Teacher Leadership in Developing Digital Skills for Improving Teaching and Learning in Secondary Schools: A Case with Community Day Secondary Schools in Phalombe

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Abstract: The essence of this study is to explore teacher leadership skills in developing the digital skills for improvement of teaching and learning in rural secondary schools. Previous studies by other researchers have underlined the problem of teachers' lack of digital skills, which means that they cannot act as competent mentors for their students. Teacher leadership today must consider the pedagogical use of digital technological skills to prepare teachers and students for their future practice. Digital devices and applications for the classroom are here to stay, so educators must be equipped to use them. We believe that by leveraging the power of connectivity and technology young people can benefit from new and broader ways of learning. For teachers, digital tools, like Microsoft Teams, enable them to plan and deliver lessons via technology so they can better track the efforts of the students and quickly spot if someone needs further assistance. As our urban secondary schools digitalise, concerns around equal access to resources and the lack of digital skills to operate virtual learning tools in rural community day secondary schools have been at the centre of the conversation. Connectivity and technology tools alone do not guarantee improved learning outcomes but also development of digital skills in teachers to help in improvement of learning in students. This qualitative research used a sample of five rural community day secondary schools in Phalombe District with the sample population of about twenty teachers, four from each school. Questionnaires and interview questions were used to collect the data.

Keywords: Digital competence/skill, teacher leadership, teacher leadership skills, rural community secondary schools.

1. Introduction

The concept of teacher leadership is now widely accepted and increasingly discussed among practitioners, researchers and educational scholars, particularly in the educational leadership field (Murphy, 2005). The growth of teacher leadership is attributed to teacher leadership's role in developing and improving schools. Teacher leadership aims to promote student learning and achievement, including to develop the school organisation altogether (Wenner & Campbell, 2017). Besides, Nguyen and Harris (2019) asserted that teacher leadership seeks to enhance teaching quality, school effectiveness, and student learning. Wenner and Campbell (2017) argued that in working towards change and school improvement, teacher leaders' roles transcend the classroom walls. Among the roles outside the classroom include helping other teachers, providing professional development programs for other teachers through professional learning communities (PLC), and getting involved in policy and decision-making at certain levels in school. Thus, teacher leadership is seen as leadership across school boundaries (Muijs, Chapman, & Armstrong, 2013).

In the development of leadership role issues in education, many studies have been conducted on principals' leadership (Crowther, (1997) and (Sashkin, and Sashkin,1993), as opposed to the role of teacher leadership in the development of digital skills to improve learning in the classroom. According to Banathy, (1991), systemic change is any change that occurs in a part of an organizational system that affects the whole organization, and consequently, will bring new changes to the organization. When this systemic change is linked to the role of teacher leadership, understanding the role of teacher leadership is a unit that will affect the overall effectiveness of a school. The difference in achievement of students in the school is also influenced by the significant differences in the teachers who contributed to the excellence of the school.

Education is a child's right and, therefore, it must be accessible and present in all geographical areas (Smith, Hyry-Beihammer, & Raggl, 2015), both rural and urban ones. Regardless of where rural communities are located: in remote regions, in the countryside, in forests or mountains (Dube, 2020) and, despite the fact that they generally have fewer connections (Townsend, Sathiaseelan, Fairhurst, & Wallace, 2013), the right to access the education system has been largely enhanced in recent years thanks to the development of the digital age (Li, Brar, & Roihan, 2021). All the same, large differences still exist between urban and rural geographic areas, both in respect of infrastructure quality (Molina-Pacheco & Mesa-Jiménez, 2018; Roberts, Beel, Philip, & Townsend, 2017) and concerning the performance of educational practices (Bhuasiri, Xaymoungkhoun, Zo, Rho, & Ciganek, 2012), where rural areas show lower availability, adoption and use levels

when it comes to new educational technologies (Salemink, Strijker, & Bosworth, 2017).

These disadvantages likewise become evident among teachers who work in rural areas, due to the lack of digital resources (Park, 2017), the low social and economic viability of sustaining technological improvement (Cristobal-Fransi, Montegut-Salla, Ferrer-Rosell, & Daries, 2020) or even the absence of teacher training (Kumar & Kumara, 2018; Xie, Tosto, Chen, & Vongkulluksn, 2018): in short, this results in a persistence and increase of the aforementioned digital gap during the last few years. Furthermore, non-governmental organisations are tasked with providing infrastructure and ICT resources to rural schools in many geographical areas around the world, which means that these schools do not benefit from government subsidies and policies (Rana, Greenwood, Fox-Turnbull, & Wise, 2018). This situation greatly hinders the exchange of scientific knowledge and innovation in such rural areas (Jiang & Chen, 2018). Nonetheless, without a doubt, one of the main barriers for teachers is that "we are so busy in school and in our private time… so… how will we be able to find time to meet other teachers and work with them in any professional learning projects with technology?" (Jamil, 2018).

Another added difficulty lies in the fact that, as Johnson and Lichter (2019) point out, rural villages with few inhabitants are the most likely to see another exodus, which eventually leads to the closure of rural schools. If innovations in rural schools are not considered, obviously this will hinder the performance of the students. Faced with this context, if teachers want to comply with the new educational requirements, they must not only make use of the necessary infrastructures and resources but also be provided count on extensive digital training (Othman, 2020) that allows them to implement technologies with a more pedagogical than technological approach (Käck, 2019). In this sense, digital resources have a direct effect on the behaviour of teachers (Artuso & Graf, 2020), who definitely need to reconsider how they teach so that they can effectively integrate ICTs into quality training processes (Pettersson & Näsström, 2020), adapting ICT to each context, especially in the rural environment (De Souza & Garcia, 2019). However, according to (Yang, Zhu, & Macleod, 2018), rural teachers do not fully adapt emerging technologies to their educational context, which not only hinders the teaching-learning processes but also hampers interactions with the educational community (Donitsa-Schmidt & Ramot, 2020), even though it has been demonstrated that online communication favours student attention in rural areas Koerwer (2007). As Räisänen and Tuovinen (2020) point out, in order to achieve digitalisation in rural areas, we need confident people who, in addition to being good communicators, know how to promote digital innovation. Concerning this, it becomes necessary to state that rural teachers willing to integrate ICT into the teaching and learning process must have a positive attitude towards that ICT integration (Wang, Tigelaar, & Admiraal, 2019). Research has shown that strong links exist between positive attitudes towards digital educational resources and the likelihood of ICT integration (Taimalu & Luik, 2019).

In brief, traditional face-to-face teaching is arguably no

longer sufficient in the current era, which makes it essential to reinvent new ways of teaching and communication (Plessis & Mestry, 2019), redesigning methodologies and activities (Stenman & Pettersson, 2020) and using e-Learning platforms (Golikov et al., 2018), digital educational resources (Hunt etal., 2015), or even smart phone apps (Nedungadi, Menon, Gutjahr, Erickson, & Raman, 2018). These new educational processes go beyond classroom walls, making it more urgent than ever to establish new and operational channels of ongoing communication and interaction between teachers, students and families (Macdonald & Hill, 2021) —especially so in rural environments— to provide the educational support required (De Metz & Bezuidenhout, 2018).

Nevertheless, in order to establish such channels, teacher leaders and teachers must have a high degree of digital competence or skills, at expert level, so that they can draw the 4 maximum benefits from educational technology when it comes to improving their teaching and learning processes. This applies to communication in particular, both with students and with their families, and even with other colleagues, i.e. involving each and every member of the educational community.

Teacher leadership today must consider the pedagogical use of digital technological skills to prepare teachers and students for their future practice (Krumsvik, 2014). Moreover, Judge and O'Bannon (2008) note that previous studies have underlined the problem of teachers' lack of digital skills, which means that they cannot act as competent mentors for their students. It is therefore the essences of this study to explore teacher leadership skills in developing the digital skills for improvement of teaching and learning in rural secondary schools.

Van Dijk (2005) defines digital skills as a collection of skills needed to operate digital technologies like computers and their networks: to search for and use information for one's own purposes. He divides the concept into three types of skills: operational skills (skills used to operate hardware and software), information skills (skills needed to search, select, process and evaluate information from computer and network sources) and strategic skills (capacities to use digital sources to achieve specific and general goals). Further, he acknowledges that the development of digital skills can occur through formal and informal approaches. Formal approaches in this context refer to organised and structured training systems with learning objectives in school or the workplace. On the other hand, informal approaches denote developing digital skills from daily experiences and interest. Consequently, the development of digital skills is often a matter of learning through practice, by trial and error, and with help from peers (Van Dijk, 2005). It is because of this that this article saves to answer questions as follows:

i. What are the facilitative conditions that support teacher leaders to develop digital skills for teaching of their school teachers?
ii. What are the challenges and barriers experienced by teacher leaders for developing digital competence of their school teachers?
iii. What are the initiatives undertaken by teacher

leaders toward developing digital competence of their fellow teachers?

iv. How do teacher leaders acted as change agents in developing the digital competence of their school teachers?

v. How do teacher leaders acted collaboratively and collegially support their school teachers to develop digital competence for teaching?

vi. What are the lessons learned from this research about teacher leadership in developing digital skills for improving teaching and learning in secondary schools?

2. Methodology, Sample and Sampling Process

A. Methods

This research adopted a qualitative approach to explore teacher leadership in developing digital skills or competence for improvement of teaching and learning in rural community day secondary schools. This study sought to explore and understand the meaning the participants attribute to teacher leadership and digital competence or skills. The research questions involved emerging questions. Data was generated through interaction with the participants in their setting. A case study was undertaken in five schools, using qualitative research approach. The case in this study is five rural community day secondary schools that are situated in the same district. Some schools have yielded outstanding results over the years but they are situated in marginal areas, that is, why they are called rural secondary schools. The rationale of the method was to actively engage participants in constructing their unique understanding of teacher leadership in developing digital skills or competence for improvement of teaching and learning in rural schools. The data was therefore generated in five rural secondary schools situated in the same district. The conversations between the participants and the researcher took place within the participants" environments. The whole focus of the process was on the principal and other teacher leaders.

B. Sampling and Sample Size

The non-probability sampling was selected for this study. In view of the fact that a small group of teachers was targeted as participants in the study, this was small-scale qualitative research. The small-scale research was conducted in five rural secondary schools in Phalombe District, Malawi. The sample comprised the following participants: three principals (one from each school), one head of department, form teachers and a teacher. The total number of participants was four from each school making twenty.

3. Findings and Results

Below are the themes obtained from the responses given to the research questions (code) by the participants (P1, P2,.., P20) in the study and quotes from texts that led to the formation of these themes.

A. How do you communicate with students and other teachers during any activities carried out at the school or outside the school?

It has been understood that most of the participants in the study do communicate in different ways. For instance (N=20, P) have the common responses such as:

1) Classroom verbal communication when teaching the students

P5: *"Our common communication method is through verbal which is done in the classroom when teaching and learning process is taking place. This is so because we are all accessible both students and teachers. It also takes place during assemblies".*

P14: *"it is easier to communicate using verbal communication method which is done in the classroom when teaching and learning process is taking place".*

2) Waiting when the calamities come to an end

P4: *"Most of the schools just wait until the calamities come to pass. This is when teaching and learning begins. This proposition is due to our rurality. As you can see most of the schools are located to rural areas which are marred by a number of factors such that they remain closed".*

P7: *"At our school, teachers just wait until the calamities come to an end. This is when teaching and learning begins. This is due to that it is situated in a rural area. As you can see most of the schools are located to rural areas which are affected by a number of factors such that they remain closed".*

3) Through radio programs like Tikwere Programs

P11: *"As for the students, it is easy as well to communicate learning activities through radio programmes organized by the government. MBC radios and other radios have these programmes where students get information".*

P18: *"The students get communication about their learning activities through radio programmes organized by the government called Tikwere on MBC radios both 1 and 2".*

4) Sending hard copies to students to work in groups after school hours at home and in holidays

P1: *"The school photocopy materials that are sent to students who work in community centres after they are through with the work, two teachers are sent to collect the learning activities to mark. This happens every time students are at home even during holidays".*

P20: *"The schools photocopy learning materials and sent to students who work in their community centres. Students are given a period of a week to work on the materials in their prescribed groups after that two teachers are sent to collect the learning activities for marking. Apart from that, they also deliver other copies to the students. This happens every time students are at home even during holidays".*

The participants differ in their responses for the following themes based on schools advancement. This is to say some schools are large and others are small. Their enrolments are different and as such they may differ as well in terms of asserts. Some have asserts that help them to facilitate online learning.

5) Online communication devices such as whatsApp and facebook

Almost eight (N=8) participants (P2, P3, P4, P6, P10, P15,

P17 and P19) from different schools have common views on this response while about (N=12) 12 participants have a different views from the eight participants as recorded below

P2: *"As for me I organize online learning through simple communication apps. I normally accept my students to be assisting one another through WhatsApp and Facebook. In here, they share notes and experiences".*

P6: *"As for me I organize online learning through simple communication apps. I normally accept my students to be assisting one another through WhatsApp and Facebook. In here, they share notes and experiences".*

P4: *"I organize online learning through simple communication apps. I normally accept my students to be assisting one another through WhatsApp and Facebook. In here, they share notes and experiences".*

P10: *"I normally accept my students to work through online using devices on WhatsApp and Facebook. In here, they share notes and experiences".*

P11: *"It is difficult to do this method of communication to learners as it promotes illusion of cultural aspects and again due to economical disparities, some cannot afford an android phone and data for this process".*

6) Through digital devices of various kinds

P8: *"I have linked my students with the digital devices which have Classroom Google and Google Meet".*

P11: *"My students are able to use Moodle even though they face many challenges due to internet failures".*

P20: *"As for me I use some apps such as Malawi Learn as well as Skilled and many more for easy communication about teaching and learning. Some of these become difficult to use such as skilled but still more, few learners are able to cope up with these new technologies".*

B. What are the Facilitative conditions that support teacher leaders to develop digital skills for teaching of their school teachers?

According to the majority of the participants (N = 18), there are several facilitative conditions that support teacher leaders to develop digital skills for teaching of their school teachers. These conditions are:

1) Teacher leaders should be knowledgeable enough with digital skills

P1: *"Well yes it requires teacher leaders to be knowledgeable enough on digital skills development. Like myself I am far behind the technological devices that I find it difficult to teach my students using these devices".*

2) Should be inquisitive in lifelong learning

P3: *"I suggest this is very significant. Teacher leaders should be inquisitive in lifelong learning".*

P7: *"if possible, government should allow the teachers to further get proper education on digital skills development through teacher continuous professional development".*

3) Initiative enough

P18: *"teacher leaders need to be initiative enough. We can manage working on digital devices by our own initiative, for instance, getting someone who is capable of doing this and help teachers in the schools in developing these skills through*

departmental meetings, and even at a school level".

4) Probing help of funds from other sources to fund programs related to digital competence learning at school level

P20: *"teacher leaders needed to search for funds from other areas such as organizations to fund the school so that all teachers should participate in courses aiming at developing digital competence / skills so that they help students".*

5) Encourage others to learn and use digital skills in the school programs

P14: *"It is very significant that teachers should still be learning and use the digital skills on their own if the devices are available such as computers. We might also use our friends to help us be conversant with these skills".*

6) Must be aware of negative effects of misuse of digital devices by other teachers or students

P7: *"Well, Digital Skills / Competence can affect teachers and students who misuse it. Like myself, I even advise my fellow teachers and students to be aware that these possess effects can negatively them. So, they should be using these devices wisely with the intended goal".*

C. What are the Challenges and barriers experienced by teacher leaders for developing digital competence/skills of their school teachers?

Three quarters of the respondents (N = 15; P1, P2, P3, P4, P6, P7, P8, P9, P11, P13, P14, P15, P17, P19, P20) pointed out that there are many challenges teacher leaders experience when developing digital skills of their teachers in various schools. While five of the other participants did not declare any ideas on the topic (N=5; P5, P10, P13, P16, P18). According to participants, in developing digital skills, teacher leaders are affected by the following challenges:

1) Lack of investment in initial teacher training and, even further, in continuous teacher professional development

P1: *"Challenges are there and one them is there is low funding in schools that they cannot manage to do some continuous teacher professional development. Most of the teachers could be helped so much because they lack some skills which were supposed to be developed while they were attending initial teacher training".*

2) Lack of power to drive the computers and other accessories used in teaching through digital devices

P12: *"Malawi is a home of blackouts, so being found in rural areas is also an addition barrier because these areas are ignored if they want to share power".*

3) Lack of technical knowhow in digital devices by most rural teachers such as lacking

knowledge of operating the devices and some application.

P4: *"I do not operate these digital devices because I do not have knowledge on how I can operate".*

4) Poor network in the rural areas that hinder the process of teaching through digital devices

P11: *"Our rural students do not learn greatly due to network problems likewise teachers".*

5) Lack of political will

P6: *"In the part of the government for example Ministry of Education, it lack political will by not funding the schools with*

a lot of money for purchasing the equipments to be used in the teaching and learning process such as buying laptops and even tabs for students and teachers".

6) Inadequately orientation towards the teachers' and students' building of the said 21st century key skills and competences

P15: *"When new things have been developed, teachers and students had to be oriented. However, we are just been provided with the material and start teaching hoping that teachers can do for themselves".*

7) Inability to develop innovative ways of using technology to enhance the learning environment, and to encourage technology literacy, knowledge deepening and knowledge creation

P20*: "Some of us find it difficult to use technology since we were born before the computers. Even using Android phone is something we see unprofitable".*

8) Teachers' perceptions on digital competence

P3: *"I do not find digital usage very important because they are bad. So I don't want to be involved in this. I will be teaching my students using the old style".*

9) Teachers' limited ability to integrate technologies into teaching and learning in a way that extends beyond the sporadic use of digital tool

P14: *"Most of us have limited ability to use these technologies when teaching. We don't know how to operate such devices such as Power point projectors".*

10) Lack of development of different frameworks for digital competence of teachers in educational system

P1*: "Our education system lacks frameworks for digital competence of teachers. We just use what other fellow Europeans have developed. Had it been we developed our own frameworks, it would be of great help to the teachers. They could never been forgotten".*

D. What are the Initiatives undertaken by teacher leaders toward developing digital competence/Skills of their fellow teachers

Almost twenty (N=20) participants (P1, P2, P3,....,P20) from different schools have common views on this response.

1) Improving teachers' continuous professional development on digital competence through teacher training

P1: *"Teachers needed to attend CPDs on development of these digital skills so that they should gain technical know how".*

2) Planning the use of digital media and information and communication technologies in the learning process

P2: *"All this could be easier had the MOE make a framework and teachers could be using that. However, as leaders, it is applicable to suit the world today by incorporating this in teaching and learning process".*

3) Orienting teaching to the available cognitive and social learner experience, digital experience

P2*: "As leaders, it is applicable to suit the world today by incorporating this in teaching and learning process".*

4) Planning teaching and learning process oriented towards the mastering of key competences specified in digital competences

P15: *"More vital indeed if as teachers we plan our work which is oriented towards the mastering of specified digital competences".*

5) ICT use for the attainment of subject-specific teaching-learning goals and for ensuring interdisciplinarity

P18: *"In all subjects there should be an inclusion of ICT. This should not only be found in specific subjects like Computer Studies".*

6) Personalisation of learning activities and tasks, and differential student support, by means of ICT

P15*: "In all subjects there should be an inclusion of ICT. This should not only be found in specific subjects like Computer Studies and again all tasks should be personalized to support student clearly".*

7) Improving in textbook selection, e-textbooks and digital resources that suit the rural environment

P10: *"As Teacher leaders we are of great help to students. We need to improve the textbooks so that the resources should suit the environment".*

8) Recording and Analysing student achievement, by means of digital tools including (e.g. e-registers, digital student portfolios)

P7: *"I used to record the data about the achievement of students by digital tools and again we need to start e-Registration as what the MANEB has done this year by registering students when writing examinations".*

9) Changing teachers' perceptions on digital competence

P9: *"I needed to change my perceptions on digital competence. I should start loving this 21st century technologies to improve teaching and learning".*

E. How do teacher leaders acted as change agents in developing the digital competence of their school teachers?

1) Providing platforms for discussions on digital competence or skills

P14: *"First of all, in the programs, it is essential to have platforms for sharing of experiences".*

2) Making sure funds are available at a school level for the purchase of small gadgets for teachers such as ICT materials

P20: *"At school level teacher leaders must make sure that funds are available so that teachers should be assisted in developing digital".*

3) Involving learners in the teaching and learning process through digital devices

P5: *"Teachers must involve learners in the teaching and learning process through digital devices".*

4) Allowing learners to use the digital devices perfectly in the lessons and try to advise them not to use it in bad intentions

P2: *"By allowing learners to use digital devices can help us so much. Tell them its effects so that they only use for intended purpose".*

5) Sharing e-textbooks and other digital resources that suit the learners and teachers for them to use at their own time

P8: *"Teacher leaders should start sharing the recommended resources to teachers and learners".*

6) Incorporating teacher continuous professional development at school level as per the requirement of the ministry of education

P5: "*CPD if it is 60 percent will enhance knowledge of the teachers (...).*"

7) Integrating technologies into teaching and learning in a way that extends beyond the sporadic use of digital tool

P12: "*I suggest that technologies should be integrated in teaching and learning. As a leader I am in forefront doing this so that my friends follow suit*".

F. How teacher leaders acted collaboratively and collegially support their school teachers to develop digital competence for teaching

1) Working as a team

P1: "*Our school encourages team work. This is significant so much*".

2) Mentoring

P5: "*Teacher Leaders are mentors. They collaborate with other teachers in shaping this world*".

3) Through professional engagement

P9: "*As for me teachers require professional growth.*"

4) Teachers need to be more critically competent when selecting appropriate digital technologies. In short they should use critical approach

P9: "*As for me teachers require professional growth.*"

5) Through interaction with others

P20: "*Interaction again is important in teaching professional.*"

4. Discussions and Conclusions

A. Teacher leadership was not well supported by national policies, nor is it well understood as a construct

Most examples of teacher leadership activities that were shared with the researcher were small-scale and informal initiatives that were intertwined at the community and classroom or student level. Few examples were provided of teacher leadership activities or innovation being taken up by governments at a systems level.

B. Teachers Reported Many Instances of Self-led Action ('Leadership')

Despite a lack of familiarity with teacher leadership as a concept, both teachers across studies area reported teachers taking action on their own to respond to their lack of digital competences. The teacher leadership was demonstrated by ensuring Learning Continuity. Teachers made valuable efforts to ensure learning continued through distance learning strategies. They normally use social media and messaging apps and other online platforms that focused on establishing school-home communication channels and raising awareness among families of the need to allow children to continue to learn and study while schools are closed, that is during holidays even in times of crisis like effects of Tropical Idai, Tropical Freddy and Covid 19, as well as ensuring that students return when schools reopen. Some teachers in high-tech contexts also reported innovations using. Given that not all students had access to connectivity or distance learning platforms, a key aspect of

teacher leadership in these contexts was ensuring inclusion and equity, for example, through translating learning materials and adapting materials to make them more locally relevant and appealing to students, to support each other even without connectivity through community learning circles. They were provided with photocopied materials which they were using in their groups in their communities. After a specific period teachers had to go to collect the responses from the learners in these community learning centres.

And again the government also did its part in a number of areas. In Malawi, according to (Masina, 2020), the education sector response to school closures has involved distance learning activities using radio, TV, and online platforms (Ministry of Education, Science and Technology, 2020). The MoEST has worked with the private sector (e.g. TNM) to provide free Internet for students in support of learning continuity. Participants' descriptions of teacher leadership were often associated with government-led initiatives, in which a small number of teachers were formally selected to deliver and record distance education lessons using TV and radio; however, such activities could not be considered examples of grassroots-level teacher leadership in the context of this study, based on our analytical framework (i.e., teachers were being asked or selected by their employer to carry out crisis education responses rather than initiating their own activities).

Some teachers did initiate and lead efforts informally to help maintain learning continuity. For example, teachers made use of WhatsApp and SMS to deliver notes and lessons, particularly to junior secondary students who were preparing to write national exams; those teachers who trailblazed the use of mobile phones to keep students connected and learning during school closures 'got other teachers onboard'. A stark contrast was noted, however, between the limited engagement of public school teachers and the 'constant' engagement of private school teachers, the latter being heavily involved with online learning activities, including the use of WhatsApp, Google Classroom and other platforms.

C. Teacher Networks Provided a Vital Foundation for Teacher Leadership

An interesting finding across the case studies was the extent to which teachers autonomously formed networks to provide support to one another and share innovations and solutions. Peer learning networks were significant for sharing experiences and supporting teachers' digital competences or skills. For example, teachers had to use Google Meet, WhatsApp and even Facebook and share their experiences.

D. Teachers Would Like to Be Supported as Leaders

When asked what is needed to help them play effective leadership roles during teaching and learning and for education system resilience, teachers across the case studies responded in similar ways.

1) Training on their roles as leaders.

Teachers noted that they had limited professional training and formal preparation on how their leadership could be harnessed during such a crisis. They also require time, mental

wellbeing, and decent working conditions to be able to engage in leadership roles.

2) More access and training in the use of technology, and greater connectivity

Teachers spoke of their frustrations with their lack of connectivity and access to technology. They hope to receive better training in the use of technology to support continuity of learning and home-school communications. Teachers suggested a need for a mix of technologies, including high-tech and low-tech solutions such as mobile-based apps. Far from rejecting a digital revolution, teachers want to play a central role in using technology – and not just during emergencies. This will help to improve the performance of our students.

3) Greater support for teacher leadership and collaboration for digital skills' development

Teachers reported that they want to continue to deepen and expand the networks they had established. They also recognized that technology can provide a key tool for teacher collaboration and problem-solving. As such if well supported with funds can make them to access the digital devices and use them to facilitate their leadership skills. The educational crisis brought a unique opportunity for wide-reaching virtual education communities, because teachers everywhere were affected, resulting in a rich talent pool for teachers to draw on for idea sharing and mutual support. Teachers in the case studies spoke about how they utilized educational applications, platforms and resources for peer-to-peer learning on new technological approaches, collaboration and collegiality, as well as for their own psychosocial and mental health support. Teacher networks were largely transferred to platforms such as WhatsApp, Facebook and Zoom. As a participant from one of the schools, 'Zoom meetings have been used to discuss how to assist the students. All teacher fellows share their experiences. We learn from each other's successes and challenges. It's been very 41 helpful. Therefore, teacher professional spaces and communities of practice can be expanded well beyond individual schools, if the teacher leaders are affording access to more varied expertise, skills and experience through trainings.

E. Facilitators and barriers to teacher leadership

- Moving on to barriers, teachers noted that lack of time and stress related to financial and health concerns were potential inhibitors of teacher leadership. Family needs, health concerns and economic challenges limit the chances of teacher leaders to develop digital skills and further limited the amount of physical and emotional energy that teachers had available for leadership activities. Teacher-led initiatives depended on collaborative work and professional development, which requires an investment of time. As one participant noted, 'teachers have to have time to study, to get together, to get motivated to innovate and lead.' In the context of COVID-19 school closure, there were extra demands on teachers' time in their personal lives -for example, caring for children at home, which may have had an unequal impact on the

capacity for teacher leadership among teachers who were mothers of school -aged children.

- There were also extra professional demands placed on some teachers. This wasespecially the case for teachers who go to school for remedial lessons which requires that they teach students during the day and then find time in the evenings or weekends to continue working with students who had not gone back to school.
- Lastly, a perhaps obvious but common challenge to teacher-led initiatives during school closures concerned poor and unstable Internet connectivity, particularly in more rural and remote areas, not to mention its costs. The reason that this is positioned as a barrier to teacher-led initiatives is that without access to ICT and relevant training during lockdown situations and school closure, the extent to which teachers can initiate, communicate and engage in student-focused initiatives is extremely limited. Teachers often expressed frustration that they could not do more for students during school closure, due to the limits on face-to-face interactions and lack of ICT to help compensate for such. Inadequate or completely absent training opportunities for teachers on the use of digital teaching and learning technologies was viewed as being a central impediment to teacher-led responses to school closures.

F. Lessons learned for teacher leadership to enhance education system resilience

During the interviews, participants shared their perspectives on lessons learned during this research fostering teacher leadership and resilience in the education sector more generally through developing digital skills. Three main areas for attention emerged from these views with the view that future efforts in these areas would help to stimulate teacher leadership during crises and more broadly: teacher recognition and support, ICT infrastructure and capacity, as well as initial teacher education and professional development.

1) Recognize and support teachers as leaders

We need to prepare our teachers to be able to take action in every time, every circumstance, every situation so that they don't see themselves only as people who transmit knowledge, but also see themselves as a change agent in society beyond education.

The need to recognize and support teachers as leaders and collaborative problem-solvers is a key insight emerging from the crisis education responses in the case study area. 'It's very important that teachers are considered leaders, as people with ideas who can offer solutions to problems. If they can see teachers as people who have ideas and solutions to problems, we can make a lot of strides'. Participants in the case studies typically did not think of teachers as leaders, and some were hesitant to embrace a role that they perceived as assigned to principals.

Thus, participants indicated that the need to recognize teachers as leaders and innovators is a change that must be reflected at all levels of the system, from government to school leaders/managers, and is important for building education system resilience for future emergencies.

Teacher leaders also need opportunities for continuous professional growth in order to develop their role, and time needs to be set aside for professional development and collaborative work and planning, as well as for the building of teacher networks. While the case studies have shown that teachers do obtain intrinsic rewards through leadership activities, such as increased influence, collegiality and benefits for students, these also came with strongly increased workload and responsibilities, often without adequate compensation. Some form of remuneration or reward for teacher leaders is critical for sustaining teacher motivation for leadership.

The research found that 'teacher leadership' could be a meaningful construct to teachers and education participants when it was introduced as a way of describing how teachers can collaborate and develop professionally through collective endeavors in ways that positively affect students and school communities.

2)　Extend and strengthen digital infrastructure and training

A further key lesson to be learned from the experiences of the countries in the case studies concerns the unavoidable dependence on digital technologies for teaching and learning in emergency education settings. For example, when schools closed and countries went into lockdown, digital learning tools became the primary means of continuing contact and interaction between teachers, learners and families. As discussed above, it was only in rare situations that teachers were able to physically meet with students in small groups and following safety protocols; for most teachers, phones, SMS, WhatsApp and online learning platforms such as Google Classroom offered the only means for them to reach their colleagues and students for academic purposes, to provide psychosocial support, and to share information and advice concerning staying safe in the pandemic.

The urgency of preparing teachers to use digital learning technologies was further underlined by a teacher in one of the study area who stated, we can't be left behind in the ICT revolution. It has awakened us to the dawn of an era that started long before COVID. That we cannot advance teacher training, teacher professional development, and teaching and learning, if our teachers are not equipped with the skills of this generation, which is ICT. COVID and other emergencies are not asking us to do anything that is strange, they are asking us to do things that we should have been doing, but we were dragging our feet.

As suggested by study participants, investments in digital infrastructure and training of teachers on the use of digital technologies for teaching and learning purposes, should be understood as helping ensure that enabling conditions are in place to help motivate and nurture teacher leadership and/or innovation. In the context of school closures, it was clear that having the ability to access and effectively use digital technologies was pivotal in facilitating collaborative problem-solving amongst teachers during school closures, and in turn,

their leadership and innovation. In sum, digital technologies and related infrastructure are not necessarily drivers of teacher leadership in and of themselves; however, we suggest that they may be critical antecedents for teacher -led initiatives during school closures.

3)　Reform teacher education.

Another key lesson concerns the need to reform pre- and in-service teacher education and training: 'now we have to change teacher education, to make sure teachers are prepared to deal with challenging adversities … especially focusing on the technological component of education. It was suggested by individuals across the participant groups in our sample study area that teacher leadership education and training practices must be reformed to prepare teachers to use distance and online technologies in what can be more individualized virtual spaces (e.g. one-on-one, small groups). The public school teacher must have access to trends, research data, new knowledge, emerging issues, new technologies in education, and the modern teacher cannot be connected with modern trends in educational development if they are not computer literate. So, this research has presented that opportunity to us, to modernize our teacher training and modernize our teachers and modernize our learning process.

In addition to integrating digital learning and preparing teachers to effectively use it in their professional practice, participants suggested the importance of reforming teacher education and training to explicitly and substantively address teacher leadership, to cultivate leadership skills and attitudes and to motivate teachers to apply these in innovative ways. Teacher education and training practices need to focus more on developing teachers' leadership capacities and motivation, something that was thought to be possible through the use of appropriate incentives (e.g. wages, resources, opportunities to collaborate with other teachers), because 'without adequate conditions, it is not possible to do the job well. For teachers to lead well, those conditions have to be in place.

Teacher research has been promoted as an extension of, or alternative to, traditional teacher professional development (Borg, 2015; Zeichner, 2003). This alternative presents opportunities for teachers to engage in self-reflective processes about their own practices (Zeichner, 2003), and personalize their professional development (Borg, 2015). In the current study, we adopted the stance taken by Borg (2015) and defined teacher research as a feasible, self-reflective tool that teachers can use to bring about change within their schools and classrooms. While this stance of research is data driven, the goal is often to focus on improving practice within the classroom or school system as compared to broader and more global impacts (Zeichner, 2003).

This conceptualization of teacher research aligns with the mission of teacher leaders as reported by Smylie et al. (2002) and Criswell et al. (2018). Zeichner (2003) found that when engaged in research in their schools that was teacher-driven, collaborative, and intellectually rigorous, educators took a more analytical approach to teaching, became more student centered, and felt empowered to make change with policy-based decisions in their schools. This research is often conducted

within the teachers' schools and classrooms. Related to the issue of the support system for teacher researchers being external to the school system is the question of what happens when these teacher leaders attempt to transfer the ideas for and findings from their research efforts into the school systems.

As Terhart, (2013), has noted, although educational researchers, school reformers and educational developers assume that teachers and schools await their programmes, proposals and new practices with baited breath, we should accept the fact that a considerable majority of teachers and schools in fact simply want to hear nothing of reform, innovation, new forms of teaching and so on.

G. Conclusions

Part of the research findings' analysis points to a mixed picture regarding the relation between continuous teacher professional development and their digital competences development. Here are some conclusions have arrived at:

- It is a very positive tendency that a large part of the study area, teachers are extremely active in terms of teacher training for improving their professional digital competences/skills.
- Most of the participants who completed the questionnaire evaluated that upgrading their digital competences/skills as a result of participating in teacher training, will be very significant.
- They even added that teachers have great impact towards students' digital skills development as a result of the learning process at school due to the teacher leaders' digital competence or skills. This makes it clear that students' performance will improve when teachers have been provided with training on digital skills. In this line of reasoning, it could be said that from the teachers' point of view there will be room for improvement in terms of teacher approaches, strategies and skills for integrating the new digital technologies in the educational environment if training will be provided.
- Another conclusion indirectly inferred from the findings is that teacher training courses in the field of digital technologies integration for educational specialists need to upgrade their quality in order to become an effective prerequisite of high digital competence/skills for teachers as well as for students for improvement of teaching and learning.
- In the Malawian context there are some gaps in the systematic and well-planned research of the degree of development and improvement of teacher professional digital skills, the results from which should become evidence for the creation of well-grounded policies for professional digital competence/skills development at the level of basic preparation and teacher continuous professional development as well as for concrete working practical solutions in the field. This requires the creation, testing and standardization of reliable research tools for measurements and evaluations in the field of digital competences as well as considering more varied research designs for looking into this phenomenon.

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