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Investigating the ICT competencies of school-based mentors and ICT infrastructure at student teachers' placement schools: a case study of Higlen District, Harare

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ABSTRACT

The study interrogates the competencies of school-based mentors in inculcating learner-centred teaching skills through technology-based pedagogies. The study employed a participatory qualitative approach to collect, present and analyse data. Use of the qualitative approach allowed for deep insights into the nuances and complexities of the lived experiences of student teachers on teaching practice. Data were collected through in-depth interviews and observation. The evolution of pedagogical and curriculum delivery approaches from traditional classroom practice to child-centred virtual learning approaches through Information Technology (ICT) has brought with it a myriad of challenges for teacher education systems in developing nations like Zimbabwe. The study established that school-based mentors struggle with technology-based pedagogies and yet they are expected to guide student teachers on teaching practice on how to teach using modern technologies. In some cases, mentors are not even aware of the 21st-century e-learning models like the flipped classroom, shared whiteboard or the blackboard among others. At schools where students are attached, there is hardly any requisite ICT infrastructure. Lack of ICT competencies by school-based mentors and the absence of ICT infrastructure in schools creates a disjuncture that culminates in a pedagogical mismatch. Against this backdrop, the study proposes a call for in-service training for all teachers who lack ICT competences.

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Introduction

The evolution of pedagogical and curriculum delivery approaches from traditional classroom practice to child-centred virtual learning approaches through Information Technology (ICT) has brought with it a myriad of challenges for teacher education systems in developing nations like Zimbabwe. This study explores challenges experienced by student teachers in teaching practice in Harare metropolitan province as the education practice migrates to e-learning platforms in this technology era. The Covid-19 pandemic provided a watershed for technology-based pedagogy as schools were forced to migrate to online learning platforms due to the perpetual lockdowns. It interrogates the competencies of school-based mentors in inculcating learner-centred teaching skills through technology-based pedagogy. According to Murgor (2015) ICT has grown tremendously around the globe, particularly in developed nations where much of the learning has moved to online platforms. However, many African education systems have not yet fully embraced technology-based pedagogies and curriculum delivery approaches due to the digital divide (Malephane, 2022 Kronke, 2020). They have continued to employ traditional teacher centred face to face teaching. Teacher development programmes are slowly embracing ICT in teacher development programmes. However, there seems to be a serious disjuncture in the teacher

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training process as the school-based mentors lack the requisite competences in technology-based pedagogies and the study intends to investigate the nature and extent of the supposed disjuncture and how it is affecting skills transfer to student teachers. With regards to the 21st-century skills, mentorship in teacher education comes under the spotlight exposing serious limitations in teaching skills transfer to the mentee. This study argues that while technology-based pedagogy remains a progressive teaching approach in the 21st century, for Zimbabwe, the student-teacher mentoring process becomes flawed as the supposed disjuncture may obstruct effective skills transfer. By extension, in circumstances such as the outbreak of the highly infectious COVID-19 pandemic, where social distancing must be enforced, teacher education in Zimbabwe becomes seriously compromised.

Background

Teaching and learning approaches in the 21st century have evolved tremendously and e-learning models which include the flipped classroom approach, virtual classrooms as well as learning management systems such as the blackboard and shared whiteboard have become a reality in classroom. Hakomi (2017) observes that as technology advances, new ways of using them in the education field also emerge. In parallel to the speed of development in technology, new education conditions develop as well and different learning demands emerge (Celen et al., 2011; Phan et al., 2021). Thus in the 21st century developed technologies affect teacher education and development as well. In this regard, as the education training field transforms, new e-learning models like the flipped classroom approach are adopted (Toto & Nguyen, 2009). The flipped classroom approach is a special type of blended learning (Strayer, 2012) which is a student-centred learning approach consisting of two parts with interactive learning activities during the lesson and individual teaching at home (Bishop & Verleger, 2013). Mull (2012) concurs and adds that it is a model that prepares students by watching videos, listening podcasts and reading articles. The flipped classroom is an asynchronous model which allows students to study at their own time and pace (Ruhinda, 2013). Further, using learning management systems such as the blackboard and the shared whiteboard demands skills and competences expected to be inculcated by the teacher development colleges and reinforced by schools where student teachers get attachment. It is the argument posed by this paper that there is a disjuncture in technology-based pedagogy and ICT skills transfer to student teachers as mentors in schools may lack the requisite competences in ICT. Teacher training through apprenticeship to acquire the 21st teaching skills is thus compromised.

It is important to understand that e-learning can be used to support the traditional way of learning (blended learning) or online learning and the school-based mentor must have an appreciation of this new technology. Techno-based pedagogies have become synonymous with the 21st century education system. According to Ananthasayanam et al. (2009), virtual classroom is a system that creates an environment that facilitates teachers in managing lessons of their students especially using computer hardware and software that involves distance learning. Virtual classrooms are synchronous, meaning that students engage with the teacher on a real-time basis as communication occurs through audio, instant messaging and usually through a shared whiteboard (Phan et al., 2021; Ruhinda, 2013). Such advanced technology calls for proper training and hands on working with school-based mentors. This new teaching and learning technology tends to be as vivid and dynamic as face-to-face interactions in traditional classrooms or even more so. Ananthasayanam et al. (2009) also observe that this new model of learning is perhaps even more immersive than the traditional classroom because of what is offered by the new technologies in the virtual classroom. This study argues that while progressive models of e-learning such as the flipped classroom and virtual classrooms remain critical components for the 21st century teacher education, for Zimbabwe, teacher development programmes tend to be distracted by lack of appropriate ICT infrastructure in teachers' colleges and schools where student teachers get attached as well lack of the requisite competences by the school-based mentors.

The world over, teaching practice is a core course in the development of a teacher and for Zimbabwe, it may take either three or five school terms depending on the model adopted (Ngara et al., 2013). However, for Zimbabwe, student teacher attachment to a mentor is a recent phenomenon which was only introduced in 1995 (Chiromo, 1999) and has since then adopted different modes of teacher training. Mentoring is a deliberate attachment of a less experienced person to a more skilled or

experienced person with the agreed upon goals of having the less experienced person grow and develop specific competences (Glover et al. (2023); The Open University, 2022; Chimhenga, 2016). In the context of this study, a mentor is a knowledgeable, experienced and highly proficient teacher who guides a student teacher to acquire the expected competences of the teaching profession. It is against this backdrop that this study interrogates a pedagogical conundrum as ICT incompetent school-based mentors guide student teachers to adopt technology-based pedagogy. The significant role played by the school in the provision of the practical component in training student teachers has influenced teacher training institutions internationally to adopt school based teacher training programmes (Wadesango et al., 2014). In her Study, Chakanyuka (2006 :98) reveals:

> The success of school-based training depends on the quality of relationship between the training institution and the school, the significant involvement of teachers in the planning, supervision and assessment of students' training.

This implies that the school-based mentor should be conversant with the 21st-century skills relevant to technology-based pedagogies.

According to Chimhenga (2016) the mentoring process may be viewed under three models; the apprentice, competency and reflective models. In all these models, the mentor is expected to model appropriate classroom practice and professional etiquette. Further, the apprentice model tends to be inclusive as it addresses both reflective skills and competence-based training. The apprenticeship is a model characterised by; participating in a community of practice and learning through imitation of the mentor (Forster et al., 2022; Glover et al., 2023; Guskey & Anderman, 2008). This model emphasises learning by doing, observing and emulating the experienced teachers. It is a practice that is informed by Bandura's social learning theory which emphasises vicarious learning as the mentor models appropriate teaching methods (Hall et al., 2019; Nabavi, 2012). By extension, technology-based pedagogies may pose challenges to school-based mentors who may lack the ICT competencies which they are expected to model. For Zimbabwe, the major challenge is that the mentors are not trained to be mentors (Chakanyuka, 2006) and this makes it more difficult for them to adapt to new technological changes in pedagogy and curriculum delivery models.

The COVID-19 pandemic has certainly amplified the digital divide and pre-existing inequalities in institutions of higher learning including teacher development colleges particularly in developing nations like Zimbabwe (Fataar & Norodien-Fataar, 2021). In this regard, Bekker and Carrim (2021) have observed that the education sector has been severely affected by the pandemic through the closure of schools, colleges, and universities. Whilst the virtual classroom becomes the most tenable alternative to address educational needs under the circumstances of the Covid-19 crisis, most teacher development colleges in Zimbabwe have been found wanting, lacking responsive information communication technology (ICT) infrastructures and techno-savvy mentors in schools of attachment.

Theoretical framework: the open systems theory

The open systems theory, initially developed by Ludwig and refined by Lunenburg (2010) is applied in this study to illuminate the ICT competences of school-based mentors and the responsiveness of ICT infrastructure in schools where student teachers get attached for teaching practice. In this regard teacher development colleges and schools are viewed as open systems because their operations are influenced by the external environment (Norlin, 2009). It is thus important to understand a system as an interrelated set of elements functioning as an operating unit (Senge, 2006). It consists of five basic elements (inputs, a transformation process, outputs, feedback, and the environment) (Figure 1).

Inputs

Systems such as teacher development colleges and schools get inputs or resources from the environment in the form of lecturers, mentors, financial resources, physical resources and information resources. With reference to this study, the interest is on ICT competences of school based mentors and the ICT infrastructure of teacher development colleges and schools which are perceived to affect the mentoring process through technology-based pedagogies.

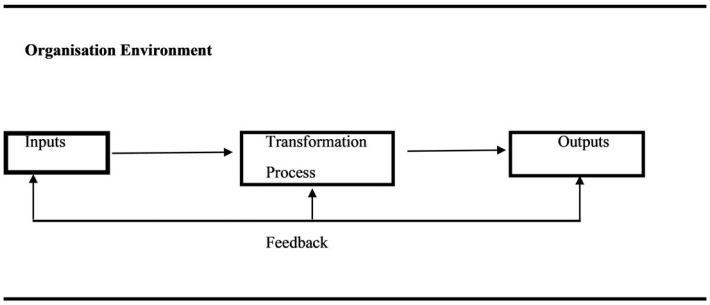

Figure 1. The open systems theory.
Source: Lunenburg(2010).

Transformation process

This transformation process includes virtual classrooms where ICT is used to mentor student teachers to apply techno-based pedagogy. It entails the teaching and mentoring process.

Outputs

The ICT infrastructure, human resources and learners are the inputs used in the transformation process while considering the external environment to produce teacher graduates (outputs) with the 21st-century skills in technology-based pedagogies.

Feedback is crucial for identifying challenges and prospects in mentoring through virtual teaching and techno-based pedagogies. The study also takes cognizance of the political and economic environment that can either impinge or promote the student-teacher mentoring process.

The open systems theory thus illuminates the responsiveness of the ICT infrastructure in teacher development colleges as well as competencies of school-based mentors in offering technology-based curriculum delivery approaches.

Research question

How effective are the current mentoring practices in teacher development colleges and schools in transferring 21st-century skills in Zimbabwe?

- To what extent are the school-based mentors competent in technology-based pedagogy of classroom practice?
- What challenges are experienced by student teachers in implementing technology based pedagogies?
- What strategies can be employed to enhance effective mentoring technology-based pedagogies competences to student teachers on teaching practice?

Research methodology

This qualitative study conducted in Harare metro-province adopted a sequential exploratory research design where in-depth interviews with key informants were preceded by focused group discussions with student teachers on teaching practice (TP) and document reviews on policies and procedures on conducting TP. The qualitative research approach guided the process of collecting, presenting and analysing data on the lived experiences of student teachers on TP. The approach allowed an in-depth exploration of the experiences, attitudes, feelings and perceptions of the research participants on the nuances and complexities of mentoring through technology based pedagogies (Neuman, 2014:51). It allowed deep insights into challenges experienced by mentors in imparting skills in ICT based teaching and learning. Document reviews, focused group discussions and in-depth interviews allowed multiple voices to be heard, provided a more holistic picture of the research issue being investigated and allowed for triangulation of data for reliability and trustworthiness as data from different sources that can be compared and any inconsistencies followed up on. Data from multiple sources provide means to develop

defendable conclusions on challenges experienced by mentors. The combination of multiple methodological practices, empirical materials, perspectives and observations in a single study is a strategy to add rigor, breadth, complexity, richness and depth to the inquiry.

Sampling

Participants for this study were identified mostly through purposive. Participants were selected on the basis of their lived experiences with reference to the research issue (Creswell, 2017). Twenty mentors were selected on the basis of their experience and having a student attached to them. We also purposively sampled two heads of TP departments and two school heads. Two focus groups each with 8 student teachers on TP were identified through purposive sampling. The sample thus comprised 40 research participants.

Data collection methods

In-depth key informant interviews (KIIs)

In-depth interviews were held with heads of TP departments heads, school heads as well as experienced mentors. The purpose of the key informant interviews was to get in-depth insights into the challenges experienced by mentors in imparting skills in technology-based pedagogy. The discussions followed up on some issues raised in focus group discussions which needed further clarification. We also sought insights into possible strategies to capacitate school-based mentors.

Participatory focus group discussion

Focus group discussions were conducted with student teachers and other mentors as well. The discussion focused on challenges experienced by student teachers and mentors on migrating to online teaching and learning platforms. We also sought insights into possible solutions to the existing challenges of skills transfer by mentors.

More data were collected through document reviews to establish some gaps in teacher training especially during teaching practice.

Data analysis

The study adopted an interpretive analysis model which helped in establishing emerging patterns or themes from the collected data. Gall et al (2007, p. 466) and Cohen et al (2007, p. 86) describe interpretive analysis as the process of examining a case study closely in order to find constructs, themes and patterns that can be used to describe and explain the phenomenon being studied. Braun and Clarke (2006) elaborate that a theme captures something important about the data in relation to the research question. We thus analysed the data set collected through focus group discussions, in-depth interviews, and document reviews and then coded the data which addressed specific research questions or emerging themes.

Ethical consideration

The study sought informed consent from research participants and the informed consent form was completed by the participants. In this regard, before every interview, we explained to the participant the purpose of the study, its benefits to teacher education and how long each interview would take. We also explained that participating in the interviews was entirely voluntary and that participants had the right to withdraw at any stage. We also ensured the confidentiality and privacy of the participants. To protect the anonymity of research participants, we generalised responses by the participants and used data aggregates and job titles.

Table 1. Characterisation of the sample for mentors.

Mentor	Sex	Age	Qualifications	Experience	Trained as a mentor	Can apply Techno-based
1	F	42	Diploma in Education	15	No	No
2	F	37	Diploma in Education	7	No	Yes
3	M	34	Diploma in Education	6	No	Yes
4	M	35	Diploma in Education & BEd	9	No	Yes
5	M	44	Diploma in Education	11	No	No
6	F	43	Diploma in Education	10	No	No
7	M	42	Diploma in Education & BEd	11	No	No
8	F	42	Diploma in Education	13	No	No
9	M	37	Diploma in Education	9	No	Yes
10	M	34	Diploma in Education	9*	No	Yes
11	F	29	Diploma in Education	4	No	Yes
12	F	31	Diploma in Education	7	No	No
13	F	33	Diploma in Education	7	No	No
14	F	44	Diploma in Education	14	No	No
15	M	48	Diploma in Education & BEd	17	No	No
16	M	50	Diploma in Education & BEd	23	No	No
17	M	39	Diploma in Education	14	No	Yes
18	M	51	Diploma in Education & BEd	24	No	No
19	F	29	Diploma in Education	5	No	No
20	F	47	Diploma in Education & BEd	21	No	No

Research findings and discussion

The findings of the study reveal that teacher development approaches in the 21st century are evolving adopting virtual teaching and techno-based pedagogies. However, in Harare metropolitan province, the evolution of teacher training approaches, particularly the student-teacher mentoring process, tends to be compromised by a lack of ICT competencies on the part of school-based mentors as well as a lack of appropriate ICT infrastructure at some schools and teacher development colleges. The study reveals both school-based and college-based challenges and prospects in the teaching practice mentoring process.

The dearth of ICT competencies with school-based mentors

Table 1 shows that the majority of mentors (70%) are diploma holders while the remaining 30% have attained a Bachelor's degree in Education. Of the 20 mentors, 55% have more than 10 years' experience of teaching which means they trained more than a decade ago. 15% of the mentors trained as teachers some two decades ago. Apparently, not even a single mentor had an opportunity to be trained as a mentor. 40% of the mentors can apply techno-based pedagogy while the rest (60%) tend to struggle with technology. It is also evident that the majority of those who struggle with technology are female mentors. 70% of the female mentors have challenges with ICT as compared to 50% of the male mentors. It is also observed that 91% of those mentors who trained more than a decade ago struggle with ICT. This may mean that the use of ICT in teacher development colleges in Harare metropolitan province is a recent phenomenon.

Similarly, Figure 2 shows a large gap in ICT competencies with school-based mentors.

Perceptions of students on mentors' competencies confirm that the majority of mentors struggle with ICT. 38% of the student teachers feel that the mentors' skills with ICT are very bad, while a further 34% feel that their skills in ICT are bad. Only 10% feel that some mentors have good skills and a further 3% feel that some have very good skills. 15% of the student teachers were indifferent and remained neutral. The bottom line is that the majority of mentors are incompetent with ICTs.

An interview with one experienced mentor reveals:

> *When I went to college more than 20 years ago, there was no ICTs used in teachers' colleges. I was never exposed to ICT, neither did I have an opportunity for in-service in techno-based pedagogy. The student teacher who is attached to me is expected by his college to use ICT when teaching and it is unfortunate that I cannot assist in that regard. So for the student, it is mere trial and error. Sometimes I learn one or two things from the student.*

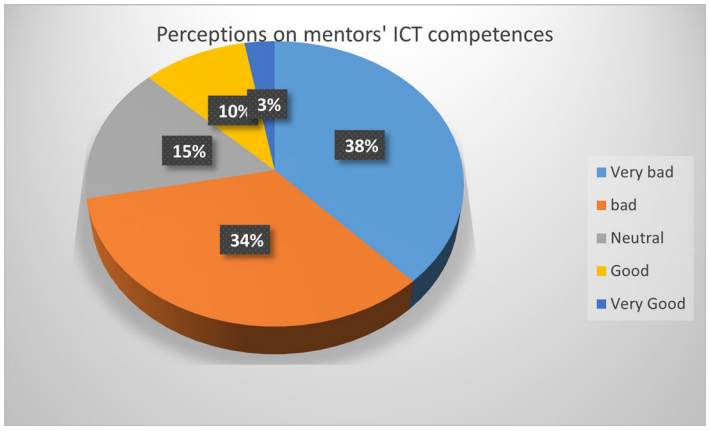

Figure 2. The students' perception of Mentors' levels of ICT competencies.

Another mentor who trained as a teacher more than a decade ago also shared her sentiments:

There was no ICT infrastructure at our college when I trained about 10 years ago. Lecturers used to rely on face to face teaching dictating notes to students. So to say the truth, I cannot operate a projector, neither can I use the interactive board to teach. With regards to modelling techno-based pedagogy, student teachers do not benefit much from mentors. In fact student teachers have a better appreciation of ICT than their mentors.

Another one explained:

Teachers who are expected to mentor student teachers are not trained as mentors them. The assumption is that, because one trained and experienced, they can mentor student teachers.

Engagements with mentors in FGDs revealed that mentors are not only incompetent in applying technology-based pedagogy but are also not even aware of the 21st-century e-learning models which include the flipped classroom, shared whiteboard or the blackboard. In fact, it emerged that most schools or even some teacher's colleges do not have learning management systems. What most schools seem to be struggling with is blended learning; where they combine a bit of ICT and the traditional classroom practice. Virtual teaching for most schools in Harare metropolitan province where student teachers get attachment remains an illusion.

The student teacher attachment and mentoring have become almost a universal teacher training approach globally (Ngara et al., 2013). However, for Harare metropolitan province, the student-teacher mentoring process tends to be greatly affected by lack of ICT competences by the school-based mentor. According to Chimhenga (2016), one of the mentoring models is the competence based training where the mentor is expected to model appropriate teaching skills. In the same vein Ananthasayanam et al. (2009) underscore that the virtual classroom approach and technology-based pedagogy have become synonymous with the 21st century education system. It therefore follows that a 21st century mentor should be able to demonstrate ICT skills in teaching such that the student teacher can emulate the appropriate 21st century skills in education. In his social learning theory, Bandura in Nabavi (2012) argues that learners acquire knowledge and skills through vicarious learning by observing the expert modelling the skills. By extension, lack of ICT skills by the school-based mentors creates a disjuncture in the teacher training process as the college lecturer's effort is not complemented. Similarly, from an open systems theory, school based mentors constitute part of the input resources that steer the transformation process (Lunenburg, 2010) resulting in outputs (teachers with the requisite 21st century skills).

Lack of ICT competencies by school-based mentors defeats the whole essence of teacher training through attachment. The significance of training through attachment cannot be overemphasised as the provision of the practical component in training teachers has influenced institutions internationally to adopt school-based teacher training programmes (Wadesango et al., 2014). By implication, the significant role in planning, supervision and assessment of student teachers' training (Chakanyuka, 2006) becomes compromised if the school-based mentor lacks the requisite skills. The study argues that the lack of ICT skills by school-based mentors further intensifies the digital divide between developed countries and developing countries. The use ICT in education gives an opportunity for developing nations to reduce

poverty as technology offers skills for socio-economic development. In this regard, Torres Martín et al. (2021) underscore that ICT provides unprecedented opportunities to effectively fight against poverty in developing countries, for example, ICT can facilitate access to education and health by the poor. According to Delitikas et al (Touray et al., 2013), ICT has turned the world into an information-intensive society and it is considered the nerve of growth that can tremendously transform the economic, political, cultural, and social conditions in many developing countries. Inadvertently technology-based pedagogy becomes part of the solution to the challenges experienced by developing countries including Zimbabwe. Against this backdrop, in-servicing teachers, equipping them with appropriate ICT skills for 21st-century education ceases to be optional but mandatory. More so, in the wake of the highly infectious COVID-19 epidemic, virtual teaching became one of the most tenable alternatives for making education accessible. This leaves the teacher development institutions with no option but to retool and reskill the human capital in education starting with school-based mentors and lecturers.

The nature and quality of ICT infrastructure in teaching practice schools

As reported by mentors, Figure 3 shows that the availability of ICT in schools where student teachers get attachment for teaching practice remains a challenge. The primary schools were selected on the basis of having student teachers on attachment as well as their accessibility. Two schools were selected per district in Harare metropolitan province making them a total of 20 schools. There is hardly (6%) any

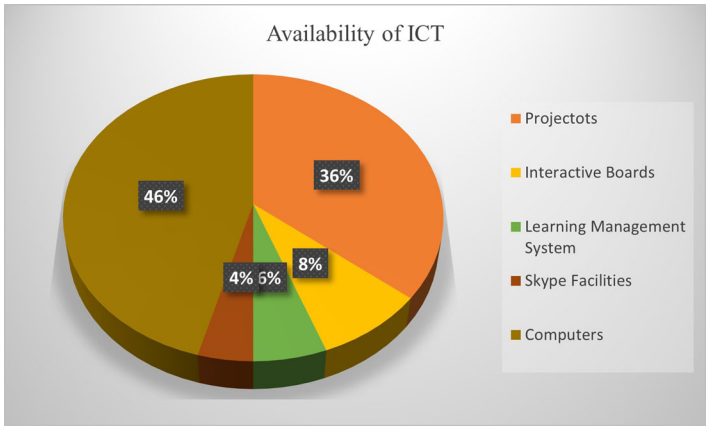

Figure 3. Available ICT in schools.

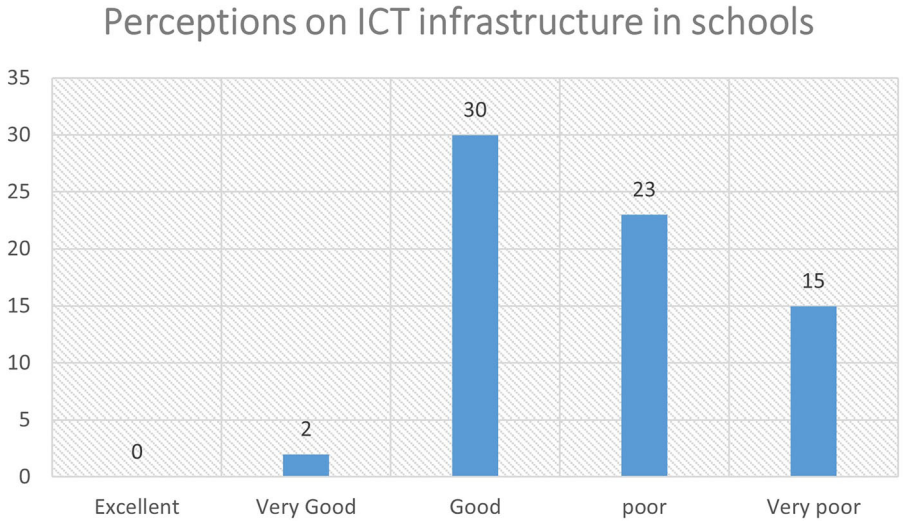

Figure 4. Perceptions on ICT infrastructure in teaching practice schools.

learning management systems in schools. Skyping facilities are hardly available (4%) as well. Interactive boards are not common (8%) in schools. What seem to be available are computers (46%) and projectors (36%). The chart reveals that there are schools where student teachers practise teaching without any ICT infrastructure. The quality of the available ICT infrastructure is further explored through FGDs and in-depth interviews with key informants (Figure 4).

ICT infrastructure in school where student teachers practise teaching is generally poor. 54, 3% of the respondents indicated that the ICT infrastructure in schools is poor or very poor. While 42.9% said its good and 2.9% said it's very good. None of the respondents rated the ICT infrastructure in schools as excellent.

An interview with one school head at one of the teaching practice schools reveals:

> *We receive very enthusiastic student teachers from colleges, with all the zeal to apply contemporary pedagogies they have learnt in colleges. But look, this is the supposed computer lab of the school, with many computers that are no longer functional. Other ICT gadgets like projectors and cameras for recording lessons are not available. Looking at the economic situation in Zimbabwe, I don't see us procuring such equipment anytime soon. So most practising student teachers get frustrated and resort to the old teaching approaches which do not need ICTs.*

Another school head concurred and added:

> *In this school, we had an opportunity to benefit from a programme where the former and late head of state was donating computers to schools. We received 10 computers, which unfortunately have seen their time and are no longer functioning. We bought two more computers on our own but these two tend to be overwhelmed by the number of teachers in the school. Because we operate on a very thin budget, we have never been able to procure other ICT gadgets like projectors and video cameras. In short, student teachers who get attached to this school have no access to ICTs.*

FGDs with mentors also revealed that the other problems with the application of ICTs has to do with internet availability and connectivity. For those schools which have internet connection, they have challenges with connectivity because of a weak bandwidth and unavailability of electricity. It also emerged out that ICT infrastructures like learning management systems, skyping or video conferencing facilities as well as interactive boards remain an illusion for most schools. Many participants felt that as long as Zimbabwe's economic woes persist, procuring ICT gadgets and equipment will remain a serious challenge for most schools.

The availability of responsive ICT infrastructure at both the teachers' colleges and schools where students get attachment for teaching practice remains very critical in the teacher development process. Luboobi (2007) observes that most educational institutions in developing countries have problems with the acquisition of ICT facilities such as computers and undertaking viable networking. In the same vein, Hogan (2011) underscores that most educational institutions in developing countries do not have learning management systems which in developed nations have become virtual classrooms. Lack of such critical ICT infrastructure becomes a major deterrent in training and equipping the 21st century teachers with the requisite ICT skills. Since most of the schools where student teachers get placement for teaching practice have no appropriate ICT infrastructure, many of such schools have remained stuck in the traditional face to face classroom practice. In this regard, Hogan (2011) and Hall et al. (2019) further observe that in developed nations, learning management systems have transformed the traditional classrooms to virtual classrooms where skype is used as a tool for video conferencing with students at a distance. Looking at the nature and state of ICT infrastructure at teaching practice schools in Harare metro-politan province, one can realise that student mentorship in virtual teaching and technology-based pedagogy is greatly compromised. According to Lunenburg's (2010) Open systems theory, ICT infrastructure is a critical input resource mentoring 21st century teachers.

Another observed challenge with ICT infrastructure in teaching practice schools has to do with internet connectivity and high cost of bandwidth. This is confirmed by a study by Ruhinda (2013) in Kenya who observed that the high cost of bandwidth remains a serious challenge for most educational institutions in developing nations. Thus lack of ICT infrastructure in teaching practice schools compromises the training in virtual teaching and technology-based pedagogies which are critical for the 21st century education practice. In circumstances of pandemics like the COVID-19, training of teachers in developing

countries like Zimbabwe comes to a halt, further intensifying the development divide between the global north and the global south (Howard, 2021).

Common teaching methods used in teaching practice schools

Most schools where student teachers are attached for teaching practice still rely on the traditional methods of teaching as shown by Figure 5.

As reported by students on teaching practice, generally the blended teaching approach seems to be popular (54.3%) in schools, where teachers combine a bit of ICT and traditional teaching methods. It is also observed that the traditional teaching methods of lecturing are still common (40%) in schools where student teachers get attached to teaching practice. Although the flipped classroom approach is a special type of blended teaching, it appears to be a recent approach in the Harare metropolitan province and most student teachers are not even aware of it as shown by only 4.3% of respondents who acknowledged the use of the approach in schools.

An interview with one head of the teaching practice department at one of the teachers' colleges reveals that the flipped classroom approach is quite some news to them. He said:

> *I have never head of the flipped classroom approach before, I am hearing it from you for the first time. I don't think our lecturers here use it when training teachers. To move with the world trend in teacher education, I will have to find out what it is all about. What is common with our lecturers and student teachers is the blended teaching approach where teachers combine ICT and the traditional face to face teaching approaches. One other issue is that, the schools where we attach our student teachers have not yet developed to a standard where they can use virtual teaching. Here at college, student teachers are taught how to use google class or video conferencing in lesson delivery.*

Another head of teaching practice department at yet another teachers' college shared her views:

> *Yes, I read about the flipped classroom approach, but honestly, I don't know what it entails and how it is applied in teaching. I know that in developed countries it is one of the popular methods used for teaching the 21st century skills in education. What we are familiar with is the blended approach where teachers use projectors or interactive boards in conjunction with the traditional teaching approaches. Although colleges expose student teachers to virtual teaching, such experience is not reciprocated by the schools where we attach our students because they do not have supporting facilities. In such circumstances, lecturing becomes the most common method because it does not involve much ICTs. For most schools, because of the economic situation in Zimbabwe, online teaching remains a serious challenge.*

FGDs with school-based mentors confirmed that they are not conversant with the flipped classroom approach. It also emerged that the most common teaching approach is some kind of blended teaching where they use, for example, a video or projector in face-to-face classroom interactions. They also revealed that the lecture method remains popular with teachers because it allows them to complete

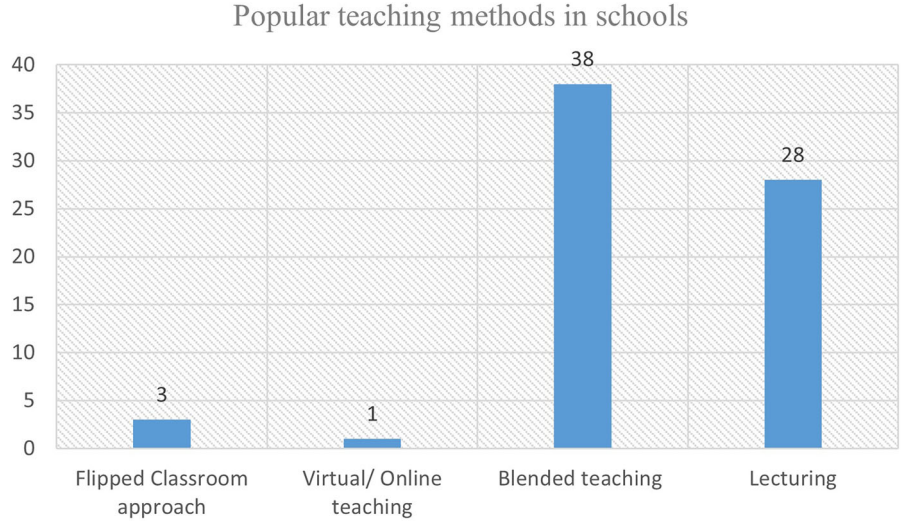

Figure 5. Popular teaching methods in schools.

the syllabi on time. Although mentors are aware that 21st century teaching approaches emphasise child-centred approaches, they resort to teacher-centred approaches because they are less time-consuming and allows them to cover a wide range of content in a short space of time. Mentors also argued that because of the teacher recruitment freeze in Zimbabwe (Tasara et al., 2019), they have too big classes, which makes it very difficult to apply child centred approaches. The discussions also reveal that although virtual teaching has become common in developed countries, for the Harare metropolitan province it remains an illusion because there is no supporting ICT infrastructure.

Blended teaching emerged as the only progressive method being used in school-based teacher training. Blended teaching is the combination of ICTs and face-to-face classroom interactions (Hakomi, 2017). Apparently, the nature of teaching methods adopted in the mentoring process tends to be mediated by the nature of the ICT infrastructure available. Lack of ICTs in teaching practice schools has influenced mentors to resort to the traditional lecturing method. It is observed that contemporary teaching approaches like the flipped classroom approach are rarely used in mentoring student teachers in Zimbabwe. As change in knowledge and technology is moving fast, education must keep abreast with it and continue its development with innovative teaching approaches (Akdemir et al., 2015). This change and transformation in the education training field takes out the existence of new strategies like the flipped classroom approach. Mull (2012) conceptualises the flipped classroom as a method that provides students with opportunities to prepare themselves for lessons by watching videos, listening to podcasts, and reading articles. Such an approach is in tandem with the provisions of child-centred approaches. This study argues that it is high time teacher development colleges in Zimbabwe introduce the flipped classroom approach in their teacher development curriculum.

Applying technology-based pedagogies remains largely subdued mainly because of the lack of appropriate ICT infrastructure in teaching practice schools. A study by Gupta and Gupta (2014) in India confirms that educational institutions in developing countries tend to struggle with establishing appropriate ICT infrastructures thereby compromising the implementation of virtual teaching approaches. For the Harare metropolitan province's teacher development programmes, virtual teaching has been largely affected by both lacks of ICT competencies by school-based mentors and inappropriate ICT infrastructure in teaching practice schools.

Conclusion

Teacher development processes worldwide have evolved significantly adopting technologies that promote learner-centred approaches. However, for Zimbabwe's teacher development, there seems to be a serious disjuncture in the mentoring process as the school-based mentors lack the requisite ICT competencies for virtual teaching and technology-based pedagogies. The study argues that while virtual teaching and technology-based pedagogies remain progressive learner-centred approaches, for the Harare metropolitan province, the mentoring process becomes flawed due to poor ICT infrastructure, weak bandwidth as well a lack of ICT skills by mentors. Progressive learner centred approaches like the flipped classroom approach remain subdued because of incompetent human capital. Mentors need to move away from the traditional retrogressive teaching approaches and move with speed to learner-centred techno-based pedagogies. The study concludes that inappropriate ICT infrastructure, lack of ICT competencies by mentors as well and high cost of bandwidth, tend to intensify the digital divide between developed and developing nations. Consequently, the development divide becomes more pronounced as the quality of teacher education in developing nations like Zimbabwe remains subdued.

Recommendations

Informed by the findings above the following recommendations are proposed:

- The Ministry of Primary and Secondary Education should initiate a call for in-service for all teachers who lack the ICT competences.
- The study also recommends teacher development colleges to introduce the flipped classroom approach in their respective professional studies syllabi.

- The government, with support from development practitioners, may assist schools with appropriate ICT infrastructures.
- Creating a Universal-based System to Support the Implementation of Technology-based pedagogy in schools - Systems developed should encourage and reach out to all teachers in schools.
- School heads or facilitators should provide flexibility to teachers/facilitators to pursue innovative technology-based pedagogy to help all children to learn.
- Lastly, there is a need for the government to subsidise the cost of bandwidth to enhance internet connectivity and availability in teaching practice schools.

Disclosure statement

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