terms, it has established that Psychological Motivation, Peer Collaboration, Cognitive Problem Solving, Interaction with Instructor, Community Support, and Learning Management held significantly positive relationships with the Social Presence of university students. The finding of the reliability among constructs is consistent with the previous study that commitment, motivation, and learning expectations are subsequential for problem-solving activities during the digital mode of learning. It is not surprising, student satisfaction belongs to motivation during the social presence of students in online learning [6].

Moreover, the mediating role of fear of COVID-19 between the psychological motivation of students and their social presence indicated that predictor of students' social presence came out to be an insignificant predictor or determinant of students' social presence. The following results do not support the presence of the mediational effect of fear of COVID-19 in the relationship between PM and SP. It could be found that psychological motivation was a significant determining factor of the social presence of the students after regulating the mediating variable, fear of COVID-19, inconsistent with the full mediation effect. It is a fact that digital learning is challenging the environment for creating self-regulated capacities of the learners, students who do not self-regulated in learning will confront trouble in engaging learning. Consequently, it has been accounted for that an essential purpose behind this high drop rate of students' low engagement levels [44]. When learners are exceptionally engaged with their learning, consequently they can enhance their critical thinking and grades [45].

Foremost, psychological motivation embodies students' thoughts and feelings like premium, expectations, and motivation that are identified with online learning. Learning expectations and learning motivation desires are fundamental for a more significant level of learning activities. Consequently, a social presence can influence the learner's

satisfaction with and motivation for online learning [50], and interestingly, this study demonstrated the student sustainable engagement (SSE) is positively associated with social presence during online learning. Similarly, [51] has shared that social presence has a significant impact on student engagement, especially in online classes. Motivation is described as an inner process changes that arouse behavior to attain the goals, mediated by the environment [52]. Similarly, Intrinsic motivation was found strongly correlated with successful learning and in everyday engagement [53]. Besides, remote learning has been affirmed to have been positively assessed while keeping students engaged and distracting them from the COVID-19 Pandemic [54]. On the contrary, interaction with the instructor was the only significant determinant of the social presence of the students after regulating the mediating variable, fear of COVID-19. By referring [55]'s instructor practices assume a significant part in cultivating student motivation during distance learning, an instructor can achieve this by empowering the students' autonomy, by ensuring learning, and being personally involved. Moreover, community support was the significant determinant of the social presence of the students after regulating the mediating variable, fear of COVID-19, with the full mediation effect. The community support is identified with the mental state of the students like the bond of sense of the community that is shared among students that are enrolled in a similar online course. The emotional feeling of belonging can be considered a major factor in the prevention of dropout and assist students to engage in online classes [6]. Such that having a robust learning management system with the instructor was not associated with their social presence. Although, the learning management system stresses social commitment in which students deal with their learning during dynamic participation in the digital classroom. Henceforth, it can be finally inferred that in Universities, psychological motivation, peer collaboration, cognitive problem solving, interaction with the instructor, community support, and learning management system of the students directly stimulated and increased the social presence or communal presence of university students. Moreover, the intervention or mediation of fear of COVID-19 among students remained inconsequential intruder such that despite intervened or mediated by the fear of COVID-19 pandemic prevailing among them, their social interaction or communal presence and gathering remained unchanged. The main factor of student sustainable engagement is composed of behavior, cognitive, and emotional engagement. Learning management system, interaction with instructor have associated with behavioral engagement, peer interaction/ collaboration in online climate and cognitive problem solving are corresponding with cognitive engagement while psychological motivation and support of the community are similar to emotional participation [6].

6 Conclusion

Around 1 billion and 575 million students from the 188 countries reported schools and universities closure because of preventive measures against the spread of deadly COVID-19 [42]. Due to confinement, the utilization of the technology has been considered the most appropriate choice to keep educational systems functional during the crisis. The shift of traditional classrooms to online classrooms has been evaluated as a good opportunity for instructors and learners to get more grounded, creative, and

innovative. Despite the declared changes and concerns, remote learning has positively reported students engaged and distracted with pandemics. The findings of this study revealed that student sustainable engagement is significantly associated with the social presence of university students. Teacher, student interaction enhances social presence and student engagement, assembles trust and associations, and communication through teachers' answers in online learning. In the event, these inquiries are the component of the instructor's social presence during an online class. On the other hand, Fear of COVID-19 has insignificant mediated effects on student sustainable engagement as well as insignificant effects on social presence in online learning among university students. Furthermore, Fear of COVID-19 has not played a significant role in the relationship between sustainable engagement and social presence in online learning of university students. It is meaningful that the actual learning circumstances in the online learning environment and more naturally subdivided the student's particular engagement behavior, cognitive cycle extending from the factors of engagement, keeping with the Fear of COVID-19 in the digital mode of learning.

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