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Early childhood student-teachers' experiences of blended learning using Community of Inquiry as theoretical framework

Abstract

Amongst the contemporary needs of societies in the fourth industrial revolution, are student-teachers who are adaptable, ethical, and literate in developing technology-mediated environments. Cultivating such teachers requires engaging them experientially in blended learning practices. We explored 155 student-teachers' experiences of blended learning, at a South African institution for higher education, by using the Community of Inquiry (CoI) as theoretical framework. We created cognitive, social, and teaching presences within the initial teacher education module on their learning management system, Blackboard Learn™. Utilising explanatory mixed-method as research approach enabled us to compare student-teachers' experiences of the three presences using a Likert-type questionnaire and reflective feedback. Student-teachers' online engagement reflected a good cognitive and teaching presence; whilst their social presence was maintained using disparate social media applications and consequently side-stepping this higher education institution's learning management system. Social constructivists endorse socially situated knowledge, collaborative validation of understanding, and one's own construction of meaning. Supposing that student-teachers education social studies for democratic citizenship education necessitate social presence as it precedes cognitive and teaching presences. The implication for higher education institutions is to create a sustainable online social presence within their learning management systems for prospective teacher citizens to be better prepared for technology-mediated milieus.

Keywords: *blended learning, community of inquiry, democratic education, early childhood education, initial teacher education, learning management systems, social studies, technology-mediated environment*



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1. Introduction and rationale

The present-day pandemic, Coronavirus Disease (COVID-19), revolutionised education, especially for initial teacher education (ITE) in South Africa, which predominantly uses face-to-face as the mode of delivery. Educators across sectors had to substitute 'traditional pedagogies' in a physical space for cyber environments. The events of 2020

transfigured educators' perceptions of the utility of information and communication technology (ICTs) and learning management systems (LMS) to utilise virtual pedagogies to deliver the intended curricula. Twenty-twenty is a watershed year in teaching where technology-mediated milieus had to be fashioned post-haste to sustain cognitive, social, and teaching presences across all education institutions. The 'new normal' demanded, from all educators, to draw on their knowledge, resources, skills, and dispositions to implement a cyber-physical environment that is conducive to effective teaching and learning (Mpofu, 2020).

Rapid changes to technology, education, and societal patterns insist humankind's efforts for immediate interconnectedness across time and space (Rizvi & Lingard, 2000), for example global citizenship, fourth industrial revolution (4IR). Advancements in technology progressively transform societies and education to provide access to knowledge systems and tools across virtual, spatial, time, and social boundaries (Du Preez & Van Niekerk, 2018). Education facilitates cultivating child citizens by developing, utilising, disseminating, and integrating knowledge systems into their daily lives. Thus, society depends on educational institutions to equip child and teacher citizens to function in an ever-changing world and keep pace with the generational transitions (e.g., Generations X, Y & Z) so children do not become estranged from teachers due to technological advancements (Deca, 2016; Du Preez & Van Niekerk, 2018).

Merging face-to-face interactions with collaborative-online learning environments at higher educational institutions (HEI) create and enlarges the scope for lifelong learning (King & Fricker, 2002). It offers an opportunity for student-teachers to demonstrate mobility and flexibility in their learning and to exercise coping strategies and resilience amidst ever-changing circumstances (King & Fricker, 2002). Virtual pedagogies allow student-teachers to assign new meaning to their teacher identity, promote intergenerational dialogues, and shape their social conscience across contexts (Deca, 2016).

We argue that first-hand experiences of blended learning environments proactively prepare student-teachers in an unpredictable world for the professional teaching context. We know that scholars contest the value of virtual pedagogies, especially in early childhood education. However, when virtual-mediated milieus are used as a 'tool', teachers and children's continuous development improves (Dockett & Fleer, 2009). We choose not to exclude virtual pedagogies in ITE. It is irresponsible to pretend technology does not impact student-teachers or that they are oblivious of its existence. A virtual pedagogy can thus support HEIs to attain their goal of developing well-rounded graduates who are: knowledgeable; skilled across learning environments; conscientious; innovative; and adept at teaching within technology-mediated milieus.

Awareness of these demands on HEIs incites reflective questions, such as: How 'ready' is South African educators to adopt a 'cybernated' mode of delivery? How can South African HEIs prepare student-teachers for technology-mediated milieus in the wake of 4IR and COVID-19? Our research question is: *What is early childhood student-teachers' experiences of blended learning as a mode of delivery using Community of Inquiry (CoI) as a theoretical framework within a social study for democratic education module?*

2. Literature Review

2.1 Social Studies for Democratic Citizenship Education

Social studies are a school subject that encompasses knowledge systems, tools, and environments that shape and connect citizens to their past, present, and future (Du Preez & Van Niekerk, 2018). Considering the complex socio-political history of South Africa, the government has raised their efforts to promote citizenship and ensure that the socio-economic and political imbalances of the past are addressed in its national school system (Department of Education, 2011). Curriculum developers constructed credibility and quality education outcomes utilising high knowledge and high skills levels that are grounded within the principles of social transformation; active and critical learning; human rights; social justice; and valuing indigenous knowledge systems (Department of Education, 2011). In this national curriculum for the foundation phase, a study area Life Skills is dedicated to social studies for democratic citizenship education.

The onus rests on HEIs for offering ITE that equips student-teachers with adept knowledge, skills, and values to interpret the intended curriculum, appropriate early childhood pedagogies, and construct learning environments that truthfully represent social studies for democratic citizenship education (Du Preez & Van Niekerk, 2018). As insightfully described by well-known Nobel Peace Prize laureate, Kofi Annan, in his address to the World Conference of Ministers Responsible for Youth in Lisbon on 8 August 1998,

No one is born a good citizen; no nation is born a democracy. Rather, both are processes that continue to evolve over a lifetime. Young people must be included from birth. A society cut off from its youth severs its lifeline.

2.2 Blended learning and learning management systems

Blended learning is a pedagogical approach that merges face-to-face and online learning opportunities using diverse educational ICT tools in a well-organised learning management system, offering engaged, flexible, and enjoyable learning (Dziuban, Hartman & Moskal, 2004). Blended learning offers flexibility because this mode of delivery benefits from both face-to-face/physical learning environments and technology-mediated/virtual milieus to serve its intended audience by offering content, resources, and competencies (Manwaring *et al.*, 2017; Spring, Graham & Ikahihifo, 2018). The success or failure of blended learning hinges on the attainment of learning outcomes and personal learning satisfaction when face-to-face and online environments are fused (Hew & Cheung, 2014).

Blended learning is transformative by mobilising education communities to use comprehensive and cohesive software, also known as a learning management system (LMS), instructional management system (IMS), course management system (CMS), learning content management system (LCMS), virtual learning environment (VLE), virtual learning system (VLS), learning portal, or e-learning platform (Wright *et al.*, 2014). Educational institutions utilise such LMS software to enable educators to centralise topics/courses/modules to be accessed by learners/students, thereby enabling educators to plan, implement, facilitate, diversify, assess, and monitor teaching, learning and socialisation. LMS are used worldwide across most HEIs. Some examples of these LMS are Blackboard Learn™, Desire2Learn™, Instructure Canvas™, Moodle™, Pearson LearningStudio and Sakai.3™ (Adzharuddin & Ling, 2013; Wright *et al.*, 2014).

For this inquiry, we used the HEI's software licence for Blackboard Learn™ to centralise content, assessment, collaboration, and the management of information behind a 'virtual wall' that provides a measure of authentication, security, and privacy to prepare the intended curriculum. Some of the features and functionalities that this LMS software offers are as follows (see Table 1).

Table 1: Social Studies for Democratic Citizenship Education constructed in LMS

Instructional Design Integrated with the CoI Framework	
In the Blackboard Learn™ environment we provided student-teachers with:	
Shared Goal	<ul style="list-style-type: none"> • <i>Outcomes</i> for the module and how it aligns with the general degree using an online topic and a printable study guide. • A personalised <i>module page</i> to welcome student-teachers. • <i>Weekly</i> themes are in the navigation panel. These pages are accessible in fewer than three clicks. • Subject-specific content and resources for each theme, based on the structure of a <i>lesson plan</i> or <i>learning experience</i>. • <i>Online mashups</i> for accessing link videos, images and presentations. • <i>Questionnaire</i> to provide feedback about the social studies for democratic citizenship education module and the seminar. • Weekly Microsoft PowerPoint presentations and any additional documents, using an <i>online group file</i>.
In the Blackboard Learn™ environment we as educational researchers have access to (the):	
Management and Information	<ul style="list-style-type: none"> • <i>Class lists</i> or <i>rosters</i> that contain information about enrolled students, that are linked with the HEIs administration platform. • <i>Attendance registers</i> to record attendance and absenteeism. This is graded and captured in <i>MyGrades</i> and the general <i>grade centre</i>. • <i>Grade centre</i> to access, evaluate, and monitor the progress of learning. • Activity reports from the <i>retention and performance dashboard</i> to identify and support enrolled student-teachers who are at risk. • Immediate and urgent <i>announcements</i> that are directly linked to student-teachers email.
In the Blackboard Learn™ environment we provided student-teachers with (the):	
Collaboration	<ul style="list-style-type: none"> • <i>Calendar</i> reminding student-teachers about new content and assessment deadlines. • <i>Online discussion board</i> to post ideas on social studies for democratic citizenship education as a thread. • Personalised <i>emails</i> and/or <i>messages</i> between lecturer and student-teachers about content, assessment, and the colloquium groups. • Self-enrolment option into an online <i>group</i> where they can collaborate on group assignments using tools such as blogs, emails, files, journals, messages, and wikis. • <i>Colloquium groups</i> participating in the seminar were allocated an additional group.

Instructional Design Integrated with the Col Framework	
<i>In the Blackboard Learn™ environment we provided student-teachers with:</i>	
Assessment	<ul style="list-style-type: none"> • A <i>graded discussion board</i> on a provided topic for all to engage in. • <i>Group assignments</i> and a <i>public online rubric</i> that lists the evaluation criteria. • <i>Restrict plagiarism</i> through <i>Turnitin</i> and empower them to take responsibility for citing all textual and visual content. Inspect their own originality of the assignment on a particular given social study for democratic citizenship education topic. • Weekly computer-aided assessment (<i>graded test</i>) on social studies for democratic citizenship education topic. The student-teachers obtained three opportunities to improve their mark.

Adapted from: Department for Education Innovation (n.d.)

The community of inquiry (Col) guided us, as the researchers, in designing the look-feel of the LMS. The specific areas and activities in Table 1 were not assigned to only cognitive, social, or teaching presences. Instead, all the presences are interdependent, interwoven, and relevant for online experiences (Garrison, Anderson & Archer, 2010).

2.3 Community of Inquiry (Col) as theoretical framework

The Col framework developed by Garrison *et al.* (2010) was originally intended as theoretical premises for computer conferencing but has since gained popularity among educationalists and researchers. Col offers structure when selecting ICT tools for creating quality educational experiences based on three 'presences': *cognitive*, *social* and *teaching* (Garrison *et al.*, 2010). Col establishes a 'collaborative-constructivist online learning experience' (Bryans-Bongey, 2016: 38), suggesting that student-teachers enrolled for social studies become a community of practice because learning is co-constructed. The BlackBoard Learning® is set-up to cater for peer learning where the individual's understanding of abstract concepts, theories and applications is collaboratively validated by the group and lecturer. Col is also a research-based approach with scientific methods, which enables researchers to practice rigorous and reflective processes for data construction. We have operationalised the Col's three presences by following the descriptive categories and indicators that apply to a blended learning environment. See Table 2.

Table 2: Col Presences, Categories, and Indicators

Presences' definition	Descriptive categories	Data set indicators
<i>Cognitive presence</i> is the ability to confirm understanding through collaboration and reflection in a community of inquiry.	<ul style="list-style-type: none"> • Triggering event • Exploration • Integration • Resolution • Knowledge building • Active collaboration • Interactive learning 	<ul style="list-style-type: none"> • Sense of puzzlement • Information exchange • Connecting ideas • Apply new ideas

Presences' definition	Descriptive categories	Data set indicators
<i>Social presence</i> is the ability to project oneself and establish personal and purposeful relationships.	<ul style="list-style-type: none"> • Affective indicators • Open communication • Group cohesion • Interaction 	<ul style="list-style-type: none"> • Expressing emotions • Risk-free expression • Encouraging collaboration
<i>Teaching presence</i> is the ability to properly design and facilitate content in an engaging and satisfactory way to maintain a sense of community.	<ul style="list-style-type: none"> • Design and organisation • Curriculum and assessment • Facilitating discourse • Direct instruction • Goal-directed • Learning platform (e.g., Learning Management System) 	<ul style="list-style-type: none"> • Setting curriculum and methods • Sharing personal meaning • Focusing discussion

Adapted from: Garrison *et al.* (2006) and Garrison (2007)

3. Methodology

Research designs enable researchers to transform a research question into a framework of methods and strategies to scientifically, systematically, and theoretically investigate a phenomenon (Creswell & Plano Clark, 2017). We used an explanatory mixed-method research approach, since it aims to explain the qualitative data by building on quantitative results. Furthermore, the qualitative data help one to reflect and explain significant and insignificant quantitative results (Creswell & Plano Clark, 2017). The cornerstones of mixed-methods research are *theory, mixing, timing, and weighting*. The application thereof are contextualised using a description and each of the concepts in brackets.

The CoI (*theory*) shaped the research activities, analysis, and interpretation. Qualitative and quantitative data were collected sequentially (*mixing*), lending to a multiphase investigation. Quantitative data were collected prior to the qualitative data (*timing*) which both occurred towards the end of the second-year module to retrieve diverse perspectives and retrospective views. The quantitative and qualitative data sets were equally considered (*weighting*). By first collecting and quantitatively analysing the questionnaire's data, based on the three CoI presences as constructs, helped us to identify statistically significant differences and deviating results (Creswell & Plank Clark, 2017). The in-depth reflective qualitative feedback, which was sequentially generated, enabled us to verify identified consistencies and inconsistencies detected in the quantitative results.

The entire process of the explanatory mixed-method research approach can be tabulated as follow (see Table 3).

Table 3: Col framework integrated within the data collection

	Quantitative Items	Qualitative prompts
Data strategy	Questionnaire based on the three presences of the Col framework	Group reflections written as a narrative report
Output format	Numeric (Five-point Likert scale) 1 = Strongly disagree; 5=Strongly agree	Textual
Data collection and generation guidelines	Self-reporting on nine items in the questionnaire. Adapted to quantify the three presences as latent constructs that are consistent with the Col framework	The guidelines for their reflective narratives are informed by the areas and bulleted information as tabulated in table 3.
Sentence starters	Blackboard Learn™...	How did Blackboard Learn™ together with weekly sessions...
Cognitive presence	<ul style="list-style-type: none"> together with weekly contact sessions informed my learning. occasioned weekly opportunities to engage in assessed learning. and weekly assessment stimulated my thinking and reasoning. served as a platform to monitor my learning and progress. 	<ul style="list-style-type: none"> direct our learning/thinking/ reasoning/understanding about social studies for democratic citizenship education in the early years?
Social presence	<ul style="list-style-type: none"> assisted me in socialising with members of my group and our class. guided my preparation for discussions in our weekly contact sessions. enabled me to collaborate on group assignments. 	<ul style="list-style-type: none"> facilitate our participation/ communication/ interaction/ collaboration about social studies for democratic citizenship education in the early years?
Teaching presence	<ul style="list-style-type: none"> strengthened the design of the project on democratic citizenship. prepared me for the project on democratic citizenship. 	<ul style="list-style-type: none"> provide structured guidance/ feedback/direction about social studies for democratic citizenship education in the early years?
Data analysis software	SPSS (Nie, Bent & Hadlai-Hull, 2017)	ATLAS.ti version 8 (Muhr, 2016)
Data analysis	<ul style="list-style-type: none"> Overall functioning and reliability of the Col inspired questionnaire. Exploratory Factor Analysis (EFA) with a Principal component analysis (PCA) Reliability statistics Pearson's correlation coefficients A repeated ANOVA with post hoc tests Custom tables Box plot 	<ul style="list-style-type: none"> The Col has a built-in data generation and data analysis strategy (Garrison <i>et al.</i>, 2006; 2010). Enables you to explore the qualitative experiences for the existence or absence of the three presences. The guidelines for their reflective narratives are informed by the areas and bulleted information as tabulated in Table 3.

3.1 Context and research site

The study was conducted at one of South Africa's metropolitan HEI's that offers ITE degree programmes to student-teachers on campus and experientially in a technology-mediated milieu. The early childhood student-teachers are introduced to a 14-week credit-bearing social studies module that focuses on democratic citizenship education. Prior to this module, the participants at this HEI enrolled for the social studies for democratic education module had only experienced limited blended learning and online teaching. For example, they predominantly used the functions offered in the "management and information" area as described in Table 1. Their blended learning experiences therefore included accessing the learning material online and navigating the LMS.

3.2 Participant sample

A purposive sampling technique was utilised for selecting the research site and student-teachers as sample. The enrolled student-teachers were on average 20 years of age and predominantly female. The latter characteristic is a common phenomenon in South Africa where early childhood education teachers are mainly female (Petersen, 2014). The *setting, actors, events, and process* techniques by (Creswell & Plank Clark, 2017) are contextualised as follows. The *setting* offers the teaching of social studies for democracy education in the early years, whilst the *actors* are students-teachers all in their second year. The *event* of investigation requires a physical and virtual research site, and the *process* indicates the evolving nature of student-teachers experience in a Col inspired blended learning environment.

The quantitative sample consisted of 127 voluntary female respondents who completed a questionnaire via Blackboard Learn™, after completing the module. The qualitative sample consisted of 155 voluntary female participants who self-enrolled into collaborative groups via Blackboard Learn™ to participate in the activity. Their enrolments resulted in 22 groups who completed a critical reflection activity after completing the module.

All aspects related to ethical standards and scientific integrity were adhered to by offering full disclosure regarding the research design, regulation, procedures and processes; ensuring non-maleficence; obtaining informed consent; protecting participants' anonymity; confidentiality; and proper storing of data.

4. Quantitative results and discussion

Administering the Col inspired questionnaire to the respondents enabled us to understand how they experienced blended learning. Before we elaborate on the latter, we will first discuss the overall functioning and reliability of the Col inspired questionnaire before concluding the interpretations using descriptive statistics in the form of custom tables.

Before data analysis was conducted, tests of normality were run to investigate the sample distribution. In these results, the null hypothesis states that the data follow a normal distribution. Because the p-value is 0.001, which is smaller than the significance level of 0.05, the decision was to reject the null hypothesis. We can not conclude that the data follow a normal distribution resulting in the use of non-parametric tests.

The exploratory factor analysis (EFA) (see Table 4) enables us to reduce the existing set of variables into more meaningful and smaller clusters. The reliability analysis enabled us to explore the internal consistency of the questionnaire. A Spearman correlation followed, as well

as a Related-Samples Friedman's Two-Way Analysis of Variance by Ranks, and a Pairwise Comparisons to further delve into the three Col presences.

To determine the underlying structure of the measured variables (IV = three Col presences; DV = respondents' experiences), an EFA was conducted. A principal component analysis (PCA) was calculated on the nine items with Varimax rotation with Kaiser Normalization (converged in five iterations). The Varimax rotation is an orthogonal method, making it easier to interpret and the entire factor model is statistically simpler. Using this technique results in high factor loadings for a smaller number of variables and low factor loadings for the rest (Field, 2018). The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO=0.710, which is well above the minimum requirement of 0.500 (Field, 2018).

Table 4: Exploratory Factor Analysis

Rotated Component Matrix ^a BLackBoard Learn@...	Component		
	1	2	3
together with weekly contact sessions informed my learning	.778	.160	.070
occasioned weekly opportunities to engaged in assessed learning	.727	.034	.100
and weekly assessments stimulated my thinking and reasoning	.675	.013	.442
served as a platform to monitor my learning and progress	.613	.466	-.118
assisted me in socialising with members in our weekly contact sessions	.172	.773	.109
guided my preparation for discussion in our weekly contact sessions	0.20	.731	.197
enabled me to collaborate in group assignments	.107	.707	.058
strengthened the design of the SoTL seminoar on democratic citizenship	.133	.145	.900
prepared me for the SoTL seminar on democratic citizenship	.095	.163	.887
Extraction Method: Principal Component Analysis Rotation Method: Varimax with Kaiser Normalization a. Rotation converged in 5 iterations			

From the PCA in Table 4, it is evident that three factors displayed eigenvalues over Kaiser's criterion of 1. All three of the factors which emerged aligned with the Col theoretical framework. The PCA also explained 64.76% of the variance within the data.

The reliability statistics of the scale based on the Col framework are tabulated in Table 5 below:

Table 5: Reliability Statistics of the Developed Scale

Items	Factor	Cronbach's Alpha	N of Items
1,3,4,7	Cognitive Presence	0.694	4
2,5,6	Social Presence	0.644	3
8,9	Teaching Presence	0.834	3

The analysis of the nine-item questionnaire measured 'adequate to moderate' with a $>.65$ value, measuring the latent constructs cognitive and teaching presence and a 'good to robust' measurement with a $>.82$ for the underlying construct teaching presence (Taber, 2018).

Pearson's correlation coefficients were calculated to determine whether there is a statistically significant relationship between the *cognitive*, *social*, and *teaching* presences' as latent constructs. The correlation between cognitive and social presence showed slightly

stronger evidence of a relationship (0.414) in comparison to the cognitive and teaching presence (0.379), and then teaching and social presence (0.275). Although a positive correlation between the constructs were found, the cognitive and teaching presence construct showed a low strength in their relationship whereas the teaching and social presence showed a negligible low relationship (Fields, 2018).

A Related-Samples Friedman's Two-Way Analysis of Variance by Ranks were performed to compare the effect of the three COI presences (IV) of the student-teachers' experiences (DV). The Pairwise Comparisons analysis shows the difference between the three presences as test related groups. The results indicated strong evidence of differences in the mean of all three factors (p-value = <0.000). It was evident that there are significant differences between the cognitive presence (p-value < 0.000) and the social presence (p-value < 0.000). There is also a significant difference between social presence (p-value < 0.001) and the teaching presence (p-value < 0.000). The findings signal that the teaching presence (4.36) and the cognitive presence (4.32) manifested more in the LMS than in student-teachers' social presences (3.13). We decided to also perform custom tables (see Table 6) and a box plot (figure 1) as descriptive tools.

Table 6: Custom Tables

BLackBoard Learn®...			Strongly Disagree / Somewhat Disagree	Neither Disagree / nor Agree	Strongly Agree / Somewhat Agree	Mean	SD
Cognitive Presence	together with weekly contact sessions informed my learning	Count Row N %	5 3.9%	0 0.0%	122 96.1%	4.47	0.733
	occasioned weekly opportunities to engaged in assessed learning	Count Row N %	5 3.9%	4 3.1%	118 93%	4.42	0.739
	and weekly assessments stimulated my thinking and reasoning	Count Row N %	4 3.2%	4 3.1%	119 93.7%	4.49	0.744
Social Presence	served as a platform to monitor my learning and progress	Count Row N %	15 11.8%	19 15.0%	93 93.2%	3.91	1.031
	assisted me in socialising with members in our weekly contact sessions	Count Row N %	71 55.9%	23 18.1%	33 26.0%	2.56	1.219
	guided my preparation for discussion in our weekly contact sessions	Count Row N %	58 45.7%	31 24.4%	38 29.9%	2.80	1.293
	enabled me to collaborate in group assignments	Count Row N %	9 7.1%	19 15.0%	99 78.0%	4.04	0.929
Teaching Presence	strengthened the design of the SoTL seminar on democratic citizenship	Count Row N %	2 1.6%	11 8.7%	114 89.7%	4.36	0.709
	prepared me for the SoTL seminar on democratic citizenship	Count Row N %	4 3.2%	9 7.1%	114 89.7%	4.36	0.783

Derived from Table 6, the respondents generally reported that they found the contact mode (i.e., face to face) of delivery and the online environment conducive to learning. The student-teachers rated their own experiences more favourably towards the cognitive and teaching presences as opposed to their social presence in Blackboard Learn™. The self-reported responses calculated a mean score of 3.93 out of a possible score of 5.00, indicating a high endorsement of the blended learning environment.

Reliability analysis was calculated for the Col questionnaire's nine items and Cronbach's alpha showed good reliability ($\alpha = 0.766$) (Field, 2018). All the items appeared to be worthy of retention. Of the three presences, the respondents experienced the teaching presence as most prominent ($M=4.36$, $SD=.692$), followed by the modules' cognitive presence ($M=4.32$, $SD=.593$) and showing a lower score with the social presence ($M=3.13$, $SD=.885$). Using a box plot, we depicted the differences in presences (see Figure 1).

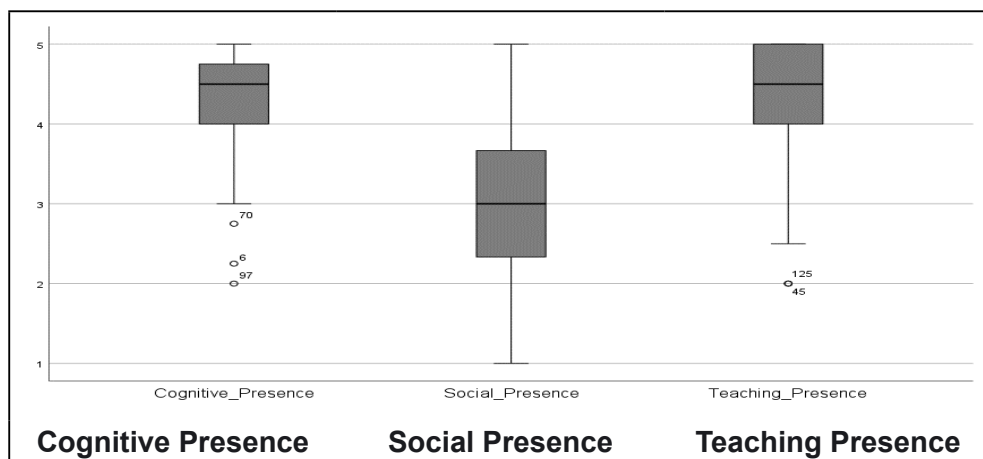


Fig. 1: Box Plot of the Performance of the Three Presences within the Questionnaire

From the quantitative findings, we then explored the qualitative reflections to explore if the social presence is lower on the LMS and why.

5. Qualitative results and discussion

From the student-teachers' group reflections, it is evident that the Col as a framework provided a comprehensive perspective on the learning that took place during the social studies for democratic citizenship education module. The social, cognitive, and teaching presences contributed in varying degrees to the socio-constructivist learning experience of the student-teachers. All three presences were identifiable in the data, which provided information relating to instructional design and how to improve student-teachers' experiences with virtual pedagogies and blended modes of delivery.

Four themes directly related to the Col framework were deductively identified and substantiated with textual quotations from the participants. To increase the findings' transparency, trustworthiness, and credibility, we numbered every quotation submitted by every group in ATLAS.ti, which is shown in brackets.

5.1 Teaching presence depends on proper design and organisation of module content

Teaching presence refers to the lecturer's ability to facilitate discourse, design whilst organising, and teach student-teachers (Garrison *et al.*, 2010). There are 86 quotations that reflect that the student-teachers experienced the blended learning module as '...convenient as it can be accessed from home or any place that has an internet connection' (30). The student-teachers elaborated on how the LMS helped them 'keep up to date' (29; 38), '...encourage[d] more interactions in class between the student-teachers and lecturers' (29), '...stay on track with the content we learn throughout the week' (41) and to '...understand the work faster' (81).

The design and organisation came to the fore as a prominent theme as the participants consistently described how the features, layout, and structure assisted their learning. For example, one explained that 'the content that was divided in weeks was very well planned because we had to process the new information' (44). Another student-teacher stated that the use of the LMS '...is a good way of combining technology with the classroom and we have developed the necessary technological skills which we can one day practice in our own classrooms' (120); which shows how the use of blended learning in the LMS for the social studies for democratic citizenship education module benefitted the student-teachers. Considering the LMS, data furthermore showed that Blackboard Learn™, promotes access, creates a sense of interconnectedness, and offers various collaboration and multimedia features that are not only engaging and content-rich but also visually appealing. These included discussion boards, announcements, gradebook, and multimedia integration such as videos and images (see Table 1).

5.2 Social presence relies on accessibility to, and confidence in, using the learning management system

Social presence refers to an interactive and collaborative learning community where social-emotional relationships are formed during online teaching and learning (Bryans-Bongey, 2016). Affective interactions, open communication, and group cohesion are descriptive categories in the data of social presence as indicated by Garrison *et al.* (2010) and in Table 2. In line with Bryans-Bongey (2016: 39), our data showed that social presence 'drives the climate' of the module. Most of the coded quotations (127) highlighted the student-teachers' experiences relating to group cohesion, communication with others, and how they collaboratively participated in the cognitive presence categories (exploration, integration and resolution) in Table 2 (Garrison, 2007; Garrison *et al.*, 2010). The student-teachers said that 'there is good communication in the group' (3), 'we made sure everyone was heard... Everybody's ideas were considered' (79), and the 'group work has developed our communication and social skills' (215).

Although the social studies for democratic citizenship education module succeeded in establishing a social presence, the student-teachers did not display their engagement within the LMS environment. The student-teachers preferred to use other platforms for communication and interaction, such as email, face-to-face meetings, and especially the WhatsApp™ application (92 quotations). One student teacher elaborated:

We also created a WhatsApp group allocated just for the module. In this group we assigned roles and divided the topic into subsections where we then allocated them to smaller groups of members to complete. This WhatsApp group helps us communicate

and develop socially and helps us clear any miscommunication. This is the form of blended learning that we adopted (145).

Student-teachers preferred not to use Blackboard Learn® for communication, but rather used WhatsApp™ as they felt it allowed them 'to communicate more easily' (485; 269). One participant explained why: 'We didn't use much of the discussion board on ClickUP because it took a lot of time to log in and work on it' (270). According to Lowenthal and Dennen (2017), establishing one's social presence and teacher identity in online learning environments is difficult due to limited communication channels and transactional distance. Thus, establishing a social presence in an online environment depends on accessibility, user-friendly nature, convenience, and confidence which aligns with our quantitative findings in Figure 1 that showed a lower score in social presence.

5.3 Cognitive presence requires social presence

Cognitive presence refers to how student-teachers interact and engage with the content (Bryans-Bongey, 2016). It is associated with a triggering event, exploration, integration, and resolution, see Table 1, during online teaching and learning (Garrison *et al.*, 2006). Cognitive and social processes are also related to creating a socio-constructivist learning experience (Bryans-Bongey, 2016; Lowenthal & Dennen, 2017). The data showed that owing to the Col framework's espoused socio-constructivist approach, building a cognitive presence in an online environment demands a social presence. To establish a socio-constructivist learning experience, student-teachers should develop cognitively by socially constructing knowledge and understanding through partaking in continuous and active collaboration, knowledge building, integration, and resolution. The interwoven nature of cognitive and social presences in the social studies for democratic citizenship education module was evident in student-teachers stating: 'we have gained new knowledge that we did not have before' (51), 'this module positively affected *everyone* in *our* group's cognitive growth' (50) and 'we thus came to the conclusion that this module has taught *us* a lot and that it has contributed to immense cognitive growth of *our* group' (102). According to Garrison *et al.* (2010), using pronouns that indicate collaboration and identifying with the group, such as 'we' and 'our', in student-teachers' discourse is an indicator of group cohesion and indicative of cognitive engagement because of a socio-constructivist learning experience. In essence, we understood that student-teachers use various platforms and applications for learning and that the cognitive presence within a module largely depends on their social presence. This was also evident in our quantitative data, where a correlation between cognitive and social presence showed slightly stronger evidence of a relationship (0.414), as compared to the cognitive and teaching presence (0.379), and then teaching and social presence (0.275).

The next theme was identified owing to the student-teachers' vociferous beliefs regarding the blended learning design of the module and how it has contributed to a deeper and more meaningful understanding of what social studies for democratic citizenship education entails.

5.4 Blended learning using Col framework promotes deeper understanding

Student-teachers held strong beliefs regarding the role blended learning played in developing a deeper understanding of social studies for democratic citizenship education. The participants explained that the Col-inspired blended learning design, 'has helped us expand our understanding' (411) as well as gain 'knowledge on the subject' (411) and 'gave us the

opportunity to work together as a group' (460). Another participant explained that blended learning 'helped us understand all the work on a much deeper level' (375). Manwaring *et al.* (2017) and Spring *et al.* (2018)'s argument that blended learning allows for flexibility in learning because it is influenced by the availability of technologically mediated resources, which is confirmed in our data sets. For example, one student-teacher described the benefits of blended learning in relation to the research they had to do online:

Blended learning proved to be invaluable in the research phase of this assignment, allowing us to draw from a wide range of resources, and conduct in-depth research using the provided study material, reference books, and academic journals, as well as online publications and media (409).

Another student-teacher agreed:

We have reaped the benefits of blended learning during this module in that we have had the opportunity to access an incredible variety of sources and have benefitted from being able to choose not only how we obtain information, but also the formats in which it is presented (435).

It is clear from the data that designing the blended learning environment using the Col framework benefitted the student-teachers by promoting a deeper understanding of the content. However, access to the Blackboard Learn™ was described as problematic and inconvenient. In addition, some student-teachers reported they have little confidence in using the LMS and it is very time-consuming.

6. Limitations

Since we only conducted an EFA on the Col inspired questionnaire and not Confirmatory Factor Analysis (CFA), we are unable to confirm the latent constructs we explored. However, by conducting an EFA, we did show how the factors are meaningfully correlated, but unfortunately, the construct validity of the questionnaire is not as convincing without a CFA. A CFA was not necessary for this study as the focus of the study was not on the development of a questionnaire but rather on exploring the quantitative data results using our qualitative data as a supporting data generation technique. We cannot generalise the findings since it was conducted at only one HEI in one country with only one group of second-year student-teachers. Lastly, even though Blackboard Learn™ offers possibilities to utilise applications to promote social involvement, this option was limited due to licences and the integration thereof in a HEI-controlled environment.

7. Conclusion

Student-teachers should experience, exercise, and become competent in technology-mediated milieus in the 4IR world to succeed in their future profession as teachers and be torchbearers amid unforeseen global crises like COVID-19. More than ever before, HEIs should realise that technology-mediated milieus are not beyond the station and skills of early childhood student-teachers and should become an essential skill that should be included in ITE. With this study, we argued that using Col and being exposed to blended learning, student-teachers can be equipped with skills that can be applied in the 21st century classroom to serve the needs of future children in any real-world situation.

From the explanatory mixed-method research approach, we realised that to achieve interactive and continuous social presence in technology-mediated milieus is more complex and difficult to fashion than cognitive and teaching presences. Interaction between student-teachers is unfavourably affected by transactional distance and the limited possibilities the current LMS platform offered during the study. The student-teachers intentionally created text-based communication platforms *outside those hosted within the LMS environment that was provisioned for* convenience, confidence, and anonymity. We are concerned that student-teachers posture an almost superficial social presence in the LMS, which opposes the fundamentals of socio-constructivism and the benefits of social interaction for learning. Therefore, we advise instructional designers using blended learning modalities in LMS to take the same precautions as face-to-face module designers, to address student-teachers' real social needs.

Constructing and maintaining a social presence in a technology-mediated learning environment is complex and multi-faceted and has a metamorphic trait that depends on whether the milieu is interpreted as conducive and beneficial. In creating a milieu that is beneficial, we thus advise that module developers, instructional designers, lecturers, and even policymakers consider the necessity of digital, virtual, and gamified learning opportunities in developing a more authentic social presence within a technology-mediated learning environment.

Further research is needed on the conceptual and contextual nature of an online social presence; and the strategies and tools needed to empower student-teachers to share versions of themselves that interlace with the content and teaching presences.

8. Recommendations

We recommend that HEIs embed pedagogical tools in their LMS which stimulates socio-constructivism offer and feedback. Some of these tools are: EduBadges, FeedbackFruits, H5P, Kahoot!, Mentimeter, Miro, Nearpod, Wooclap.

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