



Teacher candidates' experiences of emergency remote assessment during COVID-19

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Received: 21 July 2023 / Accepted: 31 January 2024

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Abstract

A myriad of studies have documented the online learning experiences of teachers and students. Few studies have explored the online assessment experiences of students, especially in the global south. In this qualitative transcendental phenomenological study, 20 Ghanaian teacher candidates were interviewed to explore their online assessment experiences during COVID-19. The study found that, compared to in-person learning, online learning provided limited opportunities for teacher candidates to actively participate in formative assessment. The lack of a personal computer or laptop, unstable internet, issues with the online learning platforms, and frequent power cuts during classes affected teacher candidates' assessment experiences and academic achievement. Socio-economic background and geographic locations of teacher candidates exacerbated the already-existing digital divide in Ghana. This study provides an initial and significant understanding of remote assessment experiences of teacher candidates, offering critical insights into improving and supporting teaching, learning, and teacher development. Implications for policy and practice are discussed.

Keywords COVID-19 · Higher education · Remote assessment · Sub-Saharan African · Teacher candidates

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Introduction

The outbreak of the COVID-19 pandemic led to a destabilizing effect on teaching and learning. The pandemic affected educational productivity, imposing academic and socio-economic changes on students (Adnan and Anwar 2020; Marinoni et al. 2020; Shahrill et al. 2024). Higher education institutions encountered tremendous challenges to facilitate learning and adhere to strict health measures. They shifted from in-person to online instructions since in-person instruction was practically impossible (United Nations 2020; Voogt and Knezek 2021). Classroom assessment was affected amid this shift, requiring instructors to develop and implement innovative ways to assess student learning. The impacts of the pandemic on classroom assessment have been a great concern for educational stakeholders, drawing widespread research attention to remote assessment.

While remote assessments have become increasingly common in recent years due to the widespread adoption of technology in education, the shift from conventional assessment practices to remote assessments resulting from the pandemic has raised concerns about equity, students' motivation, and fairness (Cooper et al. 2021; Asamoah et al. 2022; Flores et al. 2022). Within the literature, it has been uncovered that while students appreciate the convenience and flexibility of completing assignments and tasks at home, there are apprehensions about the lack of interaction with teachers and technical difficulties associated with remote assessment (Gyamerah 2020; Rahim 2020; Cariolle 2021; Topuz et al. 2022).

Consequently, most studies focusing on higher education in the global north have explored the innovative ways instructors respond, navigate, and engage in remote assessment (Ghanbari and Nowroozi 2021; Panadero et al. 2022; Veugen et al. 2022). Research studies on the experiences of students in remote assessment during COVID-19 have been well-documented in most countries in the global north (Morgan et al. 2022; Przymuszała et al. 2022; Slack and Priestley 2022). However, in the global south, there is a paucity of research on how higher education students experience emergency remote assessment, especially in low-income countries in sub-Saharan Africa (SSA) on how they respond and cope with remote assessment. Considering this gap in the context of SSA, this study explores the remote assessment strategies and challenges from the perspectives of teacher candidates in Ghana. The study addresses the question: What are the remote assessment experiences of Ghanaian teacher candidates during COVID-19?

Theoretical framework

Technology-mediated learning (TML) theory is used to understand the experiences of teacher candidates in emergency remote assessment. TML provides an environment in which learners can interact with peers, teachers, or learning materials through information technologies (Alavi and Leidner 2001; Bower 2019). The framework justifies relationships among environmental factors, student and teacher characteristics, psychological, instruction, and technology to improve learning

outcomes (Piccoli et al. 2001; Sharda et al. 2004). According to Bower (2019), technology mediates learning in TML in seven ways. First, digital technologies mediate teaching and learning, helping participants achieve learning goals. Second, the beliefs, knowledge practices, and environmental conditions of participants influence one another. Third, teachers are responsible for creating effective instructional tasks, resources, and an environment that can help learners achieve instructional goals. Furthermore, the affordability and use of digital devices influence student learning and interactions. This can also influence the way instructional resources such as images, texts, sound, and video are created, processed, interpreted, and used to improve instruction. Additionally, technology provides possible ways through which participants can contribute and share ideas online, creating a community of practice and engagement.

It can be argued that COVID-19 changed the assessment landscape, requiring instructors and students to create and use technology-based assessment to monitor student learning and improve teaching. The pandemic introduces a novel environment, requiring digital technologies: online learning and assessment platforms, internet, computers, and digital resources (video, texts, PowerPoint, and sound) in teaching and learning. Given that instructors are to design remote instructional approaches and resources, these technologies serve as a link through which instructional and assessment tasks can get to students during COVID-19 (Alavi and Leidner 2001; Bower 2019). For example, the internet helps conduct synchronous and asynchronous instruction and assessment. It helps instructors develop and upload instructional resources for students to access concurrently or later. It also facilitates group work, discussions, computerized adaptive testing, and quizzes.

Given this new shift in assessment, it is expected that students' beliefs, knowledge of using digital technology, affordability, and access, and other environmental conditions, as TML suggests (Piccoli et al. 2001; Sharda et al. 2004), may expose them to new assessment experiences. This includes the methods and types of assessment, how they access assessment tasks, and the challenges they face during emergency remote assessment. This makes TML a suitable theoretical lens to understand emergency remote assessment experiences of teacher candidates and how technology influences their assessment experiences (Wan et al. 2007).

Literature review

Several studies have reported that students from certain social demographics are disproportionately affected by remote assessments (Nguyen et al. 2020; Rahim 2020; Shahzad et al. 2020; Topuz et al. 2022; Baidoo-Anu et al. 2023a). For example Nguyen et al. (2020) found that students from low-income contexts experienced greater challenges with emergency remote assessments. According to these researchers, students faced challenges such as a lack of access to digital technology and internet services, negatively impacting their ability to effectively participate in the assessment processes. Rahim (2020) argued that students from low-socioeconomic backgrounds generally lack access to the required technology needed to participate in remote assessments.

Research led by Shahzad et al. (2020) concluded that students from low socio-economic backgrounds may experience added layers of disadvantage, such as the lack of family support, impacting their ability to complete remote assessments effectively and timely. These findings align with the UNESCO (2021) report highlighting that socio-economic barriers to remote learning and assessments can lead to students' loss of interest in remote learning and assessment practices.

Topuz et al. (2022) highlighted the issue of remote assessment systems not being mobile-friendly. This made it difficult for students to access online platforms for learning and assessment, especially for those who could not afford computers and internet costs. Topuz and colleagues' study also highlighted security challenges with remote assessments, including difficulties in monitoring students to prevent cheating and other examination misconduct.

In a study that explored university students' experiences during COVID-19, Baidoo-Anu et al. (2023b) reported that poor internet connectivity, limited access to technology, and digital literacy skills were the key barriers that Ghanaian students faced during the pandemic. Gao et al. (2022) conducted a study on students in low-income countries and found that they experienced a range of difficulties with emergency remote assessments, including a lack of access to technology, a lack of support from family, and lower levels of digital literacy.

In a bid to explore students' experiences with remote learning and assessment, Seraj et al. (2022) conducted research that identified 15 different challenges related to teaching and assessment during the COVID-19 pandemic. Key challenges include a lack of preparation and training for remote education and assessment, students' disinterest in remote assessment, cheating, emotional stress, and dissatisfaction with examination systems. Other challenges such as distractions from family, question leaks, and test anxiety were also reported. These issues were compounded by the fact that teachers and students were not familiar with using technology for remote education and assessment (Jaap et al. 2021; Jili et al. 2021).

Furthermore, emergency remote assessment has been met with concerns about accuracy and fairness, decreased motivation and engagement, increased time consumption, and decreased interaction between teachers and students (Chen et al. 2020; Flores et al. 2022). For example, Chen et al. (2020) argued that students found it laborious to navigate complex software, taking longer to complete assessments due to distractions, and having difficulties finding a suitable time and place to complete them. Similarly, in Dewaele et al. (2022) study on remote learning and assessments, students expressed concerns about the accuracy and fairness of their assessments. The study further found that students who participated in the study reported a decline in motivation and engagement in assessment compared to traditional assessments. Additionally, Ho et al. (2021) found similar challenges with emergency remote assessments in Taiwan, including a lack of motivation and difficulty with time management.

Also, the absence of a physical classroom and the lack of interaction with software and assessment platforms have been cited as a precursor to students feeling less motivated to engage in remote assessments (Demuyakor 2020). This results in a decline in academic performance and lower levels of satisfaction with teaching and assessment practices (Martin 2020). In the same vein, the shift to

remote learning has been reported to have accounted for the decline in academic performance and learning outcomes of students (Murphy 2020; Baidoo-Anu et al. 2023b) and technological challenges (Kostoulas et al. 2021; Yildirim and Elverici 2021). Students have also reported that emergency remote assessment hinders their ability to receive prompt and adequate feedback from their instructors, making it more difficult for them to understand how to improve their academic performance (Flores and Gago 2020). This can limit their ability to learn from mistakes and, thus, negatively impact their overall learning experience.

The COVID-19 pandemic and associated emergency remote assessments have had a detrimental impact on students' academic achievement, particularly for those living with disabilities and those from low socio-economic backgrounds (Tomasik et al. 2020; Hammerstein et al. 2021; Panadero et al. 2022). In a study with university students, Andersen et al. (2022) found that students' performance was lower during the pandemic due to mental stress, lack of discussion and group work opportunities, and the format of examination questions, as well as reduced learning time and pressure to respond to assessment demands. In the Philippines, a study by Baloran (2020) also found that higher education students experienced high levels of stress and anxiety during emergency remote learning and assessment. A qualitative study by Khan and Khan (2019) that explored 41 university students' perspectives on remote assessment revealed that students resisted high-stakes assessments and had apprehension towards these assessments due to several factors, such as personal preferences, technological competency, layout, and subject. The study also divulged that students appeared not to understand the usefulness of the transition to remote assessments. Furthermore, the shift to remote learning environments is associated with a range of challenges regarding both teaching and assessment (Metcalf and Perez 2020). Academic dishonesty, which is the most discussed challenge in higher education, has been raised as an issue due to the reduced ability to control students' actions in emergency remote assessments (Kostoulas et al. 2021).

Remote assessments and cheating have become a major concern as the shift to online learning has increased due to the COVID-19 pandemic. With the lack of in-person supervision, there is a greater risk for students to engage in cheating during remote examinations (Murphy 2020). This raises the concern that higher scores on remote assessments may be caused by cheating, while lower scores could stem from changes in the assessment format or the effectiveness of autonomous learning (Gonzalez et al. 2020). According to a study by Guangul et al. (2020), teachers preferred personalized questions, online presentations, and a combination of assessment methods to prevent academic dishonesty. Other limitations that have been discussed include a lack of resources, difficulty in assessing practical knowledge and skills, and the potential for technical failure. Stemming from the somewhat negative experiences of students regarding remote assessments, a corpus of studies has shed light on the need for ongoing support and teacher guidance in remote teaching and assessment.

Also, Reimers and Schleicher (2020) posit that teachers' ability to provide individualized support was crucial for student success in emergency remote assessments. They further argue that teachers who were able to adjust instruction to meet the needs of individual students were more effective in supporting

student learning. These findings have been corroborated by Kirchner et al. (2021) who conducted a study on remote assessments in Germany. According to these scholars, teachers' ability to create a positive and supportive learning environment was essential for student success in emergency remote assessments. They further found that teachers who created a positive and supportive learning environment were more effective in motivating and engaging students.

Despite the challenges and barriers with remote assessment, other studies have found positive experiences of students in online assessments. For example, Chen et al. (2020) argued that students found online assessment convenient and flexible, allowing them to complete exams from any location at a time that is convenient for them. Additionally, students who reported being ready for remote learning reported having more joy and less stress and anxiety compared to those who were not ready (Händel et al. 2020). In Spain, Gonzalez et al. (2020) found that there was a significant positive effect of the COVID-19 lockdown on students' performance, which they attributed to the change in students' learning strategies towards a more continuous manner.

A large-scale study also concluded that most students were satisfied with the support provided by teachers and their university during the first wave of the COVID-19 pandemic (Aristovnik et al. 2020). In Finland, students also reported positive aspects of online learning experiences, such as increased flexibility in learning and the ability to perform activities at their own pace and in a location that is convenient for them (Hill and Fitzgerald 2020). The same study also found that students preferred synchronous recorded live lectures and asynchronous pre-recorded lectures with synchronous follow-up sessions compared to non-recorded live lectures.

While several studies in predominantly global north and Asia have explored students' experiences with emergency remote assessments, research is lacking in SSA, including Ghanaian higher education students' experiences with emergency remote assessment. To bridge this knowledge gap, this study examines the experiences of teacher candidates on emergency remote assessment during COVID-19.

Methods

This study employed a qualitative transcendental phenomenological approach (Teherani et al. 2015) to describe the essence of a phenomenon by exploring it from the point of view of those who have personally experienced it, which in this study is the remote assessment experiences of teacher candidates in Ghana. Patton (2002) argued that a phenomenological approach is appropriate when the goal is to understand "how human beings make sense of experience and transform experience into consciousness, how they perceive it, describe it, feel about it, judge it, remember it, make sense of it, and talk about it with others" (p. 104). Given that the goal of this study is to understand the lived assessment experiences of teacher candidates during COVID-19, a transcendental phenomenological approach was considered the most appropriate qualitative design to use.

Participants and sampling

The target population for this study was 2,500 final-year teacher candidates from five colleges of education within the central and southern parts of Ghana. The colleges of education were homogeneous in terms of curriculum, pedagogy, and training, and were affiliated with five main universities. Of the five colleges, two of them were identified as digitally poor due to their remote locations and the lack of adequate ICT infrastructure to support digital teaching and learning (Kumi-Yeboah et al. 2023). Given the uniqueness of our participants, we were only interested in teacher candidates who participated in online learning. Therefore, purposive criterion sampling was used to select 20 final-year teacher candidates who participated in online learning during COVID-19. There were twelve male and eight female teacher candidates, and their ages ranged from 20 to 30 years. Eight of the teacher candidates were considered digitally poor. Table 1 presents a summary of participants' demographics based on their IDs, gender, age, and interview duration.

Ethical issues

This study obtained ethical clearance from the selected teacher training institutions. Consent was sought from the teacher candidates before conducting interviews, and they willingly agreed to share their experiences in emergency

Table 1 Demographics of participants

| Participants (P) ID (Pseudonyms) | Gender | Age range (years) | Interview duration (Minutes) |
|----------------------------------|--------|-------------------|------------------------------|
| Boamah | Male | 20–30 | 45 |
| Semenhyia | Male | 30–40 | 51 |
| Opuni | Female | 20–30 | 48 |
| Ansong | Female | 30–40 | 50 |
| Sefa | Female | 20–30 | 43 |
| Oheneba | Female | 30–40 | 41 |
| Boampong | Male | 20–30 | 59 |
| Tinkorang | Female | 30–40 | 61 |
| Bimpe | Male | 20–30 | 40 |
| Kwakye | Female | 30–40 | 47 |
| Yankyera | Male | 20–30 | 63 |
| Nyamekye | Male | 30–40 | 51 |
| Esi | Female | 30–40 | 50 |
| Ayeyi | Male | 30–40 | 44 |
| Apau | Female | 20–30 | 48 |
| Ameyaw | Male | 30–40 | 53 |
| Amposem | Male | 20–30 | 51 |
| Duemelo | Male | 30–40 | 45 |
| Akpalu | Male | 20–30 | 53 |
| Moro | Male | 30–40 | 55 |

remote teaching, learning, and assessment within the broader college context. Participants were informed of their right to withdraw consent, and the confidentiality of the responses given was assured. Consent was audio recorded, and participant voices on tape were inaccessible to any third party. Data collected were used solely for this research, and for anonymity, participant names were represented using unique IDs. The data were further protected by secure password measures.

Instruments and data collection

An in-depth semi-structured interview protocol was developed and reviewed by two qualitative research specialists. Feedback from the experts led to revisions in the protocol, addressing issues such as wording and ambiguity in some questions before data collection. Individual interviews, on average, lasted approximately 53 min and were conducted using the Zoom video conferencing program. Consent was obtained, and each Zoom video interview was audio recorded and transcribed. Field notes complemented the data by providing additional context and insights into the research setting and interviews (Phillippi and Lauderdale 2018).

Data analysis

To understand the remote assessment experiences of teacher candidates, thematic analysis was employed using the constant comparative method (Glaser and Strauss 1967). The interview transcripts were uploaded into MAXQDA Analytics Pro-2022, a qualitative analysis software. A general coding plan based on key areas of focus (e.g., remote assessment experiences, challenges, support, and resources) guided the independent analysis of the same 10 interview transcripts by three members of the research team, representing 50% of the full dataset. Each analyst followed a structured procedure of reading and re-reading the transcripts to examine and categorize the data, enhancing the reliability and validity of the coding. The research team members then met to inspect, evaluate, compare their coding outcomes, and calculate the inter-coder reliability using Cohen's kappa. The inter-coder reliability based on Cohen's kappa was found to be 0.76, indicating strong agreement among the three raters or coders (Landis and Koch 1977). Two members of the research team used the coding scheme developed to analyze the full dataset.

Findings

Four main themes emerged from the analysis of interview data: (a) online assessment platforms, (b) remote assessment strategies, (c) mixed experiences (negative and positive) of remote assessment, and (d) challenges of remote assessment.

Online assessment platforms

We found that teacher candidates had varied experiences using various platforms such as Telegram, Zoom, WhatsApp, and Google classroom and their schools' learning management system for online assessment. However, most of them ($n = 19$) shared that the most preferred platform was telegram due to its convenience in submitting quizzes and assignments. Reflecting on his experience, one of the teacher candidates shared:

We used several platforms such as Zoom, Google Meet, WhatsApp, and Telegram...but Telegram was used the most. On the telegram platform, there is a common link that connects all of us to that platform where we all respond to the questions the teacher asks and we also give feedback in the end (Bimpe).

Another teacher candidates had this to say when he was asked about the suitability of online assessment platforms:

Compared to other platforms, I think Telegram made it easy to get many students to join the class, ask questions, get assessment tasks, and upload our assignments (Oheneba).

From the views of the teacher candidates, Telegram was suitable for formative assessment such as questioning and getting feedback from their instructors. However, summative assessment in the form of tests and examinations were conducted through the accredited learning management platforms of their affiliated universities. They indicated that the assessments were timed and went off automatically when the allotted time was exhausted. One of the teacher candidates said:

We were given take-home assignments on the telegram platform. We were also given midterm tests and end of semester exams on the learning management system provided by our mother University (Ameyaw).

Remote assessment strategies

Oral questioning, feedback and take-home assignments were the prevalent assessments for learning strategies. They also shared that their instructors provided little room for students' peer assessment. However, most of the teacher candidates ($n = 15$) lacked personalized and individualized feedback. The reason being that their instructors provided generalized responses as feedback. For example, a teacher candidate shared:

... our teachers use oral questions to assess us. So, he will ask general questions and tell us to unmute ourselves to answer. At times, he gives opportunities for other students to also share their thoughts on the question. He also asks us to tell him our general concerns and questions for him to address (Ayeyi).

On feedback practices, one of the teacher candidates said:

Through voice notes, the teacher commented on our responses to questions he asked by making us know the correct responses he was expecting from us. Sometimes he responds to students' answers by typing or writing in the form of a note (Nyamekye).

For summative assessment, teacher candidates voiced that they were engaged in online multiple-choice examinations, which did not adequately cover learning content and restricted their responses. Their instructors also used non-achieving factors, which contributed to their final grading. These grades were given based on student attendance and participation in class activities. One of the teacher candidates shared:

In exams and quizzes, I think we did not get detailed questions. We answered only 30 objective tests compared to both objectives and some two or more essay questions in in-person assessment, which would have covered more content compared to the objective test alone (Dumelo).

Another teacher candidate had this to say when she reflected on her experience with 'attendance for marks':

Apart from giving marks to students on assignments and group work, the teachers sometimes used attendance to assign marks or scores. At times once you join the platform, you get some marks for your grades. This encouraged most students to get involved in online teaching and learning (Moro).

From the perspectives of the teacher candidates, awarding marks based on class attendance and participation was meant to improve student participation and engagement in online teaching and learning. This is expected because the Ghanaian context is examination driven. Therefore, using this strategy may attract students to participate in online instruction, especially when they are told that the awarded marks will count towards their summative assessment.

Experiences in remote assessment

Teacher candidates generally had a negative experience with remote assessment. They perceived it to be unfair due to time restrictions and awarding grades for class attendance, which contributed to their final grades. They shared that online assessment had a catastrophic impact on their academic performance because most of them were unable to fully participate in the assessment processes due to internet connectivity disruptions when completing their assessments. They also found their lecturers rushing through the assessment process due to the lack of time. Speaking about his experiences, a candidate mentioned the following:

Online learning had a terrible effect on my academic performance. I was a first-class student but because of how we were assessed during the emergency remote classes my GPA dropped and I failed some courses which I had to retake when school finally moved to in-person (Kwakye).

Most of the teacher candidates ($n = 18$) found the online assessment daunting, unhelpful, and mentally draining, engaging in examination malpractices such as cheating and academic impersonation. We found that some of them completed assessment tasks for their colleagues and copied responses directly from internet sources since nobody monitored them. A teacher candidate shared:

Many students, including myself, committed examination malpractice and cheating.. I had to cheat by copying answers from multiple sources. This was possible because there was no monitoring (Opuni).

Another teacher candidate also shared the following when he was asked about his academic performance in remote assessment.

Yes...to me this online platform affected my performance...in the face-to-face exams I wrote earlier, I had "As" ...but the one I did online I had 'Bs'. I did better with the face-to-face assessment than the online one (Boampong).

Given the experiences of teacher candidates in emergency remote assessment, most of them ($n = 12$) described online assessment as unfair. They attributed the lack of fairness to two main reasons. First, the learning management platforms did not allow them to complete their assessment task. According to them, assessment tasks were timed and automatically went off despite the network challenges they faced. Second, they were also unhappy about awarding marks based on attendance that counted towards their summative assessment. For most of them, those who were unable to attend classes due to network challenges and other factors beyond their control did not receive these marks, affecting their performance. The following represents the common views of most of the teacher candidates:

Most of my colleagues complained about some of the platforms not being fair in assessing them, especially the learning management platform. Sometimes, some students are unable to complete their task and the system will just go off and they will have low marks. Some students attended classes just to receive marks and later go off the class. Other students who are unable to attend class due to genuine concerns such as where they stay, and network challenges are left behind (Esi).

These experiences compelled most of the teacher candidates to develop a preference for face-to-face assessment. They were of the view that since most students come from remote areas where a stable internet connection was a problem for many, in-person assessment was considered most appropriate. According to them, in-person assessment provides opportunities for them to meet their instructors and turn in assessment tasks with limited difficulty.

Personally, face-to-face assessment is better than online assessment. This is so because when it comes to the online assessment, most of our colleagues come from places where there is no access to networks. They are unable to access assessment tasks on time and sometimes, they delay in completing those tasks (Semenhyia).

Another reason that accounted for the teachers' preferences for in-person assessment is their lack of understanding in instructional tasks. For example, they ($n = 16$) expressed that they did not understand learning content due to the challenges associated with online learning and assessment. This is illustrated in the following excerpt:

With the in-person assessment and learning, we did not encounter any problem. Relating to online learning, the challenges did not help in making sure that we understood what they were teaching. This makes in-person teaching, learning and assessment far better than online learning (Akpalu).

Despite their negative experiences, they saw online assessment as a preparatory ground for their professional practices. Most of them ($n = 16$) could apply, navigate, and use digital technologies satisfactorily in their future assessment practices. This is illustrated in the following excerpt:

This online assessment has opened us up to know how to apply technology when starting our careers as teachers. This will also help us to keep up with where the world is advancing (Ansong).

For most of the teacher candidates, teaching, learning, and assessment are evolving, and online assessment has become part of online instructional approaches. This has changed their perception that assessment could only be done in face-to-face settings. They voiced that online assessment should be inculcated into teaching and learning. One of the teacher candidates commented:

We are moving to a place where the world is becoming digital and most of the things we learn in our classrooms if you cast your mind 10–15 years ago are not the same as now. So, I think personally as a prospective teacher, I must throw away the notion that assessment is done only through paper and pencil tests... I think we should incorporate this online assessment into our teaching and learning (Yankyera).

Challenges of remote assessment

Teacher candidates faced numerous challenges in online assessment. Their socio-economic background and geographic locations exposed them to inadequate digital infrastructure (computer or laptop), unstable internet, limited time and financial resources, and frequent power cuts during classes. This made them struggle to participate in online formative and summative assessments. These multiple and interrelated constraints contributed to their harsh and negative experiences and low academic performance. A teacher candidate shared:

I had to spend extra money to travel to a nearby town to participate in the class. The internet connectivity was very poor and there were frequent power cuts. Unfortunately, our exams were held in the evening, which was not helpful. The exam was timed, and the poor internet connectivity restricted my ability to answer questions confidently (Sefa).

Another teacher candidate corroborated:

I had some low marks which resulted in a bad grade because of the similar network challenges my colleagues faced. This really drained my CGPA and brought me to second class upper (Boamah).

We found that most teacher candidates ($n = 17$) lacked capacity development, compounding their challenges in online assessment. Online teaching and learning are not new to the Ghanaian context. Some colleges and universities equipped with adequate infrastructure had implemented synchronous and asynchronous teaching and learning models through Learning Management Systems (LMS) before the pandemic. However, adapting online teaching and learning in all colleges and universities during COVID-19 was challenging for the teacher candidates and their colleges due to the lack of infrastructure and professional development. The participants lacked the prior experience, training, and school support to navigate and use online assessment platforms. For most of them, the only training they received was how to access online learning platforms through links. A teacher candidate narrated:

We did not have any orientation on the online platform we used to submit assignments, which made it difficult for me to submit assignments. When there is a power cut in the process of submitting an assignment, the system will automatically submit what we have done. We were not trained to be able to flag questions and return to the question (Amposem).

Another teacher candidate commented:

...the only kind of training they gave us was how to access the platforms via the links they gave to us. There was not any training to navigate your way through these online platforms during assessment (Tinkorang).

The challenges most of the teacher candidates faced during emergency remote assessment affected their mental health. Some of them were anxious and panicked about online assessment. However, there was inadequate support to address the mental and emotional issues associated with online assessment. They were comforted by the encouragement of their instructors. Reflecting on her experience, a teacher candidate shared:

There was nothing like an office to support us when we were faced with emotional and mental challenges regarding online assessment. At times we get angry, nervous, and anxious when we are not able to complete our online assessment tasks. However, some teachers encouraged us that things were going to be fine, which brought some comfort to us (Apau).

Discussion

This study explored the remote assessment experiences of teacher candidates during COVID-19. The findings show that Telegram was the preferred platform because it supported large class sizes. It was also convenient for formative assessment

practices: questioning and feedback. In contrast, summative assessments (tests and examinations) were conducted on the Learning Management System (LMS) as it provided a way to time assessment tasks. This finding aligns with existing studies conducted in low-income communities that argue that instructors and students prefer to use online platforms that are convenient and user-friendly (Flores and Gago 2020; Chirinda et al. 2021). Additionally, our finding justifies the mediating role of these learning platforms by providing a medium through which students can access assessment tasks, interact with their instructors, and other students to improve teaching and learning, as the Technology-Mediated Learning (TML) theory suggests (Alavi and Leidner 2001; Bower 2019). Therefore, during crises such as COVID-19, digital platforms such as Telegram and LMS can supplement formative and summative assessments, respectively.

However, our findings highlight that remote assessment did not encourage formative assessment. The predominant formative assessment techniques used by the instructors were oral questioning and feedback, and sometimes written feedback. Our participants mentioned that instructors rarely used peer assessment and lacked personalized and individualized feedback, decreasing interactions between instructors and students (Chen et al. 2020; Ho et al. 2021; Asamoah et al. 2022; Dewaele et al. 2022; Flores et al. 2022). The literature (see, for example Reimers and Schleicher 2020) has emphasized the need for instructors to provide individualized support during remote assessment. Providing personalized support helps instructors adjust their lessons to meet the unique needs of students. It also provides the necessary support to improve student learning. It can be argued that remote assessment was less likely to meet the unique needs of the participants used in this study. Consistent with the literature, Flores and Gago (2020) argued that remote assessment hinders students from receiving prompt and adequate feedback from their instructors, preventing students from learning from their mistakes and affecting their academic performance. In contrast, our results did not support the research led by Guangul et al. (2020), which concluded that instructors preferred personalized questions in remote assessment. A possible explanation is that teacher educators in Ghana did not have the prerequisite skills to effectively use the online learning platforms.

Furthermore, participants in this study reported negative experiences about remote assessment. As TML theory suggests, limited knowledge and capacity, affordability, access to digital technology, and other environmental conditions shaped the negative experiences of our participants (Piccoli et al. 2001; Sharda et al. 2004). This affected how digital technology improved remote learning and assessment. According to them, remote assessment reduced the format of summative assessment to multiple-choice questions (MCQs). This connects with a study by Jaap et al. (2021) that concluded that MCQs are an acceptable and effective approach to summative assessment. They argued that MCQs can be suitable in remote assessment if in-person assessment is not possible. Contrary to our context, we found that using MCQs alone affects the content representativeness of assessment tasks, affecting the academic performance of students. Gonzalez et al. (2020) have argued that lower scores in remote assessment could stem from changes in the assessment format. The participants expected assessment tasks that included both

MCQs and constructed response questions, which they believed could have covered more learning contents. They attributed this to the platforms they frequently used, suggesting that remote assessment did not support multiple assessment strategies.

Our participants reported that non-achieving factors (such as participation, attendance, punctuality) contributed to the final grades of the students. Although these practices were meant to improve participation and engagement in teaching, learning, and assessment, our participants expressed concerns about fairness in assessment. The participants were from different socio-economic backgrounds with different challenges. A wealth of research has shown that students from low socio-economic backgrounds, especially in developing countries, are disproportionately affected by remote assessment (Nguyen et al. 2020; Rahim 2020; Shahzad et al. 2020; UNESCO 2021; Topuz et al. 2022; Baidoo-Anu et al. 2023a). Most people in this category, like our participants, may lack access to technology and the digital literacy to participate in remote teaching, learning and assessment. Therefore, an emphasis on non-achievement grades did not only lead to the lack of satisfaction of the assessment results among the participants, but it also questions the reliability and validity of the assessment results as well as the decisions that were made from their assessment scores.

In addition to the fact that the LMS did not allow them to complete their assessment tasks, most of them considered remote assessment unfair, which is consistent with the literature (Chen et al. 2020; Dewaele et al. 2022; Flores et al. 2022). The findings of this study revealed that remote assessment had an adverse impact on the academic performance of most participants. They were unable to fully participate in the assessment processes due to internet connectivity disruptions when completing their assessments. Their instructors also rushed them through the assessment process due to a lack of time. This aligns with the existing body of knowledge that argues that remote assessment affects student performance (Demuyakor 2020; Murphy 2020), especially for students with low socio-economic backgrounds in developing countries (Tomasik et al. 2020; Hammerstein et al. 2021; Panadero et al. 2022; Baidoo-Anu et al. 2023b). For example, Andersen et al. (2022) revealed that student performance was affected during COVID-19. They attributed the low performance to lack of discussion and group work, the format of exam questions, lack of adequate learning time, and pressure to respond to assessment demands. These, among other factors, have been confirmed among the participants of this study. Conversely, this finding contradicts Gonzalez et al. (2020) that argue that student performance improved during COVID-19. The researchers claimed that the students could change their learning strategies to a more continuous manner, which did not reflect in our context.

The low performance of our participants is expected because they found remote assessment daunting, unhelpful, and mentally draining. This occurs when students find it difficult to access and navigate online assessment platforms, have difficulty completing and submitting assessment tasks, and are not familiar with using technology for remote assessment (Chen et al. 2020; Jili et al. 2021). This contributed to academic dishonesty such as cheating and academic impersonation due to the lack of monitoring. The participants in this study admitted that they completed assessment tasks on behalf of their colleagues. These findings suggest that

remote assessment, especially where students are not monitored, serves as a breeding ground for academic dishonesty, compounding the issues of fairness, reliability, and validity in remote assessment, as the literature suggests (Gonzalez et al. 2020; Murphy 2020; Kharbat and Abu Daabes 2021; Kostoulas et al. 2021; Topuz et al. 2022). For example, Kostoulas et al. (2021) found that cheating has been a major concern in higher education since the actions of students in remote assessment cannot be controlled. Murphy (2020) attributed this problem to the lack of in-person supervision and argued that there is a greater risk for students to engage in cheating during remote assessment. Topuz et al. (2022) corroborated that remote assessments make it difficult to monitor students to prevent cheating and other examination misconduct. This results in concerns that higher scores in remote assessment may be attributed to cheating (Gonzalez et al. 2020).

Given that the Ghanaian context prioritizes summative assessment, students are more likely to engage in examination malpractices to achieve higher scores. This situation can be worse when they encounter several challenges in remote learning and assessment, as our findings suggest. Therefore, it is not surprising that face-to-face assessment was a preferred alternative to remote assessment due to the lack of understanding of instructional concepts and disadvantaged geographical locations, which are a range of challenges that affect remote assessment (Metcalf and Perez 2020). We found that our participants encountered interrelated challenges during remote assessment. Their socio-economic backgrounds and geographic locations exposed them to inadequate digital infrastructure (computer or laptop), unstable internet, limited time and financial resources, and frequent power cuts during classes. These findings align with the wealth of studies that have concluded that remote assessment is associated with several challenges (Rahim 2020; Shahzad et al. 2020; UNESCO 2021; Gao et al. 2022; Seraj et al. 2022; Topuz et al. 2022). For example, there is a digital divide and inequality in developing countries such as Ghana (UNESCO 2021). Not only do people in developing countries have low digital literacy, but also, they do not have access to technological infrastructure (Gyamerah 2020; Cariolle 2021). Therefore, students from low socioeconomic backgrounds may not have access to a computer and a stable internet, which can affect their participation in remote assessment and academic performance.

In this study, most of the participants shared that they struggled to stay logged on for their assessment and had to send their assignments and exercises through emails. During our interviews, we also observed constant breakages in our interactions with the participants, which challenged our data collection. Most of the participants in both remote and urban areas lacked a stable internet connection and had to reconnect several times. Also, we had to guide some of the participants through WhatsApp calls to assist them to connect on Zoom due to their digital illiteracies. These experiences prolonged our data collection, which confirmed the experiences of the participants about emergency remote teaching and learning. The participants reported that they could not afford a stable internet, data bundles, laptops, and computers for remote assessment. Proponents of the TML theory argue that students should be able to afford digital devices to facilitate learning and interaction. Otherwise, their access and use of instructional resources will be hindered (Bower 2019).

Furthermore, the fact that most of our participants lacked capacity development compounded their challenges in remote assessment. They lacked the prior experience, training, and school support to navigate and use online assessment platforms, suggesting that these support services are needed for remote assessment to be effective. For example, Voogt and Knezek (2021) found that effective teacher support and guidance are critical for students' success in remote assessment. Providing clear support can help students adapt instructions to meet their needs and complete remote assessment tasks on time. As evident from this study, the challenges of remote assessment did not only affect the academic performance of our participants, but also affected their mental health. Some of them were anxious and panicked about remote assessment. However, there was no support to address their mental and emotional needs. This indicates that remote assessment is associated with mental and emotional problems if not conducted properly. Therefore, our findings support the literature that argues that remote assessment during COVID-19 led to stress and anxiety (Baloran 2020; Ho et al. 2021; Seraj et al. 2022). This is not surprising because, naturally, students may be anxious about a test. They may be worried and mentally unstable when they cannot meet performance expectations due to interrelated challenges, such as the ones reported in this study.

Despite the negative experiences and challenges of remote assessment, some participants preferred using both remote and in-person assessment. Most of them indicated that remote assessment served as a preparatory ground for their future professional practices, considering the changing nature of teaching, learning, and assessment. Their experience with remote assessment helped them develop skills to navigate and use digital technologies effectively, altering their perceptions regarding an overreliance on in-person assessment. This readiness can potentially mitigate future challenges in remote assessment, such as stress and anxiety (Händel et al. 2020).

Conclusions and implication for policy and practice

We explored the remote assessment experiences of teacher candidates during COVID-19. The findings revealed that teacher candidates utilized various platforms; however, Telegram and Learning Management System (LMS) were the primary platforms for formative and summative practices, respectively. Our findings suggest that digital technology did not effectively mediate teaching, learning, and assessment due to several challenges, resulting in negative experiences for teacher candidates in remote assessment. They experienced limited formative assessment practices and lacked personalized feedback, contributing to a significant impact on their participation in remote assessment and academic performance.

The findings also indicated that remote assessment was perceived as unfair. This was attributed to instructors awarding non-achievement grades that counted toward summative assessment. Remote assessment became a breeding ground for academic dishonesty, including cheating and impersonation. Socio-economic backgrounds and geographic locations exposed teacher candidates to interrelated challenges

such as inadequate digital infrastructure and unstable internet. They lacked previous experience, training, and school support in remote assessment, which adversely affected their mental and emotional health.

Despite these challenges, remote assessment served as a preparatory ground for future professional practices. Teacher candidates developed new skills to navigate and use digital technologies. For instance, colleges allowed teachers and students to upload assignments, books, reading materials, and other resources on digital platforms such as Google Classroom, emails, LMS, and social media. These practices became widespread among college lecturers, regardless of their department or program.

Emergency remote teaching, learning, and assessment encouraged self-directed learning among teacher candidates, providing opportunities for independent learning and promoting inquiry-based learning strategies. Colleges had to incorporate digital technologies they had not used in teaching and learning before, such as Zoom, Google Teams, and updated LMS systems to support asynchronous and synchronous instruction and assessment. Students had to learn different technologies, interact with others, and adapt to new remote teaching and learning styles to improve their learning and academic success. This shift changed their perceptions regarding the overreliance on in-person assessment.

The findings of this study highlight a formative assessment deficit in remote assessment during COVID-19. Oral questions, feedback, and occasionally written questions with minimal peer assessment were frequently experienced. Leveraging digital platforms such as Telegram, Zoom, Google Meet, and LMS to support other formative and summative assessment practices can be alternative ways to enhance teaching and learning. Due to the challenges many teacher candidates encountered, they could not complete their timed assessment tasks. This implies that the time loss due to the challenges of remote assessment is not compensated, and ensuring adequate time compensation may encourage student participation and improve their academic performance.

Remote assessment affects the content representativeness of assessment tasks and the use of multiple assessment strategies. We found that Multiple-Choice Questions (MCQs) were mostly used, although most teacher candidates preferred both MCQs and constructed response questions. The nature of the platforms and time constraints did not allow for the use of multiple assessment strategies and formats. Therefore, it is essential to reconsider how remote assessment can be practiced to encourage the use of multiple assessment strategies and formats. Instructors and students can be trained to develop and use digital platforms in this direction, helping to cover most of the learning content and improve student performance.

Additionally, remote assessment is associated with a lack of fairness, impersonation, and cheating, affecting the psychometric properties of assessment tasks and results. Non-achievement grades were used for participation purposes, but the process was described as unfair. Prioritizing alternative ways to encourage student participation in remote assessment, ensuring access to affordable digital technologies, and providing digital literacy training are crucial. Students may take advantage of attending online classes for the sake of marks without necessarily understanding instructional concepts, questioning their mastery of learning.

Remote assessment did not prioritize proctored assessment, leading to academic dishonesty. There should be a reconsideration of how remote assessment can be practiced, incorporating artificial intelligence and proctored software that can monitor audio, video, webcam video, computer desktops, and other suspicious student behavior. Additionally, the interrelated challenges of remote assessment require planned efforts by educational stakeholders to address them holistically compared to solving them in isolation. For example, providing digital infrastructure without corresponding training and digital literacy may have little impact on practicing remote assessment. There is also a need for mental and emotional support services in schools to address the psychological, mental, and emotional stress and anxiety students experience during remote assessment in crises like COVID-19. Finally, constant training and continued practice of remote assessment should be prioritized, using it alongside in-person assessment to help instructors and students could strengthen their remote assessment competencies.

Limitations and future directions

The participants in this study were from selected colleges of education in Ghana. The findings, conclusions, and implications of this study reflect the perspectives of our participants, limiting the generalizability of the findings to other contexts. Since the study's purpose was to understand the depth and richness of teacher candidates' experiences of online learning in Ghana, generalizability may not be applicable. However, the findings may be transferable to other settings or contexts that share similar characteristics with the study participants.

The qualitative transcendental phenomenological approach necessitated a relatively small sample size to acquire in-depth information and analyze the experiences of teacher candidates regarding their remote assessment experiences. In addition to interviews, further quantitative studies on remote assessment experiences, using a larger sample size, could help address the generalizability issues of the current study.

Nevertheless, this study is the first in Ghana and one of the few in Sub-Saharan Africa (SSA) to highlight the key experiences of teacher candidates in remote assessment during COVID-19. It provides an initial and significant understanding of how teacher candidates responded, navigated, and coped with remote assessment. The findings are crucial for enhancing and supporting teaching, learning, assessment, and teacher development. It is recommended that a follow-up study be conducted using mixed-method approaches in Ghana and other educational contexts. The provision, access, and affordability of digital infrastructure supporting teaching, learning, and assessment, along with training in digital literacy, are highly recommended for effective remote assessment practices.

Acknowledgements We express our gratitude to all school leaders and teacher candidates from the sampled colleges of education in Ghana for their patience, commitment, and support during the data collection process.

Author contributions All authors contributed to the conception, data collection, analysis, results, and writing of the study. DA edited the final manuscript.

Funding There was no funding for this study.

Data availability The interview data used in our analysis is available based on a reasonable request from the corresponding author.

Code availability Not applicable.

Declarations

Ethical approval The ethical approval for this study was granted by the Institutional Review Boards of the various colleges from which the participants were sampled. The study was conducted in accordance with the relevant guidelines applicable to research involving human participants.

Informed consent Informed consent was obtained from all participants, including their consent to publish the results of the study.

Competing interests On behalf of all authors, the corresponding author states that there is no conflict of interest.

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