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Examining the role of social connectedness and sense of humor on social presence in online learning environments

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Abstract
Social connectedness is the feeling of belonging to a network or engaging in social interactions and it pertains to the sense of community and interpersonal bonds that students establish in face-to-face or online learning environments. Social presence is one of the crucial components of online learning that describes how much users feel like they are interacting with actual people instead of just using digital interfaces. Sense of humor is a personal disposition that allows students to appreciate, produce, and use humor in social interactions and learning. This study aimed to investigate the role of social connectedness and sense of humor in social presence in online learning environments. Using a quantitative cross-sectional survey research model, students enrolled in Turkish higher education institutions who were recruited through convenience sampling were included in the study. Participants consisted of a total of 516 students between the ages of 18 and 52 with a mean age of 23.12 (SD = 5.30). Participants responded to an online survey consisting of demographic questions, Social Presence Scale (SPS), Sense of Humor Questionnaire 6 Revised (SHQ-6-R), and Social Connectedness Scale (SCS). Analyses showed that SPS was positively correlated with SHQ-6-R and SCS and they accounted for %9 of change in SPS along with some of the participant characteristics. Findings indicate that social connectedness and sense of humor are important in students' feeling of social presence in online learning environments and social psychological characteristics of students need to be considered in the design of instructional experiences in online learning environments.

Keywords Online learning · Social presence · Social connectedness · Sense of humor

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1 Introduction

In the wake of the COVID-19 pandemic, there has been a significant shift in the way educational institutions, private organisations, and public bodies deliver their services. The widespread adoption of online education platforms has become necessary, driven by various factors (Geary et al., 2023). Even as the world begins to recover from the pandemic, educational institutions at all levels continue to offer classes either entirely online or through a hybrid model, despite many reverting to traditional face-to-face teaching (Zhan et al., 2023). Universities, schools, and training facilities worldwide have undergone significant structural and technological changes in response to the evolving educational landscape. Some institutions have fully transitioned to online instruction for certain programs, while others have temporarily closed their doors (Dhawan, 2020). Therefore, the future of international education systems is being influenced by concerns regarding accessibility, student engagement, and the effectiveness of remote learning as digital education becomes increasingly popular (Hodges et al., 2020). This transition has led to an increase in online education platforms and methodologies, raising important questions about the quality and longevity of these digital solutions. There remains considerable debate regarding the duration and efficacy of online education systems, even as we move beyond the pandemic (Kesha et al., 2021).

As a result, educational institutions have begun reassessing their operational schedules, office hours, and the effectiveness of virtual learning environments. They are critically evaluating how participants and students engage in online sessions, with a particular focus on social connectedness and the maintenance of a sense of humor in these digital spaces. This 'digital culture clash' (Knox, 2014, p. 164) has introduced both benefits and challenges, necessitating a more detailed examination of online education. For instance, platforms such as Zoom, Google Meet, and Microsoft Teams experienced technical difficulties during their initial rollouts. Students, lecturers, and their families encountered challenges adapting to extended periods of online teaching. However, over time, they have generally become more accustomed to these new modalities (UNESDOC, 2020).

The long-term sustainability of online education and its effects on students and teachers have become increasingly important topics of discussion due to these changes in digital learning environments (Blankson et al., 2021). The conversation now extends beyond just technological concerns to address the deeper social and psychological impacts of virtual learning, as educational institutions continue to enhance their methods (Azmi et al., 2022). While there are recognised advantages—such as the accessibility of education to a broader audience, provided there is an internet connection and appropriate devices—there are also significant challenges. Online education can facilitate equal opportunities in accessing information, with high-quality resources, including books and articles, available either for free or at a low cost (Geçer & Bağci, 2022). Additionally, teachers can update content and recordings for students to review. Nonetheless, despite these positive aspects, the negative repercussions of online education, particularly highlighted by the recent pandemic, have triggered both social and personal anxieties. Teachers and students have reported various issues with online learning during lockdown periods. Teachers often lament the

lack of interactivity, while students struggle with establishing a sense of belonging in a virtual classroom and maintaining social connections. This disruption in social engagement contributes to a diminished sense of humor and less effective teaching (Bird et al., 2022).

Beyond its impact on the quality of instruction and learning, the decline in social interaction in online education raises concerns about student engagement and accountability. Virtual learning environments require students to remain attentive, actively listen, and take notes to retain information. However, the ability to keep cameras off often leads to disengagement, with some students becoming distracted by their phones, multitasking, or even sleeping during lessons (Gecer et al., 2023). This lack of active participation can significantly diminish social presence, hinder communication between students and instructors, and contribute to feelings of isolation and mental health challenges. As educational institutions worldwide continue adapting to this digital shift, understanding the key factors that influence student satisfaction and engagement in online learning has become increasingly critical (Tzafilkou et al., 2021).

2 Literature review

Social presence is a key factor in addressing the challenges of online education, significantly shaping student engagement and overall learning experiences. It has been widely explored in online education research, as it determines how learners perceive their interactions with peers and instructors. In this context, social presence refers to the extent to which individuals feel they are engaging with real people rather than merely interacting through digital interfaces. It is a vital component of the learning environment, fostering a sense of connection and creating a more engaging and supportive atmosphere that enhances student achievement (Cui et al., 2012). Rooted in interpersonal communication and symbolic interactionism, social presence theory posits that human-computer interactions are shaped by the level of perceived presence in digital communication (Kreijns et al., 2022). While face-to-face interactions naturally offer higher social presence, studies suggest that different forms of computer-mediated communication can vary in their ability to convey social presence (Whiteside et al., 2023). More recent research has applied social presence theory to examine the effectiveness of communication technologies in fostering meaningful, collaborative, and constructivist learning experiences in online education.

Social presence encompasses several critical components, including affective expression, open communication, and group cohesion. These elements significantly influence educational environments, whether they are conducted online or in traditional face-to-face settings. However, in the context of online learning, the concept of social presence takes on a distinctive meaning. It refers to the capacity of students to authentically project their social and emotional selves in the digital space, as well as their ability to perceive and interact with their peers as real, multidimensional individuals rather than mere avatars or text-based representations. In an online learning context, social presence plays a vital role in shaping how interactions unfold and how these interactions, in turn, affect both learning outcomes and social experiences.

When students can effectively convey their emotions and engage in meaningful communication, it enhances their sense of belonging and involvement within the virtual classroom. This, in turn, has a profound impact on their learning experience, influencing their motivation, participation, and overall satisfaction (Danver, 2016; Akgün et al., 2017).

Social connectedness, on the other hand, pertains to the sense of community and interpersonal bonds that students establish, whether in a virtual or face-to-face classroom setting. More precisely, it encompasses the feeling of belonging to a network or engaging in social interactions. Connectedness is fundamentally about how individuals connect with social networks, such as those within their local neighbourhood, educational institutions, or other group affiliations (Bailey et al., 2018). Cultivating this sense of connectedness is essential for creating a collaborative and supportive learning environment, which can significantly enhance student retention and motivation. At this juncture, because humor strengthens bonds, eases interpersonal conflicts, and promotes group cohesion, it emerges as a particularly valuable tool for social connectedness. By fostering a sense of mutual understanding and belonging, shared laughter improves relationships within the group. Additionally, humor, promoting positive feelings and breaking down barriers, further solidifies its position as an essential component of human connection (Martin & Ford, 2018; Kurtz & Algoe, 2015). It alleviates stress and fosters positive relationships between students and teachers, contributing to a more engaging and enjoyable learning experience. This, in turn, strengthens social connectedness and presence. Thus, both social connectedness and a sense of humor are crucial elements that can profoundly influence students' experiences within online learning environments. By promoting these aspects, educational settings can offer a richer and more fulfilling learning experience (Tryon & Bishop, 2012lıç Çakmak & Olpak, 2018).

One way to define a sense of humor is as an attractive quality or disposition that allows a person to laugh at themselves and appreciate the lighter side of situations. There are various interpretations of a sense of humor, including habitual behavioural patterns, the ability to find humor, a naturally cheerful temperament, an aesthetic response to amusing material, a positive attitude towards comedy, and coping strategies. In this context, humor can be viewed as a complex construct comprising four main dimensions: humor production, coping humor, humor appreciation, and humor attitude. Research into the social functions of humor indicates that a good sense of humor is essential for initiating and sustaining happy relationships with close friends, partners, and colleagues (Rucynski & Neff, 2022). Accordingly, some studies have found a positive correlation between a sense of humor and psychological well-being indicators such as optimism and self-esteem, while also identifying a negative correlation with psychological distress, including depression and anxiety. Similar findings have been observed across various cultures, suggesting that humor helps to release nervous energy, build relationships, express emotions, and exert social control when necessary (Crawford & Caltabiano, 2011; Zhao et al., 2020).

A key element of humor is affective expression, which pertains to the capacity of online learners to convey themselves through various text-based verbal behaviours. This includes practices such as self-disclosure, paraphrasing, and expressing emotions and values. Affective expression plays a crucial role in how individuals proj-

ect their personalities and engage with others in a digital learning environment. For effective affective expression to occur, two fundamental conditions must be met: open communication and group cohesion (Mireault & Reddy, 2016). Open communication involves creating a learning atmosphere where participants feel safe and confident enough to share their true selves without fear of judgment. This requires fostering a climate of trust where individuals are encouraged to express their thoughts and feelings freely. Group cohesion refers to forming a strong sense of collective identity inside the group. Participants must develop a feeling of community and engage in meaningful and cooperative work together (Strick & Ford, 2021). Members of the learning community benefit from this cohesiveness because it fosters cooperation and mutual assistance. Effective emotional expression is based on open communication and group cohesion, which enhances the learning process and creates a more engaging and encouraging learning environment (Samson & Gross, 2012; Özdoğru & McMorris, 2013).

In addition to increasing engagement, this sense of community and teamwork opens the door for more dynamic and participatory educational opportunities (James, 2004). In this context, research highlights the crucial role of humor in enhancing learning outcomes within online environments, significantly impacting both social presence and social connectedness. Humor can alleviate stress, strengthen relationships, and create a more positive learning atmosphere. For example, a study by Banas et al. (2010) demonstrates that incorporating humor into classrooms increases social presence and connectedness. Their findings reveal that humor not only fosters better communication and engagement between students and instructors but also makes the learning experience more enjoyable. Similarly, Erdoğdu and Çakıroğlu (2021) found that humor effectively breaks down barriers, fosters a sense of community, and makes interactions more approachable. These effects collectively enhance social presence in online learning platforms.

Furthermore, research examining the interplay between social connectedness and humor suggests that when students experience high levels of social connectedness and humor, their engagement and sense of social presence are significantly enhanced. Men et al. (2018) found that humor acts as a catalyst, enriching the overall learning experience and making online interactions more meaningful and enjoyable. Meanwhile, social connectedness provides the foundation for a robust sense of social presence. Students who have a sense of connection and communication with their peers and teachers display a higher level of social presence (Tackie, 2022; Jaekel et al., 2022). In a similar vein, emphasising the critical role of social presence in effective learning, Garrison et al. (1999) found in their earlier research that robust social connectedness enhances students' satisfaction and engagement, thereby improving learning outcomes. Horzum (2015) also found that interaction in online settings positively predicted social presence. Moreover, social presence was a positive predictor of satisfaction with online learning. When they have a strong social presence throughout online classes, students feel happier and more engaged.

As highlighted in the studies above, while existing research has explored the relationships between social presence, online learning, social connectedness, and humor individually, there remains a lack of studies integrating all four variables. Previous research suggests that social presence enhances satisfaction and engagement

in online learning environments (Richardson et al., 2017; Whiteside et al., 2023), while social connectedness plays a vital role in fostering meaningful interactions and reducing feelings of isolation in virtual classrooms (Kreijns et al., 2013; Kaliisa et al., 2022). Similarly, humor has been shown to positively influence student engagement and cognitive retention in both traditional and online learning settings (Banas et al., 2010; Erdoğdu & Çakıroğlu, 2021; Yalçıntaş & Kartal, 2023). However, beyond the studies discussed in this article, no research has comprehensively examined the interplay between social presence, social connectedness, and humor in online learning. Given the increasing reliance on digital education, understanding how these elements interact is essential for enhancing student experiences, developing strategies to create more engaging and supportive virtual classrooms, and improving teaching practices.

This study, therefore, aims to address this gap by offering a more comprehensive perspective on how these elements interact and influence online learning environments. Specifically, we seek to examine the intricate relationships among social presence, humor, and social connectedness within virtual learning settings. Our research question is "To what extent do social connectedness and sense of humor have a role in social presence in online learning environments?" Our objective is to explore these complex dynamics and provide valuable insights for educators and educational institutions. By analysing how social presence, humor, and social connectedness interconnect and shape one another, we aim to contribute to a deeper understanding of how these factors can be effectively utilised to enhance online education experiences.

2.1 Methodology

2.1.1 Research design

The study was conducted as a quantitative cross-sectional survey research. This type of observational study designs collect and analyze data from a population at a single point in time.

3 Participants

Population for the study is Turkish university students. Sample of the study consisted of students enrolled in Turkish higher education institutions who were recruited through convenience sampling. Participants consisted of a total of 516 students between the ages of 18 and 52 with a mean age of 23.12 (SD = 5.30). As shown in Table 1, participants were mostly female students, studying at undergraduate level, from state universities, receiving formal education, not working, unmarried, and living with their parents. A power analysis using G*Power version 3.1.9.4 indicated the required sample size for linear multiple regression to achieve 80% power for detecting a medium effect, at a significance criterion of $\alpha = 0.05$, was $N = 56$. Our obtained sample size of $N = 516$ was deemed adequate to test the study hypotheses.

Table 1 Participant characteristics of the study sample

Variable	Category	*N*	Percentage
Gender	Female	370	71.7
	Male	146	28.3
Education Level	Associate	151	29.3
	Bachelor	323	62.6
	Graduate	42	8.1
University Type	State	362	70.2
	Foundation	154	29.8
Education Modality	Formal	462	89.5
	Distance	54	10.5
Work Status	Working	144	27.9
	Not working	372	72.1
Marital Status	Married	40	7.8
	Unmarried	476	92.2
Living Arrangement	With parents	284	55.0
	Not with parents	232	45.0
Total		516	100.0

3.1 Measures

Social presence scale Social Presence Scale (SPS) was used to measure social presence in online learning environments. SPS is a 17-item five-point Likert scale self-report instrument (Kılıç Çakmak et al., 2014). Scale consists of three subscales of interaction ("When I enter a virtual environment, I greet other people in the environment."), ownership ("I feel close to other students."), and affective ("I talk about my personal issues with my friends in the virtual environment."). Higher scores indicate a higher level of social presence. In the present study, the Cronbach's alpha coefficient for the total scale was found to be 0.819, affective subscale 0.617, interaction subscale 0.731, and ownership was 0.812.

Sense of humor questionnaire 6 revised Sense of humor was measured through the Turkish version of Sense of Humor Questionnaire 6 Revised (SHQ-6-R). SHQ-6-R is a six-item four-point Likert scale self-report instrument developed by Sven Svebak and adapted into Turkish (Çiper Kaynar & Özdoğru, 2019). Higher scores indicate a higher level of sense of humor ("Do you easily recognize a mark of humorous intent?"). In the present study, the Cronbach's alpha coefficient for the scale was found to be 0.679.

Social connectedness scale Social connectedness was measured through Social Connectedness Scale (SCS). The SCS consists of eight items, each of which is evaluated on a 6-point Likert scale, ranging from 1 (completely agree) to 6 (completely disagree). Higher scores indicate a higher level of social connectedness ("I feel disconnected from the world around me."). The adaptation of this scale for Turkish use was carried out by Duru (2007). In the present study, the Cronbach's alpha coefficient for the scale was found to be 0.923.

4 Procedures

An informed consent form, sociodemographic questions and the measures were included in an online survey. Participants were recruited through in-class and social media announcements by the authors. Participants who had taken an online course before were asked to participate in the study. The survey was responded individually by the volunteer participants between 26.11.2023 and 20.03.2024.

Data from the online survey was managed and analyzed in Microsoft Excel 2016 and SPSS 26. Data was screened for missing data and normality. One case of missing data about marital status was imputed as "single" based on the case review. Main study variables on social presence, sense of humor, and social connectedness had skewness and kurtosis values within −2 and +2 range, which was indicating a normal distribution (Hair et al., 2022). Data analysis was conducted via parametric hypothesis tests. Education level variable was recategorized as undergraduate (associate and bachelor) and graduate levels.

4.1 Ethical statement

The research procedures comply with ethical principles for research with human participants consistent with the 1964 Helsinki Declaration and its later amendments and comparable ethical standards. Ethical approval for this study was granted by the Educational Research and Publication Ethics Board at Sakarya University (Approval Date: 23.11.2023; Approval Number: 25/6) before the data collection took place.

All participants voluntarily participated in the study with the assurance of confidentiality and anonymity of responses. Participants were informed about the purpose of the study and their rights before and after participation. All participants completed the online survey in the same order. Participants were not paid for their participation in the research but had a chance to receive extra course credit for their research participation.

5 Results

Main study variables of social presence, sense of humor, and social connectedness were analyzed in terms of their relationship with participants' characteristics. There were no statistically significant relationships between main study variables and participants' age, education modality (formal and distance), and marital status (married and unmarried). There were statistically significant relationships between main study variables and participants' gender, education level, university type, work status, and living arrangement. There was a significant difference in SPS Affective between female (M = 16.21, SD = 3.62) and male participants (M = 14.92, SD = 4.11); t(238.47) = 3.31, p = .001, d = 0.333. There was a significant difference in SPS Interaction between undergraduate (M = 25.25, SD = 4.41) and graduate student participants (M = 27.19, SD = 4.51); t(514) = -2.73, p = .007, d = 0.434. There was a significant difference in SPS Affective between students from state (M = 15.60, SD = 3.97) and foundation universities (M = 16.43, SD = 3.32); t(341.82) = -2.44, p = .015, d = 0.226.

There was a significant difference in SPS Total between students who were working (M = 60.88, SD = 8.34) and not working (M = 58.69, SD = 9.47); t(514) = -2.44, p = .015, d = 0.245. There was a significant difference in SPS Interaction between students who were working (M = 26.26, SD = 4.28) and not working (M = 25.08, SD = 4.47); t(514) = -2.71, p = .007, d = 0.269. There was a significant difference in SPS Total between students who were living with their parents (M = 60.21, SD = 8.28) and not with parents (M = 58.19, SD = 10.15); t(514) = -2.49, p = .013, d = 0.218. There was a significant difference in SPS Affective between students who were living with their parents (M = 16.26, SD = 3.56) and not with parents (M = 15.34, SD = 4.04); t(514) = -2.75, p = .006, d = 0.241.

Correlation analyses between the main study variables produced statistically significant moderate-size Pearson correlation coefficients. As shown in the Table 2, SCS was positively correlated with both SHQ-6-R and SPS Total scale scores as well as SPS Interaction and SPS Ownership subscale scores.

A hierarchical multiple regression analysis was conducted to predict SPS Affective scores based on sense of humor, social connectedness, gender, university type, and living arrangement. As shown in the Table 3, the Model 1 including gender as a predictor explained 2% of the variance in the SPS Affective scores, the Model 2 including gender and sense of humor as the predictors explained 4% of the variance in the SPS Affective scores, and the Model 3 including gender, sense of humor, and living arrangement as the predictors explained 5% of the variance in the SPS Affective scores. Addition of university type and social connectedness in the models 4 and 5 provided an additional of 1% variance explained, which was statistically not significant.

Another hierarchical multiple regression analysis was conducted to predict SPS Interaction scores based on sense of humor, social connectedness, education level, and work status. As shown in the Table 4, the Model 1 including social connectedness as a predictor explained 3% of the variance in the SPS Interaction scores and the Model 2 including social connectedness and work status as the predictors explained 4% of the variance in the SPS Interaction scores. Addition of education level and sense of humor in the models 3 and 4 provided an additional of 1% variance explained, which was statistically not significant.

Table 2 Descriptive statistics and correlations for the main study variables

	1	2	3	4	5	6
1. SCS	1					
2. SHQ-6-R	0.306**	1				
3. SPS Total	0.258**	0.168**	1			
4. SPS Affective	0.084	0.145**	0.701**	1		
5. SPS Interaction	0.167**	0.126**	0.812**	0.298**	1	
6. SPS Ownership	0.358**	0.118**	0.799**	0.362**	0.519**	1
N	516	516	516	516	516	516
M	35.48	20.28	59.30	15.85	25.41	18.04
SD	8.21	2.57	9.22	3.80	4.44	3.68
Min	11	11	25	5	10	5
Max	48	24	83	25	35	25

*p < .05, **p < .01

Table 3 Hierarchical regression analysis predicting SPS affective

	t	Beta	R	R^2	R^2 Change	F Change
Model 1			0.152	0.023	0.023	12.224**
Gender	−3.496**	− 0.152				
Model 2			0.206	0.042	0.019	10.296**
Gender	−3.399**	− 0.147				
SHQ-6-R	3.209**	0.139				
Model 3			0.228	0.052	0.010	5.157*
Gender	−3.179**	− 0.138				
SHQ-6-R	3.078**	0.133				
Living Arra.	2.271*	0.098				
Model 4			0.236	0.056	0.004	2.092
Gender	−2.864**	− 0.126				
SHQ-6-R	3.122**	0.135				
Living Arra.	2.062*	0.090				
Uni. Type	1.447	0.064				
Model 5			0.242	0.059	0.003	1.456
Gender	−2.960**	− 0.131				
SHQ-6-R	2.590*	0.117				
Living Arra.	2.104*	0.092				
Uni. Type	1.366	0.060				
SCS	1.207	0.055				

*p<.05, **p<.01, ***p<.001

Table 4 Hierarchical regression analysis predicting SPS interaction

	t	Beta	R	R^2	R^2 Change	F Change
Model 1			0.167	0.028	0.028	14.829***
SCS	3.851***	0.167				
Model 2			0.203	0.041	0.013	7.041**
SCS	3.806***	0.165				
Work Status	2.653**	0.115				
Model 3			0.217	0.047	0.006	3.060
SCS	3.748***	0.162				
Work Status	1.831	0.085				
Edu. Level	1.749	0.081				
Model 4			0.229	0.052	0.005	2.881
SCS	3.054**	0.138				
Work Status	1.687	0.078				
Edu. Level	1.810	0.084				
SHQ-6-R	1.697	0.077				

*p<.05, **p<.01, ***p<.001

Another hierarchical multiple regression analysis was conducted to predict SPS Ownership scores based on sense of humor and social connectedness. As shown in the Table 5, the Model 1 including social connectedness as a predictor explained 13% of the variance in the SPS Ownership scores. Addition of sense of humor in the

Table 5 Hierarchical regression analysis predicting SPS ownership

	t	Beta	R	R^2	R^2 Change	F Change
Model 1			0.358	0.128	0.128	75.380***
SCS	8.682***	0.358				
Model 2			0.358	0.128	0.000	0.047
SCS	8.192***	0.355	.			
SHQ-6-R	0.217	0.009				

*p<.05, **p<.01, ***p<.001

Table 6 Hierarchical regression analysis predicting SPS total

	t	Beta	R	R^2	R^2 Change	F Change
Model 1			0.258	0.067	0.067	36.646***
SCS	6.054***	0.258				
Model 2			0.281	0.079	0.013	7.047**
SCS	6.124***	0.259				
Living Arra.	2.655**	0.112				
Model 3			0.294	0.086	0.007	4.084*
SCS	5.223***	0.232				
Living Arra.	2.511*	0.106				
SHQ-6-R	2.021*	0.090				
Model 4			0.305	0.093	0.006	3.567
SCS	5.226***	0.231				
Living Arra.	2.225*	0.095				
SHQ-6-R	1.897	0.084				
Work Status	1.889	0.081				

*p<.05, **p<.01, ***p<.001

Model 2 did not provide any additional variance explained, which was statistically not significant.

Another hierarchical multiple regression analysis was conducted to predict SPS Total scores based on sense of humor, social connectedness, living arrangement, and work status. As shown in the Table 6, the Model 1 including social connectedness as a predictor explained 7% of the variance in the SPS Total scores, the Model 2 including social connectedness and living arrangement as the predictors explained 8% of the variance in the SPS Total scores, and the Model 3 including social connectedness, living arrangement, and sense of humor as the predictors explained 9% of the variance in the SPS Total scores. Addition of work status in the model 4 did not provide any additional variance explained, which was statistically not significant.

A visual analysis of the regression of sense of humor, social connectedness, and living arrangement on SPS Total is presented in Fig. 1. The graph shows the actual SPS Total scores and the predicted SPS Total scores with the best fitting line providing a visual sense for how well the multiple regression model explains the data.

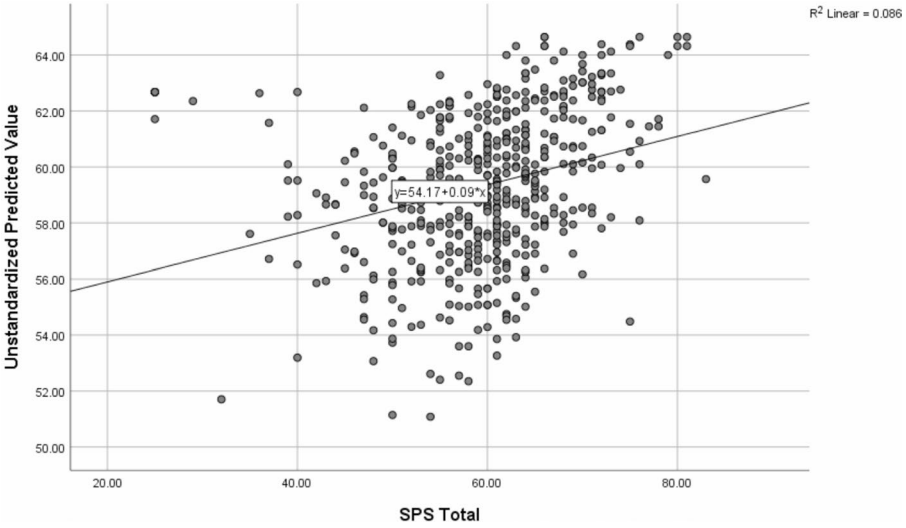

Fig. 1 Actual and Predicted SPS Total Scores in Multiple Linear Regression

6 Discussion and conclusion

Individuals who communicate with each other can be more present in their society. At the same time, individuals who exist in society can communicate with others more easily and continue their lives as social individuals. For individuals to improve themselves in educational environments, they need to socialize with the individuals in the same environment. In educational environments, individuals need to socialize with the individuals in the same environment to improve themselves. This importance is as essential in online learning environments as in face-to-face educational environments. Individuals who show a high degree of social presence in learning environments can socialize with other individuals in the environment and reach each other more easily (Rourke et al., 1999). In addition, individuals who socialize in learning environments also see themselves as individuals in the environment and express their commitment to the social environment. Social connectedness refers to the closeness of individuals with other individuals in social life, and this feeling of closeness is an essential part of the individual's sense of belonging to all their distant or close environment (Lee & Robins, 2000). Social connectedness mediates how people organize their social lives, makes them meaningful, and supports relationship-enhancing behaviors (Lee et al., 2008). People with high social connectedness tend to feel closer, easily identify with others, perceive others as friendly and approachable, and participate in social groups and activities (Lee et al., 2001). On the other hand, it is observed that individuals with social problems have difficulty in online learning environments and move away from these environments (Tzafilkou et al., 2021; Mann & Robinson, 2009). This shows that the individual may face various obstacles in integrating into the social environment.

One factor that supports the development of social presence is the sense of humor. Humor increases interaction between individuals, makes the learning process more

enjoyable, and contributes to students developing more positive attitudes towards learning materials (Banas et al., 2010; Erdoğdu & Çakıroğlu, 2021). It has been observed that the use of humor in online learning increases student participation in the course and enhances the course more (Shatz & LoSchiavo, 2005), and humor can also help students be more creative and transparent in online environments (McCabe et al., 2017; Smith & Wortley, 2017). Using humor in online courses can also be considered a tool that can make courses more attractive (Rucynski & Neff, 2022). Using humor not only in educational environments but also in business life can make the work environment fun and reduce work stress (Romero & Cruthirds, 2006).

The findings of the study revealed that there is a positive relationship between social connectedness and sense of humor, and both have a significant effect on social presence. This result shows us that individuals with a sense of humor can be more comfortable in any environment, socialize more efficiently, and stay connected to their environment. Studies indicate that the perception of socialization in online environments is a prerequisite for community, social presence, and social interaction among students (Tu, 2000; Kreijns et al., 2002). Social connectedness can be considered as a factor that motivates people to fulfill the roles necessary for their existence in social life (Geist, 2008). From this perspective, socialization between individuals must be adequate to establish healthy communication and interaction between individuals, especially in educational environments. In other words, social connectedness is the ability of an individual to develop meaningful relationships that will facilitate seeing themselves as part of their relationships (Moore, 2006). Individuals can develop these abilities in line with their needs. Today's technologies can be used to meet these needs. Online environments can bring together individuals living in various parts of the world. Since individuals who come together can communicate and exchange information, social connectedness can develop (Chayko, 2014). The individual's being social in online environments or having more areas where they socialize has facilitated their social and emotional processes. To talk about being social in online environments, individuals must have a strong sense of community, group solidarity, satisfaction, trust, respect, communication, and business relationships (Kreijns et al., 2007). Individuals who are social in online environments can also make humor with each other comfortably when they feel they belong to this environment. Studies have shown that the use of humor in the environment makes the environment fun and increases individuals' social commitment to the environment (Kuiper & Leite, 2010; Howland & Simpson, 2014; Robert et al., 2015; Warren & McGraw, 2016; Neves, 2018; Men et al., 2018). Individuals' feeling of belonging to the social environment is directly related to their ability to act comfortably online. This comfort enables individuals to socialize more easily and therefore increase social interaction.

As a result, it is seen that both a sense of humor and social commitment are essential factors of social existence at the end of the study. According to this result, individuals in the online learning environment need to move comfortably in the online environment to feel that they belong. Individuals who move comfortably in the online environment can socialize more. Individuals who can socialize can communicate more easily with others in the environment. The more communication between individuals increases, the more they feel they belong to the environment. Thus, they can improve as long as they are in the environment.

It can also be said that some individual characteristics of individuals affect their social existence. In particular, the gender characteristics of individuals create differences in the emotional dimension of social existence. The fact that women are more emotional than men brings this result with it. Another result obtained is that graduate students interact more in the social environment. Graduate students, especially after their undergraduate education and especially as a result of entering business life, show more presence in society and interact more with the environment.

6.1 Implications for practice

Understanding the relationship between social presence, humor, and social connectedness in online learning environments and discussing this relationship is essential to making the virtual classroom environment more engaging and supportive. Research on the humor factor affecting online learning environments and social connectedness in online learning environments should be included to make online learning environments more effective. In addition, humor should be used as a pedagogical tool in online learning environments; it should be supported with strategies that attract attention, increase participation, and facilitate interaction. Humor can establish social bonds between students and make learning more enjoyable. To increase the effective use of online learning environments, a better understanding of the relationships between social presence, humor, and social connectedness can yield positive results. For these favorable results to emerge, the discovery of how social presence, humor, and social connectedness are related should continue. In addition, different studies should be conducted to reveal how much humor can affect teaching in online teaching. The positive and practical aspects of humor should be explained. Studies determining how much humor in online environments can increase students' active course participation should also be supported. Both universities and other educational institutions that use online environments should be supported to develop online learning environments.

Multiple factors affect online learning environments. Some of these factors enable individuals to stay in the environment and continue their presence. For example, socialization and sense of humor in online learning environments can be expressed as some of these factors. For this reason, determining how individuals socialize in online learning environments and how their sense of humor relates to each other allows individuals to be more present in online learning environments. Applications that support social interaction, such as group work, synchronous/asynchronous discussion boards, and project-based learning, should also be included. These applications will support students in feeling a sense of belonging to the online environment and strengthening their social presence.

6.2 Strengths and limitations

The current study has several key strengths. First, no studies have been found that examine the complex interactions between social presence, sense of humor, and social connectedness in online learning environments. However, some studies examine the relationships between social presence and social connectedness in online

learning environments. Such studies prove the originality of the study and the impact of the study on future studies. Therefore, in addition to supporting studies on social presence in online learning environments, this study can potentially reveal the determinants that affect individuals' increased presence in online learning environments.

However, we should mention several limitations of this study here. The current study examined the relationships between social presence, sense of humor, and social connectedness in terms of the characteristics of the participants. The results of this relationship, which was examined among the main study variables and other variables, may be affected by some limitations. For example, the sample size was limited, the proportions of males and females, and individuals who received formal and online education were not close. Convenience sampling of the participants and variability of participants' online learning experiences might have been influential on the findings of the study. Other variables that were not included in this study might have a larger impact on the dependent variables.

Authors' contributions All authors contributed to the study conception and design. Material preparation, and data collection were performed by Asil Özdoğru, Ekmel Geçer, Hakkı Bağcı, and data analysis were performed by Asil Özdoğru. The first draft of the manuscript was written by Asil Özdoğru and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Data availability The data are available from the corresponding author upon reasonable request.

Declarations

Compliance with ethical standards The research procedures comply with ethical principles for research with human participants consistent with the 1964 Helsinki Declaration and its later amendments and comparable ethical standards. Ethical approval for this study was granted by the Educational Research and Publication Ethics Board at Sakarya University (Approval Date: 23.11.2023; Approval Number: 25/6) before the data collection took place. All participants voluntarily participated in the study with the assurance of confidentiality and anonymity of responses. Participants were informed about the purpose of the study and their rights before and after participation. All participants completed the online survey in the same order. Participants were not paid for their participation in the research but had a chance to receive extra course credit for their research participation.

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References

Akgün, F., Özgür, H., & Çuhadar, C. (2017). General attitude towards e-learning and social presence for e-learning environments of faculty of education students. In *Proceedings of the 11th International Computer & Instructional Technologies Symposium* (pp. 202–213). https://drive.google.com/file/d/1jMffd9j7L12Tztb1BRJPUVLyC0BI1Ymx/view

Azmi, F. M., Khan, H. N., & Azmi, A. M. (2022). The impact of virtual learning on students' educational behavior and pervasiveness of depression among university students due to the COVID-19 pandemic. *Global Health, 18*, 70. https://doi.org/10.1186/s12992-022-00863-z

Bailey, M., Cao, R., Kuchler, T., Stroebel, J., & Wong, A. (2018). Social connectedness: Measurement, determinants, and effects. *Journal of Economic Perspectives*, *32*(3), 259–280. https://doi.org/10.1257/jep.32.3.259

Banas, J. A., Dunbar, N., Rodriguez, D., & Liu, S. J. (2010). A review of humor in educational settings: Four decades of research. *Communication Education*, *60*(1), 115–144. https://doi.org/10.1080/03634523.2010.496867

Bird, K. A., Castleman, B. L., & Lohner, G. (2022). Negative impacts from the shift to online learning during the COVID-19 crisis: Evidence from a statewide community college system. *AERA Open*. https://doi.org/10.1177/23328584221081220

Blankson, K. L., Blankson, J., & Ntuli, E. (2021). *Handbook of Research on Inequities in Online Education During Global Crises*. IGI Global.

Chayko, M. (2014). Techno-social life: The internet, digital technology, and social connectedness. *Sociology Compass*, *8*(7), 976–991. https://doi.org/10.1111/soc4.12190

Çiper Kaynar, A., & Özdoğru, A. A. (2019). October 24–27). *Turkish adaptation of Sense of Humor Questionnaire: Transliteral equivalence, reliability and validity study* [Oral paper presentation]. 21st International Congress on Psychological Counseling and Guidance, Antalya, Turkey.

Crawford, S. A., & Caltabiano, N. J. (2011). Promoting emotional well-being through the use of humor. *The Journal of Positive Psychology*, *6*(3), 237–252. https://doi.org/10.1080/17439760.2011.577087

Cui, G., Lockee, B., & Meng, C. (2012). Building modern online social presence: A review of social presence theory and its instructional design implications for future trends. *Education and Information Technologies*, *18*, 661–685. https://doi.org/10.1007/s10639-012-9192-1

Danver, S. L. (2016). *The SAGE Encyclopaedia of Online Education*. Sage.

Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems*, *49*(1), 5–22. https://doi.org/10.1177/0047239520934

Duru, E. (2007). Sosyal Bağlılık Ölçeğinin Türk kültürüne Uyarlanması. *Eurasian Journal of Educational Research*, *26*, 85–94.

Erdoğdu, F., & Çakıroğlu, Ü. (2021). The educational power of humor on student engagement in online learning environments. *Research and Practice in Technology Enhanced Learning*, *16*(9). https://doi.org/10.1186/s41039-021-00158-8

Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, *2*(2–3), 87–105. https://doi.org/10.1016/S1096-7516(00)00016-6

Geary, E., Allen, K. A., Gamble, N., & Pahlevansharif, S. (2023). Online learning during the COVID-19 pandemic: Does social connectedness and learning community predict self-determined needs and course and learning community predict self-determined needs and course satisfaction? *Journal of University Teaching & Learning Practice Journal of University Teaching*, 20(1). https://ro.uow.edu.au/jutlp/vol20/iss1/13

Gecer, E., Bagci, H., & Atar, C. (2023). Nothing replaces meeting my students at class: Analysing academics' views regarding distance education. *Education and Information Technologies*, *28*, 16615–16636. https://doi.org/10.1007/s10639-023-11887-2

Geçer, E., & Bağci, H. (2022). Examining students' attitudes towards online. *Culture and Education*, *34*(2), 297–324. https://doi.org/10.1080/11356405.2022.2031785

Geist, R. A. (2008). Connectedness, permeable, boundaries, and the development of the self. *International Journal of Psychoanalytic Self Psychology*, *3*(2), 129–152. https://doi.org/10.1080/15551020801922971

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (3rd ed.). Sage.

Hodges, C. B., Moore, S., Lockee, B. B., Trust, T., & Bond, B. (2020). The difference between emergency remote teaching and online learning. *Educause Review*, *27*(1), 1–12. https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning

Horzum, M. B. (2015). Interaction, structure, social presence, and satisfaction in online learning. *Eurasia Journal of Mathematics Science and Technology Education*, *3*, 505–512. https://doi.org/10.12973/eurasia.2014.1324a

Howland, M., & Simpson, J. A. (2014). Attachment orientations and reactivity to humor in a social support context. *Journal of Social and Personal Relationships*, *31*(1), 114–137. https://doi.org/10.1177/0265407513488016

Jaekel, A. K., Scheiter, K., & Göllner, R. (2022). Distance teaching during theCOVID-19 crisis: Social connectedness matters most for teaching quality and students' learning. *AERA Open*. https://doi.org/10.1177/23328584211052050

James, D. (2004). A need for humor in online courses. *College Teaching*, *52*(3), 93–120. https://doi.org/10.3200/CTCH.52.3.93-120

Kaliisa, R., Rienties, B., Morch, A. I., & Kluge, A. (2022). Social learning analytics in computer-supported collaborative learning environments: A systematic review of empirical studies. *Computers and Education Open*, 3. https://doi.org/10.1016/j.caeo.2022.100073

Kesha, N., Perkins, K. C., Schneider, S. K., Holt, M. K., & Green, J. G. (2021). School connectedness still matters: The association of school connectedness and mental health during remote learning due to COVID-19. *The Journal of Primary Prevention*, *42*, 641–648. https://doi.org/10.1007/s10935-021-00649-w

Kılıç Çakmak, E., & Olpak, Y. Z. (2018). Learning strategies predicting the perception of social presence of distance education students. *Bartın University Journal of Faculty of Education*, *7*(1), 276–295. https://doi.org/10.14686/buefad.365218

Kılıç Çakmak, E., Çebi, A., & Kan, A. (2014). Developing a social presence scale for e-learning environments. *Educational Sciences: Theory & Practice*, *14*(2), 755–768. https://doi.org/10.12738/estp.2014.2.1847

Knox, J. (2014). Digital culture clash: Massive education in the e-learning and digital cultures. *Distance Education*, *35*(2), 164–177. https://doi.org/10.1080/01587919.2014.917704

Kreijns, K., Kirschner, P. A., & Jochems, W. M. (2002). The sociability of computer-supported collaborative learning environment. *Educational Technology & Society*, *5*(1), 8–22.

Kreijns, K., Kirschner, P. A., Jochems, W. M., & Buuren, H. V. (2007). Measuring perceived sociability of computer-supported collaborative learning environments. *Computer & Education*, *49*, 176–192. https://doi.org/10.1016/j.compedu.2005.05.004

Kreijns, K., Kirschner, P. A., & Vermeulen, M. (2013). Social aspects of CSCL environments: A research framework. *Educational Psychologist*, *48*(4), 229–242. https://doi.org/10.1080/00461520.2012.750225

Kreijns, K., Xu, K., & Weidlich, J. (2022). Social presence: Conceptualization and measurement. *Educational Psychology Review*, *34*(1), 139–170. https://doi.org/10.1007/s10648-021-09623-8

Kuiper, N. A., & Leite, C. (2010). Personality impressions associated with four distinct humor styles. *Scandinavian Journal of Psychology*, *51*(2), 115–122. https://doi.org/10.1111/j.1467-9450.2009.00734.x

Kurtz, L. E., & Algoe, S. B. (2015). Putting laughter in context: Shared laughter as behavioral indicator of relationship well-being. *Personal Relationships*, *22*(4), 573–590. https://doi.org/10.1111/pere.12095

Lee, R. M., & Robbins, S. B. (2000). Understanding social connectedness in college women and men. *Journal of Counseling and Development*, *78*, 484–491. https://doi.org/10.1002/j.1556-6676.2000.tb01932.x

Lee, R. M., Draper, M., & Lee, S. (2001). Social connectedness, dysfunctional inter personal behaviours, and psychological distress: Testing a mediator model. *Journal of Counseling Psychology*, *48*(3), 310–318. https://doi.org/10.1037/0022-0167.48.3.310

Lee, R. M., Dean, B. L., & Jung, K. R. (2008). Social connectedness, extraversion, and subjective well-being: Testing a mediation model. *Personality and Individual Differences*, *45*(5), 414–419. https://doi.org/10.1016/j.paid.2008.05.017

Mann, S., & Robinson, A. (2009). Boredom in the lecture theatre: An investigation into the contributors, moderators and outcomes of boredom amongst university students. *British Educational Research Journal*, *35*(2), 243–258.

Martin, R. A., & Ford, T. (2018). *The Psychology of Humor: An Integrative Approach*. Academic Press.

McCabe, C., Sprute, K., & Underdown, K. (2017). Laughter to learning: How humor can build relationships and increase learning in the online classroom. *Journal of Instructional Research*, *6*, 4–7.
Men, L. R., Tsai, W. H. S., Chen, Z. F., & Ji, Y. G. (2018). Social presence and digital dialogic communication: Engagement lessons from top social ceos. *Journal of Public Relations Research*, *30*(3), 83–99. https://doi.org/10.1080/1062726X.2018.1498341
Mireault, G. C., & Reddy, V. (2016). *Humor in infants: Developmental and psychological perspectives*. Springer.
Moore, T. L. (2006). *Social connectedness and social support of doctoral students in counselor education*. Doctoral Dissertation, Idaho State University.
Neves, P. (2018). Exploring a model of workplace ostracism: The value of coworker humor. *International Journal of Stress Management*, *25*(4), 330–347. https://doi.org/10.1037/str0000069
Özdoğru, A. A., & McMorris, R. F. (2013). Humorous cartoons in college textbooks: Student perceptions and learning. *HUMOR: International Journal of Humor Research*, *26*, 135–154. https://doi.org/10.1515/humor-2013-0008
Richardson, J. C., Maeda, Y., Caskurlu, S., & Lv, J. (2017). Social presence in relation to students' satisfaction and learning in the online environment: A meta-analysis. *Computers in Human Behavior*, *71*, 402–417. https://doi.org/10.1016/j.chb.2017.02.001
Robert, C., Dunne, T. C., & Iun, J. (2015). The impact of leader humor on subordinate job satisfaction: The crucial role of leader–subordinate relationship quality. *Group & Organization Management*, *41*(3), 375–406. https://doi.org/10.1177/1059601115598719
Romero, E. J., & Cruthirds, K. W. (2006). The use of humor in the workplace. *Academy of Management Perspectives*, *20*(2), 58–69. https://doi.org/10.5465/amp.2006.20591005
Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (1999). Assessing social presence in asynchronous text-based computer conferencing. *The Journal of Distance Education*, *14*(2), 50–71. https://www.ijede.ca/index.php/jde/article/view/153
Rucynski, J., & Neff, P. (2022). Is this thing on? Teacher views of incorporating humor into online Language classes. *The Language Teacher*, *46*(6), 9. https://doi.org/10.37546/JALTTLT46.6-2
Samson, A. C., & Gross, J. J. (2012). Humor as emotion regulation: The differential consequences of negative versus positive humor. *Cognition and Emotion*, *26*(2), 375–384. https://doi.org/10.1080/02699931.2011.585069
Shatz, M. A., & LoSchiavo, F. M. (2005). Enhancing online instruction with humor. *Teaching of Psychology*, *32*(4), 246–248.
Smith, V. D., & Wortley, A. (2017). Everyone's a comedian. No really, they are: Using humor in the online and traditional classroom. *Journal of Instructional Research*, *6*, 18–23.
Strick, M., & Ford, T. E. (2021). *The social psychology of humor*. Routledge.
Tackie, H. N. (2022). Dis)connected: Establishing social presence and intimacy in teacher–student relationships during emergency remote learning. *AERA Open*. https://doi.org/10.1177/23328584211069525
Tryon, P. J., & Bishop, M. J. (2012). Evaluating social connectedness online: The design and development of the social perceptions in learning contexts instrument. *Distance Education*, *33*(3), 347–364. https://doi.org/10.1080/01587919.2012.723168
Tu, C. H. (2000). On-line learning migration: From social learning theory to social presence theory in a CMC environment. *Journal of Network and Computer Applications*, *23*, 27–37. https://doi.org/10.1006/jnca.1999.0099
Tzafilkou, K., Perifanou, M., & Economides, A. A. (2021). Negative emotions, cognitive load, acceptance, and self-perceived learning outcome in emergency remote education during COVID-19. *Education and Information Technologies*, 7497–7521. https://doi.org/10.1007/s10639-021-10604-1
UNESDOC. (2020). *Harnessing culture in times of crises*. https://unesdoc.unesco.org/ark:/48223/pf0000373383?posInSet=1&queryId=d86aecac-9f2c-4739-bbb5-a0eac343d693
Warren, C., & McGraw, A. P. (2016). Differentiating what is humorous from what is not. *Journal of Personality and Social Psychology*, *110*(3), 407–430. https://doi.org/10.1037/pspi0000041
Whiteside, A. L., Dikkers, G., & Swan, K. (2023). *Social presence in online learning: Multiple perspectives on practice and research*. Routledge.
Yalçıntas, E., & Kartal, H. (2023). Children's sense of humor and humor in the classroom. *E-International Journal of Educational Research*, *14*(1), 20–36. https://doi.org/10.19160/e-ijer.1124944
Zhan, Z., Huo, L., & Yao, X. (2023). *China's Formal Online Education Under COVID-19: Actions from Government, Schools, Enterprises and Families*. Routledge.

Zhao, J., Yin, H., Wang, X., Zhang, G., Jia, Y., Shang, B., Zhao, J., Wang, C., & Chen, L. (2020). Effect of humor intervention programme on depression, anxiety, subjective well-being, cognitive function and sleep quality in Chinese nursing home residents. *Journal of Advanced Nursing*, *6*(10), 2709–2718. https://doi.org/10.1111/jan.14472

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