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# A Latent Profile Analysis of Instructor Presence in Online Teaching and Learning in Higher Education: A Students' Evaluation Perspective

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## Abstract

This study examined instructor presence in the context of online learning in Ghanaian higher education by focusing on the post-COVID-19 virtual teaching environment. Grounded in the Community of Inquiry framework, the study specifically examined how instructors create teaching, cognitive, social, and emotional presences that foster students' engagement in the online learning environment. We collected data from 404 postgraduate students using a self-administered online questionnaire comprising 39 items. We used Latent Profile Analysis to classify instructors into four groups: *novice*, *intermediate*, *promising*, and *ideal*, based on their ability to create these presences. The results indicate that the dominant presence is teaching, but barriers such as low technological readiness and digital literacy make the cognitive and social presences less evident. The results also indicate that emotional presence, which strongly correlates with other presences, is the second most important presence the instructors created. The students' perceptions of the instructor's presence did not vary based on their gender, suggesting that the instructors' proficiency in online teaching is comparable, potentially enhancing the uniformity of the learning experience across various student groups.

This paper underscores the need for faculty development that addresses training on technology-enhanced pedagogy and emotional intelligence for online teaching. Specific recommendations relate to targeted support for instructors teaching online courses, the development of technological resources, and support for enhancing cognitive and social presences in virtual classrooms.

**Keywords:** Community of Inquiry, Online Learning, Instructor Presence, Latent Profile Analysis, Higher Education, Emotional Presence

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## INTRODUCTION

The COVID-19 pandemic caused the shift in using technology to teach and learn to happen at a faster pace than ever, affecting education systems all over the world. This shift brought focus to the type of knowledge that instructors must demonstrate when teaching in online learning

environments to foster student engagement and success (Morreale et al., 2024; Singh et al., 2022). Instructor presence, which is the extent to which the instructor is present and responsive in a virtual learning environment, has also been found to have a significant impact on the motivation to learn, class attendance and academic achievement of the students (Tyrväinen et al., 2021; Cleveland-Innes & Campbell, 2012). While the benefits of instructor presence are well-known, the majority of the research conducted in this area relates to Western countries, while the role of the instructor presence in non-Western contexts such as sub-Saharan Africa remains a void in the literature (Ankoma-Sey et al., 2022). Further, the existing studies provide a limited understanding of the Community of Inquiry (CoI) framework's presence, which encompasses the teaching, cognitive, social and emotional presence (Shea et al., 2022; Cleveland-Innes & Campbell, 2012). Specifically, the role of emotional presence has emerged as a focus of attention in online teaching, as a form of care and compass in online interaction (Kuo et al., 2023; Zhang et al., 2023).

Further, recent research works have also discussed the post-pandemic consequences of instructor presence, and, in particular, high levels of social and emotional presence have been found to significantly impact increased learning satisfaction and reduced feelings of loneliness (Eklund & Isotalus, 2024; Tang & Hew, 2020). There is a lack of research about these dynamics in the context of African higher education institutions as technological constraints, Internet connection issues, and low digital literacy hamper the development of constructive instructor presence (Quansah et al., 2024; Aidoo et al., 2022).

To address these gaps, this study aims to examine the forms of presence, that is, teaching, cognitive, social, and emotional, that instructors create in virtual learning environments with reference to Ghanaian higher learning institutions. This study also helps to fill the gap in the literature about online instructor presence by examining student perceptions of online instructors in a non-Western context, such as Ghana. It also adds understanding to requisite approaches to improve instructors when the teaching and learning environment is relatively emergent in the context of the virtual mode.

## Theoretical Framework

This study is grounded in the CoI framework (Garrison et al., 2000), which posits that online learning is most effective when a sense of community is created through four types of presence: This view postulates the role of teaching presence with social, cognitive, and emotional presence as the other foci when designing instruction in the online environment (Cleveland-Innes & Campbell, 2012). These presence facets are essential to maintaining and developing an effective virtual teaching and learning environment. As noted in previous literature, it is essential to understand how these presences work together to enhance teaching and learning in an online setting (Garrison & Akyol, 2015; Kaban, 2021; Shea et al., 2022).

### *Teaching Presence*

Teaching presence comprises content, assessment, and administration of learning activities. This guarantees a structural framework, which is especially important in distance learning. This presence involves specifying learning goals, offering instructional resources or materials, and monitoring the discussions. Garrison and Arbaugh (2007) stressed the fact that teaching presence is invariable in terms of directing and facilitating the learning process. Their research established that teaching presence enhances cognitive and social activities and is directly linked to student retention and satisfaction (Shea et al., 2022). This indicates that instructors who post feedback within the timeframe and continue to be engaged in the course, further improve students' perceptions of the learning process (McNeill, L., & Bushaala, 2023).

### *Cognitive Presence*

Cognitive presence can be described simply as learners' ability to make and verify meaning while engaging in content reflection and discourse. Most importantly, it is indispensable in learning the development of critical thinking and problem-tackling skills. Cognitive presence is critical in any course, and instructors are right to employ strategies that ensure that the students

think more about the content. In a recent meta-analysis research, Kozan and Richardson (2014) noted that cognitive presence is positively enhanced when teaching presence is appropriately incorporated especially through continuing professional development conferences and reflective practices.

***Social Presence***

Perceived interactivity is the extent to which participants feel they are communicating with other real people and belong to a community. This presence is invaluable to keep one motivated and engage everyone in a work setting. Lehman and Conceição (2010) argued that increased social presence decreases loneliness which is familiar in online courses. A study by Lim and Richardson (2021) established that student social presence was associated with higher activity participation and satisfaction with online courses.

***Emotional Presence***

Emotional presence has recently been highlighted in the literature as a component of online teaching-learning environments (e.g., Jumaat & Termidi, 2022; Kaymak; 2024; Tan & Jung, 2024). Emotional presence is the extent to which instructors and students can facilitate feelings-responsive mode to one another. This is a significant multifunctional role of promoting; it facilitates the development of a positive and trustful learning atmosphere. Of all the personalities, emotion is most relevant when students are faced with a problem or have a difficult time figuring something out. Zhang et al. (2023) pointed out that the instructors who showed empathy and feedback to the students' emotions enhanced the students' satisfaction and completion rate.

**Instructor Presence Profile**

The emergence of COVID-19 sparked increased research interest in the use of online teaching and for that matter, a focus on how instructor presence is created (Singh et al., 2022). Consequently, earlier research has revealed the four varied instructor presences prevalent among instructors with teaching presence being generally highly reported across studies with social presence being the least reported (e.g., Ke, 2010; Li, 2022; Lim & Richardson, 2021). There is a lack of definitive pattern regarding the ranking of emotional and cognitive presences with some studies not investigating these presences. This observation is partly due to the notion that the emotional and cognitive presences cannot be decoupled from the teaching presence and thus, some scholars have stressed that building teaching presence appropriately automatically leads to increased levels in the two presences (Lim & Richardson, 2021; Kozan & Richardson, 2014).

A large amount of literature on instructor presence though has agreed that there is a close relation between all four presences (i.e., teaching, cognitive, social, and emotional), they are distinct (see Cleveland-Innes & Campbell, 2012; Garrison & Akyol, 2015; Shea et al., 2022). For example, teaching presence supports learning presence in cognitive and social means, while emotional presence supports learning presence in ways that produce helpful feelings amid the learning process (Majeski et al., 2018). Each of these presences in moderation or equal measures enriches students' learning process and performance (Garrison & Arbaugh, 2007).

For several decades, gender has been the centre of literature discussions on technology equity and access issues. The highlights from the literature have suggested gender variations in information and communication technology and digital tools access, usage and skills among both students and teachers with findings skewed in favour of males (Qazi et al., 2022). Although there is virtually non-existent literature on gender differences related to the creation of instructor presence in higher education, we argued that males are more likely to demonstrate and recognize appropriate technology-related instructional pedagogy compared to females.

**The Methodological Gap**

This research presents and addresses a methodological gap in the earlier literature on instructor presence. We note that all available previous research works assessing instructor behaviours regarding online teaching presence heavily rely on descriptive statistics (i.e., mean and standard deviation) (see Ke, 2010; Li, 2022; Kozan & Richardson, 2014; Lim & Richardson, 2021; Singh et al., 2022). Although these measures offer general insightful information, findings from such analysis lack depth failing to capture the nuances in the interaction and variability

between the distinct forms of presence for each instructor's behaviours (Ferguson et al., 2020). In other words, findings from earlier research assume that teaching practices are homogeneous among instructors and thus, do not acknowledge the unique combinations of the four presences that may reflect varied instructional styles. Aside from the mean-standard deviation-based analysis, this research adopts the Latent Profile Analysis (LPA) (Spurk et al., 2020; Rosenberg et al., 2019) to capture and explore a more in-depth understanding of instructors' presence in online teaching.

Adopting the LPA is useful in the field of instructor teaching behaviours and has some notable implications. First, using this statistical approach in this study reflects the assumption that individual instructors demonstrate varying levels of online presence (Weller et al., 2020). For example, an instructor may emphasize high levels of teaching and social presence with little demonstration of emphasis on emotional and cognitive presence. Other instructors may also demonstrate varying levels of the four online presence domains which could help inform customized, personalized and adaptive support and interventional strategies. Secondly, utilising the LPA strategy offers a catalyst for the refinement and possible extension of some key theoretical frameworks like the CoI model by showing how multiple domains of instructor presence coexist dynamically during virtual teaching.

Sequel to the gap analysis, three research objectives were proposed to guide the study. First, the study explored the nature of instructor online presence during teaching engagement and the relationship existing between the domains of instructor presence. This initial objective is to provide a descriptive overview of the instructor presence and a basis for comparison with the profiles. The second objective assessed the online instructor presence profiles of the teachers in line with evaluating their capabilities of creating the presences using the LPA. The third research objective examined the gender differences in the evaluation of instructors based on online instructor presence profiles.

## METHODS AND MATERIALS

### Participants

The survey was conveniently distributed to 446 postgraduate students; however, only 404 began and completed the survey. About one-third of the sample consisted of male students (70.5%), whereas the rest were females (29.5%). The age distribution ranged from 25 years to older than 56 years. However, the greater portion of the sample was between 25 and 30 (32.2%), and very few participants were older than 55 (3.7%). Other respondents fell into the age bracket of 31 to 35 years (15.5%), 36 to 40 years (15.3%), and 41 to 45 years (16.6%) (see Table 1).

**Table 1:** Demographic Information

| Variable | Level | Count | Proportion |
|---|---|---|---|
| Sex | Male | 285 | 0.705 |
| | Female | 119 | 0.295 |
| Age | 25-30 years | 130 | 0.322 |
| | 31-35 years | 64 | 0.158 |
| | 36-40 years | 62 | 0.153 |
| | 41-45 years | 67 | 0.166 |
| | 46-50 years | 37 | 0.092 |
| | 51-55 years | 29 | 0.072 |
| | 56 and above | 15 | 0.037 |

**Procedure**

The study was approved by the Institutional Review Board. Google Forms survey software (Google Inc., Mountain View, CA) was used to gather quantitative data online. Participants were informed that filling out the online survey was entirely voluntary. Participants were also guaranteed confidentiality, anonymity, volition, and the right to withdraw from the study. Participants completed the survey in about 10 minutes.

**Measure**

An online instructor presence scale (OIPS) was designed to assess how instructors create presence in an online learning environment based on the CoI framework (Garrison et al. (2000). Besides the COI framework, other literature was consulted to fine-tune the items in order to improve its psychometric properties (Arbaugh et al. 2008; Cleveland-Innes & Campbell, 2012; Sarsar & Kisla, 2016; Tyng et al., 2017). Particularly, some of the items were adapted from Arbaugh et al.'s scale on teaching, cognitive, and social presence which did not have an emotional component. We constituted a 5-member panel of experts in educational psychology, measurement and evaluation, curriculum, instructional technology, and educational statistics who independently reviewed the items to ensure their content and face validity. Based on the panel members' feedback, modifications were made before the items were subjected to psychometric analyses using factor analysis.

The final form of the instrument used for this research comprised a 39-item scale with four dimensions, namely, teaching presence, social presence, cognitive presence, and emotional presence. Example statements included: "*My instructor created assignments that focused on real-world situations*", "*My instructor created the opportunity for students to discuss their ideas with other students*", "*My instructor provided a forum for students to voice out their frustrations about their learning*" and "*My instructor connected to students individually to get to know them well*". All 39 statements were rated on a four-point Likert scale, with 1 indicating "*strongly disagree*", 2 "*disagree*", 3 "*agree*" and 4 "*strongly agree*" The first section of the survey consisted of three demographic variables. The reliability estimates using the McDonald Omega are as follows: teaching presence – 0.919, social presence – 0.907, cognitive presence – 0.911, and emotional presence – 0.927.

**Statistical Analysis**

The data were first screened and managed by performing frequency and percentage counts for all the variables to identify any unusual pattern of responses. After that, the analysis was conducted to address the research objectives. The mean, standard deviation, skewness and kurtosis scores were generated for the variables to explore the descriptive nature of the instructor presence domains. As part of the descriptive analysis, a correlation plot (based on Pearson Product Moment Correlation analysis) was generated to offer insight into the relationship existing among the domains of instructor presence. An LPA was then conducted to examine the unique combinations of the four presences that may reflect the varied instructional styles of instructors (Weller et al., 2020). The choice of the number of classes was informed by the model fit indices and the literature on instructor online presence (Ferguson et al., 2020). A chi-square analysis was performed to examine whether male students evaluated the online presence profile of instructors differently from their female counterparts.

## RESULTS

**Descriptive statistics**

The study examined the nature of the presence created by instructors in a virtual learning environment. Based on previous literature and existing measures of online presence, we examined four main types of presence: teaching presence, cognitive presence, social presence, and emotional presence. The focus was to understand the generally predominant presence created by instructors during online teaching and learning and to examine the relationships among the forms of presence. The findings (Table 2) showed that teaching presence was more dominant among all the types of presence, (Mean = 4.03, SD = .790), while emotional presence received a mean score of 3.84 out

of 5 with a standard deviation of .828. Cognitive presence scored significantly lower (M = 3.77, SD = 0.845) as did social presence (M = 3.74, SD = 0.836) because it is difficult to bring the sense of deep cognitive activity and interactivity by staying connected online.

**Table 2:** Descriptive statistics of the forms of online presence

| | Emotional Presence | Social Presence | Cognitive Presence | Teaching Presence |
|---|---|---|---|---|
| Mean | 3.85 | 3.74 | 3.77 | 4.03 |
| Standard deviation | 0.828 | 0.836 | 0.845 | 0.790 |
| Skewness | -1.07 | -0.946 | -1.04 | -1.81 |
| Std. error skewness | 0.121 | 0.121 | 0.121 | 0.121 |
| Kurtosis | 1.42 | 1.03 | 1.11 | 3.95 |
| Std. error kurtosis | 0.242 | 0.242 | 0.242 | 0.242 |

**Correlations among the forms of online instructor presence**

Statistically measurable relationships existed between all kinds of presence (Figure 1). In particular, measures of emotional presence turned out to be most strongly related to those of social presence (r = 0.669); their correlation with cognitive presence was also considerable (r = 0.625). These results imply that emotional presence may be central to improving both cognitive and social interactions in virtual settings.

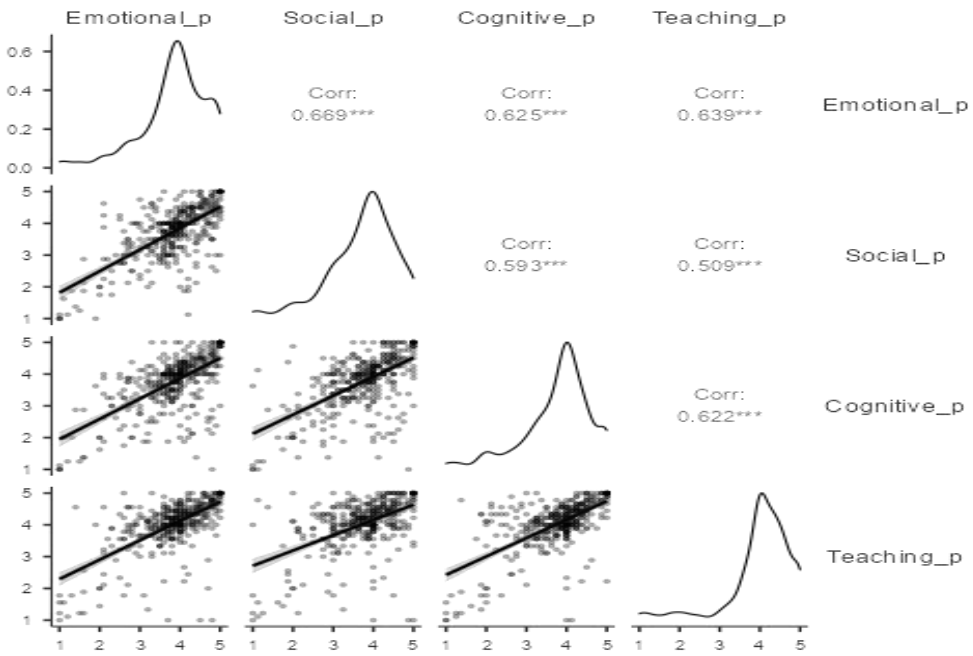


**Figure 1:** Correlational Analysis of the Forms of Online Presence

**Latent Profile Analysis and Fit Measures**

The instructors were first categorised based on their level of presence in the online learning environment through the LPA (Spurk et al., 2020; Rosenberg et al., 2019). LPA assesses behaviour patterns by categorising people in relation to the answers given. Other goodness of fit

measures such as the Akaike Information Criterion (AIC) and Bayesian information criterion (BIC) were used to check the respective number of profiles. Four different classes of instructors were identified in this study, namely novice, ideal, intermediate, and promising instructors. Based on the entropy score of 0.849, Loglik = -15556, AIC= 3157, BIC=3251, and CLC= 3114 (see Table 3), the researchers were able to successfully differentiate between the 4 groups.

The latent profiles represent realistic differences regarding the various combinations instructors exhibited during virtual teaching and learning, with a low presence strategy score for the novice, and a high presence score for the ideal profile that incorporates both emotional and cognitive presences to a greater extent.

**Table 3:** Model Comparison Based on Model Fit Indicators

| Class | LogLik | AIC | AWE | BIC | CAIC | CLC | KIC | SABIC | ICL | Entropy |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -1979 | 3975 | 4077 | 4007 | 4015 | 3961 | 3986 | 3981 | -4007 | 1.000 |
| 2 | -1725 | 3476 | 3643 | 3528 | 3541 | 3451 | 3492 | 3486 | -3542 | 0.947 |
| 3 | -1620 | 3275 | 3508 | 3347 | 3365 | 3241 | 3296 | 3290 | -3440 | 0.793 |
| 4 | -1556 | 3159 | 3456 | 3251 | 3274 | 3114 | 3185 | 3178 | -3326 | 0.849 |

LogLik= ;AIC= ; AWE=; BIC= ; CAIC= ; CLC= ; KIC= ; SABIC= ; ICL;

Detailed results describing the characteristics of each cluster of instructors have been shown in the latent profile plot (Figure 2) and the correlation plot (Figure 3).

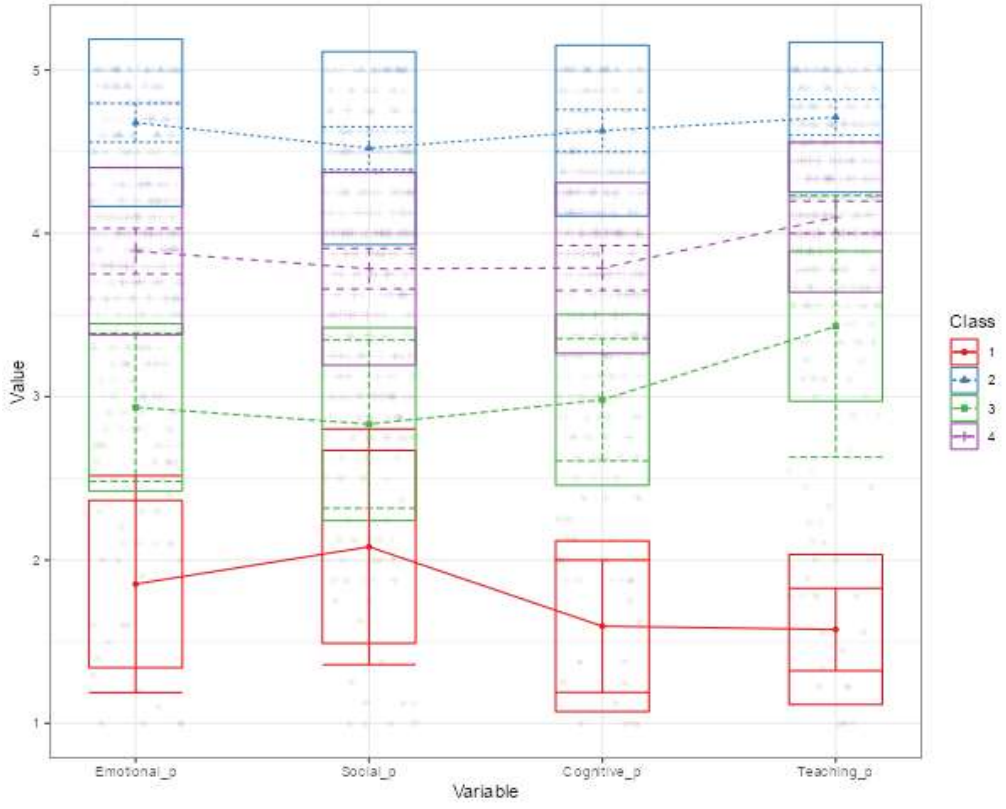


**Figure 2:** The Latent Profile Plot (Box Plot)

As shown in Figure 2, Class 1 (red) showed low median scores on all four domains of online presence, followed by Class 3 (green) with higher median scores on the domains. Class 4 (purple) had the second-highest median score while the topmost median score was obtained by Class 2 (blue). Further analysis from the density plot (see Figure 3) showed the score distribution and dispersion. It can be observed that instructors in Class 1 had their density curve concentrated towards the lower end of the spectrum indicating consistently minimal presence. The Class 3

instructors had a distribution peak around the mid-range with high variability. Although there seem to be some overlapping distributions for instructors in Class 2 and Class 4, the peak of the density plot for the Class 2 group was more skewed at the highest end with less spread.

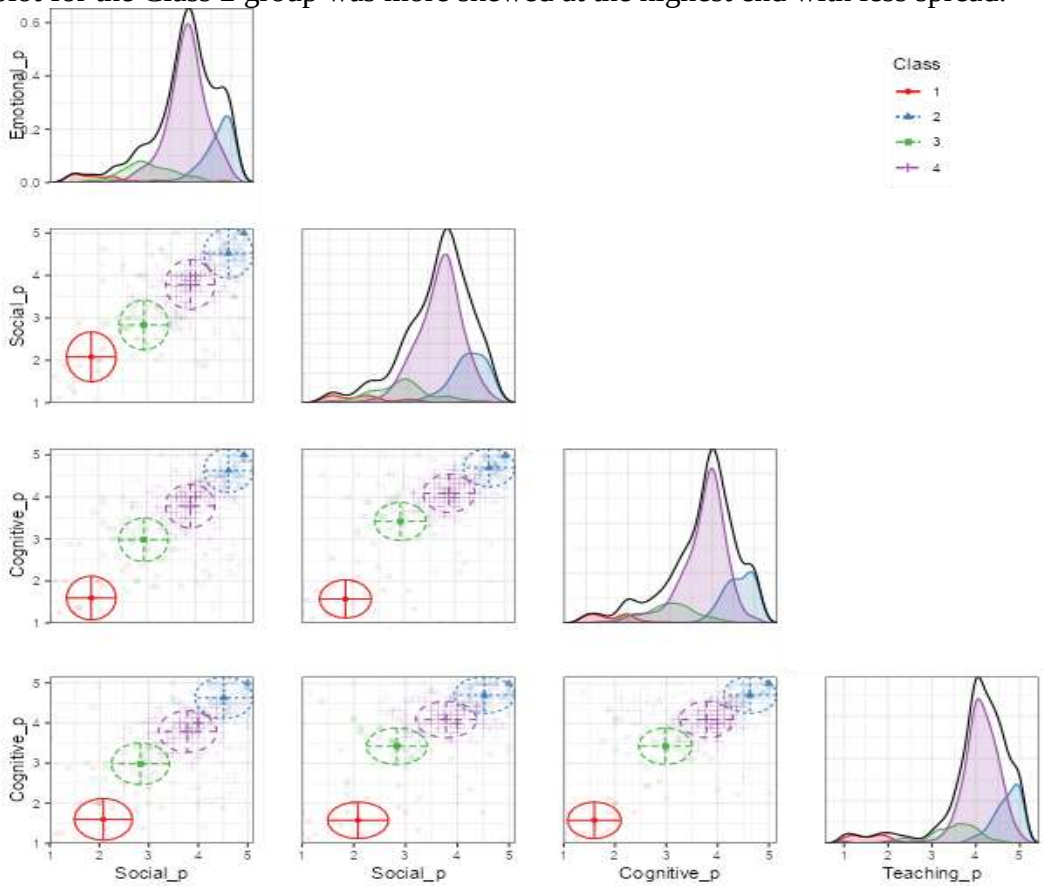


**Figure 3:** Correlation Plot for the 4 Class Model

**The cluster of instructors with specific combinations of online presence**

This study identified four distinct latent profiles of instructors based on the varying combinations of online presences they create: There are four levels of instructors namely, Novice, Ideal, Intermediate, and Promising. As noted earlier, these profiles were developed through LPA which categorised these instructors based on their level of teaching, cognitive, social as well as emotional engagement during online teaching.

***Class 1: Novice Online Instructors (n=19, 4.7%)***

The study shows that Novice Online Instructors have very low teaching, cognitive, emotional, and social interactional presence online. In particular, these instructors make almost no effort to make learners feel warm and cared for. They have their preplanned approach for each lesson and very seldomly consider a student's welfare or emotions while designing their lesson. For instance, they might publish the assignments and recorded classes and barely provide any interaction, feedback or emotional support. For example, novice instructors can provide resources for learners and wait until their assignments are done without considering the presence of live chats and other assistance. These instructors are not available for impromptu student questions and virtually never offer helpful criticism. The study revealed that about 4.7% of the students encountered instructors with these set characteristics.

***Class 2: Ideal Online Instructors (n=76, 18.8%)***

The study reveals that Ideal Online Instructors exhibit a high extent of teaching, cognitive, emotional and interpersonal interactions. They ensure that students engage in the school's

activities and establish order between the informative and the transformative online platform. Ideal online instructors share students' ideas and contributions quickly, give group assignments, provide constant feedback, and make students puffed with ideas and feel intellectually stimulated as well as emotionally rooted. For instance, typical instructors start their online courses with brainstorming exercises, meaningful discussions, and changing their planned activities based on their group's feedback. They foster a deep sense of community and make students feel comfortable presenting their ideas and feelings. Close to 19 percent of the students encountered such instructors.

***Class 3: Intermediate Online Instructors (n=45, 11.1%)***

Intermediate Online Instructors exhibit a moderate proportion of teaching–cognitive but a low proportion of socio-emotional presence. While they try to be creative in the way students are addressed through the content, there can exist problems with building an atmosphere that allows communication. While these instructors might offer sufficient cognitive demands with adequate amounts of mental stimulation, few promote emotional experience or actual social interaction. For instance, intermediate instructors may directly engage students in online discussions and give feedback on tasks but avoid dealing directly with students' emotional problems or peer-to-peer conflicts; thus, learners may experience certain social isolation. About 11% of the students claimed to have encountered an "intermediate online instructor".

***Class 4: Promising Online Instructors (n=264, 65.3%)***

Promising Online Instructors scored moderately in all four presences. These instructors show a lot of promise but are still growing in terms of developing their skills in the best practices for teaching in the online environment. It is worth noting that these instructors attempt to perform good teaching, cognitive, social, and emotional roles at the same time but fail to create ideal depth as frequently exhibited by ideal instructors. For example, promising teachers can occasionally offer genuine interaction and differentiated feedback during live sessions but have yet to perfect directions for supporting each student emotionally or settling the peer-to-peer conflict. This was the most common perception reported by the students in that about 65 percent of them reported encountering a "promising online instructor".

The summary of the characteristics of the classes of instructors is shown in Table 4.

**Table 4**: Summary of the Characteristics of the Classes of Online Instructors

| Classes | Teaching Presence | Cognitive Presence | Social Presence | Emotional Presence |
|---|---|---|---|---|
| Ideal Online Instructor | High | High | High | High |
| Promising Online Instructor | Moderate | Moderate | Moderate | Moderate |
| Intermediate Online Instructor | Moderate | Moderate | Low | Low |
| Novice Online Instructor | Low | Low | Low | Low |

**Differences in Online Instructors Based on Gender**

We further examined whether male and female postgraduate students encountered different clusters of online instructors. Using the classes of instructors and the gender variable, we conducted a chi-square analysis to achieve this objective. The result revealed a non-significant difference in the classes of online instructors based on gender: $\chi^2(3) = 6.90$, $p = 0.075$. In other words, male and female students reported encountering similar distributive patterns among online instructors (see Table 5).

**Table 5:** Contingency Table for Classes of Instructors and Gender of Students

| | | Sex | | |
|---|---|---|---|---|
| **Membership** | | **Male** | **Female** | **Total** |
| 1 | Observed | 13 | 6 | 19 |
| | % within row | 68.4 % | 31.6 % | 100.0 % |
| | % within column | 4.6 % | 5.0 % | 4.7 % |
| | % of total | 3.2 % | 1.5 % | 4.7 % |
| 2 | Observed | 63 | 13 | 76 |
| | % within row | 82.9 % | 17.1 % | 100.0 % |
| | % within column | 22.1 % | 10.9 % | 18.8 % |
| | % of total | 15.6 % | 3.2 % | 18.8 % |
| 3 | Observed | 30 | 15 | 45 |
| | % within row | 66.7 % | 33.3 % | 100.0 % |
| | % within column | 10.5 % | 12.6 % | 11.1 % |
| | % of total | 7.4 % | 3.7 % | 11.1 % |
| 4 | Observed | 179 | 85 | 264 |
| | % within row | 67.8 % | 32.2 % | 100.0 % |
| | % within column | 62.8 % | 71.4 % | 65.3 % |
| | % of total | 44.3 % | 21.0 % | 65.3 % |
| Total | Observed | 285 | 119 | 404 |
| | % within row | 70.5 % | 29.5 % | 100.0 % |
| | % within column | 100.0 % | 100.0 % | 100.0 % |
| | % of total | 70.5 % | 29.5 % | 100.0 % |

## Discussion

The study assessed the instructor's presence in online teaching and learning in higher education through the lens of postgraduate students. The study specifically examined the (a) nature of presences created by online instructors during their teaching engagements, (b) online instructor presence profiles of the facilitators in line with evaluating their capabilities of creating the presences, and (c) gender differences in the online instructor presence profiles of the facilitators.

### *Insights into teaching and emotional presence*

The findings of the study revealed teaching presence as the most predominant presence created by the facilitators, followed by emotional presence. Cognitive presence and social presence were rated as the least presences created by the instructors. The findings that teaching presence was largely created is expected because it has been noted for the fundamental role it plays in teaching and learning. Of course, every instructor engages their students through designing, facilitating, and directing the cognitive and social environment to foster better learning outcomes.

Besides, any experienced instructor with high pedagogical content knowledge will almost certainly create a teaching presence with little effort (Garrison, 2016). Since lecturers in universities in Ghana are carefully selected based on their training and expertise, teaching presence will likely be a dominant feature in their online teaching. This finding has been confirmed in previous literature where teaching presence was the highest presence created and as well served as the predictor and promoter of the other forms of presence during online engagements (see Ke, 2010; Kozan, 2016; Li, 2022; Lim & Richardson, 2021).

A significant aspect of this study's finding is the fact that emotional presence was rated to be greatly created than cognitive and social presence. This high rating of emotional presence over the two identified presences could be attributed to some notable reasons. First, emotions have been identified as an inevitable factor in teaching and learning engagement. It has been established that affective states manifest during lesson delivery through class management, directing and controlling the teaching environment which subsequently facilitates cognitive retentive, class engagement, and learning outcomes (Wang, 2022; Zhang et al., 2023).

From this observation, the teaching presence which usually initiates the teaching engagement may foster emotional presence. Secondly, the literature on instructor presence has emphasised that teaching presence fosters emotional presence which in turn enhances the creation of cognitive and social presence (Majeski et al., 2018; Williams, 2017). Therefore, it is not surprising that emotional presence is identified as the factor that permeates all the types of presences created during teaching and learning (Swan, 2019). Finally, unlike teaching, cognitive, and social presences which require careful planning, training and some level of expertise, emotional presence may not require much effort and expertise. We stress that these factors interact to produce appreciable levels of emotional presence higher than cognitive and social presence.

***Insights into cognitive and social presence***

Consistent with the findings of this research is the study by Lim and Richardson (2021), which revealed social presence as the least presence created during online teaching engagement. This finding suggests that higher education instructors put little effort into ensuring that learners identify with the online community, purposefully communicate in a trusting classroom climate and thus, develop an interpersonal relationship through the learner's personalities.

A probable reason why instructors were rated low on social presence is that before the COVID-19 pandemic, the majority of the higher education institutions (including the study setting for this research) did not utilise online teaching; thus, this sudden switch resulted in low readiness by instructors and students (Ankoma-Sey et al., 2018; Ankoma-Sey et al., 2022). Because both instructors and students might not be used to online teaching and learning, they are likely to experience social isolation due to geographical separation making social presence creation challenging (Wut & Xu, 2021). Other key factors such as non-familiarity with technological gadgets, Internet challenges and the absence of facial and implicit emotional cues among all parties in the teaching environment (Heidari et al., 2020) may be the driving force behind the low creation of social presence as found in this study.

The lower score in cognitive presence was also expected, particularly for instructors transitioning to online teaching, especially in developing countries such as Ghana. As noted earlier, the COVID-19 pandemic necessitated a switch to online learning, which caused instructors and learners to concentrate mostly on knowledge sharing (teaching presence) and comforting students during these tough times (emotional presence), rather than promoting critical thinking (cognitive presence). This corresponds with research findings that indicate that instructors in online learning who are green on technology tend to experience some challenges with the modes of interaction and critical thinking (Tang & Hew, 2020).

***Interconnections among the four types of presence***

The study further showed significant positive associations among the four types of presences (i.e., teaching, emotional, cognitive and social presences). This outcome has been

confirmed in several earlier studies (see Lim & Richardson, 2021; Majeski et al., 2018; Swan, 2019; Williams, 2017). This observation also supports the propositions of the CoI theoretical framework, which reflects the development of deep and meaningful (collaborative-constructivist) learning experiences for higher education students in a virtual learning environment through the interdependent roles of four key factors, namely, teaching, emotional, cognitive, and social presences (Garrison, 2016).

Although each element offers a unique contribution to the learning experiences and outcomes of the learner, the interaction of all four elements rather creates far superior learning experiences. For example, social presence interaction with teaching presence defines the climate setting, cognitive presence association with teaching presence fosters content selection, emotional presence interaction with teaching presence strengthens emotional feedback, and social presence relationship with cognitive presence facilitates discourse. This finding has implications for higher education instructors to focus simultaneously on all the elements in the CoI model to enhance life-long learning among the students.

***Latent Profiles of Online Presence of Instructors***

Subsequent findings also discovered four profiles of facilitators based on the type of presence they created during teaching and learning engagements: ideal online instructors, promising online instructors, intermediate online instructors and novice online instructors. Over 65% of the facilitators fell into the category of promising online instructors who demonstrated moderate levels of teaching, cognitive, social and emotional presence. We highlight that though this group of instructors were promising, their score distribution shows that they were consistent with their engagement practices with fluctuating scores on the online presence domains. This finding could reflect the sudden transition to online teaching following the COVID-19 pandemic coupled with limited familiarity (and availability) of virtual teaching tools which might have resulted in a lack of demonstration of consistency in pedagogical strategies.

As earlier indicated, it was not until the emergence of the COVID-19 pandemic that higher education instructors started using online teaching and learning engagements. It is possible that the majority of the instructors received little or no training (with little experience) on the use of online teaching and thus, this effect extends to the nature and level of presence created. This observation could be attributed to the limited capacities of the instructors in implementing the key elements of the CoI framework. While some facilitators may quickly adapt well and develop confidence, others may still function in the learning stage, reflecting the inconsistency in their teaching engagement strategies. It is not surprising that a few instructors possessed the characteristics of an ideal online instructor with consistent engagement practices ensuring a high level of presence (Aidoo et al., 2022; Gyane, 2021).

Although the instructors who were classified as novice and intermediate online instructor presence creators were not large, their score distributions were consistently low, especially for the novice. This finding has important implications for higher education institutions in Ghana suggesting that perhaps the rapid switch to online teaching may have left a proportion of instructors struggling in their teaching engagement. This observation could also reflect the limited digital literacy of instructors, limited experience with online teaching, technological/institutional barriers and resistance to change on the part of some instructors. It is important to stress that this category of instructors most likely will have low learner engagement and satisfaction in online courses.

The findings of this study should generally be appreciated against the backdrop of technological limitations that are characteristic of Ghana and other developing countries. These factors include limited internet connection, expensive data charges, lack of access to digital appliances and variability in the level of digital literacy which form some of the hurdles that instructors experience while trying to build a strong online platform. Most of them, especially those who are categorised as novice and intermediate instructors, had difficulties in transitioning

to the online mode of delivering instruction during the COVID-19 pandemic. This is because real-time engagement as well as the presence felt both emotionally and socially goes hand in hand with real-time interactions which are always impacted negatively by technological set-up. Meeting these challenges will require commitment to invest in communication solutions and professional development programmes that equip faculty in the use of instructional as well as communication technology to enhance student interconnectivity.

### *Gender Variations in Instructor Presence Profiles*

The findings further showed no significant difference in the male and female students' evaluation of the type of online presence demonstrated by their instructors during their online engagement. Stated differently, the students, irrespective of their gender, reported similar patterns of instructor presences created by their facilitators during the online teaching and learning. Results from earlier research reflect this pattern of findings (e.g., Swan & Shih, 2005). This finding may suggest consistency in the instructors' online teaching practices and technological know-how. In the Ghanaian context, instructors who normally teach online are prepared in accordance with online teaching best practices including the capacity to foster an effective instructor presence, student engagement and support as well as encouraging healthy cognitive interactions (Bickle & Rucker, 2018). Thus, when students' perceptions of instructor presence are similar or aligned, it may suggest that the instructors' proficiency in online teaching is comparable, potentially enhancing the uniformity of the learning experience across various student groups.

### *Comparison to Western and Non-Western Countries*

The study findings are relevant to Western-based research, where teaching and emotional presence are often prioritised by instructors (Chen et al., 2023; Jiang, & Koo, 2020; Parker, 2021; Scott, 2016) However, the lower levels of cognitive and social presence may be more significant in Ghana because of infrastructure constraints of developing academic institutions, digital literacy, and a lack of prior exposure to online instruction (Ankoma-Sey et al., 2022). On the other hand, in developed Western cultures interaction is significantly social as well as cognitive due to better Internet connectivity, availability of requisite tools, technological proficiency, prior learning experience and exposure that aids in the customised use of digital tools in virtual learning (Kuo et al., 2023). Such differences show that effective solutions needed in contexts such as sub-Sahara Africa require customised approaches due to dynamics which are different for online learning.

The study findings also support similar studies done in other non-western countries settings. For instance, in Southeast Asia and Latin America, a lack of technology and infrastructure also poses difficulties for instructors in creating a sufficient online presence (de Moura et al., 2018; Jayampathy et al., 2023; Okoye et al., 2023; Zainun et al., 2022). Furthermore, the high levels of collectivism, authoritarian approach to teaching and learning as well as decreased focus on a student-centred learning approach (Claramita et al., 2022; Pham Thi Hong, 2011) may negatively influence the creation of emotional and social presence in these cultures. By situating the study within a global perspective, we can understand better how differences in educational contexts affect the effectiveness of the strategies for teaching online.

## Practical Implications

The findings of this research highlight the essence of channelling efforts towards the creation of online instructor presence to improve student's educational experiences. The provision of digital and technological infrastructure/resources by higher education institutions is warranted to foster the creation of online instructor presence for effective virtual interaction. For example, the use of live virtual classrooms and conferences which enhance idea sharing and network learning and interaction can positively facilitate social presence (Aldosari et al., 2022). Furthermore, the adoption of mobile instant messaging platforms and video lectures can foster emotional presence, social presence, and cognitive presence (Chen et al., 2023; Ng & Przybyłek, 2021; Tang & Hew, 2020).

We emphasize that the provision of digital resources for online teaching should be accompanied by training the instructors in terms of their online pedagogy and the effective use of virtual platforms for effective teaching. This training should specifically highlight the utilisation of synchronous learning technologies especially Zoom, and its many elements such as breakout rooms and oral presentations, polling, whiteboards, screen sharing, waiting rooms and the like. These interactive technologies can help instructors realise a higher social and cognitive presence within courses that are conducted online. This recommendation calls on administrators of higher education institutions to invest in the professional development of instructors regarding how they can create an online presence during virtual teaching, especially for cognitive and social presence. Students should also be trained and oriented on the use of digital platforms to facilitate networking and knowledge sharing which can facilitate online presence. This training is necessary because students can also facilitate the creation of some level of social, emotional, and cognitive presence. Significant challenges from both parties in the virtual environment can hinder effective involvement and negatively impact students' learning experiences (Pinto & Leite, 2020). It is recommended that students' teaching evaluation platforms be used sparingly to assess instructors regarding their capacities to create an online presence for virtual teaching (Quansah, 2022; Quansah et al., 2024).

Additionally, the professional development programmes for online instructors should include workshops on emotional intelligence, the formation of an academic community, and social empathy, which may be needed by both instructors and students to understand how to build a positive learning environment in the online platform. Social presence can also decrease the sense of loneliness among learners who are undertaking their studies online, while the students' level of emotional presence can greatly increase their motivational level and persistence levels. Furthermore, support to new online instructors would enable them to acquire knowledge on the utilisation of positive instructional affect alongside the student-centred learning approaches under online learning from experienced mentors.

**Strengths and Limitations**

This study is unique in its robust methodology and statistical approach adopted to achieve the overall objective of the investigation. For example, the use of latent profile analysis presents interesting findings on the capacities of instructors in higher education in their efforts to enhance online presence during virtual teaching. Adopting an evaluation perspective from the students also offers insight into the satisfaction of students with online teaching and learning, paving the way for instructional and policy reforms.

While the current study offers significant contributions to understanding online instructor presence, it also has limitations. The use of a survey approach only presents a snapshot of the issue under investigation, with little attention to the longitudinal analysis of the problem. Besides, the reliance on self-reported data may introduce biases because participants might have different perceptions of their instructors' presence based on personal experiences. Additionally, conducting this study in a single higher education institution in Ghana limits the generalization of the findings to other institutions.

**Future Directions**

Although the present research provides good information regarding the profile of online instructors, it is necessary to study how the profiles change with time, particularly regarding the use of instructional technologies. Thus, it would be beneficial to employ longitudinal studies to track changes in instructors' social presence over time; for example, from one semester to another. It would also be useful to assess how different methodological requirements across disciplines influence the creation of instructor presence and see if presence is created differently in different disciplines. For example, an instructor in a Creative Art class may prefer to focus on cognitive presence while his or her counterpart in humanities may consider the social and emotional

presence most appropriate. Again, it is recommended that further studies be conducted across several higher education institutions with large sample sizes to enhance the greater applicability of the findings (Dzakadzie & Quansah, 2023). Finally, it is recommended that qualitative and mixed methods approaches be employed by future research to capture a more comprehensive view of instructor presence and its impacts on student learning.

## CONCLUSIONS

This research highlights the significant roles played by the key elements in the CoI framework in improving the learning experiences of higher education students. The study indicates that teaching presence is important, but more focus needs to be placed on cognitive and social presence. Emotional presence is important to engagement while interaction lends itself to the need to provide instructor training that incorporates emotional aspects into online courses. Thus, this study deepens the interactive roles of teaching, emotional, cognitive, and social presences and emphasises that each form of presence is important in enhancing students' educational experiences in higher education institutions.

Future studies should focus on creating activities that encourage students to think critically and to collaborate in group assignments and online discussions, especially in contexts with limited resource provisions. Furthermore, quantitative investigations focusing on the impacts of instructor presence over the years on learners' retention and achievement will enrich the understanding of online learning sustainability in sub-Saharan Africa.

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