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CONNECTING THE DOTS: DIGITIZING TEACHING AND LEARNING IN RURAL SCHOOLS IN UGANDA

INTRODUCTION

In the words of Nelson Mandela, "Education is the most powerful weapon which you can use to change the world." (Mandela, 2014). This holds true for the future generations in our globalised world in this Information Age. As the complexity of economic, social, cultural and environmental issues increases, there is need to address global challenges and their relationship with education. As many researchers, governments and educators around the world have realised, ICT creates many opportunities for teaching and learning in the education system. Learners must be equipped with the right skills, attitudes and values to ensure they embrace global challenges and positively impact on the future. This is only possible if investment is made in the quality of teachers (Hassler, Hennessy, & Hofmann, 2018). According to The Association for Educational Communications and Technology (AECT, 2019), "Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources."

Uganda has a population of 45.6million people, of whom 202,617 are teachers in both private and government-aided primary schools and 58,100 are secondary school teachers, bringing the total number of teachers in the country to 260,717 as per the 2016 annual census (Uganda Bureau of statistics, 2017). The modern trend in education calls for the teacher to be more of an adviser or coach. This is important because the traditional classroom-based, teacher-centred methods of learning deny learners the opportunities to acquire the skills they need in this Information Age. On the other hand, learner-centred methods create a warm and lively teaching and learning environment which encourages critical thinking, learners' self-discovery and lifelong learning and do not confine learning to the classroom. Learning becomes an ongoing activity resulting from our daily interactions with others and with the world around us, thus making us lifelong learners.

Background of TEP

The Teacher Empowerment Platform (TEP) is an initiative that envisions a society with innovative, motivated, multi-skilled and passionate teachers as a means for promoting quality education. TEP aims at empowering teachers to teach with passion and building their capacity to provide quality education through exposing them to innovative approaches and creating linkages and networks (TEP, 2018). TEP is working with pre-service teachers, in-service teachers and teacher trainers. TEP works directly with teachers in rural communities because this is a group of educators that hardly get any professional development.

TEP operates on a three-strand approach. Strand 1: building a network. TEP believes that teacher collaboration is highly effective at improving teaching quality. Strand 2: creating partnerships in order to create a bigger impact. Strand 3: providing training to schools in need. This third strand is done by first partnering with a particular school; after that a lead teacher is identified; and then the school's needs are assessed through observations, meetings and surveys. TEP focuses on identifying the needs of the school because different schools have different needs; for example, while the majority of teachers in a given school may not have any basic ICT knowledge, in another school, the majority of teachers may have the knowledge and the digital tools but only need to learn how to integrate ICT into the teaching and learning process.

STATEMENT OF THE PROBLEM

According to the National ICT policy (2003) and (2014), all schools in Uganda ought to embrace digitalization of education (Farrell, 2007). However, only a few urban-based schools have embraced it. To the rural schools that are left out, this call to integrate ICT in teaching and learning remains more of a far-off dream (Ssewanyana, 2007). Curriculum reforms to meet innovative digital learning are moving at a snail's pace thus leaving the schools and the teachers in rural areas with no knowledge and access to the relevant materials and tools to facilitate this system of learning (Mutonyi & Norton, 2007). It is evident from existing research that digitalizing education accelerates learning further and faster than ever before (Cheah & Merican, 2012; Dahlström & Doracic, 2009; Sánchez & Alemán, 2011). However, this can only be achieved if all teachers at all levels have been granted access to and training in the emerging technology used in the teaching and learning process (Mortion, 2004).

This is where the Teacher Empowerment Platform (TEP) comes in with its different projects and programmes to see to it that teachers in Uganda, especially those in rural schools, are availed with opportunities to learn and fill the different knowledge gaps in a bid to achieve SDG4 in the country (UN General Assembly, 2015). TEP believes that no education system can outperform the quality of its teachers. The purpose of this paper is to discuss the

different challenges rural-based teachers face in digitalizing education and how TEP is addressing some of those challenges.

METHODOLOGY

This descriptive case study employed both quantitative and qualitative methods of data analysis. Stratified random sampling was used to select respondents to the survey questionnaire and the follow-up interviews that were used for collecting data. Teachers were given post-workshop surveys focusing on their experiences in the workshops and in the field before and after the workshops. A questionnaire with closed-ended questions was designed by the TEP team to find out how many teachers and administrators know how to use digital tools like computers and smart phones, how many of them integrate ICT in their teaching and learning, how many employ learner-centred methods of teaching and learning, and how many have digital tools to use in teaching, etc. One-on-one follow-up interviews were conducted with 18 key informants. Altogether, 50 teachers and nine school administrators from three sampled primary schools in Luweero district of Central Uganda participated in the study.

DISCUSSION OF FINDINGS

The study investigated the manner and the extent of learner-centeredness and computer use in teaching and learning processes conducted by the teachers in Luweero district primary schools. Teachers in Uganda face similar challenges when it comes to digitalizing education. According to the Education Sector Policy on ICT (Jane. Okou 2014), teachers ought to be retooled and imparted with the necessary technological pedagogy and skills in order to enable them use ICTs in the teaching and learning process. However, this is only happening mostly with the pre-service teachers, leaving the in-service teachers lacking in training. Consequently, in-service teachers lack the confidence and skills required to integrate ICT in teaching and learning (Aguti & Fraser, 2006; Farrell, 2007). The survey results indicated that 18% of the teachers knew how to use computers; 74% of the teachers own smartphones; 68% of them knew how to operate smart phones for basic use; 2% of the teachers own smartphones but cannot operate them; and only 10% of the teachers had attempted to integrate ICT in their teaching.

About 90% of the teachers and administrators we interacted with confessed that, prior to the training workshops, they lacked proper knowledge about the benefits of using ICT in teaching and learning. This had limited the use of ICT in their classrooms. They pointed out that most of their fellow teachers and school administrators did not yet appreciate the importance of going digital. They feel like ICT integration into the teaching and learning process is just a government intervention that wastes a lot of their time. This becomes a challenge because teachers cannot use or apply what they do not believe in (Robertson, 2003). And 62% of the teachers and administrators interviewed prior to the TEP training workshops said they were not willing to try and challenge themselves to do new things. From the interviews conducted by the TEP team and multiple observations by other scholars, the teachers' lack of confidence is attributed to fear of failure in front of learners (Bingimlas, 2009; Robertson, 2003). One of the teachers interviewed vulnerably confessed that he would rather quit teaching than be seen fidgeting with a computer in front of his class.

Another challenge expressed during the interviews is job dissatisfaction among most teachers. Teachers indicated that adoption of new methods of teaching require a lot of self-motivation. However, they pointed out that most teachers have lost the zeal in the profession for reasons ranging from poor pay, no motivation, no promotions because of the unfavourable policies, no incentives whatsoever, to personal hate or wrath from school administrators, among others.

Time is yet another challenge faced by teachers in integrating ICT in their teaching and learning processes. Most of the teachers interviewed confessed that they do not have enough time to plan for ICT integration in their teaching. They pointed out that the time allocated for a lesson (that is, 40 minutes allocated for each subject in a day) is not enough for the teacher to explore the digital tools during the lesson. In case of technical problems, the lesson is disrupted and you end up cheating the learners' time. This also affects their ability to complete tasks and complete the syllabus in time for examinations, which are a priority in the Ugandan context.

Another challenge highlighted is the inadequate or non-existent digital tools. This is a challenge in most schools. Although the government, through the National ICT Policy (2014), has provided some ICT infrastructure to schools, this has mostly covered urban secondary schools leaving the primary schools in rural areas at the mercy of a few donors.

Despite the efforts Uganda has put in implementing the Rural Communications Development Policy (2001) to address universal access of ICT and internet, there are still substantive gaps. In Luweero where the selected schools are located, power supply and slow internet are still a big challenge. Most of the teachers interviewed reported that they are overwhelmed by the high and unfair taxes imposed on internet services. One of the administrators told us that he would rather invest the money he is supposed to use to buy data bundles in buying manila charts and markers for his teachers than "waste" it on internet that he may fail to use due to the low speed or the intermittent power supply.

From the keen observations made by the TEP team, most teachers portrayed a form of unwillingness to embrace new technology. This is mainly because of the attitude they have towards digitalising their teaching and learning. And yet, for change and growth to happen, someone needs to change the way they think or feel about something and embrace a growth mind-set.

HOW TEP IS ADDRESSING THE CHALLENGES

The Teacher Empowerment Platform, with the primary objective of building the capacity of teachers to integrate ICT and embrace the use of participatory learner-centred methods in teaching and learning, has carried out capacity building projects for teachers with the aim of providing teachers with skills, knowledge about the importance of using ICT in the teaching and learning, and the confidence they need to handle and use the digital tools. TEP has trained over 123 teachers in basic ICT skills and provided the teachers with a foundation of building their understanding of technology integration in the teaching and learning processes. While some teachers have the requisite ICT skills, they may not know how to use ICT as an important part of instructional delivery. Teachers are encouraged to deeply think of some of the instructional strategies needed to infuse technological skills into the learning process.

TEP has partnered with different agencies (both governmental and non-governmental) who share the same passion for education. Through the collaboration with 1Million Teachers, a unique reward-based teacher development programme designed to keep teachers engaged, motivated, and excited about learning and teaching, TEP has secured over 50 scholarships for some teachers to pursue the 1Million Teachers online course (www.1millionteachers.com). Teachers are becoming lifelong learners because of this collaboration. Their computer skills are being perfected, teachers are also becoming mentors to other teachers and their learners, thanks to this course. The 1Million Teachers (1MT) online course aims to close the gap of shortage of qualified teachers by attracting new teachers into the profession, training both new and existing teachers, and motivating them to keep improving their performance through the comprehensive reward-based development programme that combines high quality online and classroom-based training with mentorship on a scale never attempted before. The Web-based component incorporates gamification, best practices that engage participants and motivates them to keep learning. 1MT leverages on machine learning and artificial intelligence to create bespoke training of teachers on a large scale. The 1million course's curriculum covers all the essentials of teaching from what a teacher needs to know to be effective, classroom management and culture, school leadership, learning and motivation and special needs among others. One of our teacher's testimony can be found at the appendix.

Since teacher collaboration is a powerful engine for change, TEP has created online and offline platforms where teachers from both primary and secondary school levels meet and interact, collaborate, share materials, best practices and information for continuous professional development. These include the WhatsApp mentorship groups for the different subjects on which connect over 100 teachers; the Facebook account with over 700 followers; and an online file sharing system on Google Drive (every teacher can access this on a smartphone) to help teachers seek support, share experiences in handling learners, share helpful teaching resources and lesson plans while improving their confidence. With the increasing numbers of Ugandan teachers able to use digital tools like smartphones and access the internet, this is a great way to make professional development accessible to them while encouraging the culture of collaboration hence helping teachers acquire skills for efficiency and self-reliance.

Every school term, TEP organizes edu-gatherings for teachers and educators. This is a face-to-face collaborative meeting in which teachers and educators come together to discuss key topics. The first one of the kind was organized on 8th February 2019. The 15 teachers who attended discussed what education for the next generation looks like. Another edu-gathering was organized on 6th April 2019. About 50 teachers, school administrators and educators from private, public and social sectors were in attendance, discussing how continuous professional development of teachers (CPD) can change the world. It is in these gatherings that teachers amplify their voices to be heard. They share how they manage their time while integrating ICT into the teaching and learning process; how to handle students who know more than you do; how to utilize any available digital tools; and how to prepare to take advantage of any available opportunities. This model has been a success.

Generally, it is accepted that digital tools have the potential to enhance teaching and learning (Roschelle, Pea, Hoadley, Gordon, & Means, 2000). At TEP, we could not agree more; hence our continuous efforts to support teachers.

EFFECTS OF THE TEP PROJECTS ON TEACHER PERFORMANCE

TEP has organized several ICT training workshops for teachers and also trained them on learner-centred methods of teaching and learning. Teachers are now integrating ICT in their teaching and learning processes; lessons are more engaging than ever; and learners' grades are improving. Both teachers and learners are becoming lifelong learners because of the ICT lessons and the deeper understanding of instructional technology in line with pedagogical issues; for example, most of those who attend TEP training workshops regularly say that they now use the available digital tools to teach all subjects and are collectively impacting thousands of learners in their different schools. Some teachers are already competent and confident with using technology.

Teachers who received the ICT basic skills have started using connection-based learning with their pupils. Through the Empatico project, a teacher at Lusenke primary school connected his pupils with a partner classroom. Pupils in rural schools are sharing experiences with pupils from other schools. They are peer teaching and learning from one another and are very enthusiastic about learning. Teachers are also training their pupils in handling digital tools, hence championing self-directed learning in different settings.

TEP organizes refresher trainings for teachers from the three schools in Luweero district at the beginning of each term. The workshops are to familiarize teachers with the learner-centred approach of teaching and to help teachers to understand differentiation of learners. The teachers are taken through the process of understanding the different types of learners in the class. This focus was used to usher the teachers into a new year with new students joining their classes from different classes and schools. It is from this training that the audience was left with the quote by Albert Einstein: *"Everybody is a genius, but if you judge a fish by its ability to climb a tree, it will live its whole life believing that it is stupid."*

In one of the workshops, teachers were asked to participate in an exercise where they were tasked to plan a lesson focusing on at least one of the basic elements of differentiation (i.e., interest, readiness or learning profile) in mind. Every group was given an opportunity to discuss and present their lesson plans and explain the details to the other participants. The teachers also discussed capacity building and branding, building relationships, and professional growth and development. At the end of the training, a feedback form was distributed to all the teachers and 65% of the members suggested that, to make the training better, it should last for more than a day so as to give ample time to practice the different activities. About 85% of the participants emphasized the need for further training on professional development; while 99% of the participants said they believe every child is capable of learning; and that it is up to the teacher to devise means to make every child in the classroom learn. The participants very much very much appreciated the session on differentiation because it opened their eyes to see beyond what they had been seeing.

Follow-ups have been made by the TEP Team on 83% of the teachers who were trained, to see if they were implementing the strategies for creating learner-centred learning environments. Mentors' reports indicate that 51% of the teachers said their classes were more engaging than they were before. Another 28% of the teachers said they still need support to learn how to group their learners meaningfully (differentiation) and help them learn in groups, and 4% of the teachers are still struggling with fixed mind-sets.

Through social media and direct connections, teachers have been connected to other teachers from different schools. For example, Lusenke Primary School in rural Luweero has been linked to GEMS Cambridge International School in Kampala city, for mentoring, motivating and supporting each other so as to achieve quality education for all learners. The teachers have formed a unique learning relationship.

CONCLUSION

The experience of TEP in Luweero district of Central Uganda suggests that the biggest challenge to digitizing learning in rural schools is the teachers and school administrators' mind-set. Notwithstanding the technical, policy and technological impediments that stand in the way of adoption of technology-mediated learning, a change of mind on the part of teachers and school administrators goes a long way in making what appeared impossible possible. Continuous professional development that engages with the teachers and school administrators' fears and provides opportunities for reflection, discussions and hands-on practice is a clear pointer to a way out of this impasse. The ministry of ICT together with ministry of Education and the National Curriculum Development

Centre should acknowledge the fact that teachers need to develop a foundation upon which to build their understanding of technology integration and therefore ICT integration should be included in the primary curriculum and the practice encouraged by the ministry because technology integration is a process of instructional preparation and should not be treated as a separate entity. More insights may be gleaned from TEP's efforts to scale-up this apparently fruitful intervention to a wider population, with more partners, and over a longer period of time. In the meantime, however, the TEP intervention is achieving the intended effect on the adoption of ICT for education in rural schools in this particular context.

References

AECET (2019). Association for Educational Communications and Technology website. Retrieved from: https://www.aect.org/

Aguti, J. N., & Fraser, W. J. (2006). Integration of Information Communication Technologies (ICTs) in the Distance Education Bachelor of Education Programme, Makerere University, Uganda. *Online Submission*.

Bingimlas, K. A. (2009). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia journal of mathematics, science & technology education*, *5*(3).

Cheah, P. K., & Merican, A. M. (2012). Education Policy: A Case Study of Digitizing Education in Malaysia. *Procedia-Social and Behavioral Sciences*, *69*, 1714-1718.

Dahlström, M., & Doracic, A. (2009). Digitization Education. *D-Lib Magazine*, *15*(3/4), 1082-9873.

Farrell, G. (2007). Survey of ICT and education in Africa: Uganda country report.

Hassler, B., Hennessy, S., & Hofmann, R. (2018). Sustaining and Scaling Up Pedagogic Innovation in Sub-Saharan Africa: Grounded Insights for Teacher Professional Development. *Journal of Learning for Development*, *5*(1), 58-78.

Mandela, N. (2014). Education is the most powerful weapon which you can use to change the world. *Computer*, *8*, 45pm.

Mortion, S. (2004). Emerging technologies for teaching and learning. *Concordia university. Available@ teaching. concordia. ca/index php*.

Mutonyi, H., & Norton, B. (2007). ICT on the margins: Lessons for Ugandan education. *Language and Education*, *21*(3), 264-270.

Robertson, J. W. (2003). Stepping out of the box: Rethinking the failure of ICT to transform schools. *Journal of educational change*, *4*(4), 323-344.

Roschelle, J., Pea, R., Hoadley, C., Gordon, D., & Means, B. (2000). Changing how and what children learn in school with computer-based technologies. *Children and Computer Technology*, *10*(2), 76-101.

Sánchez, J. J. C., & Alemán, E. C. (2011). Teachers' opinion survey on the use of ICT tools to support attendance-based teaching. *Computers & Education*, *56*(3), 911-915.

Ssewanyana, J. K. (2007). ICT access and poverty in Uganda. *International Journal of Computing and ICT Research*, *1*(2), 10-19.

UN General Assembly. (2015). *The Sustainable Development Goals (SGDs): Transforming our world*. Retrieved from New York:

APPENDICES

Teachers at the first TEP EDU-Gathering sharing ideas on education for the next generation (2019) lusenke pupils on a skype call with a partner classroom

Teachers and TEP team at the second Edu-Gathering (2019)

TESTIMONY OF ONE OF THE TEACHERS

The Heart of a Teacher: In praise of the One Million Teachers project

One Million Teachers project has brought teacher enrichment to our fingertips. Gone are the days one needed a desktop to undertake an e-learning project. With One Million Teachers all you need is an internet embedded smart phone.

The training itself takes you through a wide range of topics from critical thinking to teachers as leaders in a changing world, class management to managing stress and the learning growth mindset. As you train, learning styles come in handy, the universal design for learning takes you through global trends and you are bettered through personal development lessons. As teachers we are reminded on lesson planning, poverty issues in and out of the classroom. You are retooled on pupil management, team management, the thinking classroom and professional conduct of teachers. I would endlessly pour out the richness of this project but phew let me skip to something else. 1MT has created a community page where members share experiences on the teaching learning process across the globe. On this platform teacher share challenges, highs and lows of this Nobel profession. Allow me applaud Team 1MT for handling questions and quarries on this same platform in a timely and professional manner. The road to this project has been made smother through my interaction with Teachers Empowerment programme. TEP as we fondly call it as bridge to 1MT has made it possible for us as teachers to reach out to one another share ideas to make education better for generations to come. Through partnering with One another 1MT and TEP are taking inroads to making education best for all. As you take the train journey with One Million Teachers and Teachers Empowerment projects you will further your understanding to learn to review one's work with a critical eye and encourage pupils and students to evaluate their own work, identify their own success criteria in an inclusive classroom.

Dr. Seuss puts it clearly “The more that you read, the more things you will know, the more that you learn, the more places you’ll go."