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TEACHERS' PERCEPTIONS ON ICT INTEGRATION IN TVET CLASSES: A CASE STUDY IN KHARTOUM STATE-SUDAN

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Abstract

Information and communication technology ICT has been strongly admissible used in teaching and learning process in the world. In Sudan, despite the Federal Ministry of General Education FMGE policy plan encourages the use of ICT in the education sector to advance the education system as one of the state's sectors. Apart from the FMGE policy plan to integrate ICT in education sector still, there is no progression of ICT in general education. Many factors hindered the integration of ICT in technical and vocational education and training TVET system particularly. Therefore, this study investigated the teachers' perceptions of ICT integration in TVET classes. The interviews used for collecting data from (10) teachers in Khartoum state. The results revealed that there is no clear ICT policy in education, the lack of physical, and ICT infrastructures, and lack of support in using ICT in TVET from the educational management. The

findings imply that the government should increase efforts on ICT integration and also should involve various education stakeholder including teachers, the overall process of ICT integration in the TVET system. Additionally, international experiences are highly recommended to propose private ICT policy and, the modern digital learning materials might be equipped in TVET classrooms.

Keywords

Information and Communication Technology, Technical and Vocational Education and Training, Classroom, Teachers, Teaching and Learning Process

1. Introduction

Information and communication technology (ICT) has been strongly admissible used in teaching and learning process all over the world. "Unlimited possibilities for effective learning, knowledge, and development of additional efficient institute service could be achieved by the use of technologies" Education For All EFA, 2012 (King, 2011; Mingaine, 2013b). Hence, the world is racing to implement ICT application whether in the educational field or any other project related to a feature of the society's organizations. In spite of the use of ICTs are increasing rapidly, key challenges are confronted in terms of accessibility, connectivity, professional and content development respectively, strategic plan and ICT policies as well (UNESCO-UNIVOC, 2014) as cited in (Latchem, 2017a).

The technical and Vocational Education and Training (TVET) is an education that formulates people for a particular career, or a professional position in engineering depend on state's policies in the certain country's needs for labor markets (Najafabadi, et al., 2013). TVET also included permanent training and professional development being as part of in-service preparations individually or in collective initiatives. The Sustainable Development Goal, which aims to, "ensure inclusive, equitable quality in education and lifelong learning opportunities for all" (Latchem, 2017). The Qingdao Declaration 2015 as cited in (Latchem, 2017), also (UIS, 2009) announces that; to achieve the goals of inclusive, equitable and quality of education and lifelong learning by 2030, the ICT-based teaching and learning need to be integrated into all sectors of education.

Based on the second plan of Sudan's federal ministry of general education FMGE (2012-2016) the ICT will contribute effectively to human development and training as the general goals to improve the characteristics and abilities of the learner (Tairab & Ronghuai, 2017). Therefore,

the technical and vocational education and training represented as a cornerstone of the human development, economic sustainability and other types of development can be achieved by the use of ICT technologies (Mingaine, 2013a; Nour, 2013). With ICT integration, it is expected that there would be the better output of skilled (students, teachers, and institutions) which increase the quality of the skilled workforce, poverty reduction, economic production, and will facilitate the stability and lifestyle changes. Moreover, based on Sustainable Development Goal states that; "substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship" by 2030 (Latchem, 2017c).

From the overview, in fact, Sudan is struggling with the implementation of ICT in the education system in order to adopt the changes in the world. Therefore, the need for ICT technologies in TVET classes is very important as a fundamental modern pattern of teaching and learning process instead of the conventional teaching.

Continually, education systems have made an effort to harness technology in order to enlarge education chances (Guttman, 2003). Therefore, the current research represented as a very a few studies implemented in the TVET system in African countries in particular Sudan. Hence, the study investigated the ICT application in TVET classes, in Khartoum state – Sudan focused on technical secondary schools, artisan institutions, and vocational training centers.

1.1 The objective of the study

The objective of the study was to investigate the teachers' perception of the ICT integration in TVET classes in Khartoum state – Sudan specifically in technical secondary schools, artisan institutions, and vocational training centers.

1.2 Specific objectives

- To investigate the teachers' perceptions of the ICT implementation in TVET classes
- To assess the difficulties that teachers face in the integration of ICTs in TVET classes

2. Background of the study

2.1 ICT in TVET system

According to the speech of the President and Chief Executive Officer Commonwealth of Learning "Information and communication technologies (ICTs) provides opportunities to increase access, reduce costs and improve the quality of education" Professor Asha Kanwar, as cited in (Seelig & Nichols, 2017). The use of ICT in education has been narrowing the gaps

between areas and the individual differences among the students (Lu, Tsai, & Wu, 2015), collaborative learning (Albugami & Ahmed, 2015), and their attitudes (Dinç, Memnun, & Aydın, 2018). One of the advantages can be held with ICTs usage in TVET will enhance the quality of teaching (Najafabadi et al., 2013); encourage and support online learning communities in which learners contribute to knowledge-building through blogs, chat rooms, discussion forums, wikis, etc.(Buttar, 2016; Latchem, 2017b).

The strong comment from Najafabadi et al., (2013) argues that ICT could improve the unskilled instructors and trainers, a number of courses in which they can be accessed online (Latchem, 2017), then it could be very useful for TVET system management. Additionally, ICT has the aptitude to contribute directly into three dimensions as the administrative, educational, and personal (Mumcu & Usluel, 2010). In this situation, for TVET teachers whether nationally or internationally ICT has the ability to make them keep up with the course of the professional development in the field of technical education in pedagogical knowledge and skills, further stand on all that is new in order to apply it in their teaching and learning electronically (Latchem, 2017). Therefore, from the above-mentioned advantages of ICT can strongly enhance TVET development when ICT technologies and infrastructures have to be accessible in hands, in another word the readiness of school infrastructures such like computers software, hardware, courseware, brainware, internet connectivity and electricity service, which had signified as an important part of the system (Buttar, 2016).

2.2 ICT policy and strategic plan

The FMGE policy plan in Sudan encouraging the use of ICT in the education sector to advance the education system (Hamdy, 2007; Tairab & Ronghuai, 2017). The National Conference Report for International Education as cited by (Alamin, 2014) stated that; since the revolution of the ICTs emerged, there is no progression of ICT in general education system in Sudan as a result of the shortage of strong desire and strategic plan to construct the platform of educational technologies from the decision makers' perspectives. Whereas, the report stated that, Sudanese policymakers realized with approved that the easy way to access EFA objectives through the ICTs technologies. Consequently, the FMGE discusses the challenges that antagonize to process EFA goals as; reluctance of using technology in the classrooms, deficiency of the basic skills, lack of ICT infrastructure, the cost of ICTs and the absence of logical procedure toward ICT integration in the education system. Therefore, the existence of ICT policy and strategic plan whether from the state government, even as a local policy in TVET

management or schools are quite important in educational sector (Albugami & Ahmed, 2015; Tairab, et al., 2016; Tairab & Ronghuai, 2017).

However, studies by Seelig, et al., as cited in (Latchem, 2017) describes that a salutary example of national planning for ICT-enabled TVET in Australia framework has been drawn and implemented through three stages as following; Firstly, eLearning infrastructure and expertise. Secondly, the framework focused on appealing the target groups, and. finally, focused on establishing eLearning in training for providers and companies. Therefore, Sudan as national or institutional aspect, there is a need for clear and specific ICT policy regulation and strategic plan to provide support and implement ICT technologies in education to obtain the efficiency and quality of TVET system outputs.

2.3 ICT Infrastructure

Studies have shown that some countries, in spite of the potentialities of ICT infrastructures they have, the various deficiencies have had appeared. For example, in Saudi Arabian secondary schools, spaced out from receiving a good deal of financial support of ICT for enhancing the teaching and learning performance, still suffered from the shortage of classes spaces, power supply, and infrastructures' prices (Albugami & Ahmed, 2015; Elmunsyah, 2012; Nomsa Mndzebele, 2013; Salehi & Salehi, 2012). In Sudan, (Elemam, 2016) justifies that computer lab deficiencies are the main obstacles in secondary schools in Sudan. As a result, it is difficult to equip TVET classes with ICT technologies. There is a need to address and be attentive to overcome the current shortage of ICT infrastructure. Also, have to create an appropriate environment for the basic requirement to accommodate technologies. For instance; preparing the physical infrastructure of schools or institutions like; buildings, electricity, fixed telephone and digital instruction facilities, educational satellite and solar energy sources as spare in case of the electrical supply interruptions (Elmunsyah, 2012; Lu et al., 2015; Schreurs, 2007).

Accordingly, ICT resources become a fundamental factor in implementing ICT both for less and developed countries, depending on who has most awareness and attention about the values of ICT applications use in the teaching and learning process (Albugami & Ahmed, 2015). Whereas in the developed country nowadays ICTs witnessed the progression which was crossed beyond the distance learning which has been used in teaching and learning process; For instance, China's education system has so-called live-transmission and synchronous classroom teaching so as to solve the teachers' shortage (Buttar, 2016; Zhang, Meng, & Jing, 2016). Further, China the classes prepared with technologies like; multi-media classroom, computer classroom and multi-

function e-classroom (Lu et al., 2015; Yeh, Chang, & Chang, 2011). Therefore, (Lu et al., 2015) stats that, the higher utilization rate of multimedia, the greater number of teachers and students will facilitate the use of ICT in teaching and learning process.

2.4 Financial support

Meanwhile, the introduction of ICT applications into education and the related financial investments have been policy concerns in several countries (UIS, 2009). ICT-based learning can be as resource and labor-demanding for both staff and students, great advantages are going to be realized such as; economic, sustainability as well as pedagogical and sociocultural. A careful attention needs to be paid to the funding issues Seelig et, al., as cited in (Latchem, 2017). It has observed that ICT in Sudan encounters serious financial problems or difficulties concerning to its high payment, simultaneously government thinks that the ministry of education one of the ministries did not feed the state's capital (Alamin, 2014). The same problem has been reported by (Latchem, 2017). Hence, the lowest budgets amount has been given to the ministry of education, for instance; only for about 2.7% of the GDP in the year 2012 see (Alamin, 2014). In addition, this percentage would not subject to cover all of the educational service's needs. The alternative solutions need to take into account. Therefore, the governmental civil services, foundations might do any action to come across the deficit in such current circumstances in the country especially universities those have association or specialist in teaching ICTs program. In this term, the FMGE might establish initiatives with attempt the Public-Private Partnership PPPs program to access particular support, for its potentialities and multi solutions could be available to fill the gap of ICTs investment whether form finance support or an infrastructure preparation and teacher professional development program (Tinio, 2016). Such as; World Bank, European Union, US Aid, and African Aid perhaps they will support the educational systems worldwide according to their experiences in this phenomena. Chiefly, the US management expressed its approval of the lifting of the economic embargo on Sudan, which affected the country for more than two decades in all the political, economic and social aspects.

2.5 Technical support

Above all mentioned the literature reviewed that, the technical assistance and maintenance have to exist among ICT preparations, because teachers may not become familiar to make repairs the devices when the tools and equipment had troubleshooting (Albugami & Ahmed, 2015). In general secondary schools in Sudan, also the technical support represented as a major reason for ICT integration (Elemam, 2016). Based on the reviewed literature there is a

necessity to prepare a technical support staff for a whole process of integration of ICT in education system specifically in TVET institutions in Sudan by the government, schools or institutional management.

2.6 Teacher Role

The ICT implementation in TVET classes as the focus of this study, the teacher's role has been inevitable, as a core, backbone of the strategic and ICT implementation policy in teaching and learning process (Wallace E. et, al., 2011). Hence, teachers have a role in understanding the importance, positive attitude and beliefs towards ICT technologies especially in schools, and other educational sectors. Additionally, studies revealed that the gap between generation and individual use had no influence on the method of pedagogical practices in the classroom (Dube, 2017). Moreover, to establish and maintain a partnership between all organizations involved in the educational process is necessary to include teachers in order to lever all ICT issues successfully (Albugami & Ahmed, 2015; Bingimlas, 2009). Therefore, apart from teachers' roles, the collective of bodies might be work together for ICT implementation (government, stakeholders, and firms) to share ideas and the way that leads to better outcomes in TVET system.

3. The Method of the Study

This study used qualitative approach through a semi-structured and structured interview to teachers who teaches the basic technical subjects (automotive, electricity, production, architecture, computer science etc) in TVET classes in Khartoum state - Sudan. The interview enables the researcher to develop an in-depth understanding on the issues of teachers' perception on ICT integration in TVET classes in Sudan as well as to explore the difficulties that teachers' face in the whole process of ICT integration in TVET classes. Themes were created based on the views of participants (Teachers). Random and purposeful sampling was used in getting a sample for the study on the basis of position, qualification, and experiences in TVET institutions, the sampled size was (10) respondents. The interview sessions consisted (One) teacher for 20 minutes interview. Issues that were involved in the interview include the teachers' perception of ICT integration in TVET classes in Sudan and the difficulties that teachers' faced in the process of ICT integration in TVET classes. Content and discourse analysis were employed in analyzing collected data.

4. Findings and Discussion

In this part of the study, the results have been presented and discussed along with the literature review conclusions and study objectives.

4.1 ICT policy and strategic plan

Based on the study findings and results, teachers perceived that there is no a clear vision for ICT policy and strategic plan from the state government, so as to integrate into Sudanese education system from the FMGE aspects, which direct negatively affected the ICT integration in TVET classes. As a result, there are also no plans or initiatives from educational stakeholder to reflect on the introduction of the educational technology into the educational system. Respondents 4 and 10 says that:

"There are many studies and national strategies carried out by the Ministry of Education and related bodies, but funding is an obstacle in their implementation (4)"…"In fact, there are plans for education development, maybe ICT included (10)".

Sudanese studies indicate that ICT policy needs to be formulated (Ahmed, 2015; Elemam, 2016; Tairab & Ronghuai, 2017). Therefore, to make ICT policy and strategic plan for ICT integration in TVET system, the respondents suggested that; initially, the awareness significance of the ICTs in TVET institutions might be disseminated among the teachers, to make the institutions' leader know what is ICTs policy is, to know values of ICT application in TVET classes.

"the rehabilitation of the classes physically, offering the presentation devices and digital tools, and the most important thing in this planning the teachers might be trained to have basic skills in these technologies (10,3,7, 6, 8)".

Generally, this result is compatible with (Albugami & Ahmed, 2015) and other studies which revealed that when teachers have the understanding of ICT policy guidance it would be easy to practice by their own tools or devices in teaching and learning process.

4.2 ICT infrastructure

The results showed on ICT infrastructure in TVET classes restricted by the physical infrastructure and related factors, the teachers perceived that the physical infrastructure status and the readiness of the institutions such as the classes from the power supplies, lighting, ventilation, safety represented as real problems which would not make sense to use of ICT integration in TVET classes. On the other hand, the respondents said; the ICT infrastructure such

as; computers, internet connectivity, wall screens, overhead projectors, camera record, an interactive whiteboard, are also not available in TVET classes. For instance one of the respondents said:

"in our school, we have approximately ten computer in the school lab used for teaching students the basic skills of Offices' package… the number of students is (60 students, 2 in 1Computer), the class period is (80 minutes), then the students are divided into three groups, every group has not more than 20 minutes practice (10)"

This finding is supported by (Elemam, 2016; Elmunsyah, 2012; Mingaine, 2013) all these items have not been available in all the schools/institutions, which hinder the integration of ICT in some general TVET classes.

In terms of internet usage, there is a lack of internet connectivity in TVET institutions due to the neglect of education leaders to the ICT in general, also the educational environment not encouraging to do so, but some teachers use their own devices whether through their personal computers or the smartphones to search for information that they used it to access the internet so as to strengthen their teaching and learning process, and most of the respondent stated that they used ICT in the social media. These findings also in line with (Elemam, 2016; Salehi & Salehi, 2012) results in terms of internet connectivity and its limit of use.

In contrast, the modern vocational training centers, which belongs to the Ministry of Labor and Human Development (MLHD) - Khartoum state, funded by nongovernmental organizations NGOs like; EU, JICA, GIZ, and UNDP, and well prepared with physical and ICT infrastructures as well as internet connectivity. Therefore, in this part, the result agreed with the studies that reported on the importance of partnership to equip the ICT infrastructure (Tairab et al., 2016; Tinio, 2016). The respondents perceived that;

"the stakeholders, private sectors and organizations partnership is significant and strongly needed because they will contribute and cover the shortage of ICT into the TVET classes, which its outcomes would be related directly to not only the national labor markets needs but, international standards of labor markets (10, 2)".

4.3 Financial support

Funding and financial support represent a serious problem of ICT integration in Sudan. The respondent reported that such like the normal services in the schools had been funded by the educational councils (parents). For example, the electricity (The average consumption of

electricity in the institution/school is $ 22 monthly and $ 201 for the academic year). Therefore, ICT also supposed to be funded.

This results harmonious with (Alamin, 2014; Latchem, 2017) still there has been difficult for FMGE to stand alone to finance the whole educational services and ICT technologies particularly, this case there might be a cooperation and partnership between the FMGE, TVET management and national private sector and NGOs (Tinio, 2016). Teachers (7, 10, 5) said:

"Yes, it needs partnerships, especially from the relevant international organizations whose working in the field of education, such as UNESCO, African Development Bank ADB as well as the private sector, which can play an active role, especially the government does not have the capacity to finance education (7,10,5)".

4.4 Technical support

According to the lack of technical support noted as a problem in ICT integration in TVET classes. Due to the shortage of computer devices and other ICT tools, there are not enough technical support members at TVET schools/institutions, the respondents said that;

"the simple maintaining like the software it had been done by the teacher and hardware let the people going to make the repairment by the technicians out of the school… we encountered the high fee of devices repairment when it has trouble, sometimes stayed for a long time to be maintained (10, 2, 4)".

This explains that teachers have little ideas about that or maybe there is no time to repair, this interpretation is come up with (Kozma, 2008; Newhouse, 2002) stated that the availability of software and hardware without skills and knowledge teachers have, does not work with technical support. Also, respondents complain about the spare parts cost. Further, based on this results the technical support should be included when the ICT application become as a reality in the future, which will be helpful for teachers who have moderate experiences on ICT and time to solve these problems (Albugami & Ahmed, 2015; Kozma, 2008).

4.5 Teacher Role

In this aspect, teachers perceived that there is no a great concern about ICT integration from the FMGE, normally the result would be there is no a great impact of using the ICT applications in TVET classes, in this case, the result agreed with the study which discussed that the institutional and agential levels have the main role of ICT implementation in teaching and

learning practices (Dube, 2017). Consequently, the result stressed that all the teachers have no interest and attitude for ICT implementation due to the deficiency of strategic policy plan as well as ICT equipment. This finding agreed with the study which indicated the absence of policy and infrastructure affected negatively on teacher views, attitude and beliefs on ICT implementation (Wallace E. et al, 2011).

From the findings, a few of TVET school/institutions have integrated ICT technologies in their classes and leaders encourage teachers to practice it by offering the ICT equipment. While most of the institutions' leaders do not encourage the teachers, one of the respondents says;

"I have the interest to prepare some ICT tools and use it in our class but, the school leader could not offering the relevant equipment which I could not access them, arguing that the devices and tools are expensive and there is not enough budget (10, 4)".

As a result, most of the respondents in this study showed that their skills of computer use are ranking in a high skills level regardless of the lack of ICT training program from the educational management, that means the individuals have great efforts to train themselves to integrate ICT despite this result does not match with the results which represented the individual values would not affect the use of ICT in the classroom (Dube, 2017). Whereas, the result is contradicting with teacher interest in using ICT in the general education system (Elemam, 2016).

In addition, some of the teachers reported that they got ICT training whether in their college when they are studying undergraduate and post-graduation studies or in private institutions for computer courses as self-training instead of in-service training. These findings matched with interpreted that the majority of TVET teachers might be trained purposively about the basic skills of ICT applications.

"Teachers were not trained in the use of computer skills, ICTs, because the state considers this to be a special concern. Therefore, most teachers rely on training in private institutions to develop themselves (1, 2, 7, 8, 10)".

At the same time, the respondents reported that the computer science has been taught in TVET just as a theoretical subject for TVET students, yet due to the limit number of computer devices, even into the schools/institutions which have a computer lab, there are no relative ICT tools such as whiteboard, overhead projector, etc. In addition, most of the schools have no more than five teachers who teach computer science, depending on how big the school/institution is,

even though there is no training program for those teachers who work as a computer since teacher as a special subject in some TVET classes.

5. Conclusion

The 21st century is made shrunk narrow with ICT in every and each generation life, in particular, the context of Sudan ICT integration still not witnessed the real implementation in education and especially the TVET system. Hence, a collective matters hindering the integration of ICT, for instance; there is no clear ICT policy and strategic plan, which has a strong relationship with ICT infrastructures (Computer devices, Software, Hardware, and digital materials), the study results have characteristics that these resources and strategic plan have a pivot role in the process and influencing the ICT utilization (Ekberg & Gao, 2018; Gil-Flores, Rodríguez-Santero, & Torres-Gordillo, 2017; Ramadan, Chen, & Hudson, 2018). Moreover, the classes are not meet the standardization in order to use ICT.

The PPP in TVET is strongly needed in order to offer the ICT application and to cover the financial support issues besides the educational councils that had been supporting the schools/institutions in some general services. Additionally, TVET system management might follow the international models and experiences to make ICT policy and strategic plan.

Due to the lack of ICT infrastructures, there is no technical support department at TVET institutions, however, teachers attempted to solve the small problems that faced in the school/institution ICT tools. Technical support division strongly recommended being existed in the TVET system in the future.

Generally, the teacher's role one of the crucial factors has influences in ICT integration in the education system. This study summarizes that teachers have no strong desire and interest to integrate ICT in TVET classes, in accordance with the glance view of ICT policy in education, lack of ICT infrastructure, financial support, and teacher training in the basic computer skills altogether affected on the teachers awareness, attitudes, and beliefs towards ICT integration as well as education stakeholders. In terms of ICT training for educators in order to lever their skills, also it has been mentioned by (Ekberg & Gao, 2018; Ramadan et al., 2018), besides the lack of incentives represented one of the factors effects on teacher motivation in ICT practices in the classroom (Dube, 2017).

The study recommends that Sudanese TVET might have especial ICT policy plan in addition to the modern digital learning materials have to be prepared and all the facilities enable

the teachers practicing their teaching and learning process in a proper manner with their students inside the classrooms.

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