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SDO Cagayan's Training Platforms: A Comparative Analysis of Social Presence, Interaction, Collaborative Learning, and Satisfaction

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Abstract

Purpose: This study examined teachers' assessments of online and face-to-face training platforms in the Schools Division Office (SDO) of Cagayan, Philippines, across four dimensions: social presence, social interaction, collaborative learning, and satisfaction.

Methodology: This study used a mixed methods sequential explanatory design and involved 388 teachers selected through proportional stratified random sampling. Survey data and qualitative responses from interviews and open-ended questions were analyzed to compare perceptions across training modes,

Results: Results showed consistently higher ratings for face-to-face training across all four dimensions, with significant differences favouring in-person interactions. Teachers highlighted stronger interpersonal connections, more effective collaboration, and greater overall satisfaction in face-to-face settings, while acknowledging the accessibility and flexibility of online platforms. Several profile variables, such as ICT skill level and prior training, significantly influenced perceptions. Both modalities presented unique challenges, including engagement and scheduling issues in face-to-face training and device or connectivity issues in online training.

Conclusions: This study compared teachers' perceptions of face-to-face and online training. Face-to-face training scored higher in social presence, interaction, and collaboration. Despite the flexibility of online training, it faced challenges. The results suggest that a blended approach would be more effective for teacher development.

Limitations: This study focused on teachers' perceptions during SY 2022–2023 and relied primarily on self-report data from an adapted instrument.

Contributions: The findings informed the development of policy recommendations to strengthen the implementation of both online and face-to-face training programs.

Keywords: *Comparative Analysis, Face-To-Face, Online, Training Platforms*

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1. Introduction

The COVID-19 pandemic accelerated the widespread adoption of online professional development for teachers, prompting institutions to explore digital alternatives to traditional face-to-face training. Online training environments offer flexibility, convenience, and autonomy, allowing teachers to participate at their own pace and from any location. These advantages have positioned online modalities as viable

solutions for large-scale professional development initiatives, particularly when logistical or financial constraints limit in-person delivery. However, as traditional face-to-face activities resumed, concerns emerged about the comparative effectiveness of online platforms in supporting meaningful learning experiences.

While online training facilitates broad participation and overcomes geographical barriers, questions persist regarding its ability to match the depth of interpersonal interaction, collaborative engagement, and immediacy of feedback found in face-to-face settings. Several scholars have suggested that online professional development may fall short in addressing complex pedagogical challenges and sustaining authentic engagement, largely due to technological limitations, the instability of online learning environments, and varying levels of teachers' digital proficiency. These challenges create uncertainty about whether online modalities can fully replicate the richness of traditional learning experiences.

Despite the increasing reliance on digital training in the post-pandemic landscape, empirical studies comparing online and face-to-face training across multiple learning dimensions remain limited. Much of the existing research focuses on isolated constructs, such as social presence or satisfaction, without examining how these dimensions interact within a single comparative framework. This gap is particularly notable in public-school systems, where teacher professional development is delivered using diverse platforms and where resource limitations, digital access issues, and contextual nuances shape training effectiveness. Within this context, the Schools Division Office (SDO) of Cagayan, Philippines, implemented both online and face-to-face training modalities from March 2020 to December 2022.

Given the substantial number of programs delivered in both formats, understanding teachers' perceptions of these platforms is essential for informing future policy decisions. However, little is known about how teachers evaluate these modalities across social presence, social interaction, collaborative learning, and overall satisfaction, four constructs widely regarded as critical to effective professional development. To address this gap, the present study investigated teachers' assessments of online and face-to-face training platforms in SDO Cagayan, Philippines. Specifically, it examined and compared the two modalities across the four learning dimensions and identified the challenges participants encountered. Through this analysis, the study aimed to provide evidence-based insights that can guide the design, refinement, and strategic implementation of professional development programs in the division.

1.1. Research Questions

This study investigated the assessment of SDO Cagayan teachers on online and face-to-face trainings. Specifically, this study sought to answer the following questions:

1. What was the respondents' assessment of online and face-to-face trainings along the following dimensions:
   a. Social Presence
   b. Social Interaction
   c. Collaborative Learning
   d. Satisfaction
2. Is there a significant difference in respondents' assessments between face-to-face and online platforms along the four dimensions?
3. What challenges did the respondents encounter during their training?

2. Literature Review and Hypothesis Development

2.1. Theoretical Background

The integration of online and face-to-face modalities in teacher professional development must be understood within broader theoretical perspectives that conceptualize learning as a socially mediated, motivationally driven, and relational process. Spears (2012) provided the foundational framework for this study, positing that social presence facilitates meaningful interaction, which, in turn, enhances collaborative learning and ultimately increases learner satisfaction. This framework aligns with social

learning theory and the community-of-inquiry model, in which communication and shared meaning-making are central to effective learning environments.

Recent studies have extended and reinforced this theoretical grounding. Caratiquit and Caratiquit (2023) argued that technology-mediated learning environments, such as those using AI academic support tools, significantly influence student performance through the mediating role of learning motivation, emphasizing that online learning becomes effective when learners feel socially and cognitively supported. Their findings parallel Spears (2012) model by underscoring that social presence and meaningful interaction strengthen motivational pathways that drive successful learning.

Similarly, Caratiquit and Pablo (2021) highlighted that teachers' professional preparation and adaptive practices during the new normal directly influence the quality of interaction and collaboration in both online and in-person settings. Their work affirms the theoretical position that teacher readiness and facilitation shape the relational climate necessary for social presence to translate into active engagement. Caratiquit (2022) further expanded this perspective by showing that psychosocial protective factors, such as support systems and self-efficacy, mediate the effects of anxiety on academic performance among Filipino learners. This finding reinforces the view that emotional and interpersonal support enhance one's ability to participate meaningfully in collaborative, socially rich learning environments.

Beyond the Philippine setting, T. Y. Mohammed, Philip, and Labaran (2024) demonstrated that students' social media use significantly shapes their patterns of social interaction and learning behavior. Their findings highlight that digital environments can strengthen or weaken social presence depending on how interactions are structured, mirroring challenges experienced in online teacher professional development. Finally, Lichauco, Molina, Tengco, and Vidallo (2023) showed that diminished social presence and limited instructor-learner interaction in online learning environments can contribute to disengagement and increased academic dishonesty. This underscores the importance of strong relational and interactive elements, key components of Spears (2012) framework, in sustaining accountability, collaboration, and learner satisfaction.

Collectively, these studies affirm that social presence, interaction, collaborative learning, and satisfaction are shaped by motivation, emotional factors, technological affordances, and the overall relational climate of the learning environment. Whether online or face-to-face, learning is most effective when participants feel connected, supported, and engaged. These theoretical insights justify the comparative approach of the present study, which examines how training platforms influence teachers' perceptions across these four interconnected dimensions.

2.2. Social Presence

Social presence refers to the extent to which individuals feel psychologically connected to others in a learning environment. Online environments have increasingly provided teachers with opportunities for social engagement and community building (Hennessy et al., 2022). Gamage, Ayres, and Behrend (2022) emphasized that computer-aided training supports responsive and intelligent interactions while offering temporal and spatial flexibility. However, Valtonen et al. (2022) highlighted the need to study the nature of online learning to develop more effective instructional models.

Despite these benefits, teachers continue to struggle with the complexities of online socialization. Social presence remains a critical factor influencing affective and cognitive learning (Andel et al., 2020; Nasir, 2020; Zou et al., 2021). Dahlstrom-Hakki, Alstad, and Banerjee (2020) described socialization as learning group values and behaviors, while Huff, Jacobsen, and Papenmeier (2025) referred to presence as immersion in virtual environments. Chen and Liu (2020) argued that meaningful interaction, not mere attendance, is required to establish social connectedness. Several scholars have noted that understanding and quantifying social presence helps design more engaging online learning communities (Park & Kim, 2020; Song, Kim, & Park, 2019). Andel et al. (2020) and Gacs, Goertler, and Spasova (2020) further asserted the need for frameworks that examine how social presence influences knowledge acquisition, particularly in online settings.

2.3. Social Interaction

Social interaction is central to both online and face-to-face learning experiences. It is considered a key determinant of the quality of engagement between learners, instructors, and content (Baber, 2022). Gherheș, Stoian, Fărcașiu, and Stanici (2021) emphasized that social interaction mediates the relationship between social presence and social learning. Kaufmann and Vallade (2022) also identified interaction as essential to meaningful learning across modalities. Ahoto et al. (2022) described interaction in three forms: learner-content, learner-instructor, and learner-learner interaction. These forms are particularly important in online contexts, where teachers must navigate content independently, rely on instructor guidance, and collaborate with peers. Hamdan et al. (2021) asserted that online platforms can support high levels of student-student and student-teacher interaction when effectively designed. Given these perspectives, understanding how teachers perceive social interaction on different training platforms is crucial for determining which modalities best support interpersonal and instructional engagement.

2.4. Collaborative Learning

Collaborative learning has long been recognized as an effective instructional strategy in both traditional and online settings (Shukla, Dosaya, Nirban, & Vavilala, 2020). However, organizing meaningful collaboration in teacher training can be challenging (Garcia-Martinez, Tadeu, Montenegro-Rueda, & Fernandez-Batanero, 2022). As technology becomes increasingly integrated into professional development programs, opportunities for collaboration are expanding (Rasmitadila et al., 2020).

Miller (2021) highlighted the importance of fostering closeness and belonging in online collaborative environments. Bilgin and Gul (2020) recommended that training programs build on teachers' experiences, encourage active engagement, and provide real-world applications. Strauß and Rummel (2020) noted that collaborative learning relies on shared knowledge construction, diverse viewpoints, and cooperative activities. In face-to-face settings, Caballero, González, and Serrate (2016) argued that direct communication helps ensure equal participation and supports the co-construction of understanding. Thus, comparing collaborative learning across modalities remains essential for improving the design of teacher training.

2.5. Satisfaction

Learner satisfaction reflects the perceived quality and usefulness of training. Multiple factors, including communication, accessibility, instructor support, and collaborative engagement, shape it. Amodu, Oyedokun, and Atoke (2022) described satisfaction as a critical intermediate outcome in online learning. Binmohsen and Abrahams (2022) found that online learners tend to be more satisfied with face-to-face interactions, suggesting that direct human contact enhances satisfaction levels.

Lin, Wang, and Lee (2023) emphasized that learner-instructor interaction significantly influences satisfaction, while L. A. Mohammed et al. (2022) reported that peer interaction contributes even more positively. Gegenfurtner, Zitt, and Ebner (2020) noted that teachers appreciate direct access to facilitators during training. Wang and Hong (2020) highlighted the importance of timely feedback in shaping satisfaction. Given the variations in communication and engagement across modalities, examining satisfaction on online and face-to-face platforms is vital for identifying strategies to enhance teacher training experiences.

2.6. Hypotheses Development

Drawing on the reviewed literature and theoretical framework, this study proposes the following hypotheses:

- H_1: There is a significant difference in teachers perceived social presence between face-to-face and online training platforms.
- H_2: There is a significant difference in teachers perceived social interaction between face-to-face and online training platforms.
- H_3: There is a significant difference in teachers perceived collaborative learning between face-to-face and online training platforms.

H_4: There is a significant difference in teachers perceived satisfaction between face-to-face and online training platforms.

3. Methodology

This study employed a mixed methods sequential explanatory design, combining quantitative (rating scales) and qualitative (focus group discussions and open-ended responses) approaches to examine the advantages and disadvantages of online and face-to-face training platforms and to determine their effectiveness relative to traditional in-person modalities. The qualitative findings complemented and validated the quantitative results by offering deeper contextual explanations of teachers' training experiences.

3.1. Sampling

The study population consisted of 12,577 public school teachers in the Schools Division Office (SDO) of Cagayan, Philippines. Proportional stratified random sampling was used to ensure representation across districts and teaching levels. Using Slovin's formula, a sample of 388 teachers was selected, comprising 234 from elementary schools and 155 from secondary schools.

Table 1. Participants of the study

Level	Population	Sample
Elementary	7,577	234
Secondary	5,000	155
Total	**12,577**	**388**

For the qualitative phase, participants were selected from the top and bottom 10% of teachers based on their quantitative ratings across the four constructs, thus ensuring diverse perspectives on their training experiences.

3.2. Instrumentation, Validity, and Reliability

The primary quantitative instrument was an adapted version of the questionnaire used in Spears (2012) study. The instrument utilized a four-point Likert scale (4 = strongly agree to 1 = strongly disagree). To ensure its appropriateness for the local context, the instrument underwent expert validation by specialists in educational research, instructional design, and teacher professional development. The experts assessed relevance, clarity, cultural appropriateness, and construct alignment.

A pilot test was conducted with a small group of teachers not included in the main sample. Reliability analysis using Cronbach's alpha yielded a value of 0.87, indicating high internal consistency. This ensured that the questionnaire reliably measured the intended constructs. Construct validity was further supported by aligning each set of items with established theoretical definitions from Spears (2012) and other literature supporting the four dimensions. Feedback from respondents during the pilot test was incorporated to refine ambiguous wording and improve item clarity.

3.3. Data Collection

Data collection involved a blended approach, combining online and face-to-face administration. Permission from school authorities was obtained prior to data collection. Respondents received background information, including the study's purpose, data confidentiality, and instructions for completing the instruments. After the quantitative data were collected and preliminarily analyzed, the qualitative phase commenced. Selected respondents were invited to participate in follow-up interviews or focus group discussions (FGDs), during which they were asked to elaborate on their experiences and explain the factors influencing their perceptions of the two training modalities.

3.4. Data Analysis

3.4.1. Quantitative Analysis

Descriptive statistics were used to evaluate respondents' assessments across the four dimensions. A paired t-test was employed to determine significant differences between face-to-face and online platforms at a 0.05 level of significance.

3.4.2. Qualitative Analysis

The qualitative data were analyzed through a thematic analysis approach, which involved several systematic steps to ensure rigorous interpretation. First, the researchers repeatedly read interview and FGD transcripts to gain familiarity with the data. Meaningful segments were then manually coded to capture recurring patterns and ideas related to training experiences. These codes were organized into broader categories and refined into themes representing teachers' challenges and perceptions across both platforms. The themes were carefully reviewed against the raw data to ensure accuracy and avoid researcher bias. Each theme was clearly defined and aligned with the constructs from the quantitative phase to support the interpretation of the results. To ensure credibility, the researchers conducted triangulation and member checking, allowing selected participants to verify that the themes accurately reflected their experiences. This process ensured methodological consistency, as the themes presented in the results section directly emerged from the systematic coding and verification procedures described above.

3.5. Ethical Considerations

Participation was voluntary, and respondents were assured of confidentiality and anonymity. Informed consent was obtained prior to data collection. All procedures adhered to the ethical guidelines for educational research.

4. Results and Discussion

4.1 Social Presence in Online and Face-to-Face Training

Table 2 shows that teachers consistently rated face-to-face training higher for social presence than online platforms. As summarized in the results, face-to-face settings strengthened teachers' ability to form impressions, feel comfortable engaging in discussions, and experience a sense of community. These patterns suggest that in-person environments provide richer cues and more spontaneous communication, which naturally enhances social connection. This aligns with the literature, which indicates that online settings often struggle to replicate the psychological closeness found in physical environments.

Andel et al. (2020); Nasir (2020) emphasized that technological barriers and limited non-verbal cues can constrain online social presence, while Chen and Liu (2020) argued that meaningful engagement, not mere connectivity, is crucial for establishing social presence. The study's findings reinforce these insights, echoing Hennessy et al. (2022), who noted that, although online tools support interaction, they may not fully capture the immersive nature of face-to-face learning. Overall, the difference between the modalities confirms Spears (2012) theoretical model, which asserts that social presence is foundational to effective learning environments. In this study, face-to-face training more effectively facilitated the interpersonal connections necessary to foster authentic engagement.

Table 2. Assessment of respondents on the social presence of training platforms.

No	Indicators	Face-to-Face			Online		
		Mean	SD	DV	Mean	SD	DV
1.	I formed distinct impressions of some of the participants in the training.	3.43	0.60	SA	3.02	0.70	A
2.	The speaker/trainer facilitated discussions in the training sessions.	3.64	0.56	SA	3.37	0.65	SA
3.	I felt comfortable introducing myself in the training sessions.	3.31	0.60	SA	3.13	0.64	A

4.	I felt comfortable participating in the training discussions.	3.42	0.60	SA	3.14	0.68	A
5.	I felt comfortable conversing in the training.	3.28	0.62	SA	3.05	0.70	A
6.	The speaker/trainer/facilitator created a feeling of community	3.64	0.57	SA	3.34	0.68	SA
7.	I felt that my point of view was acknowledged by other participants in the training.	3.41	0.58	SA	3.13	0.71	A
8.	The training introductions enabled me to understand the community.	3.52	0.59	SA	3.19	0.72	A
9.	Communication in the training sessions was impersonal.	3.13	0.77	A	3.10	0.73	A
10.	As a result of my training experience, I have made acquaintances with participants from other parts of the division.	3.55	0.61	SA	3.06	0.81	A
	Overall Mean	**3.43**	**0.61**	**SA**	**3.15**	**0.70**	**A**

Descriptive Value (DV):
1.00 – 1.74 Disagree (D)
1.75 – 2.49 Partially Disagree (PD)
2.50 – 3.24 Agree (A)
3.25 – 4.00 Strongly Agree (AG)

4.2 Social Interaction in Online and Face-to-Face Training

Table 3 indicates that teachers experienced stronger social interactions in face-to-face settings than in online training. They felt more comfortable engaging with both peers and trainers during in-person sessions. Moreover, they perceived the quality and amount of interaction to be higher in physical environments. These findings align with Baber (2022); Gherheș et al. (2021), who explain that social interaction thrives when communication flows naturally, which is more easily achieved in in-person contexts. Although online platforms can support interaction when well-designed (Hamdan et al., 2021), teachers in this study still described online interaction as comparatively limited. The results further support Kaufmann and Vallade (2022) observation that learning environments influence climate and rapport, emphasizing the superiority of face-to-face formats in generating spontaneous dialogue. Thus, consistent with Spears (2012) framework, the stronger social presence observed in face-to-face settings appears to directly translate into stronger social interactions.

Table 3. Assessment of respondents on the social interaction of training platforms.

No	Indicators	Face-to-Face			Online		
		Mean	SD	DV	Mean	SD	DV
1.	I felt comfortable interacting with other participants in the training.	3.50	0.61	SA	3.10	0.72	A
2.	The quality of interaction with the speaker/trainer/facilitator in the training was appropriate.	3.59	0.58	SA	3.21	0.70	A
3.	The trainings were an excellent means for social interaction	3.61	0.57	SA	3.18	0.75	A
4.	The amount of interaction with the speaker/trainer/facilitator in the training was appropriate.	3.58	0.59	SA	3.19	0.70	A
5.	The amount of interaction with other participants in the training sessions was appropriate.	3.56	0.58	SA	3.16	0.71	A
6.	The quality of the interaction with other participants in the training was appropriate.	3.57	0.58	SA	3.16	0.74	A
	Overall Mean	**3.57**	**0.58**	**SA**	**3.17**	**0.72**	**A**

Descriptive Value (DV):
1.00 – 1.74 Disagree (D)
1.75 – 2.49 Partially Disagree (PD)
2.50 – 3.24 Agree (A)
3.25 – 4.00 Strongly Agree (AG)

4.3. Collaborative Learning in online and face-to-face training

The findings in Table 4 show that collaborative learning was rated significantly higher in face-to-face training. Respondents emphasized that in-person settings provided better opportunities for sharing ideas and developing skills. They also noted that these environments fostered a stronger sense of community. This reflects the literature, which argues that collaborative learning benefits from direct communication, equal participation, and the co-construction of meaning (Caballero et al., 2016; Strauß & Rummel, 2020). Although technology expands opportunities for collaboration (Rasmitadila et al., 2020), teachers still perceive online collaboration as less fluid and more dependent on technological reliability. The study findings reinforce Miller's Miller (2021) assertion that belongingness plays a central role in collaborative learning; in this case, the stronger sense of community found in face-to-face training appears to enhance collaborative processes. The results also confirm Bilgin and Gul (2020) argument that active engagement and experience-based learning are more easily realized in physical settings.

Table 4. Assessment of respondents on the collaborative learning dimension of the training platforms

No	Indicators	Face-to-Face			Online		
		Mean	SD	DV	Mean	SD	DV
1.	I developed problem-solving skills through peer collaboration.	3.61	0.58	SA	3.11	0.75	A
2.	I developed new skills and knowledge from other members of the training.	3.64	0.56	SA	3.16	0.77	A
3.	I actively exchanged ideas during training.	3.51	0.62	SA	3.09	0.73	A
4.	I felt part of a learning community during the trainings.	3.58	0.57	SA	3.19	0.73	A
5.	Collaborative learning in my training was effective.	3.63	0.57	SA	3.14	0.77	A
6.	Collaborative learning in training was maximized.	3.61	0.58	SA	3.15	0.77	A
	Overall Mean	**3.60**	**0.58**	**SA**	**3.14**	**0.75**	**A**

Descriptive Value (DV):
1.00 – 1.74 Disagree (D)
1.75 – 2.49 Partially Disagree (PD)
2.50 – 3.24 Agree (A)
3.25 – 4.00 Strongly Agree (AG)

4.4. Satisfaction in online and face-to-face training

As shown in Table 5, satisfaction scores were higher in face-to-face training across indicators such as learning quality, discussion effectiveness, and motivation to engage further with the content. While teachers were satisfied with online training, they expressed a preference for the richer interactions experienced during physical sessions. Overall, they viewed face-to-face training as more meaningful and comprehensive.

This finding is consistent with Binmohsen and Abrahams (2022), who found that teachers perceive in-person interactions as more satisfying because of direct human contact. Similarly, Lin et al. (2023); L. A. Mohammed et al. (2022) highlight that both instructor interaction and peer engagement strongly influence satisfaction, factors rated higher in the face-to-face mode. Wang and Hong (2020) further emphasize the importance of timely feedback in increasing satisfaction, which may explain why teachers viewed physical sessions more favorably. Overall, the findings affirm Spears (2012) model, in

which stronger social presence, interaction, and collaboration lead to higher satisfaction with face-to-face training.

Table 5. Assessment of respondents' satisfaction with the training platforms.

No	Indicators	Face-to-Face			Online		
		Mean	SD	DV	Mean	SD	DV
1.	I learned from the training discussions.	3.65	0.56	SA	3.34	0.65	SA
2.	I was stimulated to conduct additional reading or research on topics discussed in the training.	3.57	0.59	SA	3.30	0.67	SA
3.	Discussions helped me understand other points of view.	3.61	0.58	SA	3.30	0.65	SA
4.	Training was a useful learning experience.	3.64	0.57	SA	3.42	0.65	SA
5.	The diversity of topics in the training prompted me to participate in the discussions.	3.59	0.58	SA	3.30	0.64	SA
6.	The level of learning that took place in the trainings was of the highest quality.	3.52	0.59	SA	3.24	0.68	A
	Overall Mean	**3.60**	**0.58**	**SA**	**3.32**	**0.66**	**SA**

Descriptive Value (DV):
1.00 – 1.74 Disagree (D)
1.75 – 2.49 Partially Disagree (PD)
2.50 – 3.24 Agree (A)
3.25 – 4.00 Strongly Agree (AG)

4.5. Difference in the Assessment of the Respondents Between Face-to-Face and Online Platforms along Social Presence, Social Interaction, Collaborative Learning, and Satisfaction

Table 6 summarizes the comparative results between the two modalities. Across all four dimensions–social presence, social interaction, collaborative learning, and satisfaction–teachers rated face-to-face training significantly higher than online training. These findings confirm the hypotheses and reinforce Spears (2012) model, which suggests that a strong social presence supports richer interactions, thereby enhancing collaboration and overall satisfaction. The paired t-test results reveal that the differences between platforms are not only consistent but also statistically significant. This pattern mirrors earlier literature Bali and Liu (2018); Binmohsen and Abrahams (2022), which similarly found that in-person settings promote more natural communication, clearer feedback, and deeper engagement, elements that remain difficult to replicate fully in digital environments.

Qualitative insights from the follow-up interviews further contextualize and strengthen the quantitative findings. Participants repeatedly emphasized that being physically present with colleagues made discussions more engaging and meaningful. One participant explained, "*There's just something about being in the same room with others that you can't replace online,"* highlighting how physical proximity supports spontaneous interaction and a stronger sense of belonging. Another shared, *"I feel more engaged and connected when I can see and interact with my colleagues face to face,"* reinforcing that visual cues, body language, and real-time reactions play an important role in perceived training quality. Several respondents also noted that *"discussions flow more naturally in person,"* which aligns with Kaufmann and Vallade (2022) assertion that rapport and climate are more easily built in face-to-face environments.

However, the interview data also affirm the value of online platforms for accessibility, flexibility, and convenience. Many teachers appreciated the reduced travel time and the opportunity to participate, even during busy schedules, echoing Hennessy et al. (2022), who argue that online learning expands participation opportunities. However, these advantages were often overshadowed by technical challenges, inconsistent connectivity, and reduced opportunities for interpersonal connection, factors that likely contributed to the lower online scores. Taken together, the quantitative results and qualitative insights illustrate a consistent pattern: while online platforms provide practical benefits, face-to-face

training offers stronger interpersonal dynamics and higher overall perceived effectiveness. This suggests that future training initiatives may benefit from a balanced, blended approach that leverages the strengths of face-to-face interactions while integrating online components to enhance accessibility and flexibility.

Table 6. Comparison results in the assessment of the respondents between face-to-face and online platforms along the four (4) dimensions

Variables	Platform	Mean	t-value	p-value	Statistical Inference
Social Presence	Face-to-face	3.43	11.6	0.000	**Significant**
	Online	3.15			
Social Interaction	Face-to-face	3.57	12.7	0.000	**Significant**
	Online	3.17			
Collaborative Learning	Face-to-face	3.60	13.1	0.000	**Significant**
	Online	3.14			
Satisfaction	Face-to-face	3.60	10.5	0.000	**Significant**
	Online	3.32			

*Tested at 0.05 level of significance - Paired T-test

4.6. Challenges encountered by the teachers on the training platforms

Following a thorough qualitative analysis of the feedback from the 20 participants, the data revealed six prominent themes, which were further interpreted through subsequent thematic analysis.

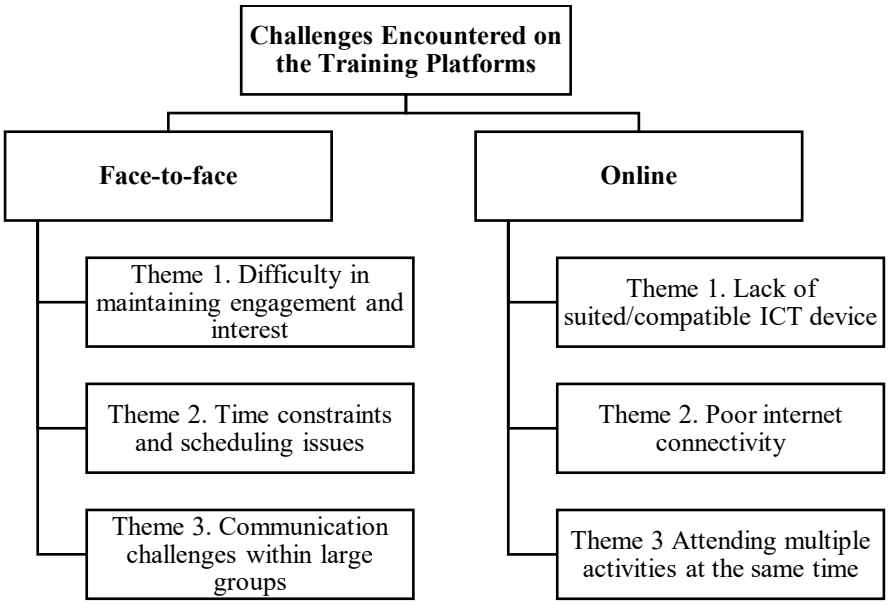

Figure 1. Thematic analysis

4.7. Face-to-face Training Platform

4.7.1. Theme 1. Difficulty in Maintaining Engagement and Interest

Participants 2, 4, 6, and 11 stated, *"If the speaker is boring, the participants are busy talking to each other, they will make their own business. I found it hard to stay focused during the sessions. Sometimes, the topics weren't engaging, and my mind wandered. I struggled to maintain interest, especially when the sessions were long. It felt like I was going through the motions."* Moreover, they also added, *"I wish there were more interactive elements. Just listening to someone talk for hours gets monotonous. I found myself zoning out a lot during the sessions. It was tough to stay engaged when the material didn't resonate with me."*

This implies that participants' reported difficulty maintaining social interaction and interest suggests a potential need for more interactive and engaging training methods. Incorporating varied instructional

techniques, such as group discussions, hands-on activities, and multimedia presentations, could help address this challenge. Additionally, offering shorter sessions or implementing breaks at strategic intervals could help participants stay focused and engaged throughout the training. Babkair, Al-Nasser, and Alzahem (2023); Pather et al. (2020) reported that strategies such as incorporating group discussions, hands-on activities, and multimedia presentations could mitigate disengagement in training. Shortening session durations and strategically incorporating breaks may also help sustain participants' focus and engagement. Moreover, tailoring content to participants' interests and requirements could enhance engagement and learning effectiveness.

4.7.2. Theme 2. Time Constraints and Scheduling Issues

Participants 1, 5, 10, and 13 mentioned, *"I found it difficult to attend the sessions because they often conflicted with my work schedule. It was frustrating trying to balance both. The scheduling of the sessions was a major issue for me. I have other commitments, and finding time to attend is challenging. I wish there were more flexibility in scheduling. The length of the sessions was also an issue. Sometimes, they ran longer than planned in the matrix, and it was hard to commit to that amount of time for the training."*

The time constraints and scheduling issues among participants highlight the importance of offering training that is satisfying and flexible, with accommodating schedules. Implementing options, such as varying session times or providing recorded sessions for participants to access at their convenience, can mitigate scheduling conflicts and improve accessibility. Additionally, communicating session durations and adhering to agreed-upon timeframes can help participants better plan and allocate their time effectively. Moreover, by considering participants' diverse schedules and commitments when planning training sessions, attendance and engagement can be increased, ultimately enhancing the effectiveness of the training program.

Chohan and Hu (2022) noted that incorporating strategies such as offering session variations and providing access to recorded sessions and training programs can alleviate conflicts and enhance accessibility for participants. Ensuring clear communication about session durations and adhering to agreed-upon timeframes help participants manage time effectively. Furthermore, accounting for participants' diverse schedules and commitments during session planning can boost attendance and engagement, maximizing the success of the training initiative.

4.7.3. Communication Challenges within Large Groups

Participants 7, 8, 12, and 16 said, *"With so many people participating in the training, it felt disorganized sometimes. It was not easy to follow the conversation and contribute meaningfully. I found it challenging to connect with other participants in such a large group. It was overwhelming and made me hesitant to speak up."* They also added, *"There were instances where important information was shared, but I missed it because of the large group size. It's frustrating when communication isn't clear and concise."*

This finding suggests that communication challenges experienced in large groups underscore the importance of fostering collaborative learning in an inclusive and conducive environment that supports effective participation and relationships. Implementing strategies such as smaller group discussions or using online platforms with breakout rooms can facilitate more meaningful interactions and ensure that all voices are heard. Encouraging active listening and providing opportunities for structured communication, such as designated speaking turns or digital tools for asynchronous discussions, can help mitigate the challenges of large-group dynamics.

Additionally, fostering a culture of respect and inclusivity, in which participants feel comfortable expressing their thoughts and ideas, can enhance overall communication and collaboration within the training environment. Karpa (2021) noted that trainers can facilitate more intimate and participatory interactions by organizing smaller group discussions or leveraging online platforms with breakout rooms, allowing all voices to be heard. Furthermore, cultivating a culture of respect and inclusivity

fosters an atmosphere in which participants feel empowered to contribute freely, ultimately enhancing interactions and collaborations within the training context.

4.8. Online Training Platform

4.8.1. Theme 1. Lack of Suited/Compatible ICT Device

Participants 8, 14, 19, and 20 specified, *"I couldn't fully participate because my device wasn't compatible with the platform. It was frustrating to miss out on important information. My device kept lagging during the sessions, making it difficult to follow along. It impacted my overall experience."* Furthermore, the participants also cited, *"I didn't realize beforehand that my device wouldn't work well with the platform. It was disappointing to encounter technical difficulties. I had to borrow a device from a family member to participate, which made me feel unprepared."*

This means that the challenges posed by a lack of suitable or compatible ICT devices underscore the critical importance of ensuring accessibility and technical readiness for all participants. Addressing this issue requires proactive measures, such as guiding compatible devices and technical requirements before the training sessions. Additionally, offering alternative participation options, such as providing devices or allowing participants to join via phone calls if needed, can help mitigate the impact of device compatibility issues. Furthermore, investing in user-friendly platforms with low technical requirements and providing technical support during sessions can enhance the inclusivity and effectiveness of the training program, ensuring that all participants can fully engage and benefit from the experience.

Bolaji and Adeoye (2022); Rahiem (2020) state that ensuring accessibility and technical readiness for all participants in training is crucial, despite the challenges posed by inadequate ICT devices. By investing in user-friendly platforms and providing strong technical support throughout sessions, training organizers can significantly enhance inclusivity and effectiveness, ensuring that participants are fully involved and benefit from the training experience.

4.8.2. Theme 2. Poor Internet Connectivity

Participants 3, 8, 11, 15, and 17 stated, *"My internet kept cutting out during the sessions, which made it difficult to follow along. It was frustrating to miss important information. I live in an area with unreliable internet access; therefore, I had to keep reconnecting during the sessions. It disrupted my learning experience. The sessions were constantly buffering due to poor internet connectivity. It was hard to stay engaged when the video kept freezing. I had to switch to using my mobile data because my home internet was too slow. It was costly on our part and not very reliable."*

This highlights the significant impact of poor internet connectivity on participants and the critical need for alternative solutions and accommodations to ensure equitable access to training resources. Implementing strategies such as providing offline materials or recording sessions for later viewing can mitigate the adverse effects of internet disruptions. Azıonya and Nhedzı (2021) also state that advocating for improved internet infrastructure in underserved areas to address connectivity challenges can create a more inclusive and accessible training environment for all participants.

4.8.3. Theme 3. Attending Multiple Activities at the Same Time

Participants 1, 7, 9, 16, and 18 stated, *"I struggled to keep up with all the different sessions happening simultaneously. There were times when I wanted to participate in multiple activities, but they were scheduled simultaneously. It felt overwhelming when trying to prioritize which ones to attend. Attending multiple activities concurrently made staying focused and absorbing the information challenging."*

The observation that participants struggled to manage multiple activities concurrently implies the importance of optimizing social presence by scheduling and prioritizing within training programs. Incorporating staggered session times or providing recordings for participants to access at their convenience can alleviate the pressure to simultaneously attend multiple activities. In addition, providing clear guidance on prioritizing sessions based on relevance or importance can help participants decide where to allocate their time and attention. Creating opportunities for flexible participation, such as allowing participants to participate in different activities at different times or offering asynchronous

options, can enhance accessibility and accommodate varying schedules and preferences, ultimately fostering a more manageable and effective learning experience.

Cavinato, Hunter, Ott, and Robinson (2021); Cohnitz, Trapps, Pâslaru, and Perkins (2020) noted that options such as alternating session times and recorded materials can ease the burden of attending multiple online activities simultaneously. Providing clear instructions for prioritizing sessions and offering flexible participation options can improve accessibility and customize the learning journey to suit individual preferences, resulting in a more streamlined and personalized educational setting for participants.

5. Conclusions

5.1. Conclusion

This study compared teachers' perceptions of face-to-face and online training across four essential learning dimensions: social presence, social interaction, collaborative learning, and satisfaction. The results showed consistently higher ratings for face-to-face training, indicating its continued advantage in promoting interpersonal connections, richer interactions, and more effective collaborative learning. Although online platforms offered flexibility and accessibility, their effectiveness was hindered by connectivity issues, limited non-verbal cues, and challenges in maintaining engagement. This research offers a clear and explicit contribution to the existing literature by providing one of the few comprehensive analyses that examines all four constructs simultaneously within a single comparative framework.

Previous studies often focused on only one or two dimensions independently; thus, this study advances the field by demonstrating how these constructs interrelate across modalities and by generating empirical evidence from a large-scale public-school context in the Philippines, an area where comparative post-pandemic training research remains limited. This integrated perspective strengthens theoretical understanding and addresses a notable gap in professional development studies. Overall, the findings highlight the need for a blended training approach that leverages the interpersonal strengths of face-to-face learning while incorporating the flexibility of online delivery. Such a model may provide a more balanced and effective pathway for future teacher professional development initiatives.

5.2. Research Limitations

This study explored teachers' perceptions of social presence, social interaction, collaborative learning, and satisfaction across online and face-to-face training platforms in the SDO of Cagayan during SY 2022–2023. The primary data collection tool was an adapted questionnaire derived from Spears (2012) work, and all statements were reviewed and revalidated to ensure appropriateness for the local context. The final instrument consisted of 28 Likert-scale items: 10 on social presence, six on social interaction, six on collaborative learning, and six on satisfaction (Tables 2–5). The questionnaire demonstrated strong internal consistency, with a Cronbach's alpha of 0.87, confirming its reliability.

To complement and validate the quantitative results, follow-up qualitative interviews and focus group discussions were conducted to provide deeper contextual insights into teachers' experiences. To conduct a deeper analysis, this study compared face-to-face and online training platforms. The study was limited to teachers' perceptions of social presence, social interaction, collaborative learning, and satisfaction on online and face-to-face training platforms. Furthermore, to validate the study's quantitative results, a semi-structured interview was conducted using a focus group or online interview.

5.3. Suggestions and Direction for Future Studies

The following recommendations are proposed to improve the effectiveness of teacher training programs based on the results of this study:

1. Program managers should integrate the strengths of both face-to-face and online platforms by leveraging traditional in-person interactions to foster community and engagement and harnessing the accessibility and flexibility of online platforms to enhance learning opportunities.
2. Program managers should make face-to-face sessions interactive and engaging by incorporating group discussions, hands-on activities, and multimedia presentations.

3. Program managers should provide flexible scheduling options for training sessions, including staggered session times and recorded materials, to accommodate participants' time constraints and scheduling conflicts.
4. Program managers could consider organizing smaller discussions or using online platforms with breakout rooms to facilitate better interaction.
5. Program managers should foster a collaborative and inclusive training environment by encouraging active participation, peer collaboration, and the sharing of experiences among participants.
6. The Department of Education should consider providing ICT devices to teachers to ensure that everyone has the necessary tools to participate.
7. Schools and teachers can improve internet connectivity by investing in infrastructure upgrades or supporting alternative options to ensure uninterrupted online participation.

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Author Contributions

ATBT contributed to the conceptualization of the study, development of the research framework, and overall supervision of the research process. RAA was responsible for designing the research methodology, collecting the data, and conducting the statistical analysis. KDC contributed to the literature review, data interpretation, and preparation as well as revision of the manuscript. All authors discussed the results, contributed to the final version of the manuscript, and approved the final manuscript for publication.

References

Ahoto, A. T., Mbaye, M. B., Anyigbah, E., Ahoto, A., Mbaye, M., & Anyigbah, E. (2022). The Impacts of Learner-Instructor Interaction, Learner-Learner, Learner-Content Interaction, Internet Self-Efficacy and Self-Regulated Learning on Satisfaction of Online Education of African Medical Students. *Open Access Library Journal, 9*(9), 1-16. doi:https://doi.org/10.4236/oalib.1109202

Amodu, A. A., Oyedokun, D. M., & Atoke, A.-A. M. (2022). COVID-19 and Sustainable Development: An Assessment of Global Efforts Towards Achieving Sustainable Development Goal 3 in Nigeria. *International Journal of Research and Innovation in Social Science, 6*(9), 42-51. doi:https://doi.org/10.47772/IJRISS.2022.6902

Andel, S. A., Vreede, T. d., Spector, P. E., Padmanabhan, B., Singh, V. K., & Vreede, G.-J. D. (2020). Do Social Features Help in Video-Centric Online Learning Platforms? A Social Presence Perspective. *Computers in Human Behavior, 113*, 1-8. doi:https://doi.org/10.1016/j.chb.2020.106505

Azıonya, C. M., & Nhedzı, A. (2021). The Digital Divide and Higher Education Challenge with Emergency Online Learning: Analysis of Tweets in the Wake of the COVID-19 Lockdown. *Turkish Online Journal of Distance Education, 22*(4), 164-182. doi:https://doi.org/10.17718/tojde.1002822

Baber, H. (2022). Social Interaction and Effectiveness of the Online Learning–A Moderating Role of Maintaining Social Distance during the Pandemic COVID-19. *Asian Education and Development Studies, 11*(1), 159-171. doi:https://doi.org/10.1108/AEDS-09-2020-0209

Babkair, K. A., Al-Nasser, S., & Alzahem, A. (2023). Experience of Emergency Medicine Residents Toward an Implemented Modified Teaching Approach. *Frontiers in Medicine, 10*, 1-14. doi:https://doi.org/10.3389/fmed.2023.1152892

Bali, S., & Liu, M. (2018). Students' Perceptions Toward Online Learning and Face-to-Face Learning Courses. *Journal of Physics: Conference Series, 1108*(1), 1-7. doi:https://doi.org/10.2139/ssrn.5146064

Bilgin, C. U., & Gul, A. (2020). Investigating the Effectiveness of Gamification on Group Cohesion, Attitude, and Academic Achievement in Collaborative Learning Environments. *TechTrends, 64*(1), 124-136. doi:https://doi.org/10.1007/s11528-019-00442-x

Binmohsen, S. A., & Abrahams, I. (2022). Science Teachers' Continuing Professional Development: Online vs Face-to-Face. *Research in Science & Technological Education, 40*(3), 291-319. doi:https://doi.org/10.1080/02635143.2020.1785857

Bolaji, H., & Adeoye, M. A. (2022). Accessibility, Usability, and Readiness Towards ICT Tools for Monitoring Educational Practice in Secondary Schools. *Indonesian Journal of Multidiciplinary Research, 2*(2), 257-264. doi:https://doi.org/10.17509/ijomr.v2i2.48247

Caballero, D., González, M., & Serrate, S. (2016). Blended Learning to Optimise the Teaching-Learning Process: The Synergy between Face-to-Face and Virtual Learning Environments. *9th Annual International Conference of Education, Research and Innovation*, 4326-4326. doi:https://doi.org/10.21125/iceri.2016.2024

Caratiquit, K. D. (2022). Mediating Effects of Protective Factors on COVID-19 Anxiety and Academic Performance of K to 12 Filipino Learners: A PLS-SEM Analysis with WarpPLS. *Journal of Social, Humanity, and Education, 2*(3), 225-243. doi:https://doi.org/10.35912/jshe.v2i3.972

Caratiquit, K. D., & Caratiquit, L. J. C. (2023). ChatGPT as an Academic Support Tool on the Academic Performance Among Students: the Mediating Role of Learning Motivation. *Journal of Social, Humanity, and Education, 4*(1), 21-33. doi:https://doi.org/10.35912/jshe.v4i1.1558

Caratiquit, K. D., & Pablo, R. (2021). Exploring the Practices of Secondary School Teachers in Preparing for Classroom Observation Amidst the New Normal of Education. *Journal of Social, Humanity, and Education, 1*(4), 281-296. doi:https://doi.org/10.35912/jshe.v1i4.721

Cavinato, A. G., Hunter, R. A., Ott, L. S., & Robinson, J. K. (2021). Promoting Student Interaction, Engagement, and Success in an Online Environment. *Analytical and Bioanalytical Chemistry, 413*, 1513–1520. doi:https://doi.org/10.1007/s00216-021-03178-x

Chen, L.-T., & Liu, L. (2020). Social Presence in Multidimensional Online Discussion: The Roles of Group Size and Requirements for Discussions. *Computers in the Schools, 37*(2), 116-140. doi:https://doi.org/10.1080/07380569.2020.1756648

Chohan, S. R., & Hu, G. (2022). Strengthening Digital Inclusion through E-Government: Cohesive ICT Training Programs to Intensify Digital Competency. *Information Technology for Development, 28*(1), 16-38. doi:https://doi.org/10.1080/02681102.2020.1841713

Cohnitz, D., Trapps, R., Pâslaru, V., & Perkins, T. (2020). The Online Alternative: Sustainability, Justice, and Conferencing in Philosophy. *European Journal of Analytic Philosophy, 16*(2), 145-171. doi:https://doi.org/10.31820/ejap.16.2.7

Dahlstrom-Hakki, I., Alstad, Z., & Banerjee, M. (2020). Comparing Synchronous and Asynchronous Online Discussions for Students with Disabilities: The Impact of Social Presence. *Computers & Education, 150*, 1-38. doi:https://doi.org/10.1016/j.compedu.2020.103842

Gacs, A., Goertler, S., & Spasova, S. (2020). Planned Online Language Education versus Crisis-Prompted Online Language Teaching: Lessons for the Future. *Foreign Language Annals, 53*(2), 380-392. doi:https://doi.org/10.1111/flan.12460

Gamage, S. H., Ayres, J. R., & Behrend, M. B. (2022). A Systematic Review on Trends in Using Moodle for Teaching and Learning. *International Journal of STEM Education, 9*(1), 1-24. doi: https://doi.org/10.1186/s40594-021-00323-x

Garcia-Martinez, I., Tadeu, P., Montenegro-Rueda, M., & Fernandez-Batanero, J. M. (2022). Networking for Online Teacher Collaboration. *Interactive Learning Environments, 30*(9), 1736-1750. doi:https://doi.org/10.1080/10494820.2020.1764057

Gegenfurtner, A., Zitt, A., & Ebner, C. (2020). Evaluating Webinar-Based Training: A Mixed Methods Study of Trainee Reactions Toward Digital Web Conferencing. *International Journal of Training and Development, 24*(1), 5-21. doi:https://doi.org/10.1111/ijtd.12167

Gherheș, V., Stoian, C. E., Fărcașiu, M. A., & Stanici, M. (2021). E-Learning vs. Face-To-Face Learning: Analyzing Students' Preferences and Behaviors. *Sustainability, 13*(8), 1-15. doi:https://doi.org/10.3390/su13084381

Hamdan, K. M., Al-Bashaireh, A. M., Zahran, Z., Al-Daghestani, A., Al-Habashneh, S., & Shaheen, A. M. (2021). University Students' Interaction, Internet Self-Efficacy, Self-Regulation and Satisfaction with Online Education During Pandemic Crises of COVID-19 (SARS-CoV-2). *International Journal of Educational Management, 35*(3), 713-725. doi:https://doi.org/10.1108/IJEM-11-2020-0513

Hennessy, S., D'Angelo, S., McIntyre, N., Koomar, S., Kreimeia, A., Cao, L., . . . Zubairi, A. (2022). Technology Use for Teacher Professional Development in Low- and Middle-Income Countries: A Systematic Review. *Computers and Education Open, 3*, 1-32. doi:https://doi.org/10.1016/j.caeo.2022.100080

Huff, M., Jacobsen, C., & Papenmeier, F. (2025). Edit Blindness is not Related to Immersion and Presence in Hollywood Movies. *Psychology of Aesthetics, Creativity, and the Arts, 19*(2), 353-361. doi:https://doi.org/10.31234/osf.io/e6zsd

Karpa, K. (2021). Tips for Converting Interprofessional Education Sessions from in-Person to Remote Synchronous Formats for Experiential Learning. *Journal of Interprofessional Education & Practice, 22*(1). doi:https://doi.org/10.1016/j.xjep.2020.100408

Kaufmann, R., & Vallade, J. I. (2022). Exploring Connections in the Online Learning Environment: Student Perceptions of Rapport, Climate, and Loneliness. *Interactive Learning Environments, 30*(10), 1794-1808. doi:https://doi.org/10.1080/10494820.2020.1749670

Lichauco, T. A. N., Molina, A., Tengco, D., & Vidallo, M. F. (2023). Academic Dishonesty in Online Classes: Investigating Self-reports Using McCabe's Academic Integrity Survey. *Journal of Social, Humanity, and Education, 4*(1), 1-19. doi:https://doi.org/10.35912/jshe.v4i1.1500

Lin, G.-Y., Wang, Y.-S., & Lee, Y. N. (2023). Investigating Factors Affecting Learning Satisfaction and Perceived Learning in Flipped Classrooms: The Mediating Effect of Interaction. *Interactive Learning Environments, 31*(9), 5759-5780. doi:https://doi.org/10.1080/10494820.2021.2018616

Miller, K. E. (2021). A Light in Students' Lives: K-12 Teachers' Experiences (Re) Building Caring Relationships During Remote Learning. *Online Learning, 25*(1), 115-134. doi:https://doi.org/10.24059/olj.v25i1.2486

Mohammed, L. A., Aljaberi, M. A., Amidi, A., Abdulsalam, R., Lin, C.-Y., Hamat, R. A., & Abdallah, A. M. (2022). Exploring Factors Affecting Graduate Students' Satisfaction toward E-Learning in the Era of the COVID-19 Crisis. *European Journal of Investigation in Health, Psychology and Education, 12*(8), 1121-1142. doi:https://doi.org/10.3390/ejihpe12080079

Mohammed, T. Y., Philip, K. Y., & Labaran, K. (2024). The Influence of Social Media on Students of Second-Cycle Institutions in Tamale and its Implications. *Journal of Social, Humanity, and Education, 4*(3), 205-217. doi:https://doi.org/10.35912/jshe.v4i3.1939

Nasir, M. K. M. (2020). The Influence of Social Presence on Students' Satisfaction toward Online Course. *Open Praxis, 12*(4), 485-493. doi:https://doi.org/10.5944/openpraxis.12.4.1141

Park, C., & Kim, D. g. (2020). Exploring the Roles of Social Presence and Gender Difference in Online Learning. *Decision Sciences Journal of Innovative Education, 18*(2), 291-312. doi:https://doi.org/10.1111/dsji.12207

Pather, N., Blyth, P., Chapman, J. A., Dayal, M. R., Flack, N. A., Fogg, Q. A., . . . Meyer, A. J. (2020). Forced Disruption of Anatomy Education in Australia and New Zealand: An Acute Response to the Covid-19 Pandemic. *Anatomical Sciences Education, 13*(3), 284-300. doi:https://doi.org/10.1002/ase.1968

Rahiem, M. (2020). Technological Barriers and Challenges in the Use of ICT during the COVID-19 Emergency Remote Learning. *Universal Journal of Educational Research, 8*(11), 6124-6133. doi:https://doi.org/10.13189/ujer.2020.082248

Rasmitadila, R., Aliyyah, R. R., Rachmadtullah, R., Samsudin, A., Syaodih, E., Nurtanto, M., & Tambunan, A. R. S. (2020). The Perceptions of Primary School Teachers of Online Learning during the COVID-19 Pandemic Period: A Case Study in Indonesia. *Journal of Ethnic and Cultural Studies, 7*(2), 90-109. doi:https://doi.org/10.29333/ejecs/388

Shukla, T., Dosaya, D., Nirban, V., & Vavilala, M. P. (2020). Factors Extraction of Effective Teaching-Learning in Online and Conventional Classrooms. *International Journal of Information and Education Technology, 10*(6), 422-427. doi:https://doi.org/10.18178/ijiet.2020.10.6.1401

Song, H., Kim, J., & Park, N. (2019). I Know My Professor: Teacher Self-Disclosure in Online Education and a Mediating Role of Social Presence. *International Journal of Human–Computer Interaction, 35*(6), 448-455. doi:https://doi.org/10.1080/10447318.2018.1455126

Spears, L. (2012). *Social Presence, Social Interaction, Collaborative Learning, and Satisfaction in Online and Face-to-Face Courses.* Retrieved from https://doi.org/10.31274/etd-180810-507

Strauß, S., & Rummel, N. (2020). Promoting Interaction in Online Distance Education: Designing, Implementing and Supporting Collaborative Learning. *Information and Learning Sciences, 121*(5-6), 251-260. doi:https://doi.org/10.1108/ils-04-2020-0090

Valtonen, T., López-Pernas, S., Saqr, M., Vartiainen, H., Sointu, E. T., & Tedre, M. (2022). The Nature and Building Blocks of Educational Technology Research. *Computers in Human Behavior, 128*, 1-16. doi:https://doi.org/10.1016/j.chb.2021.107123

Wang, Z., & Hong, T. (2020). Reinforcement Learning for Building Controls: The Opportunities and Challenges. *Applied Energy, 269*(3), 1-30. doi:https://doi.org/10.1016/j.apenergy.2020.115036

Zou, W., Hu, X., Pan, Z., Li, C., Cai, Y., & Liu, M. (2021). Exploring the Relationship between Social Presence and Learners' Prestige in MOOC Discussion Forums Using Automated Content Analysis and Social Network Analysis. *Computers in Human Behavior, 115*. doi:https://doi.org/10.1016/j.chb.2020.106582