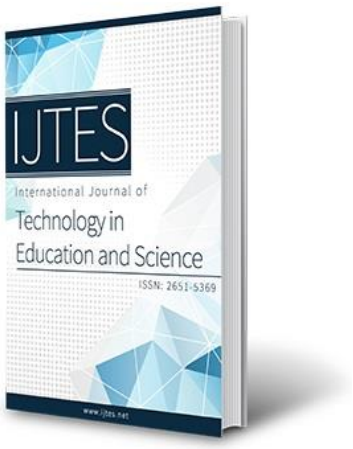

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Pre-service Teachers and Online Learning Technology in Practice Today: Perceptions, Preparedness and Competence in E-practicum

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Abstract

Teaching has gone beyond mere memorizing of rules and the use of talk and chalk method of teaching. Learning is no longer tied to the four-walls of the classroom hence teachers should adapt to the new digital way of learning. This paper investigated pre-service teachers' perceptions, preparedness and competence in using virtual meeting solutions (Zoom and Google Meet) in non-physical classroom practicum. Three hundred and fifty two preservice teachers selected from the Faculty of Education of a Nigerian University participated in the descriptive research study. A validated close-ended questionnaire and self-rated rating scale were used to gather data from the respondents. The study found out that: i) the respondents perceived the use of Zoom and Google Meet for e-practicum as solutions for teaching and learning in the 21st century; ii) most of the respondents were not adequately prepared for the integration of Zoom and Google Meet into e-teaching practicum; iii) respondents were not pedagogically competent to use Zoom and Google Meet for teaching practicum. This study showed some lapses in TPs' personal development in basic computational skills and teacher digital education programmes. The study suggested solutions that would be useful for concerned stakeholders in digital education industry.

Introduction

Literature reveals different names given to the initial practical experience that student teachers (pre-service teachers, teaching practice students or teachers in training) have in teacher education programme as "field placement", "teaching practicum", "teaching practice", "field experience", "apprenticeship", "internship", and "practical experience" (Gebhard, 2009; Aglazor, 2017; Vancell, 2019; Ormeño & Rosas, 2023). These terms refer to an integral part of teacher education program. It is the first phase into the authentic teaching situation which provides a glimpse into professional change and development and avails teaching practice students (TPs) the avenue to link the theoretical skills and knowledge of what they have been taught with practice in actual classroom milieu.

In practicum, TPs are exposed to the hands-on experience in teaching: assess their teaching abilities; learn how to handle rigorous classroom activities; receive feedback; reflect on their teaching practices; improve upon their teaching skills; and are guided, tutored and monitored by cooperating teachers and supervisors. Lee et al. (2012)

explain that student teaching experiences are significant in five ways namely; pedagogical content knowledge; planning and preparation for instruction; classroom management; promoting family involvement; and professionalism. The experience gathered during this phase will help TPs build student-teacher interaction, pedagogical competence and professional qualities.

Teaching and learning are no longer confined to the four walls of the classroom. With the aid of technological improvement, resounding innovation has been recorded in the way in which teachers learn, communicate and execute their duties (Akele, 2013). Montilla et al. (2023) agreed that the incorporation of technology in teaching and learning has become increasingly germane as the world becomes more digitally oriented. It is important that that TPs are digitally competent. Digital teaching competence is referred to as all those capacities, skills, attitudes, and knowledge of technological tools needed by teachers in a digitalized world in the teaching and learning process (Fernández-Batanero et al., 2021). Purina-Bieza (2021) explained that digital competence in education is the ability to know the technologies that should be introduced in the learning process as well as how to relate them to the content and goals of learning to foster learning outcomes. García-Delgado et al. (2023) explained that the new educational reality in the 21st century requires teachers to develop skills and competencies to improve the teaching-learning process and the quality of teaching by integrating new technologies to improve education. Probably, if teachers are skilled in digital pedagogy, it may endear them to find it interesting and warm to incorporate ICT into their pedagogical practices.

The researchers opined that teaching practice is practical-oriented but traditionally assumed to be restricted to face-to-face teaching in many underdeveloped countries. However, the practical aspect and live performances of teaching practices are not alien to online teaching or e-practicum but are realizable in online teaching due to the incorporation of information and communication technology (ICT) through synchronous or asynchronous modes such as e-mails, bulletin boards, forums, chat features, or other text-based communication means; video conferencing platforms; and other proprietary software systems that combine many of these features (Ersin et al., 2020).

The use of technology in teaching and learning process is an academic task, nonetheless, Dada and Jimola (2021) observed in their study that a significant number of university undergraduate students have technological expertise of social media platforms, smart phones, computer, and tablets, however, they do not explore them for academic purposes but are rather used for different non-academic purposes. Also, Aina et al. (2021) and Hunter-Johnson et al. (2021) posited that large number of TPs are unskilled in the processes of incorporating technologies into teaching and learning.

One of the novel means of incorporating technology into teaching practice is e-practicum. Despite that this generation of the present preservice teachers proved to be technologically savvy, coupled with the fact that e-practicum is a promising platform that familiarizes TPs with online instruction and helps them garner experience with such instruction, yet, TPs seem unskilled at manoeuvring the features of the online video platforms/software such as Zoom and Google Meet for teaching in virtual classrooms, and are not warm to the practice of integrating digital resources into teaching in virtual classrooms as majority of them expressed doubt and low self-efficacy

with teaching virtually (Gallup et al., 2021). Reasons for these shortcomings have been traced to lack of fundamental knowledge in informatics, lack of experience and expertise in using digital materials and platforms for academic purposes which have resulted in a struggle of digital integration (Ersin et al., 2020; Hunter-Johnson et al., 2021).

Consequently, based on the researchers' assumptions, TPs who lack appropriate knowledge of the basics of informatics and rudiments of online video software like Zoom and Google Meet may not be able to join virtual classes, initiate live broadcasting, download and upload information, initiate and sustain chat/lecture, and make use of screen sharing. These assumptions could, probably, be one of the reasons why TPs are not warm to the practice of integrating digital resources into teaching in virtual classrooms.

Tıngöy and Güllüoğlu (2011) noted that informatics incorporates the way data is collected, organized, analyzed, represented, filtered and managed. Sianturi (2017, p.212) affirmed that informatics involves "the acquisition, processing, storage and dissemination of vocal, pictorial, textual, and numerical information by a microelectronics-base combination of computing and telecommunications." TPs who lack appropriate knowledge of the basics of computer cannot, by themselves, conduct research projects, analyze data, solve problems, design products, assess their own work, and in the long run, may never wish to utilize technology in classrooms. Other reasons adduced for TPs' unfavourable disposition to teaching in virtual classrooms are lack of self-development in computational skills, lack of exposure to basics of computer when TPs were in primary or secondary schools, and the inability of tertiary institutions to incorporate and expose TPs during teacher education programs to courses that focus on the basic knowledge in computer sciences and other related 21st century technologies in classroom such as information technology courses, instructional technologies, e-learning material design, classroom management course, assessment and evaluation of online learning, and digitalized curricula (Yastibas, 2021).

Apart from teachers' lack of digital competence, other barriers are lack of technical support, teachers' beliefs in digital pedagogy and their utilities, skill enhancement and practices in the classroom, and teachers' inability to update and develop skills systematically to suit the radical change in digital pedagogy (Nanjundaswamy et al., 2021). Fakeye (2010) stated other factors for TPs' lukewarmness to teaching in virtual classrooms as dearth of ICT tools for teaching; non-usability of the few available ICT tools, indifference to novel innovations, and teachers' perception has influenced by non-manipulative teachers' factors (demographic characteristics of the teachers) and manipulative teachers' factors (language of delivery, school board, and training facilities) (Obielodan et al., 2020). Hunter-Johnson et al. (2021) who worked on the various challenges and support for pre-service teachers' virtual teaching and practicums explained that preservice teachers embarking on virtual practicum are faced with the problems of inadequate training for teaching in the virtual classroom, unfamiliar online learning platforms, lack of proficiency in various technological devices and strategies, insufficient quantities or lack of devices, and lack of support.

Falloon (2020) reiterated the need to expand TPs' understanding of the sort of competencies required to function productively, safely and ethically in diverse and increasingly digitally-mediated environments. Ottestad et al.

(2014) advised that teacher education institutions need to rework their programmes before they fully integrate digital competence into their practice. They opined that TPs are most likely not prepared to integrate the fostering of mandatory digital competence in their subject teaching even when they graduate because of low level of knowledge in informatics. This has led to the neglect and reduction of digital competence to mere shallow and instrumental activities, like learning to use the computer or searching the Internet.

Research Questions

To achieve the objectives of this study, some research questions were raised to guide the study:

1. Do TPs have basic knowledge of informatics?
2. How do TPs perceive the use of Zoom and Google Meet as virtual solutions for e-practicum?
3. How prepared are TPs on the integration of Zoom and Google Meet into e-teaching practicum?
4. Are TPs pedagogically competent for the integration of Zoom and Google Meet into teaching practicum?
5. What are the probable factors that could inhibit TPs' ability to integrate Zoom and Google Meet into their teaching practicum?

By investigating preservice teachers' perceptions, preparedness and competence in Zoom and Google Meet, it is expected that this paper can provide useful insights for education practitioners and researchers on the readiness of the TPs to leverage smart classroom learning environments for teaching practicum and as well see Zoom and Google Meet as backups for sustaining teaching practicum.

Theoretical Framework

The theoretical frameworks that underpin this paper are social constructivism theory propounded by Vygotsky and Siemens' theory of connectivism. It is assumed in social constructivism theory that when human beings jointly collaborate with one another in a society, knowledge, understanding, importance, and meaning of the world are developed. Social constructivism is rooted in three specific assumptions which are reality, knowledge and learning. The first assumption is that reality is formed through human activities and discovered by individuals but that reality is not made before social invention nor does it exists in advance. Social constructivists propound that knowledge is socially and culturally constructed and constituted through language hence, it is a human product. Meaning can be formed from knowledge when individuals interact with the environment they live in.

Social constructivists believe that learning is a social process and knowledge is sustained by social processes. Meaningful learning is achieved when individuals involved are engaged in social activities such as interaction and collaboration (Siu-Wai & Shek, 2002; Kim, 2001). Zulu et al. (2021, p.93) explain that "social constructivism theory increases student motivation, collaborative skills, increasing students' opportunity to talk with one another and discuss their ideas increases their ability to support their thinking, develop reasoning skills, and to argue their opinions persuasively and respectfully".

In connectivism theory, knowledge is acquired through a network connection between humans and artifacts (non-

humans). Bell (2009) notes that ideas, individuals, groups, resources or communities constitute these network connections. Connectivists advocate that through peer-to-peer or group interaction and exploration, learning takes place better when learners explore and create new learning opportunities through the Internet rather than limiting learning to individual basis (Jimola & Ofodu, 2021).

Social constructivism and connectivism theories of learning have showcased the importance of online learning especially, the essence of organizing educational tasks to a dispersed but organized intercommunicating groups. The implication of the learning theories in online learning is that learning must be carried out with meaningful activities through an active process and learning should help individual learners promote knowledge construction with the learners taking the initiatives in conjunction with other learners (Yana & Soepriyanti, 2023). Software applications used for online learning have undoubtedly bridged the gap of time and space in learning and have become parts of day to day learning. These applications give room for flexibility, interaction and collaboration. Through these applications, perceived difficult topics are collaboratively solved through the help of peers and teachers, flexible learning environment is provided, time frame is considered when teachers plan and assign appropriate tasks to students, and consideration is given to relevant assessment strategies with the inclusion of a wide range of resources which involve humans and artifacts.

Software for Online Video-Conferencing

Perla and Agrati (2023) revealed different perceptions about the effectiveness of online practicum. The perceptions affirmed that online practicum promotes knowledge of technological skills and familiarity with technologies such as software and online platforms; fosters successful and frequent interaction through communicative, emotional and technical support between student-teachers, professors and expert teachers; and reinforces instant constructive support and mutual feedback from experts.

On the other hand, Nzeako and Onyekwere (2014) affirmed that the application of ICTs in teacher education is still at the infancy level in developing countries, nevertheless they advocated that TPs be groomed in the state of the art of ICT tools and its content applications. TPs are enjoined to exhibit technological dexterity at using drill and practice software programme, tutorial software, higher order thinking problem solving package, computer managed instruction, computer enhanced learning, web based instruction, print technology, e-learning, integrated program for diverse learners with individual needs, and virtual classroom.

Numerous video-conference software exist but the selected participants of this study are familiar and have been exposed to the various features of online video conferencing of Google Meet and Zoom. Since the objectives of the study are to determine the perceptions, preparedness and competence of pre-service teachers about online video conferencing, Google Meet and Zoom are chosen for this study. In addition, they are chosen because of their similarities in terms of the features of online platform, applicability of device such as laptop and cell phone, and accessibility for collaboration. Wright (2023) stated that Google Meet and Zoom are video conferencing platforms with each offering a range of features for virtual meetings, webinars, and remote collaboration.

Zoom

Zoom, according to Erito (2020), is a cloud-based video conferencing service that allows users to meet virtually with others either by video or audio-only or both while conducting live chats. Chidera (2021) notes that Zoom connects to conferencing equipment; hosts up to 500 participants; allows addition of participants in the course of lecture; works with every single working device including Linux; possesses collaboration tools; offers free account but incurs extra fee cost for call-in users; and cancels popup blockers. Zoom is characterized by one-on-one meetings, group video conferences, HD video and audio, scheduling, transcription features, security, screen sharing, camera, speaker, raising of hand, virtual background, chat-box, recording, and break-out rooms (Gunawan et al., 2021; Rio-Chillcce et al., 2021).

Zoom has become popular in virtual classrooms because lecturers and students can draw, write, analyse and illustrate on the whiteboard, broadcast notes by sharing the screen, send audio and video recorded lecture lessons and upload lecture notes. In Zoom virtual classroom, distortion or classroom disorder can be minimized through the mute button. Lecturers can monitor their students' engagement and ensure that that they partake at the same time.

Some past studies investigated the use of Zoom as a teaching/learning platform: (Laili & Nashir, 2020; Octaviani, 2021; Gunawan et al., 2021; Bahtiar, 2021; Erito, 2021; Benmansour, 2022). These studies affirm that Zoom application is an effective educational platform which facilitates distance learning and enables discussion like in a real classroom. A good number of participants in these studies have positive perceptions of the use of Zoom meeting and consider it is an active means of joining virtual classroom presentation and accommodating interaction with lecturers and students.

Nonetheless, some participants in these studies are not in favour of Zoom because of some technical problems such as media and devices, internet access and network, and facilities. Yana and Soepriyanti (2023) noted that participants in their study experienced difficulty in using Zoom. They revealed that participants perceived Zoom to be ineffective because some participants faced connectivity issues, while others found it to be resource-intensive and draining on their devices.

Google Meet

Google Meet, which was formerly known as Google Hangouts Meet, is a video communication service developed by Google as part of G Suite. Google Meet allows real-time subtitles and give room to 250 participants in the same virtual meeting to talk to one another or share videos wherever they can access the Internet and allows 100,000 live-streaming viewers. It is a viable means of teaching and learning where lecturers can share on-screen content with everyone in the call, and any participant can turn off their audio and/or video feeds at any time. Google Meet is a website and application for iOS and Android (Rodzi et al., 2021; Apriyana, 2021).

Chidera (2021) explains that Google Meet shares screen, sends records through visit, free for everybody to use,

no extra fees for call-in members and additional features with G suite membership but has messy dashboard, has a 40 minutes limit for the free version and can accommodate less participants. Some past studies have investigated the use of Google Meet as a teaching/learning platform: (Apriyana, 2021; Fuady et al., 2021; Rahman et al,. 2021; Abdul Halim & Bakar, 2022; Benmansour, 2022). Participants in these studies confirm that Google Meet has the capability to harmonize every student and make sure that no student is left behind. A number of participants showed positive attitudes and perspectives to Google Meet due to its valuable features which other tools do not offer. Ironsi (2020) found out that language instructors and TPs perceive Google Meet to be capable of actualizing lesson objectives, easy to handle, flexible to interact with, and easy for performing classroom tasks.

A number of studies (Roy, et al. 2020; Muniandi, 2020; Octaviani, 2021; Bahtiar, 2021; Suadi, 2021; Oloyede et al., 2021; Benmansour, 2022) have investigated the use of online pedagogical resources in the teaching and learning process. These studies, reiterate the suitability of Zoom and Google Meet for future sustenance of teaching practice in the 21st century and in any emergencies. In spite the various merits of Google Meet and Zoom, there are some setbacks. Zoom is free but limits meeting time to 40 minutes. Zoom does not have noise filtering. Zoom cannot schedule meetings from Gmail inbox. Zoom does not have noise filtering. Zoom is good for small population that needs to connect with a few individuals at a time. Zoom is more expensive than Google Meet, but it has a wider range of devices.

On the other hand, Google Meet does not have the variety of add-on features that Zoom features offer such as whiteboard tools, polls and surveys. There is no waiting room for participants in Google meet. From desktops, Google Meet can only be accessed from only Chrome browser. In Google Meet, there is no room for background customization. Google Meet is excellent for larger population that needs to communicate with many people simultaneously (Priya, 2022; Angadia, 2023).

In spite of the various benefits inherent in online teaching, Mohebi and Meda (2021) indicated that online teaching is not without its gray areas. The gray areas are related to the extrinsic and intrinsic barriers that make integration of technology a challenging task. The extrinsic factors are stated as insufficient time to plan instruction; lack of access to computers and software infrastructure; technical issues and limited access to internet services; inadequate technical and administrative support; less physical activities that involve tactile and kinesthetic practices; limited interaction between trainee teachers and students; and lack of student engagement, while intrinsic factors include unwillingness to change; beliefs about computers; established and accustomed classroom practices; and beliefs about teaching (Leonard & Guha, 2001; Kim, 2020).

There are different views about the preparedness of TPs about online teaching. In the study conducted by Evagorou and Nisiforou (2020), not all PTs showed a high level of readiness for online teaching. Although Aghar and Quirke (2023) reported that TPs who were participants in their study showed lack of preparedness and resistance for online teaching, yet they indicated that they have new experience and developed better technological skills for using different platforms, teaching methods and virtual classroom management skills in online teaching. They revealed that the mentoring support from the Ministry of Education online teaching and learning platform Teams enabled them to cope with unfamiliar technology and overcome online teaching fears. Kim (2020) stated

that the participants in his study affirmed that the experience of feelings of success in learning about the processes of online teaching and the opportunities to learn about the different communication tools that they could use when teaching online was as a result of the confidence they have in utilizing technology and managing a group of children properly online.

Zachariah et al. (2021) focused on Teaching English as a Second Language (TESL) trainee teachers' level of knowledge, attitude and readiness towards online teaching during their practicum. The study findings revealed that the level of knowledge, attitude and readiness of the teacher trainees were at moderately high level. This indicates that the TESL trainee teachers were quite keen on online teaching. The outcome of the findings was attributed to the trainee teachers' background, ability and confidence as digital natives who are able to adapt to changes and make the best of technology even though they were not fully prepared to implement online teaching.

However, in spite of the various strengths and weaknesses of Zoom and Google Meet, this study seeks to bridge some gaps in the literature. The literature reviewed in this present paper have not investigated TPs' perceptions, preparedness, competence in using Zoom and Google Meet, and factors that can inhibit TPs from using Zoom and Google Meet for e-practicum. To bridge these gaps, this present study seeks to investigate TPs' perceptions, preparedness, competence in using Zoom and Google Meet, and probable factors that can hinder TPs from using Zoom and Google Meet for e-practicum.

Methodology

The research design adopted for this study was the descriptive survey type. The research design was used to describe participants' perceptions, preparedness and competence in Zoom and Google Meet. The target population was all the students in the Faculty of Education in Ekiti State University, Nigeria. Through a purposive sampling technique, the sample were purposely selected because they have been taught online teaching in a course titled "Educational Technology" with the Course Code "EDU 305". The sample of the study consisted of 352 preservice teachers. These students offer discipline-specific teaching method courses which introduce and furnish them with the principles and pedagogy of teaching practice before they go the teaching field. The research was conducted in the year 2023.

Instrumentation and Procedure

A closed-ended questionnaire and a self-rated rating scale, were employed for data collection. The questionnaire was made up of five parts: the demographic information of the respondents; students' perceptions of the use of Zoom and Google Meet as virtual solutions for e-practicum; TPs' preparation on the integration of Zoom and Google Meet into teaching practicum; pedagogical competence of TPs on the integration of Zoom and Google Meet into teaching practicum; and factors that influence the integration of Zoom and Google Meet into teaching practicum. The rating scale focused on how familiar TPs were with topics of basics of online video calls, meetings and conferencing programmes. TPs rated themselves by ticking appropriate boxes of 0: not at all, 1: average, and 2: very good.

Validity and Reliability

After a thorough scrutiny by experts in the fields of Information Technology, and Test, Measurement and Evaluation (TME), the validity of the instruments was established through face and content validation. To test for reliability, 65 TPs outside the sample were used. They responded and returned the questionnaire. After two weeks, using test-retest method, the same process was repeated but the items were reshuffled. Reliability coefficient of 0.79 was obtained. The self-rated rating scale was subjected to Cronbach and the value of 0.81 was obtained. This showed that the instrument was reliable. There were no missing data or outlier problems in the data obtained from the research.

Demographic Information of The Respondents

Participation in the study was made voluntary, no participant was compelled to participate in the study. Respondents were assured of their confidentiality and anonymity. Any means through which participants' identity may be linked to specific information were not disclosed. The respondents understood the essence of the study. They were told why their participation was necessary, what they would do, what the information they provided will be used for, how the information will be used, and how and to whom the information will be reported. A total of 355 questionnaires were distributed to TPs but 352 respondents completed and returned their responses as presented in the Table 1 below.

Table 1. Demographic Variables (N=352)

Variables	Grouping	Frequency	Percentages
Sex	Female	184	52.3
	Male	168	47.7
Age	16-20	124	35.2
	21-25	225	63.9
	26 and above	3	0.9
Device owned	Tablet	15	4.3
	Laptop	29	8.2
	Android phone	265	75.3
	iPhone	26	7.4
	Ordinary phone	13	3.7
	No phone	4	1.1

Findings

TPs' Basic Knowledge of Informatics

Figure 1 indicates the preservice teachers' knowledge in the foundations of informatics (computer sciences) is shallow. TPs are very good at using word processing, file management and vocal, pictorial, textual, and numerical resources but are not good at other fundamental informatics like spread sheet, database management,

programming management of data, computer graphic design, and other management.

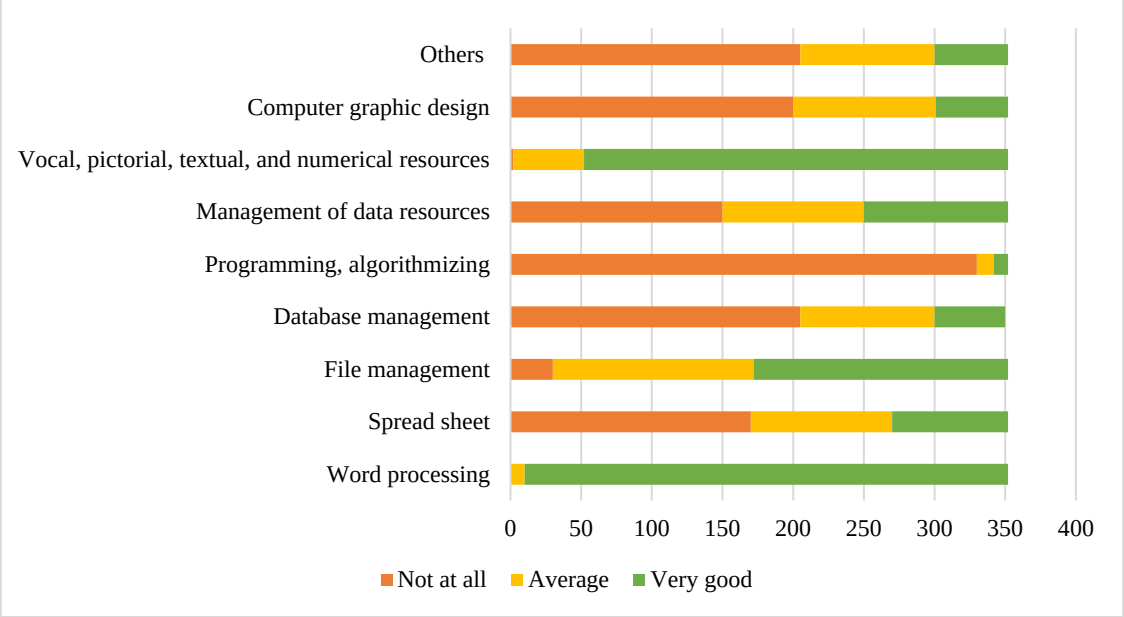

Figure 1. TPs' Basic Knowledge of Informatics

TPs' Perceptions of the Use of Zoom and Google Meet as Virtual Solutions for E-Practicum

The analysis in Table 2 shows that the majority of the respondents opined that it is important to learn how to make use of online video calls, meetings and conferencing programmes for e-practicum. Also, many of the respondents agreed that Zoom and Google Meet conserve time, energy and save cost of teaching, and that with Zoom and Google Meet there could be continuation of teaching practicum in case of emergencies. However, half of the respondents claimed that the use of Zoom and Google Meet for e-practicum is not an easy task. They preferred face-to-face teaching method to the online teaching. A significant number of the respondents expressed their uncertainty as to if Zoom and Google Meet can reduce the anxiety of actual classroom teaching practice, and give room for discussion and question-answer time.

Table 2. TPs' Perceptions of the Use of Zoom and Google Meet

S/N	Statement	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Mean	SD
1	Online video calls, meetings and conferencing programmes such as Zoom and Google Meet are important for e-practicum	146 (41.5)	111 (31.5)	19 (5.4)	34 (9.7)	42 (11.9)	3.81	1.378

S/N	Statement	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Mean	SD
2	Time and energy saving	130 (36.9)	100 (28.4)	14 (4.0)	56 (15.9)	52 (14.8)	3.57	1.481
3	Continuation of teaching practicum in emergencies	100 (28.4)	120 (34.1)	11 (3.1)	68 (19.3)	53 (15.1)	3.41	1.451
4	Reduce of anxiety of actual classroom teaching practice	62 (17.6)	22 (6.3)	188 (53.4)	32 (9.1)	48 (13.6)	3.05	1.185
5	Availability of discussion and question-answer time	6 (1.7)	51 (14.5)	210 (59.7)	61 (17.3)	24 (6.8)	2.87	.802
6	Easiness of operation	46 (13.1)	58 (16.5)	62 (17.6)	126 (35.8)	60 (17.0)	2.73	1.287
7	Preference of online teaching method	52 (14.8)	22 (6.3)	86 (24.4)	124 (35.2)	68 (19.3)	2.62	1.280
8	Cost reduction	40 (11.4)	50 (14.2)	7 (2.0)	146 (41.5)	109 (31.0)	2.34	1.347

Preparedness of TPs on the Integration of Online Video Calls, Meetings and Conferencing Programmes into E-Teaching Practicum

As shown in Table 3, majority of the respondents desired to make use of Zoom and Google Meet for e-practicum, yet the large proportion of the respondents opined that for now, e-practicum may not be achievable because teachers and students alike are not set for its use. Half of the respondents claimed that they lacked the basic technological know-how of online technology, that is, they do not possess *the basic knowledge of online technology regarding the use of or way of making use of* Zoom and Google Meet for e-practicum *more* efficiently and effectively. Furthermore, a large number of the respondents indicated that they are not prepared to integrate Zoom and Google Meet for e-practicum because do not understand how the features of Zoom and Google Meet can be used differently according to the purpose and course contents.

Most of the respondents affirmed that they have not been taught different courses that focus on how to use the new technologies for teaching and learning purpose, even though they have ICT-compliant gadgets that could accommodate Zoom and Google Meet for e-practicum. A good number of the respondents revealed their anxiety that since they have not been taught how to incorporate digital pedagogy into teaching and learning in their subject area, Zoom and Google Meet may not suit all topics they teach and its attending pedagogical practices. They also claimed that they do not have a supportive Internet connection in their locality. Some of the respondents revealed that their supervisors from the university are not ready for e-practicum, and that TPs may not quickly get solutions from their lecturers during e-practicum because not all their lecturers are ICT-inclined. Besides, most of the

respondents claimed that cooperating teachers in schools seem not ready for e-practicum. Many of the respondents noted that the secondary school students have not been exposed to the features of online technology for educational purposes, and do not have the necessary resources for e-practicum.

Table 3. TPs' Preparation for the Integration of Online video Calls, Meetings and Conferencing Programmes such as Zoom and Google Meet into E-teaching Practicum

S/N	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	SD
1	Non-preparedness of TPs	199 (56.5)	148 (42.0)	3 (.9)	2 (.6)	3.55	.548
2	Prohibition of phones during school hours in secondary schools	153 (43.5)	138 (39.2)	30 (8.5)	31 (8.8)	3.17	.919
3	Lack of exposure to ICT-related courses	138 (39.2)	154 (43.8)	32 (9.1)	28 (8.0)	3.14	.885
4	Anticipation and interest in e-practicum.	130 (36.9)	126 (35.8)	56 (15.9)	40 (11.4)	2.98	.993
5	Availability and accessibility of compatible ICT gadgets	114 (32.4)	116 (33.0)	90 (25.6)	32 (9.1)	2.89	.966
6	Lack of technological know-how of the workings of Zoom and Google Meet for e-practicum	91 (25.9)	87 (24.7)	90 (25.6)	84 (23.9)	2.53	1.117
7	Availability of supportive Internet connection	82 (23.3)	84 (23.9)	88 (25.0)	98 (27.8)	2.43	1.127
8	ICT support is received from supervisors from the university	82 (23.3)	84 (23.9)	88 (25.0)	98 (27.8)	2.43	1.127
9	Possession of the workings of Zoom and Google Meet	63 (17.9)	74 (21.0)	122 (34.7)	93 (26.4)	2.30	1.049
10	All my lecturers are ICT experts who are ready for e-practicum	48 (13.6)	54 (15.3)	138 (39.2)	112 (31.8)	2.11	1.004
11	Cooperating teachers are ready for e-practicum	51 (14.5)	38 (10.8)	136 (38.6)	127 (36.1)	2.04	1.025
12	Zoom and Google Meet have limitations to pedagogical practices	46 (13.1)	32 (9.1)	140 (39.8)	134 (38.1)	1.97	.998
13	Exposure of secondary school students to e-practicum for educational purposes	25 (7.1)	19 (5.4)	152 (43.2)	156 (44.3)	1.75	.850
14	Integration of technological teaching tools into teaching/learning in my subject area is easy	24 (6.8)	18 (5.1)	154 (43.8)	156 (44.3)	1.74	.839

S/N	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	SD
15	Non-possession of resources for e-practicum secondary school students	46 (13.1)	32 (9.1)	140 (39.8)	134 (38.1)	1.97	.998

Pedagogical Competence of TPs Integration of Online Video Calls, Meetings and Conferencing Programmes into E-Teaching Practicum

Figure 1 shows the pre-service teachers' level of digital pedagogical competence in the use of Zoom. Most TPs can join classes, make use of screen sharing, initiate live broadcasting, and download and upload information. However, most of them cannot schedule meeting, make use of screen recorder, start a meeting, manage time, and the class properly. They confirmed that they are unable to initiate and sustain chat/lecture, manage participants, evaluate learners' achievement, employ diverse questioning skills, initiate and sustain students' engagement, make use of virtual whiteboard, and utilize instructional materials through Zoom.

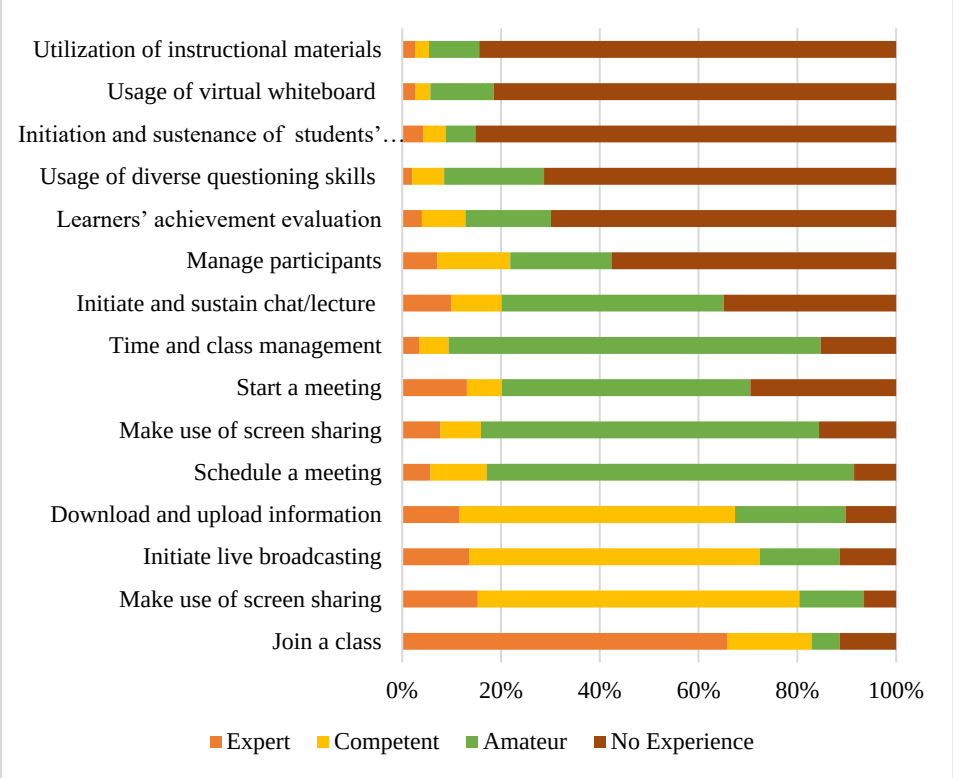

Figure 2. Pedagogical Competence of TPs on Zoom

Figure 2 shows the pre-service teachers' level of digital pedagogical competence in the use of Google Meet. Majority of the TPs can join meetings, and download and upload information. However, most of the respondents cannot initiate and sustain chat/lecture, invite other users to join a meeting, create a video call, control for hosts, and manage time and class. They further revealed that they are incapable to use screen recording, make use of screen sharing, evaluate learners' achievement, utilize questioning skills, initiate and sustain students'

participation, and make use of instructional materials.

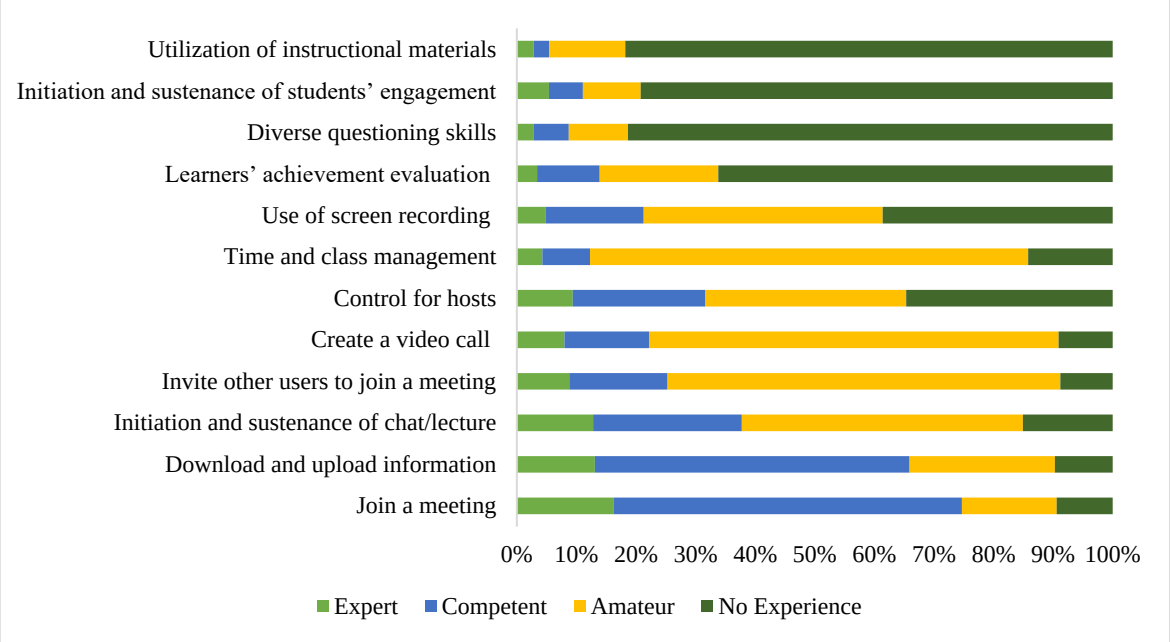

Figure 3. Pedagogical Competence of TPs on Google Meet

Factors that Could Inhibit TPs' Ability to Integrate Zoom and Google Meet into Their Teaching Practicum

As shown in Figure 3, paying lip service to policies supporting the integration of ICT in teaching/learning situation in schools (98.0%), inability of tertiary institutions to expose TPs to courses that focus on integration of technologies in classroom (94.3%), cost data subscription (93.7%), internet connectivity (85.2) and large class size to manage the class effectively (844.7%) are the major barriers to the preservice teachers' inability to integrate Zoom and Google.

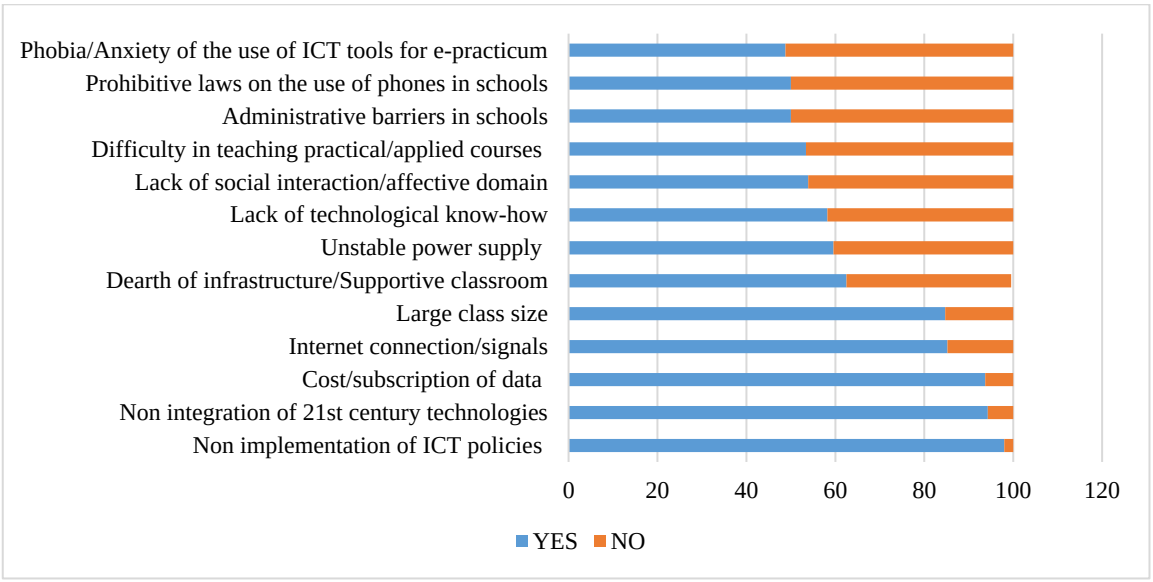

Figure 4. Probable Factors that Can Inhibit Integration of Zoom and Google Meet into e-practicum

Discussion

Findings reveal that TPs do not possess deep knowledge of foundational computational skills. It can be inferred in the figure that the low level of knowledge in informatics does not allow preservice teachers use Zoom and Google Meet as educational resources because they are not versed in certain computational skills such as spread sheet, database management, programming management of data, computer graphic design, other management except for word processing, file management and vocal, pictorial, textual, and numerical resources. The finding is supported by Siddiquah and Salim (2017) that students not good at ICT programs like using the digital library, discussion forums, and blogs but were skilled at using simple ICT programs like surfing the Net, use of MS Word, computer games, and social networking. Panskyi and Korzeniewska (2021) noted that teachers have not understood that personal development is essential for teaching informatics, and that the role of teachers is not only to educate themselves and develop their professional knowledge but also to promote and integrate innovations in informatics teaching. The knowledge of the basics of computer will broadened TPs' technological knowledge.

The findings of the study indicate that the respondents perceived the use Zoom and Google Meet for e-practicum as solutions not only during emergencies, but as important e-learning tools in the 21st century because of various advantages. Zoom and Google Meet conserve time, energy and could be used for e-teaching practicum. In the literature there are studies in line with the results revealing that Zoom is perceived as the most useful, easiest and acceptable online learning applications (Fuady et al., 2021); an easy-to-use remote teaching tool (Abdul Halim & Bakar, 2022). On the contrary, majority of the respondents in this study opined that using Zoom and Google Meet for e-practicum is cost effective hence, they prefer face-to-face traditional teaching method to the online teaching method. This finding aligns with study of Ersin et al. (2020) who posit that participants in their study preferred to have their teaching experience in a physical classroom than in online teaching. Also in the literature, Roy et al. (2020) note that a number of students had mixed reaction for continuing online Zoom-app for teaching. Furthermore, many of the respondents in this present study are doubtful if Zoom and Google Meet could neither reduce the anxiety of actual classroom teaching practice nor give room for discussion and question-answer time like the face-to-face traditional teaching practice.

It was found out from the study that most of the respondents are not adequately prepared for the integration of Zoom and Google Meet into e-teaching practicum because the teachers and students are not ready for the use of Zoom and Google Meet. One of the important factors that dissuade preservice teachers from integrating Zoom and Google Meet into their teaching practice is lack of fundamental knowledge in the basics of computer, limited technological knowledge of effective application and use of digital technologies. Some do not have basic knowledge of computing and typing skills, knowledge of computer systems, operating system, search internet, communication and networking, word process, image process, and technological platforms. These findings imply that pre-service teachers had low technological knowledge that would have assisted them in effective usage of Zoom and Google Meet for teaching purposes. Therefore, it is imperative that attention be given to the teaching of fundamentals of technological pedagogical content knowledge and the effective and efficient use of ICT, including both hardware and software. Since not all applications can be taught, focus should be on the content.

Some other reasons found in this study are: dearth of exposure to sufficient courses on the use of technology in classroom such as designing, developing, and delivering courses online; poor internet connection; non-readiness of respondents' supervisors for e-practicum; non-comprehension of how the features of Zoom and Google Meet work for course contents; problems of technical know-how; dearth of adequate training on students' management and assessment in online; non-provision of quick solutions from lecturers; non-readiness of cooperating teachers in schools; and the thought that Zoom and Google Meet may not suit some topics. These findings are consistent with the findings of Benmansour (2022, p.176) who posits that people with limited knowledge of technology would invariably and deliberately oppose change since they are not digitally competent. As a result, *they would become technophobic* and have negative dispositions to ICTs. Also, Yastibas (2021) noted that the lack of exposure of TPs to ICT related courses during teacher education programs affected the transitioning from traditional face-to-face teaching practice to e-practicum. Buttressing the findings from this present study, respondents in the studies of Serhan (2020) and Alghamdi et al. (2022) are not satisfied with their instructors, Zoom app and sudden change from face-to-face pedagogy to online due to their teachers' unfamiliarity with the technology and means of integrating technology into practice.

Findings from this present study reveal that respondents' digital skills are not developed, therefore, the respondents affirmed that they are not pedagogically competent to make use of Zoom and Google Meet for e-practicum. Majority of the respondents are amateurs and inexperienced users of Zoom and Google Meet for e-practicum. It was found out from the study that respondents demonstrated expertise in just joining Zoom classes but none of the respondents are adjudged expert in Google Meet. Respondents are adjudged competent users of Zoom and Google Meet when asked to download and upload information, initiate live broadcasting and make use of screen sharing. But respondents are adjudged amateurs when asked to manage users who are the participants, initiate and sustain chat/lecture, manage time and the class properly, start a meeting, make use of screen recorder and schedule a meeting. However, respondents have no experience of how to utilize teaching aids and instructional materials, make use of virtual whiteboard, initiate and sustain students' engagement, use diverse questioning skills and evaluate learners' achievement. It is discovered from the study that TPs' inability to use digital technology in this study can be linked to their incompetence in computational thinking and digital skills. Until TPs' digital skills are developed, little or no development can be guaranteed in their use of digital technology for e-practicum because TPs cannot be competent in what they are not knowledge of nor make use of.

TPs should make efforts to learn the basics of computer, video-conference applications and how they are operated. TPs should be knowledgeable about the features of video-conference applications and be exposed to digital educative courses during teacher education programme. Alasoluyi (2021) supports these findings that to a large extent that teachers are aware of the transition from classroom-based to online teaching but they find it difficult to relate with the new normal era because they have low competence in the operations of online teaching applications. Ersin et al. (2020, p.113) affirm that TPs *"need techné (knowing how) and by connecting the skills of teaching to episteme (knowing what) through reflection in practicum, they gradually start developing phronesis (practical wisdom*)". Biswas (2022) affirmed that teachers are less acquainted with the use of technology in the classrooms, consequently they fail to create the attractive digital learning environment on some of the content.

However, in a study conducted by García-Delgado et al. (2023) on digital teaching competence among teachers, the results show an intermediate level of competence among teachers at all the educational stages surveyed. Participants were integrators and experts who could use technologies and optimize resources to adapt them to different learning situations, and continuously improve the use of digital technology according to the context in which they are used. Also, in the study of Montilla et al. (2023), it was shown that teachers exhibited a high level of proficiency in their pedagogical digital competence because they were well-equipped with the necessary skills and understanding to effectively utilize digital technology and resources in their instructional practices. Their competence in these areas enabled them to create engaging and interactive learning environments, thereby enhancing the overall educational experience for students.

The findings in this present study indicate that the major barriers militating against the incorporation of Zoom and Google Meet into teaching practicum are lack of sincerity in the implementation of policies supporting the incorporation of ICT in teaching/learning situation in schools; inability of tertiary institutions to expose TPs to courses that focus on integration of 21st century technologies into teaching/learning; cost/subscription of data; and internet connection. The other significant barriers discovered in this study are large class size to manage the class effectively; lack of/inadequate infrastructure and unsupportive classroom environment; unstable power supply; lack of technological know-how; poor social interaction and affective domain, weak assessment and evaluation; administrative barriers in schools, and phobia/anxiety of the use of ICT for online teaching. These findings are supported by some past studies that both adaptation and application of new teaching methods in higher learning institutions in Africa are still facing various challenges (Ogbonnaya et al., 2020; Laili & Nashir, 2020; Alasoluyi, 2021; Paschal et al., 2022; Jimola & Adeleke, 2022).

Limitations

Limited number of sample, 352 respondents, participated in the study, hence this makes the study less representative and cannot be used for generalizations. However, the study gave hints at the broader picture. Also, the research design was descriptive. Further study could be carried out on in-service teachers' knowledge in informatics. This will give the future research a new and interesting dimension.

Conclusion

The art of teaching is a complex and all-encompassing task. To meet up with the demands of 21st century, online learning technology serves as innovative virtual meeting solution. Virtual meeting solution gives the students the opportunity to replay, revisit and reflect on the recorded learning tasks at any time for better comprehension and adjustment. Teaching practicum conducted through online platforms like Zoom and Google Meet are technological pedagogical interventions that could help teacher education programme. Although, TPs cannot learn all applications however, they should develop computational thinking skills and fundamental informatics of computer science. Applications like Zoom and Google Meet and others should not be the focus but the content, the rudiments that cut across all these applications, because it is impossible to teach with hundred different tools in one class. Applications come and go; they do not stay long. The knowledge of the basics of informatics will

help TPs to navigate any applications. Ersin et al. (2020) revealed that expertise and competence of learning applications are pivotal therefore technology integration and material preparation for online courses should be part of any course in the existing educational programme. These new technological pedagogical interventions can help institutions, schools, TPs, cooperating teachers, and supervisors experience an all-encompassing seamless learning and interesting interface than traditional face-to-face teaching/learning. Executing a teaching practicum through online platforms can foster effective practicum, teaching, learning, mentoring, monitoring, and supervision. This study concludes that virtual learning is not a tentative phase but has come to stay therefore, TPs should be open to innovativeness and develop themselves, while teacher education institutions can as well train their respective TPs for virtual classrooms.

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