International Journal of Multidisciplinary Research and Development
www.allsubjectjournal.com
ISSN Online: 2349-4182 ISSN Print: 2349-5979
Received: 26-09-2023, Accepted: 12-10-2023, Published: 28-10-2023
Volume 10, Issue 10, 2023, Page No. 72-77

Teachers as catalysts for digital transformation and cyber security in schools: Lessons from northern region in Zambia

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Abstract
In the current digital age, technology plays a crucial role in education and teachers have a vital role in integrating technology into the learning process. This article explores the topic of teachers as catalysts for digital transformation and cyber security in schools, drawing on lessons learned from the Northern Region in Zambia. The paper highlights the importance of digital literacy and cyber security awareness in schools, and provide insights and strategies for teachers, administrators, and community members to promote digital transformation and enhance cyber security in Chongwe District. By leveraging digital tools and resources, teachers can enhance student engagement, personalize instruction, and foster critical thinking skills. Moreover, as cyber security threats have become increasingly prevalent, it is essential for teachers to be aware of the potential risks and to educate learners about safe and responsible use of technology. This topic provides valuable insights and strategies for teachers, administrators, and community members to promote digital literacy, enhance cyber security awareness, and create a safe and conducive learning environment for learners in Chongwe District of Lusaka Province of Zambia.

Keywords: Digital transformation, cyber security in schools, Zambia

Introduction

Digital transformation in school systems

We live in a world today where all aspects of human activities are characterized by the use of digital tools. As it has become clear that noting can be done without the use of technology, it therefore requires that a systematic and deliberate engage into the digital transformation in schools. By digital transformation, we mean the process of adoption and implementation of digital technology by school organizations in order to create new or modify existing products, services and operations into translating learning processes into digital formats. This is consistent with the definition given by https://www.compnow.com.au who defines digital transformation in education as all about making changes to the way students are educated mean anything from incorporating new technology into the classroom, to changing the way assessment and tracking, students' progress is done. They state that whatever changes are made, they should aim to improve overall student outcomes.

It must be also be understood that there are challenges of cyber security concerns associated with the use of digital use in the teaching and learning process which must as well be addressed in order to realize the full potential digital transformations

For the purpose of this paper, Cyber security is has been defined as a way on how individuals and organizations can do to reduce the risk of cyber-attack. As such, the core function of cyber security should mean to incorporate such activities to protect the devices used in the teaching process such as the smartphones, laptops, tablets and computers and the services accessed both online and at in school settings from theft or damage.

The paper also looks at the provisions of the Cyber Security and Cyber Crimes Act, 2021 of the Zambian laws which also notes that cyber security concerns tools, policies, security concepts, security safeguards, guidelines, risk management approaches, actions, training, best practices, assurances and technologies that can be used to protect the cyber environment, organization and user assets. The Act further deal with cyber security incidents which mean an act or activities on or through a computer or computer system, that jeopardizes or adversely impacts, without lawful authority, the security, availability or integrity of a computer or computer system, or the availability, confidentiality or integrity of information stored on, processed by, or transiting a computer or computer system. It is from this premise that the paper endeavors to highlight the need for educators and the community in Chongwe to pay particular concern with the real threat paused by cyber-attacks.

Understanding digital transformation and its benefits on education.

As alluded to earlier, digital transformation has world over including developing countries brought about significant changes in various aspects of human lives, which also include educational provisions. The proliferation of digital technologies and the internet phenomenon has made education become more accessible and convenient today than in any point in time. According to the survey conducted in selected schools in Northern Region of Zambia, below are some of the identified benefits of digital transformation, which are also consistent with finding highlights from the study done by Zhang, Mao & Yao (2023) [10].

Increased Access to Information; this allows learners across the geographical divide to access the immense amounts of information from anywhere in the world due to the power of internet. This is also true due the efforts government is making in ensuring that internet services are available even in rural areas. Learners are able to learn about any topic they

are interested in by simply searching for it online. This has opened up new opportunities for self-directed learning and has made education more democratic, as anyone with an internet connection can access educational resources.

Personalized Learning is one of such areas where using digital technologies, educators can customize learning experiences for each student based on their learning style, preferences, and pace. This makes learning more engaging and effective, as students are able to learn at their own pace and in their preferred style. With technology, teachers can track each student's progress and identify areas where they need extra help. This allows educators to give each student individual attention and ensure that they are making progress towards meeting their academic goals. Further, using the available digital technologies, teachers can are able to deploy new teaching methods and use simulations, gamification, and virtual reality to make learning more interactive and engaging. They can also use social media and other online platforms to connect with students and create collaborative learning environments. Further, benefits of digital transformation in schools include Performance tracking for students, Optimized outcomes using accurate data analytics, Curricula focused on the future, Stronger teacher-parent synergies and enables time-Saving opportunities in the processes of content creation, data saving and retrieval to highlight by a few (Vicente etal 2023) [9].

The other benefit of Digital transformation is that it makes it possible for Global Learning. The successful deployment of use of digital learning allows students to participate in online courses and enables the collaboration of students with peers from different countries there by befitting from deferent way of doing things and able to appreciate the diversities of cultural orientations. This approach broadens learners' worldview and helps them develop cross-cultural competencies that are essential in current globalized environment and as such, education institutions need concerted effort to make it possible for the full implementation of digital transformation.

The other area of focus about digital transformation in schools is an aspect of effective data collection and management of it. Data is usually collected from various educational and external stakeholders to help improve education delivery. Data is collected from parents, teachers, administrators, students and other agencies that provide valuable insights into how to improve the educational process. The purpose of data management is to speed up the process of managing data with a centralized system. This helps ensure that all stakeholders have access to accurate information in a timely manner. It also makes it possible for effective and timely report to various educational stakeholders such as District Provincial and national as well as for purpose of global information. This form of data management allows educators to compare the performance within and outside the institution.

Making schools more secure by protecting against cyber threats. The use technologies in schools provides IT support to manage and deliver on the requirements of a digital learning environment thereby enabling the full sensitization of learners against any possible cyber threats. Effective Cyber Security Incident Response: Education leaders are adopting digital transformation plans, which include cybersecurity incident response plans (CIRP). By doing so, they' are able to protect their infrastructure and data from potential cyber threats. In addition, this will also allow them to maximize their funding opportunities (National Assembly of Zambia, 2022) [2].

Case studies on the positive impact of digital transformation in schools

St. Peter's College positive adoption and use of technologies St. Peter's College is a highly ranked Independent, Anglican day and boarding school with 1,250 students located in Adelaide, South Australia. The school has undergone a whole-of-school digital transformation to provide its students with the best possible education. This transformation was made possible by a commitment to professional learning on the part of the teachers at St. Peter's College.

Before 2011, the technology at St. Peter's College was not effective due to the high demand of its students. To address this issue, the school created a detailed and effective plan of action to embark on a digital transformation. Part of this plan involved training teachers in a professional learning program that improved their digital confidence and ability to build technology-rich pedagogies. The strategy was then implemented through services such as technical support, device insurance and an iPad buyback program provided by Comp Now.

The project has helped St Peter's College optimise its digital strategy with services such as device management, content filtering and remote support from CompNow consultants who are involved at every step of the process. As a result of this implementation, the college has been able to incorporate technology into the curriculum in novel ways. For example, one class used Minecraft Education Edition to create an ancient civilization, and students showed their creations through virtual reality presentations. In another instance, the robots were developed from iPads which control them through code that students develop on the device.

It is challenging but effective, and it comes back to being inspired by the teacher. Walter Barbieri, Director of ICT at St Peter's College has learned that learning is about more than just technology (https://www.compnow.com.au).

A success story of Northmead Primary School adoption and use of digital Transformation in learning programmes Northmead Primary School pupils is one of the local success story about programmes involving the use adoption and use of digital transformation in school. Northmead Primary School pupils showcased unique inventions created under a first-of-its kind coding programme sponsored by Stanbic Bank Zambia. In July 2022, Stanbic launched a coding programme at Northmead Primary School aimed at driving technological innovation, which assists pupils in growing their awareness of technology. This programme centered on STEAM – five key subjects, namely, Science, Technology, Engineering, the Arts and Mathematics. Since launching the coding programme last July, over 30 students were taught basic technology uses as well as basic programming. Several pupils were exposed to technology, such as computers & Raspberry Pi, for the first time and were able to gain new knowledge. Additionally, these students worked on real-world problems to demonstrate their new-found knowledge by creating innovative inventions, which included: a chat bot, a temperature station and time-lapse camera (ZICTA, 2023) [11]. Results proved significant and tremendous outcomes of exposing learners to digital and technological manipulations in the learning processes.

Challenges of digital transformation in schools

While there are innumerable positives for digital transformation in schools, suffice to point out also Challenges that characterizes the implementation of it. One of the main challenges is the digital divide, where students from low-income households continue to face challenges accessing the necessary digital technologies and the internet due to lack of funds to finance the acquisition of the required gadgets and internet. This has continued to create a disparity in access to educational resources and opportunities.

Further, the potential for digital distractions, where students may be more tempted to spend time on social media or other online activities rather than focusing on their studies is quiet real and tempted education authorities in most schools in Northern region of Zambia to prohibit learners possessing electronic gadgets in school premises. This development requires urgent attention by educators to find ways to keep students engaged and motivated in their learning with electronic enabled devices.

It is also important to note that the temptations of electronic abuse is not only limited to leaners but equally have potential distracting teachers in the use and access to social media. Finally, one of the biggest challenges facing organizations today is security. As more and more data moves online, cyber threats become increasingly common and dangerous. Organizations need to have comprehensive security solutions in place to protect their systems and data from these threats (https://www.compnow.com.au).

Teacher's role in driving digital transformation in education.

While technologies are rapidly exerting tremendous influence on the teaching and learning processes to a point where the relevance of the presence of teachers in the learning processes is challenged, it must always be remembered that the role of a teacher amidst technological transformations is critically important. As such, teachers also need to realize that as digital technologies continue to evolve, it is important for educators at all levels of education delivery need to adapt and embrace new teaching methods and technologies to provide students with the best possible learning experiences.

In fact, Ramya (2023) [3] states that in the digital age, where technology permeates every aspect of our lives, the role of teachers in embracing technology has become increasingly vital. Teachers who adopt technology and implement digital transformation inside the classroom are making significant contributions to enhancing learning outcomes. This article highlights the invaluable role of teachers in harnessing technology and explores how it positively impacts the learning experience of students. Educators need to bear in mind the needs of students are changing and will continue to change in the future and as such it is important for schools to focus on digital transformation now than ever before so that the education system can keep up with the changing needs of their learners.

Teachers' role therefore in digital transformation in education should be understood to mean that whatever digital transformation is aimed at must be directed to making changes to the way they educate students. This could mean anything from incorporating new technology into the classroom, to changing the way we assess and track student progress. Therefore, teachers must aim at making changes with respect to digital transformation to improving the overall student outcomes.

Ramya, (2023) [3] points out that teachers who embrace technology and adapt to the evolving educational landscape are catalysts for change. By being open to incorporating digital tools and resources, they create a dynamic and engaging learning environment for their students. They understand that technology is not a mere accessory but a powerful tool that can augment traditional teaching methods and foster creativity, critical thinking, and problem-solving skills. Through their willingness to learn and integrate technology, teachers set an inspiring example for their students, demonstrating the importance of lifelong learning and adaptability in an increasingly digital world.

Further, teachers are use of technologies in teaching are empowered teachers to employ innovative instructional methods that cater to diverse learning styles and abilities. With the aid of digital platforms, teachers can deliver interactive lessons using multimedia content, including videos, simulations, and educational applications. These resources facilitate visual and experiential learning, making complex concepts more accessible and engaging. Moreover, technology enables teachers to personalize instruction, providing tailored learning experiences that address individual student needs and pace of learning. By leveraging technology, teachers can unlock the full potential of their students, fostering a love for learning and encouraging active participation in the classroom.

Others have argued that a teacher's role under full digitalization of learning represent another social layer involved in the learning process and are at the center of making learning live through learning automations. It is therefore required that teachers are made aware and be prepared to meet new demands for the emergence of new technologies by constant engaging in the continuous advanced professional training. This approach will enable them to adjust themselves and rebuild their methodologies and approaches to the new learning paradigms (Kalimullina *et al*, 2021) [1].

Tadeu et al., (2019) [5]; Tarman, (2017) [7] have noted that the immutability of the role of the teacher as a tutor or curator of the educational process, even in non-traditional teaching models, to facilitate the integration of digital technologies into the educational process, developing teaching systems for teachers is necessary. In addition, as the review of the literature has shown, training courses, and seminars to increase the "digital literacy" of teachers should be prioritized in the short term and require careful and detailed provided for as new technologies for teaching appear.

Lessons from the northern region in Zambia

While claims of the power of new and emerging digital technologies to transform education and learning abound, the evidence that supports such claims has been ambiguous. This claim is also consistent with the report of UNESCO's International Commission on the Futures of Education which points out that, 'there is tremendous transformative potential in digital technologies, but we have not yet figured out how to deliver on these many promises' (UNESCO, 2022) [8]. An Overview analysis of the situation in Northern Region is no different from this observation about digital transformation Successes in education.

Suffice to note that the northern region which comprises of Muchinga, Northern and Luapula Provinces the average coverage of access to and use of digital devices (Phone, Computer and internet) accounting only for 5.9% of the national coverage (ZICTA, 2023) [11]. While government is making every effort to construct communication towers through mobile providers such as Zamtel, Airtel and MTN, the uptake of digital transformation remains very low. A check at each of the district and provincial teachers' resource centers reviewed that all the originally stocked ICT gadgets had stopped functioning leaving only single laptops helped by the resource center coordinators.

Nonetheless, the region does have hope of developing an ICT infrastructure with computer laboratory in some few schools especially private and secondary schools, which had opportunities of receiving support from government. During the period of review, District Resource Center Coordinators reported that there positive indication of good will to equip resource centers with digital libraries by the Teaching council of Zambia an effort aimed at improving quality education delivery by this institution. However, this undertaking still face challenges due to financial inadequacies by the TCZ to implement the provision of such equipment. It must however be indicated that even if there are heightened promotion of making digital infrastructure to citizens and schools in particular available, the situation on the ground is worrisome.

The gloomy picture of non-availability of digital infrastructure is also true with qualified required teachers who are ICT literate in the region. During the period under review, A survey to assess the competencies of both long serving teachers and new graduates seeking teacher registration and practicing certificate services through online platforms was conducted at the TCZ regional office. Results were analyzed and presented in Fig 1 below

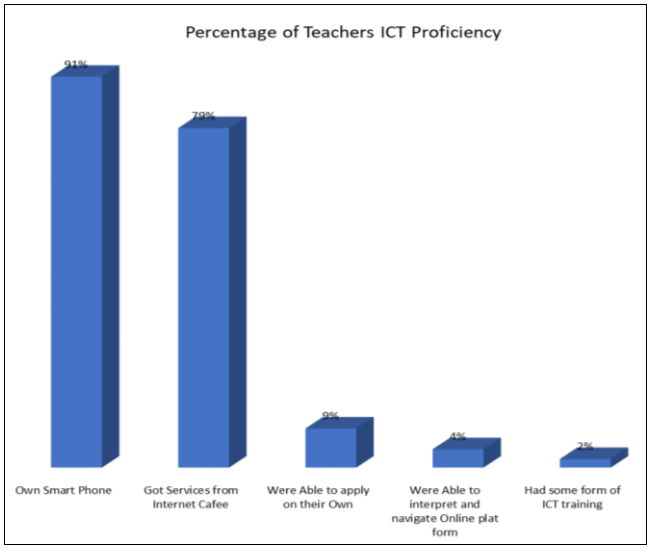

Fig 1

Three and Fifty (350) teachers seeking registration services from the TCZ who provide services through online platforms were target. It was observed that 91% owned the smart phones but 79% were not able to interact with the online platform due to not being ICT literate. 9% of the target population did apply on their own and only 2% of the target population had some form of ICT training. The finding review a serious concern and pause a big challenge to the effective implementation of the digital transformation in the Northern Region. Considering this phenomenon, teachers are more vulnerable to cyber security risks and jeopardizes the progress for the implementation of the much-needed digital transformation in the country.

While our teachers pause this high level of ICT illiterate in Northern Region, the global Digital Transformation has had a significant progress and continues to significantly influence educational delivery and transforming the way the learning and teaching is conducted and how education players are consuming the product. The increased access to information, personalized learning, and opened new opportunities for global learning has however, also created challenges such as the digital divide, digital distractions and cyber security concerns.

Cyber security concerns among teachers and other education players

Looking at the high demand for the use of digital technology in schools, the need to address the cyber security concerns becomes paramount amongst teachers and leaners in order secure both the learning process and the practice itself among all players. Teachers in Zambia remain at high risk of cyber attacks and violations due to lack of information about the dangers of violating cyber security laws.

Where it is expected that teachers will in the forefront observing and sensitizing the public of the ills of indulging in violation of cyber rules, it is however observed that the majority were not in a compromising mood to head the call from the CEO of the teacher regulatory body. A sample conducted on the reactions to the registrar's call for teachers to stay away from social media abuse show that 99% were not ready to heed (Smart Eagles, 2021) and opted to continue with the abuse of social media, which is a cyber-security concern in the country.

A survey conducted on cyber-crimes globally indicate that there is rampant exposure to cyber-crimes and attacks. In 2021 alone, 10.7 million cyber-crimes were reported to the Zambia Computer Incident Response Team (ZM-CIRT), which included mobile money reversal frauds and social media hijacking (National Assembly of Zambia, 2022) [2].

In terms of cyber-attacks, teachers were reported to be the most vulnerable victims of online business transactions, social media posting of sensitive personal and office related data. A check with the Police command Northern Province reviewed that teachers were toping on the list of vulnerability on cyber security concerns followed by nurses and police officers.

Arising from the real cyber security concerns, there is need for all stakeholder in the provision of education to leaners beginning with teachers, leaners community leadership and members of the public to be actively involved in sensitizing teachers and leaners on the adverse impact of abuse of cyber systems. Support can be in form of provision of funds, logistics for holding training and sponsoring training to teachers on programmes that aimed at upskilling teachers on both knowledge and pedagogical skills on ICTs.

It is worth noting that Government through ZICTA under the Ministry of Science Technology has collaborated with a number of institution including financial houses in supporting programmes aimed at sensitizing education stakeholders. Recently ZICTA in conjunction with TCZ have been conducting sensitization programmes to teachers,

pupils and stakeholders from various community organizations on cyber security. Programmes are also addressing issues of how to curb the proliferation of such incidences in schools and the public.

The challenge though is that, the programmes were conducted at the exclusion of the major beneficiaries, the teachers and pupils. This situation in Northern Province is not so impressive. Out of all the targeted district, the major implementing institutions, only the DRCCs for Mungwi, Kasama and Mbala acknowledged having participated in the sensitization programmes but did not confirm the clear road map for rolling out implementation programme. ZICTA and TCZ did not clearly outline how the districts were going to roll out to all schools in the districts. Nonetheless, the initiative for the two institutions to embark on sensitizing teachers and other stakeholders in the region is a right thing in a positive direction.

Conclusion

Digital transformation as well as cyber security are a reality in the today's world. These will continue to shape the way we conduct businesses in all human endeavors and as such teachers and other educational players need to bear in mind that this development is unescapable. Just Ramya, (2023) [3] points, teachers who embrace technology and implement digital transformation inside the classroom are pioneers in shaping the future of education. Their contribution is invaluable as they harness the power of technology to enhance learning outcomes, engage students, and foster critical skills for success in the digital age. By adopting technology, teachers become facilitators of knowledge, guiding students on a transformative learning journey that prepares them to navigate the challenges and opportunities of the modern world. As technology continues to evolve, the commitment of teachers to embrace its potential will remain a driving force in unlocking the full potential of every learner. Teachers also will be expected to champion the sensitization of leaners and the public on the need to observe and deceit from engaging in cyber related concerns. To be able to do so, teachers across the divide need to be encouraged to engage in continuing professional development (CPD) courses especially course to deal with digital transformations. Government and the community are also encouraged to put in place support programmes that will promote teachers' upskilling their knowledge and competencies in digital technology.

Recommendations

Learning from Northern Province scenario, the following are recommendations for Chongwe District Communities:

- Form deliberate committees to spearhead the sensitization programmes. The composition of committees must include teachers, pupils, civic leaders and traditional leaders as well as business communities.
- Mobilize resources from various sources that include civic leadership, business communities and other well-wishers.
- Partner with the University (Chalimbana) to provide technical and skills component to deal with training on content and skills needed to roll out to communities.
- Build community libraries and stock with required resource materials such as computers and other ICT gadgets as well as provide the internet connectivity
- partner with Government institutions for a number of reasons which include but not limited to:
- Linkages of the Chongwe Community with the outside world.
- Provision of logistical support in financial and technical know.
- Provision of policy and legal frameworks in dealing with matter of litigations for the beach of the cyber security Act.
- Provision of policy direction on the implementation of school curricular on digital utilizations
- The members of public need to take an active role in ensuring that teachers are fully cooperating with the curricular demands.
- Providing an oversite support to ZICTA and TCZ who are mandated to ensure adherence to strict use of digital enabling systems for example; Teachers not miss use digital media when interacting with learners and learning processes.
- Ensures Teachers are providing the roles of role model to leaners in the use of digital systems
- Support Teachers to undertake training courses in digital systems that will enable them transform the teaching and learning processes.
- Help the school to mobilize required digital resources and monitor the effect use of every provided resources.

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