



Constructivists' Teacher-Preparation Strategy for Crossover to the 21st Century: A Case of Eastern Uganda

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Abstract

This study aimed to explore the constructivists' teacher-preparation practices in selected Teacher Training Institutions (TTIs) in Eastern Uganda as leverage to derive a strategy that enables crossover to the 21st. Century. A qualitative research design using purposively sampled Primary Teachers Colleges and 15 participants informed the study. Data were collected using multiple in-depth interviews and observations and analyzed following Moustakas's (1994) procedure. Data analysis and results revealed that teacher educators continue to rely on traditional approaches in instruction and supervision of school practice. This phenomenological study established the lived experiences of teacher educators and students in light of constructivists' teaching. Colleges are nascent in implementing modern constructivist practices in education moving away from being stuck to traditional instructional practices and the lack of motivation and knowledge among teacher educators to adopt modern approaches. This research study adds to the existing pool of knowledge, suggesting how constructivist' teaching can support teaching effectiveness and promote students' learning by amplifying the need for pedagogical enhancement and digital fluency through integrating ICT and reflective practice in instruction. The study recommends establishing and setting up a Reflective Practice Laboratory at the Uganda National Institute for Teacher Education (UNITE)- Another Degree Awarding Institution in Uganda, and the affiliated Teacher Training Institutions (TTIs) for Teacher Educators and trainees' induction on several constructivist' practices that include systematic reflection, clinical supervision, use and integration of ICT and other interventions in congruence with the Education Agenda 2063 and 21st Century Skills.

Keywords

Constructivism, teacher-preparation, reflective practice.



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Introduction

Education is critical to the global integrated framework of sustainable development goals (UNESCO, 2015), which raises the demand for a stronger focus on teachers and educators as change agents across the board. According to Kasule *et al.* (2016), teachers are essential agents in shaping students' education and bringing about change and innovation in educational practices. Teacher education is, therefore, the most important and known way of preparing change agents because success in educational reforms depends on the teachers' awareness of the new changes, their attitudes toward them and how they situate the reforms in the daily operations (Gusango *et al.*, 2021; Snoek *et al.*, 2010).

Literature Review

The 21st Century demands effective teacher - preparation where theory and practice are linked effectively and a new progressive and innovative approach to teaching and learning as a way to break away from the traditional and conservative approaches (Gusango *et al.*, 2021; Pitsoe&Maila, 2012). The literature review on the educational philosophies and instructional designs revealed a move from the traditional-behavioral approach to the progressive-constructivist approach (Taneri, 2010). To attain quality pre-service teacher preparation, the priority is to prepare teachers who can deliver high-quality pedagogy and provide all learners with enriched learning experiences (Ssegantebuka *et al.*, 2021). The quality of a teacher largely depends on the quality of pre-service teacher education. The quality of pre-service teacher education highly relates to the quality of instruction, curriculum, environment, inputs, processes and products of teacher training. The teaching competencies that have emerged and are highly desirable in the 21st century include cultural preparation, critical analysis, reflective ability, technical knowledge, adaptability, teamwork and cooperation, organizational capacity, and administrative competence (Barrios, 2021) while from the market perspective, the desirable competencies demand the ability to; use information, use communication technology, solve problems, supervise and lead, undertake continuous learning and having a capacity for teamwork.

To develop competencies in education, UNESCO (2014) states that tutors need to know how others learn and how to teach, and they need to integrate a growing body of knowledge on learning into their teaching practice, aware that learning to learn is an essential trend today. In Uganda, tutors face great difficulty transmitting their knowledge to students in class, which is unrelated to tutors' subject knowledge or mastery of content, which is generally considered decent. Tackling Primary Teachers Colleges (PTCs) efficiency requires a comprehensive approach, starting with tutors' practices (Gusango *et al.*, 2021; Kagoda&Ezati, 2013). The role of teacher educators today is to mend the existing system with a vision to help teacher education grow as a profession and produce quality teachers for schools (Gusango *et al.*, 2021; Banerjee, 2013). Practice must be at the core of teachers' preparation and entails close as well as detailed attention. Quality and effective pre-service teacher preparation, teacher education should be anchored on theories that offer learners as well as tutors the opportunity to construct their knowledge through social interaction, communication, inquiry learning and respect for the environment (Ssegantebuka *et al.*, 2021) to enable the desired "learning how to learn." According to Chabra *et al.* (2013), constructivism has progressively expanded its dominion from just being a theory of learning to becoming a theory of teaching and the theory of education. It is a theory for the origin of ideas and a theory of both personal and scientific knowledge. Therefore, constructivism is the best theory to support this research.

The constructivist education philosophy envisions a school where students are empowered to learn how to learn, fostering a learner-centered environment that places a premium on learning through discovery and exploration, and on experiences in the development of problem-solving strategies

(Dimitris et al., 2009). In constructivist classrooms, students are encouraged to reflect on and discuss their activities, use inquiry methods to pose questions, set their own goals and means of assessment, investigate a topic, utilize a variety of resources to uncover solutions and answers, and take charge of their own learning process (Taneri, 2010). This approach, which emphasizes 'reflective practice', holds immense potential to transform the teaching-learning dynamic in schools and institutions (Aguti, 2010).

Recent education reforms require teachers to depart from the traditional practice of knowledge transmission and teach constructively, where students are encouraged to construct knowledge through inquiry.

The knowledge demanded in today's world is one that can be explored, researched, experimented with, and created to meet human needs, and this is only possible through constructivist approaches such as the application of technology in instruction and learning (Gusango *et al.*, 2021; UNESCO, 2015). According to Mensah (2015), different philosophical perspectives have sparked increased debate about contrasting beliefs regarding the nature of knowledge and truth. These disagreements stem from researchers' epistemological and ontological positions on what knowledge is and how it can be acquired. The objectivist and constructivist traditions mark the opposite ends of that continuum (Cronje, 2006). Unlike behaviourists, who view a learner as a blank slate, constructivists see learners as active participants in the learning process, understanding that knowledge is not received from the outside or from someone else but constructed or created as an outcome of the individual learner interpretation and processing of what is received through the senses. Good and Brophy (2007) argue that the construction of knowledge is facilitated when learners can relate new information to existing background knowledge, enabling students to develop a worldview that is authentic rather than learning accurate but meaningless or inert knowledge.

Constructivists emphasize situated learning, contextualized by learning activities that allow learners to contextualize the information. Learning is moving away from one-way instruction to the construction and discovery of knowledge. According to empirical constructivists, the best way to help students develop an authentic understanding of reality is to use reflective instruction and discovery learning that relates closely to students' prior or existing experiences (Edlin, 2008). Studies indicate that active participation is more effective in a learning environment that emulates an authentic and accurate world learning environment (Gusango et al.; Gupta, 2011). The characteristics of an effective teacher are grounded in constructivist theory, where teachers are facilitators who practice constructivist teaching and create a learning environment with technology that encourages learners to process and organize information actively by making internal cognitive connections.

Constructivist teaching portrays the shift in the role of teachers from the traditional teaching environment to settings that encourage active students' participation in the learning process (constructivist learning environment). Constructivist teaching involves learner-centeredness, engagement, inquiry, and knowledge construction within an appropriate, conducive learning environment. It embraces the use of e-learning and the integration of ICT in instruction. In this global technological development context, traditional teaching activities are under intense pressure from the rapid development of digital technologies (Tusiime et al., 2019; Säljö, 2010; Mishra & Koehler, 2006). The constructivist teaching approach has gained tremendous attention, with e-learning taking up the baton of education and training from the traditional method.

Today, teacher education must consider the pedagogical use of digital technology to prepare student teachers for their future practice (Tusiime *et al.*, 2019; Krumsvik, 2014). Teachers should deliver a

competence-based education, emphasizing integrating skills that help learners in the competitive world (Olema *et al.*, 2021). This delivery requires effective use of information and communication technologies for teaching and to engage more in planning within evaluative and accountability frameworks. Computers and the internet provide immense possibilities for learners to explore learning independently. There is a growing demand for Information and Communication Technology (ICT) in school education. Colleges, too, should orient, sensitise and equip the students with the skills to use ICT for their professional development. However, African countries such as Uganda need more knowledge and skills to use ICT when teaching to support student learning (Kasule *et al.*, 2016).

There is a pressing need to design, develop, and identify technology-based platforms such as social media platforms (e.g., WhatsApp groups, Instagram, LinkedIn, Twitter, and Facebook) that can effectively support the transition from knowledge-based to competency-based education (Olema *et al.*, 2021). This shift, a significant reform, calls for teachers' professional development as an integral component (Olema *et al.*, 2021; Nakabugo *et al.*, 2011). Effective professional development includes training, practice, and feedback with adequate time and follow-up support. Therefore, professional development programs encourage teachers to involve students in learning activities, enabling teachers and students to share their expertise and experience more systematically. The shift to a competency-based curriculum necessitates modern classrooms, smart boards, laboratories, creative centres, and technologies at all levels. This would enhance the face-to-face teacher professional development efforts, which alone may not be sufficient for an effective transformation. Such technology-enhanced platforms would encourage informal collaborative professional development activities such as discussions with peers, being mentored, informal peer review, and peer feedback well beyond the formal settings.

For the competency-based curriculum to be consistently, effectively, and efficiently delivered, teachers in Uganda need to be retooled with skills, values, and attitudes in blended learning approaches (Olema *et al.*, 2021). However, the current implementation of the teacher professional development program for a shift from knowledge-based education to competence-based education in Uganda is fraught with challenges. The inadequacy of material resources and infrastructure may hinder the proper implementation of the shift (Olema *et al.*, 2021; Kyobe and Rugumayo (2005).

Constructivist-informed teaching originated from methods used in ancient Greece and China. Socrates (470 BC-399 BC) used questions to draw out what was already within the students to enable them to reason and recognize their weaknesses in thinking (Tracey & Morrow, 2012). Socrates firmly believed that ideas exist prior to experience (Jordan *et al.*, 2008). The constructivists have a different perspective on the source of knowledge, truth and reality. Like sophists, they believe in self-knowledge construction and the possibilities of multiple interpretations and realities. Olusegun (2015) states that the contemporary constructivist conceptions of learning and instruction have their historical roots in the work of Dewey, Bruner, Vygotsky, and Piaget. According to Chabra *et al.* (2013), Bruner and Piaget are the proponent theorists among cognitive constructivists, while Vygotsky is the primary theorist among social constructivists.

Bruner's theory of education in the 1960s and the 1970s directly influenced the education programs formulated during those decades. Bruner was a radical constructivist and central player in the cognitive revolution. Bruner developed the constructivists' theory on the Socratic tradition of learning through dialogue, encouraging the learners to enlighten themselves through reflection. Bruner believed that learning involves three processes: knowledge acquisition, knowledge transformation and knowledge review (Jordan *et al.*, (2008). Though the constructivist theory focuses on learning, the constructivist informed teacher enables the constructivist learning environment. There is a reciprocal

relationship between learning and teaching to the extent that it is tough to treat each process in isolation (Kellough&Carjuzaa, 2009). Aware that many scholars face challenges, using the constructivist learning theory from the teaching perspective was imperative, and it has attracted few scholars for a long. Bruner constructivist learning theory states that students learn best when they construct their knowledge based on prior knowledge (Bruner, 1961; Erizar, 2017). The theory transforms the teacher's role from that of a knowledge transmitter to that of a coach who must support students in meaning-making and knowledge-construction processes (Gusango *et al.*, 2021; Asgar& Huang, 2020).

Jia (2010) observes that the learning process of knowledge is also the construction process of knowledge where teachers are the helpers and the drivers for students constructing knowledge. From that perspective, teachers are designers of the teaching environment, guides for students' learning, and academic consultants for students. Teachers must become constructivist by providing a learning environment where students search for meaning, appreciate uncertainty, and inquire responsibly. It requires the teachers' philosophical orientation to shift from the role of purveyors of knowledge to facilitators and coaches who enable students' knowledge construction.

Jesus Christ has the reputation of being one of the most outstanding teachers ever (Fønnebø, 2011). This description of constructivism is equivalent to what Jesus did in his storytelling method. Jesus directed his teaching towards adults, whom he expected to interpret, understand, and learn according to their level of readiness. Jesus went out into the wilderness to unwind and meditate, thus recognising the human need for reflection to prepare for upcoming tasks (Mark 6:31, 47). Reflection is an integrative mental process, and its outcome is a more sorted-out and tidied-up cognitive structure, which is more valuable than before the reflection process started.

Proponents of Constructivism are exploring the potential of educational Technology to enhance constructivist teaching/learning strategies. The rapid digitalisation of education in the past decade (Tusiime *et al.*, 2019; European Union, 2013; Farrell *et al.* 2007) has sparked interest in integrating digital Technology into education. The assumption is that digital technologies have the power to significantly improve the quality of education (Toit, 2015; Tusiime *et al.*, 2019). However, studies in Africa by Tusiime *et al.*, (2019) and Aduwa-Ogiegbaen (2014) reveal that many teachers need technological knowledge, highlighting the need for extensive professional development in this area.

Teachers' preparations need to encourage the teaching of skills in using an array of constructivist teaching strategies and methods like cooperative learning, active learning, discovery, inquiry and project methods along with modern technologies, as this will increase effectiveness in working with students from diverse backgrounds. Twenty-first-century teachers must be familiar with and incorporate the new Technology in classroom teaching. Technology in learning helps the students interact with the contents, the programmed interface, the instructor, and other learners individually and in groups. Technology in classroom teaching requires prospective teachers to use the facilities and be familiar with ICT in their classes. Indeed, teachers need to have skills in operating particular technologies, which includes knowledge of operating systems and computer hardware, and they must also use standard sets of software tools such as word processors, spreadsheets, browsers, and e-mails. It is essential to use Technology to support new social arrangements in teacher education. It may be helpful for teacher preparation institutions to think of one of their responsibilities as the need to produce technically literate teaching professionals.

According to Kasule *et al.* (2016), participation in professional development activity not only enhances the capability to use ICT as a tool to meet the teaching and learning needs of a large number

of students but also helps them to expand their opportunities for reflection, dialogue, and collaboration beyond the classroom activities. Teachers should deliver a competence-based education, emphasizing integrating skills to help learners in the competitive world (Olema *et al.*, 2021). This delivery requires effective use of information and communication technologies for teaching and to engage more in planning within evaluative and accountability frameworks.

In Uganda, teachers seem to be neither innovative nor creative, and they rarely use learner-centred methods in the classrooms (Olema *et al.*, 2021; Malunda, 2017). While primary school teachers use a mix of methods to deliver lessons, they use more of the teacher-centred method (NPA, 2018), implying a gap between training and practice exists. In most educational institutions, teachers transmit ready-made knowledge to the learners to help them pass national examinations. Several lecturers and tutors contradict themselves by teaching about learner-centred methods using the lecture method (Otaala *et al.*, 2013; Aguti, 2010). If the tutors are not innovative and creative, they cannot expect their students to be different. It is a concern that most universities in Uganda are accused of producing graduates who are irrelevant to the country's labour market needs and are ill-prepared for the ever-changing and competitive knowledge economy (Kasule *et al.*, (2016).

Although Uganda, like other nations, has been recognised for its efforts to integrate digital technology in teacher education, the teachers lack adequate knowledge and skills to use ICT to support student learning (Kasule *et al.*, 2016; Tusiime *et al.*, 2019; UNESCO, 2015; 2014). Most teachers need help to use the available digital resources as instructional tools due to inadequate digital skills (Bagarukayo, 2018; Wamakote, 2010; Nakabugo *et al.*, 2008). Digital resource use is still embryonic due to a need for more effective policies, basic infrastructure (electricity, devices, Internet), financial resources and teacher capacity (Ndiwalana&Tusubira, 2012). For almost ten years, studies in Uganda continue to reveal a gap between the technology available in classrooms and teachers' abilities to use this technology in teacher education programmes (Tusiime *et al.*, 2019; Nakintu&NeemaAbooki, 2015).

Statement of the Problem

Educational practices require regular reviews due to the growing proportion of information communication technology, social changes, globalization of education, and the pursuit of quality (Dorit, 2016). These renewal needs require developing updated instructional practices that could integrate knowledge with personal transferable skills (Pellegrino & Hilton, 2012). By using constructivist-informed teaching in teacher preparation, the students are likely to emulate it and be able to use it when teaching in primary schools. However, despite the growing attention paid to constructivist pedagogic challenges in the context of learning environments, the instructional principles of this theory, which aim at directing the nature of educational processes, still need to be actualized (Dorit, 2016).

Uganda's education system challenges include providing quality curricula and preparing quality teachers (Ssegantebuka, 2021). Teacher education is confronted by a prevalent gap between theory and practice, as students need help to translate what they learn into practice readily. This prevalent gap does not give students the confidence and creativity to handle daily problems with a theory-guided action. Though the tutors are aware of constructivists and other modern approaches for the 21st century, implementation faces challenges due to the tutors' fixed mindset and conservative tendencies, which manifest in failure to demonstrate or guide students. According to Maani (2013), many teachers use teaching methods that promote regurgitation of content due to the emphasis on passing national examinations. Inappropriate pedagogical methods in PTCs lead to poor pedagogical methods in primary schools, which should be corrected. The fixed mindset has perpetuated the

traditional transmission model while hindering the pace of reforms in the sector and consequently leading to low teacher competence and quality of education (Darling-Hammond, 2006; Lin, 2013; Wang, 2016; Mbugua, 2011; Kablan&Kaya, 2014).

The emergence of ICTs as learning technologies has coincided with a growing awareness and recognition of alternative theories for learning, of which the most significant sway today are those based on constructivist principles. These principles posit that learning is through actively constructing knowledge supported by various perspectives within meaningful contexts. ICT is instrumental in shifting emphasis for learning environments from teacher-centered to learner-centered. When teachers move from being the essential source of information and transmitter of knowledge to students, the role of students changes from passivity to activity. ICT changes the concept of learning within the four walls as the introduction of technology breaks the boundaries of colleges and offers students an opportunity to learn irrespective of place and time. Individuals can access the data whenever and from wherever they are learning. However, lack of awareness towards technology and utilization of technology with improper knowledge add complexities to the successful implementation of ICT in colleges.

Methodology

The research Methods for the constructivist philosophical paradigm include:- Narrative Study, Case Study, Ethnographic Study, Grounded Theory, Descriptive Study, and Phenomenological Study (Kim, 2005). A unique commonality of all these methods is that comprehending is a significant phenomenon studied within natural contexts. Phenomenology was appropriate for this study because it gives scholars a humanistic outlook towards man and the world. Phenomenology based on constructivist philosophy premised that the phenomenon is analysed by a cognitive subject, which is a human being. The constructivist view is that the subject constructs what it knows, while the phenomenological view is that the subject knows what it constructs. The researcher utilised the qualitative research design to undertake this review. Interviews and observation analysis were employed to review the literature on the subject while highlighting the relevance of the qualitative research approach.

Data Collection and Instruments

The study was conducted in purposely selected Primary Teachers' Colleges in Eastern Uganda and involved 15 respondents. According to Padilla-Diaz (2015), the sampled group should consist of 3 to 15 members who must be able to articulate their lived experiences and the guiding principle should be the concept of saturation (Mason, 2010). The selected Teacher Training Institutions manifested well the phenomena under study, mainly the focus on the instructional process and pedagogical preparation. The target population consisted of three School Practice Coordinators, six tutors, and six year-two PTC students as primary respondents.

Data analysis

Phenomenological research does not prescribe specific techniques in data analysis since imposing a method on analysing a phenomenon stifles its integrity (Groenewald, 2004). This study analysed data following all data collection and transcription using the framework described by Padilla-Diaz (2015) and Moustakas (1994).

Study findings and discussions

ICT integration

The integration of ICT is a constructivist' practice that enhances students' engagement, research, critical thinking and creativity. The integration of ICT in instruction is evolving and gradually

unfolding as both tutors and students see its relevance. The study probed the use and integration of ICT in instruction. The integration of ICT is a constructivist practice that enhances students' engagement, research, critical thinking and creativity. Unfortunately, the level of integration is deficient, and it is limited to surfing the internet and using phones. The colleges have internet access to enable tutors and students to access information. Students use the computer laboratories as well as their phones. Unfortunately, students spend more time on e-mails, WhatsApp and Facebook, which they find free when they use the college internet. The tutors need to gain digital literacy and fluency, which makes them unable to adapt well to the current pace and the 21st-century world stance.

On the concern of ICT integration as a constructivist practice, majority of the respondents reported that colleges experienced a challenge of students chatting more with friends on Facebook and What's-app than utilizing the internet for productive concerns. SC2 comments as in indicated in the quotation;

I have never used technology here at college. By the way, we can use phones to research things we cannot find in textbooks. We can use that smartphone.

When integrating ICT in instruction, majority of the participants (tutors) expressed that it is mildly evolving as tutors and students see its relevance. TB2 reveals that the internet can provide all required information in case of uncertainties and misconceptions.

TB2 states that; *A clique on Google will give robust information.*

TA1 reported that; *The internet in colleges and permitting students to have phones in colleges has enhanced their (students) research and sharing of information.*

Consequently, on the issue of how lessons were conducted, it was reported that majority of the teacher educators (tutors) could prepare their own content in form of notes and read as their trainees copy. That situation demonstrated clearly that the trainees were treated under the 'master and novice' mentality and not given an opportunity to contribute to their learning, a situation which contradicted with constructivist practices!

Reflective practice: The only practice in colleges related to reflection is self-evaluation. Unfortunately, students do not give more thought as many write "successfully taught" as a routine remark or comment. Reflective practice is not familiar to students, even the tutors, yet it gives them the privilege to act and think about their actions. Reflection as an activity is not a common practice in colleges since neither the tutors nor the students had any form of structure to follow when reflecting on sessions. The experience of this practice was limited to the component of self-evaluation on lesson plans while needing to be made aware that reflective practice is structured formally and routinely in modern teaching. The use of reflective journals and post-observation records is outside practice. Records like reflective journals and journal wheels have never been used and are therefore not known. Reflective practice requires formalized self-observation and self-evaluation, articulating areas of weakness during a presentation and options or remedies for improvement in the following sessions. Reflective practice is significant and has a high potential to bring about desirable improvements and changes in the teacher's instructions. The researcher wished to scrutinize any document as evidence for reflection or reflective practice for tutors and students. Besides comments on lesson plans under self-evaluation, reflective practice is strange to the tutor and students. Anticipated reflective practice records needed to be more present.

Challenges that affect tutors' application of the constructivist principles

The tutors give students less but expect them to think more and construct their own knowledge. The tutors revealed inadequate awareness of constructivists' informed teaching, knowledge construction, and the applicability of constructivism to many of the concepts. Many tutors have experienced a traditional instruction orientation and background, which strains their adaptation to emerging shifts in teaching. Tutors faced challenges in assuming new roles (facilitator), integrating ICT into instruction, and taking on reflective practice.

Although constructivist principles are essential, the tutor's acceptance is minimal. There is difficulty in translating a theory of learning into a theory or practice of teaching, a conversion that has always been difficult. Sufficient acquaintances by the tutors and students on constructivist teaching are required. Tutors rely on teacher-centred methods as they largely lectured and dictated notes to students and rarely used instructional materials. Tutors defended using teacher-centred methods that save time and give students good grades in the final examinations. The tutors used learner-centred teaching methods such as demonstration, group work, practical, and instructional materials. The college administrators who assume that all tutors know what to do are unaware that many of these are not grounded in primary school methods, the use of ICT and integrating constructivist principles. Student teachers spend most of their time learning theory at college rather than learning how to teach. The tutors have a task to transform students' engagement in content from rote recall and comprehension to more meaningful analysis, synthesis, application, and evaluation via constructivist teaching models and methods. The study reveals that tutors rarely get feedback on their teaching performance. Reflection is not a feature of all constructivist practices, yet modern teaching vividly improves individual and group performance. Student evaluations provide direct feedback to teachers so that they can refine their courses and teaching practices to provide students with better learning experiences (Kasule *et al.*, 2016). For teacher attitudes and practices to change, tutors should employ pedagogical strategies that establish a two-way conversation, foster reflection, and actively involve learners in instruction (Edlin, 2008).

Implementation of ICT in colleges is a big challenge due to the high cost incurred for acquiring, installing, and replacing the latest software. In addition to that, there are various opportunity costs for colleges to develop infrastructure. Besides the lack of infrastructure to accommodate the technology, problems with electricity, network availability, lack of awareness towards technology, and utilization of technology with improper knowledge add complexities to the successful implementation of ICT in colleges. The development of e-content and its dissemination, selection, and evaluation requires large-scale networking among users and producers. Intellectual property rights among the stakeholders are also a significant concern for the holistic integration of ICT in education. The colleges are nascent in integrating ICT into education because many are accustomed to traditional learning practices and need more motivation and knowledge among tutors to adopt ICT in teaching.

Final reflection

ICT is an essential curricular resource and an important part of education. They are taking a critical perspective on ICTs and promoting constructivist approaches that privilege participation and cooperation over mere access to principles that the course will help teachers explore. Managers of TIET institutions should encourage teachers and students to acquire ICT skills. The benefits of such skills are enormous. All managers of education institutions should have acquired a copy of the ICT policy and internalize its provisions (MOES, 2010). Obtaining a copy of the ICT policy and its acquaintance is not a justification for implementation. The levels of ICT integration in colleges still need to be higher, as evidenced by the almost no interaction during the COVID-19 lockdown, unlike other sections of the system that manage online teaching. ICTs are technologies.

Along with developing such understanding, the course will help student teachers to learn by integrating technology tools for teaching and learning material development, developing a collaborative network for sharing and learning. Addressing the inherent challenges of teacher education and the need for adequate and appropriate learning material is very important. ICTs can be adapted to support decentralized structures and processes and build the 'digital public' to make education a participatory and emancipator process. Tutors should integrate ICT in assessment practices and the preparation of teachers for primary schools. Introducing teachers to new technologies for teaching and learning can support a change in teaching practices (Lawless & Pellegrino, 2007).

Recommendations for Future Research

Aware of the rapid development of information and communication technologies (ICT) and the experience of the instructional challenges during the COVID-19 lockdown, the researcher recommends an in-depth study on the use and integration of ICT in education, particularly in colleges and higher education. According to Abdelhafez (2021), the COVID-19 pandemic has negatively impacted how teachers learn and professionally develop, which has also hastened the coveted digital transformation. Four strategies have proved effective in providing remote teaching support during the COVID-19 pandemic: virtual professional learning, video conferencing, global webinars, and safe texting. These require comprehensive research in teacher preparation.

The current educational aspirations and instructional shifts must align strongly with constructivists' ideologies, of which reflective practice has emerged as a prominent strategy to effectively address desired practices and realize the aspirations of the 21st century. The study reveals that reflective practices are not yet common in colleges, despite their vital role in constructivist-informed teaching, which is also relevant in the 21st century. The researcher proposes a reflective practice laboratory for UNITE and all affiliated colleges to accelerate the instructional shift to adapt to the demands of lifelong learning in our current times and realize future aspirations as illustrated in **Figure 1: The Reflective Practice Laboratory (RPL)**

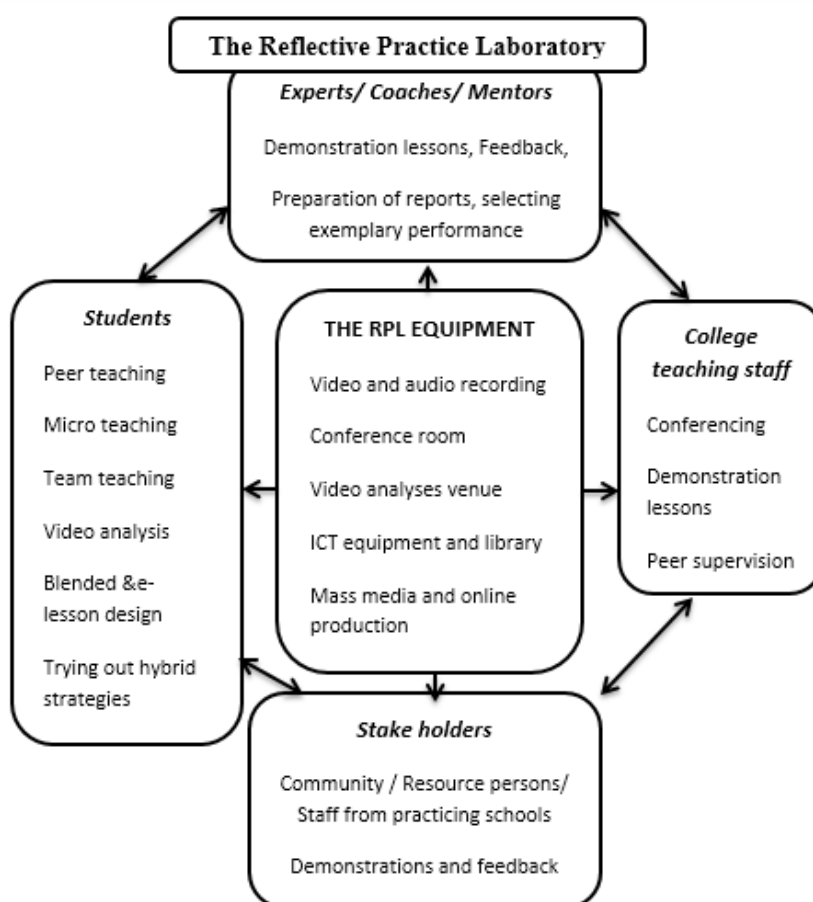


Figure 1: The Reflective Practice Laboratory (RPL)

Source: (Gusango, 2023).

In many ways, reflective practices in education have shown value as these allow students to reflect on their learning experiences within a blended learning environment. Reflective practices are a learning strategy whereby professionals become aware of their implicit knowledge base (Herrington et al., 2010). The reflective practice laboratory conference room will be an appropriate venue for attending professional conferencing practices, inductions, seminars, demonstration sessions and practice using educational technology, the Internet and other digital forms, which are effective when developing a teacher. The RPL will make teachers capable of using digital technology and learning resources in productive ways to transform their knowledge into discipline-specific didactics, classroom management techniques and assessments of how students productively use available digital resources.

Teachers need training on using and integrating new digital technologies into their practice. Gudmundsdottir (2010) calls for a policy focus on addressing the severe digital inequalities within and outside of the school environment to increase digital competence and ensure that technology is perceived not as an add-on but as an integral part of the curriculum (Tusiime et al., 2019).

ICT and reflective practice integration will allow active participation, collaboration and engagement (Gachago et al., 2013). The knowledge and skills needed in a digital age, where all 'content' will be increasingly and freely available over the Internet, require students with expertise. Technological and electronic media should be integrated with student-centred technological approaches that are

meaningful and conducive to how today's learners engage with life-world environments (Bozalek *et al.*, 2013; Herrington & Kervin, 2007).

Relevant ICT skills to acquire through the Reflective Practice Laboratory

The 21st-century teacher who is evenly grounded in constructivist' teaching must possess several skills that the reflective practice laboratory is likely to offer, which include word processing skills, spreadsheet skills, database skills, electronic presentation, Web navigation, website design, skills for audio recording, skill of using digital camera, e-mail management, computer Network knowledge applicable to teacher education system, file management & windows explorer skills, downloading software from the web (knowledge including eBooks, Installing computer software onto a computer system, web ICT or blackboard teaching skills, video conferencing skills, computer-related storage devices, scanner knowledge, knowledge of PDAs, deep web knowledge, educational copyright knowledge, computer security knowledge.

The Relevance of Video and Audio Recording in the Reflective Practice Laboratory

According to Mayer (2021), recording devices allow students to observe and re-observe their own performance. Through a process of video and audio recording, describing, analyzing, and interpreting the teaching, both the tutors and student teachers can develop an awareness of and learn more about their own teaching. With this approach, the student and teacher together can learn equally from each other. While the teacher provides guidance and insight, the student creates new ideas and approaches. The relationship between student and teacher has a co-teaching arrangement where the student is the primary teacher, and the teacher is a guide towards the student's complete autonomy (Mayer, 2021).

De Monte (2013) supports this practice. His research affirms that student teachers who received specific feedback on videotaped teaching shared with an instructional coach had higher achievement gains than students' teachers not receiving coaching

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