CHALLENGES FACING TEACHERS' INTEGRATION OF INFORMATION COMMUNICATION AND TECHNOLOGY IN TEACHING AND LEARNING OF WELDING AND FABRICATION AT THE VOCATIONAL TRAINING CENTERS IN MANDERA COUNTY

Yakub Mohamed Abdi.
School of Education Communication and Technology, Kenyatta University, Kenya
Michael Mchoki Waititu.
School of Education Communication and Technology, Kenyatta University, Kenya
Bernard Chumbo Mugo.
School of Education Communication and Technology, Kenyatta University, Kenya

ABSTRACT

World globalization has resulted in the digitization of social and economic lives. The digital era associated with this globalization has prompted the adoption and integration of information communication and technology in almost every other sector. The education sector is no exception. Advancements in technology have increasingly pressured this sector to implement educational reforms that promote the adoption and integration of ICT in their teaching and learning activities. These reforms ensure the development of graduates with the necessary technical skills and knowledge that are useful in developing modern solutions to modern problems. However, the integration and adoption of ICT in learning institutions face many challenges. For this reason, this study sought to establish the challenges facing teachers' integration of Information Communication and Technology in teaching and learning fabrication and welding in vocational centers in Mandera County. A descriptive research design was adopted for this study focusing on learners and instructors in Mandera vocational centers and Takaba vocational centers both in Mandera county. The study targeted a population of five (5) technical staff in the institutions, twenty-five (25) instructors, seven (7) administrators, and 133 learners which was a total of 170 staff. A 30% of the target population was considered as the sample size and therefore 52 respondents were considered. Interview schedules and questionnaires administered through the drop and pick methods were used in collecting data from the trainees and principals of the institutions respectively. Qualitative and quantitative data analysis was carried out on the collected data. The quantitative data was analyzed through frequencies and percentages whereas the qualitative data was analyzed through content analysis. The study results were presented on tables as well as narratively. The results of the study indicate that ICT resources in the vocational centers were inadequate making it difficult to integrate ICT in the teaching activities. In addition, the instructors were not provided with adequate training on ICT. Learners faced challenges such as outdated software and hardware, slow network connections, scarce ICT resources, inadequate time allocations, and inadequate technical support. The study concluded that the challenges faced by both instructors and trainees make it difficult to integrate ICT in the teaching and learning of welding and fabrication in vocational centers in Mandera County. The study recommended that with changing times and increasing innovations, institutions should focus more on giving trainees and instructors ICT resources that are up-to-date to avoid the challenge of these resources breaking down very often. Regular maintenance and check-ups are also key in reducing the breakdown of ICT resources. In addition, the study recommends that institutions should improve the accessibility of the ICT resources and also work with reliable internet providers. Finally, the study recommends hiring more instructors and technical staff to enhance the process of integrating ICT in teaching and learning welding and fabrication in vocational centers in Mandera County.

Key words: **Information Communication and Technology, integration, welding, fabrication, challenges**

.

INTRODUCTION

Information communication and technology refers to the hardware, software, network, and media components that enable the collection, storage transmission, and processing of information. Information communication and technology also refers to the technology that is used in the conveying of information, manipulation, and processing of information. Such technologies include the use of social media platforms such as Facebook, WhatsApp, video charts such as youtube. Besides computing devices such as laptops, desktops, printers, projectors are also used in communication (Lawrence, 2018). Integration of ICT in teaching and learning institutions involves all these technologies and their application in the process of communication and handling of information for educational purposes. It involves the efforts of the society to ensure citizens are equipped with knowledge and skills on communication and computing devices as well as the running of applications, software, and systems associated with these technologies (Kler, 2014).

Rapid technological advancements in the world have resulted in numerous changes in the social and economic lives of many people around the world (Ngeze, 2017). The advancements have prompted the adoption of Information Communication and Technology (ICT) in almost every sector including the teaching and learning sector and have since been an integral part of the success of most institutions (Tedla, 2012). In addition, world globalization, as well as increased innovation that has led to increased sophistication of technologies, has resulted in increased pressure on organizations including learning institutions from students, governments, and employers to come up with modern solutions to solve modern problems prompting these institutions to turn to Information Communication and Technology (Abaidoo & Arkorful, 2014).

Lawrence and Tar (2018) revealed that ICT has become increasingly important in the day-to-day operations of most people and every other education system in the world hence the growing demand for teaching and learning institutions to use ICT in equipping learners with knowledge and skills for the digital era. Continuous innovation in the ICT sector is increasingly being used as a source of improvement in the education sector through implementing necessary changes. Abaidoo and Arkorful (2014) indicate that numerous resources have been invested in the integration of ICT in learning institutions. However, the educational field has undergone massive growth over the years making the governance of this sector a very cumbersome task. Therefore, there has been increasing concern among stakeholders such as managers, government, teachers, researchers, and scholars all around the world on the level of adoption of ICT in schools and how these technologies impact the quality of education.

Kler (2014) who studied the impact of technology through ICT integration in teaching and learning on empowerment of education indicates that with increasing innovation in technologies, different methods through which the process of teaching and learning can be improved are devised. A platform for effective education is provided through these new

technologies, therefore, enhancing and improving the interaction between the students and the teacher.

Alemu (2015) who conducted a study on the integration of ICT into teaching and learning practices in higher educational facilities indicates that Information Communication and Technologies (ICTs) in the education sector plays numerous roles such as equipping learners with necessary skills in an information society, providing a catalyst that prompts changes into the teaching practice as well as the enhancement and improvement of results and the teaching and learning quality. In addition, the integration of ICT in learning institutions is used as a tool to empower both teachers and learners by promoting efficient and effective education.

Umar and Hassan (2015) further indicate that the level of education in an area determines its rate of development while the integration of ICTs into the education system is a crucial component that promotes the professional development of teachers as well as the skills of students. Through ICTs integration, the quality of education increases, and the use of educational resources is optimized. It does not necessarily have to be carried out in a classroom setting but can take place anywhere and at any time provided teachers have adequate skills and are committed to the process. Lawrence (2018) further indicates that using ICT in teaching and learning practices presents a vast array of potential merits to students and teachers such as improving the teaching and learning process for successful education. Moreover, students and teachers who have acquired technological skills can work well in a world where almost everything is digitized.

Tedla (2012) who sought to determine the importance, effect and challenges of ICT on learning and teaching in countries in East Africa indicates that Information Communication and Technology in a classroom setting entails more of an innovative, practical, and interactive process rather than a theoretical one. It equips learners with the necessary environmental readiness, provides them with educational opportunities, and makes it possible to use and process information for efficient problem-solving. In addition, Tedla (2012) indicates that the integration of ICT in many Africa countries does not meet expectations due to factors such as the beliefs and commitment of teachers, age, gender, educational and computer experience as well as availability of ICT resources.

Governments have the responsibility to provide quality education to all. ICT integration in schools promotes quality and equal opportunities in education to all for a better future and through ICT integration, students can acquire the necessary skills and knowledge to become ICT competent (Salam, Zeng & Pathan, 2018). Mbodila, Jones, and Muhandji (2013) who studied the challenges faced in ICT integration in the education sector indicate that institutions that base the choice of the technology to integrate on technological possibilities are likely to encounter challenges. As such, institutions should base their choices on educational needs.

Most institutions of higher learning focus more on student-centered learning and have increasingly found the need to integrate ICT in their teaching and learning practices. ICT has

been adopted in institutions of higher learning in different areas such as classroom learning and teaching, admission, administrative and finance departments (Abaidoo & Arkorful, 2014). However, this study will focus only on the integration of ICT in teaching and learning in a classroom setting.

Salam et al. (2018) who studied the impediments to the integration of ICT in public schools in a contemporary society indicate that developed countries have advanced technologies than developing countries and for this reason, the developed countries have been successful in the integration of ICT in teaching and learning. However, developing countries face numerous challenges in educational reforms while trying to provide quality education to all and implement ICT in the teaching and learning practices of their education system. As such, the employees from developing countries find it hard to compete with those from developed countries due to their digital incompetency. Salam et al. (2018) further indicate that balancing economic realities with educational goals is the main problem faced by the developing countries in integrating ICT. A larger proportion of the budget of these countries is used in paying salaries to teachers and maintenance of schools rather than investing in the integration of ICT. Such challenges make the developing countries lag in achieving the required goals compared to their developed counterparts. As such, governments, researchers, scholars, and other stakeholders in developing countries are now looking for solutions to these challenges. This study sought to establish the challenges facing teachers' integration of Information Communication and Technology in teaching and learning fabrication and welding in vocational centers in Mandera County.

Scholars such as Lawrence and Tar (2018); Alkahtani (2017); Alemu (2015) and Salam et al. (2018) have conducted studies on the challenges faced by learning institutions during ICT integration in the teaching and learning process. The findings indicate that ICT integration and adoption faced numerous challenges such as lack of ICT knowledge, lack of release time to ensure adequate participation in development programs, lack of adequate training, complexity in the integration process as well as lack of technical support.

For this reason, this study sought to establish the challenges facing teachers' integration of Information Communication and Technology in teaching and learning fabrication and welding in vocational centers in Mandera County. Specifically, the study sought to establish: What are the challenges facing teachers' integration of Information Communication and Technology in teaching and learning of fabrication and welding in vocational centers in Mandera County?

RELATED LITERATURE AND THEORIES

Mathevula and Uwizeyimana (2014) in their study on the challenges facing the integration of ICT in teaching and learning activities in secondary schools in South Africa revealed that challenges such as scarce ICT resources, inadequate use of these ICT resources, and lack of ICT equipment at these schools negatively impacted ICT integration as well as teaching functions of most teachers. Besides, most schools in the region had only a TV, a few

photocopiers and computers. In addition, the study revealed that some teachers had received training in ICT however, this training had very minimal effect on the ability and willingness of the teachers to use ICT in their teaching.

Amuko, Miheso, and Ndeuthi (2015) studied the opportunities and challenges faced in the process of ICT integration in teaching and learning mathematics in Kenyan secondary schools. The study adopted a descriptive research design with questionnaires administered through the drop and pick method and face-to-face interviews being used to collect data from 12 public secondary schools in Nairobi County. The results indicated that despite the enthusiasm of teachers in the integration of ICT in teaching, most schools lack capacity-building support, therefore, contributing to teacher lax in the same process. For example, training to teachers on the use of ICT in teaching has not been availed, and are forced to self-train to develop technical knowledge and skills.

Lawrence and Tar (2018) studied the factors that influence the level of ICT integration and adoption in the teaching and learning process. The study adopted an exploratory and descriptive research design where qualitative data analysis techniques were used in the analysis of data collected through both questionnaires and interviews. The study indicated that ICT integration and adoption faced numerous challenges such as lack of ICT knowledge, lack of release time to ensure adequate participation in development programs, lack of adequate training, complexity in the integration process as well as lack of technical support.

The study of Bingimlas (2009) on the challenges faced in ensuring the successful integration of ICT in teaching and learning environments revealed that teachers have a strong desire to integrate ICT in classroom operations but they face many challenges. The study indicated that some of the barriers faced by teachers include inaccessibility of ICT resources, lack of confidence, and incompetency. As such, Bingimlas indicated that sufficient time for professional development, technical support, as well as hardware and software resources, should be provided to schools to enhance ICT integration in the learning process. In addition, the availability of all of these components increases the chances of successful ICT integration.

Alkahtani (2017) studied the challenges facing the integration of ICT in the process of teaching in schools in Saudi Arabia. The study focused on both teachers and students in four Saudi schools. The findings of the study revealed that lack of adequate training and sufficient equipment were the main challenges faced by teachers in the integration of ICT in teaching. In addition, most students and teachers lacked basic knowledge on the operations of the equipment while most teachers lacked ICT teaching techniques. As such, the study indicates that teachers, managers, and principals in schools are key stakeholders who should be involved in making decisions concerning the integration of ICT to solve and prevent further problems in the process.

Mwanda (2017) studied the integration of ICT in teaching and learning Biology in Kenyan Schools. The study adopted a descriptive research design focusing on teachers and students in

schools located at Rachuonyo South Sub-County. An observation checklist and questionnaires were used to collect data from 56 subject teachers from 15 different schools. The findings indicated that while some few schools had as many as 47 computers some schools had only 2 computers thus making the instruction process very difficult. In addition, most teachers did not use the available computers for personal development on technological knowledge and skills despite them being inadequately trained on computer applications.

Alemu (2015) sought to determine how the challenges, promises, and future direction of higher education institutions are impacted by integrating ICT into teaching and learning practices. The study adopted a mixed approach research design focusing on 188 instructors, 5 heads of departments, and 10 school deans from five schools of Adama Science and Technology in Ethiopia. Questionnaires, interviews, and observation were the main tools used to collect data. After descriptive analysis of the collected data, findings drawn from the study indicated that ICT integration in the teaching process is not fully adopted and the students and teachers have a positive perspective towards the integration of ICT. Challenges such as university instructors have not been provided with adequate training to improve their technical skills, inaccessibility of ICT resources, overcrowded classrooms, and lack of pedagogical support have made it difficult to fully integrate ICT in the teaching and learning process in the university.

Njenga (2015 studied the different related challenges on the integration of technology in secondary schools that are located in the Thika district. The study was conducted among 59 secondary and high schools in the Thika district. Questionnaires were administered among the headteachers in Thika, district. The study objectives were to establish the influence of cost, technical issues, and the skills of the teachers in using ICTs in teaching secondary schools. The study was descriptive and used Likert scale questions to assess the extent of the challenges facing the institution in the integration of ICTs in teaching. The study revealed that projectors and projectors screen boards, use of tablets and computers was mainly used in teaching in secondary schools. The study revealed that challenges that affected the effective integration of ICTs in the secondary and high schools were to do with lack of skills among the teachers in using the ICTs, for instance on a scale of 1 to 5 where 1 represented not confident and 5 represented very confident, the teachers revealed a mean score of 2 which indicated that they were not confident in using the ICTs in teaching. The study also revealed that the instability of the internet a well as the costs that relate to the acquisition of the ICTs facilities hampered the effective integration of ICTs in the secondary and high schools in the Thika district.

Amuko et al. (2015), studied the obstacles as well as the opportunities that are presented in integrating Icts in teaching in secondary schools in Nairobi County. The study was descriptive and involved 60 secondary school teachers, 5 deans as well as 15 principals of secondary schools who 'were purposefully selected. The study data was collected through interviews and questionnaires. Descriptive analysis conducted revealed that there exist several obstacles in the implementaion of ICTs in teaching, among the challenges, included lack of teachers confidence during integration, lack of teachers skills in teaching using ICTs,

negative attitudes towards the use of ICTs in teaching, lack of the ICTs infrastructure to use. On the other hand, the study noted that the teachers especially the ones below 35 years were eager to use technology while teaching and preparing for class presentations. The study recommended capacity building among the enthusiastic teachers who should serve as an example in rolling out integration of ICTs in teaching, the strategy would help in reducing resistance as well as laxity among the old teachers on the implementation of ICTs in teaching. Tusiime, Johannesen, and Gudmundsdottir (2020) studied the challenges affecting the integration of ICTs in teaching mathematics subjects among secondary schools in Uganda. The study used checklists for observation, interviews, and questionnaires as the main tools in data collection. The study revealed school factors and teacher factors as the major hindrance in the implementation of education policy by the ministry of education in the integration of ICTs in teaching. The study revealed that teachers' negative attitudes towards the integration of ICTs served as the major hurdle in the implementation of ICTs in teaching. The institutional factors that hindered the integration of ICTs in learning included lack of Icts equipment, lack of proper training for the teachers to use the ICTs as well as lack of institutional policies on the use of ICTs in teaching. The teachers' factors included lack of confidence, conformity of the teachers, and the technical qualification in the use of the ICTs. The study noted that the lack of skills in the use of ICTs among the teachers made teachers anxious in using the technologies, therefore, lacking confidence which made them avoid using technologies while teaching.

Agyei and Voogt (2011) who studied the teachers' attitudes, competence, and integration of ICTs in the teaching of mathematics in Ghana revealed that teachers who had negative attitudes or neutral attitudes towards the use of technologies in the teaching did not consider the use of technology as appropriate, teachers attitudes were on the pedagogical as well as the consideration of the usefulness of the technology itself in teaching. Furthermore, the teachers who lack important computer competence skills also presented challenges in the utilization of the ICTs in teaching mathematics. The result was a very low score in the grade of mathematics especially for the teachers with a low opinion on the use of ICTs in teaching mathematics as well as the ones with low technical competence on how to use computers.

There is an ongoing debate on the effect of ICT integration in the teaching and learning process among higher learning institutions which needed thoroughly reviewed. There are, however, few studies that have been conducted on the challenges that face the integration of ICT among schools located in the Kenyan Northern Region. Most studies focusing on challenges facing the integration of ICT among schools are limited in their scope. As such, this study sought to establish the challenges facing teachers' integration of Information Communication and Technology in teaching and learning fabrication and welding in vocational centers in Mandera County.

DATA AND METHODS

The study adopted a descriptive research design since it allowed the use of different methods of collecting both qualitative and quantitative data. The study was conducted in the Northern region of Kenya in Mandera County focusing on two vocational institutions in the county; Tabaka vocational center and Mandera technical and vocational center. The target population for the study comprised 133 trainees, five (5) technical staff in the institutions, twenty-five (25) instructors, and seven (7) administrators in the two institutions. A 30% proportionate sample size was taken from the target population therefore, the study considered 52 respondents to provide data for the study. Interview schedules and questionnaires administered through the drop and pick methods were used in collecting data from the trainees and principals of the institutions respectively. Both qualitative and quantitative analysis was then carried out on the collected data. Quantitative data was analyzed through a descriptive analysis where percentages, frequencies, standard deviation, and mean were applied. Besides, content analysis was used to analyze the qualitative data from the interviews. Tables and bar graphs were used in the presentation of the quantitative data whereas the qualitative data was presented through narratives.

RESULTS AND DISCUSSIONS

Response Rate

The study had a response rate of 50% (1) on administrators, 62.5% (5) on the instructors, 80% (32) on the trainees, and 100% (2) on the technical staff.

Demographic Analysis

The study sought to establish the demographic characteristics such as teaching experience, highest academic qualification, and professional qualifications of the respondents. 50% of the instructors and technicians had experience of 11 to 15 years in teaching. The majority of the instructors (60%) had a diploma as their highest level of qualification which was also their highest professional qualification.

Descriptive Analysis

Challenges faced by Instructors while Integrating the ICT Based Pedagogy into the Curriculum

The findings of the study indicated that instructors and technicians lacked adequate training on the functioning of ICTs, for example when connecting devices when making presentations. As such, most instructors were inexperienced in the use of ICT. In addition, the devices malfunctioned in some instances when making the presentations. Besides, the ICT resources and facilities in the schools are inadequate thereby limiting the integration of ICT into the curriculum. The study also revealed that power outages, slow internet connections,

and lack of memory backups are some of the challenges that instructors face while teaching welding and Fabrication in Mandera County.

Raman and Yamat (2014) who studied the barriers faced by teachers when integrating ICT during English lessons concurs with the findings of this study that teachers lack adequate skills and knowledge on the functionality of technologies which limits their ability to incorporate ICT in teaching. Ekberg and Gao (2018) who researched the use of ICT in Sweden secondary schools indicate that schools provide digital resources but fail to provide adequate training to teachers on how to use the resources. In addition, Habibu et al., (2012) further indicate that among the difficulties faced by teachers using ICT in teaching and learning in Ugandan higher educational institutions are lack of the latest ICT equipment, low internet connection, lack of support and motivation from the administration and lack of expert technical staff. The study further indicates the need for institutions to explore different approaches involved in the use of ICT in teaching and learning.

Descriptive Statistics on the Challenges faced by Learners in using E-Schools ICTs

From Table 1 below, 88% of the learners indicated that the internet access was slow, not reliable, and inadequate. They also revealed that accessibility to the facilities in the E-schools is inadequate as shown by 59%. 66% indicated that ICT resources breakdown very often while 34% indicated that the software and hardware used is outdated. 28% revealed that computers in the E-schools have viruses, spam, and Trojan horses. The learners also indicated that the scope of online literature on their subject areas is limited as shown by 47%. 53% felt that the instructors offer little support and guidance on how to use the resources and 78% indicated that technicians in the E-Schools offer inadequate help, assistance, and services. Similarly, 63% revealed that the time allocated on learning using ICT is inadequate whereas 50% indicated that the ICT resources are scarce hence competition for the resources is high.
The study further indicates that trainees in welding and fabrication should acquire their laptops rather than rely on those provided by the schools since PCs can be used by the learners to carry out their studies at home in case resources are inadequate. This would also solve the problem of competition for the scarce resources in the schools.

Alkahtani (2017) who conducted a study on the challenges faced by Saudi schools while integrating ICT in the process of teaching concurs with the results of this study that lack of sufficient equipment is the main challenge faced by learners in the integration of ICT in the curriculum. In addition, most students and teachers lacked basic knowledge of the operations of the equipment. Razak et al., (2019) further indicate that most institutions have scarce ICT resources which prompt learners to compete for these resources which prove to be ineffective when integrating ICT. Muslem et al. (2018) indicate that among the challenges faced by Indonesian Schools in teaching using ICT include inadequate time and equipment to facilitate the process.

Table 1: Challenges faced by Learners in using E-Schools ICTs

Statement	Frequency	Percentage
The internet access was slow, not reliable, and inadequate	28	88%
Accessibility to the facilities in the E-schools is inadequate	19	59%
ICT resources breakdown very often	21	66%
The software and hardware used is outdated	11	34%
Computers in the E-schools have viruses, spam, and Trojan	9	28%
horses	15	47%
The scope of online literature on my subject areas is limited	17	53%
Instructors offer little support and guidance on how to use the		
resources	25	78%
Technicians in the E-Schools offer inadequate help, assistance,		
and services	20	63%
Time allocated on learning using ICT is inadequate	16	50%
ICT resources are scarce hence competition for the resources is		
high		

CONCLUSIONS AND RECOMMENDATIONS

The study concluded that instructors and technicians face numerous challenges when integrating ICT in the teaching and learning process of welding and fabrication in vocational centers. These challenges include a lack of adequate instructors and trainers who are experienced in ICT. In addition, these schools lacked adequate ICT resources to enhance the integration of ICT into the teaching and learning activities. The learners in the schools also faced challenges such as inadequate accessibility of facilities in the E-schools where most of these facilities used outdated software and hardware and slow network connections. In addition, the ICT resources in the schools were scarce thereby attracting competition from the trainees for the scarce resources. The institutions allocated inadequate time to allow students to familiarize themselves with the functioning of the ICT resources and the instructors as well as technicians did not offer adequate support and guidance to the learners. Computer viruses, spam, and Trojan horses were also challenges faced by the trainees.

The study recommended that with changing times and increasing innovations, institutions should focus more on giving trainees and instructors ICT resources that are up-to-date to avoid the challenge of these resources breaking down very often. Regular maintenance and check-ups are also key in reducing the breakdown of ICT resources. In addition, the study recommends that institutions should improve the accessibility of the ICT resources and also work with reliable internet providers. Finally, the study recommends hiring more instructors and technical staff to enhance the process of integrating ICT in teaching and learning welding and fabrication in vocational centers in Mandera County.

REFERENCES

Abaidoo, N. and Arkorful, V. (2014). Adoption and Effective Integration of ICT in Teaching and Learning in Higher institutions in Ghana. *International Journal of Education and Research, 2*(12), 411-423. https://ijern.com/journal/2014/December-2014/35.pdf

Agyei, D. D., & Voogt, J. (2011). ICT use in the teaching of mathematics: Implications for professional development of pre-service teachers in Ghana. *Education and information technologies*, *16*(4), 423-439. https://link.springer.com/article/10.1007/s10639-010-9141 9

Alemu, B. (2015). Integrating ICT into Teaching-learning Practices: Promise, Challenges and Future Directions of Higher Educational Institutes. *Universal Journal of Educational Research, 3*(3), 170-189. http://doi.org/10.13189/ujer.2015.030303

Alkahtani, A. (2017). The challenges facing the integration of ICT in teaching in Saudi secondary schools. *International Journal of Education and Development using Information and Communication Technology (IJEDICT), 13*(1), 32-51. https://files.eric.ed.gov/fulltext/EJ1142266.pdf.

Amuko, S., Miheso, M. and Ndeuthi, S. (2015). Opportunities and Challenges: Integration of ICT in Teaching and Learning Mathematics in Secondary Schools, Nairobi, Kenya. *Journal of Education and Practice, 6*(24), 1-7. https://files.eric.ed.gov/fulltext/EJ1078869.pdf.

Bingimlas, K. (2009). Barriers to the Successful Integration of ICT in Teaching and Learning Environments: A Review of the Literature. *EURASIA Journal of Mathematics, Science and Technology Education, 5*(3), 235-245. https://doi.org/10.12973/EJMSTE/75275.

Ekberg, S. and Gao, S. (2018). Understanding challenges of using ICT in secondary schools in Sweden from teachers' perspective. *The International Journal of Information and Learning Technology, 35*(1), 43-55. http://www.emeraldinsight.com/2056-4880.htm.

Habibu, T., Abdullah-Al-Mamun, N. and Clement, C. (2012). Difficulties Faced by Teachers in Using ICT in Teaching-Learning at Technical and Higher Educational Institutions of Uganda. *International Journal of Engineering Research & Technology (IJERT), 1*(7), 1-9. https://www.ijert.org/research/difficulties-faced-by-teachers-in-using-ict-in-teaching-learning-at-technical-and-higher-educational-institutions-of-uganda-IJERTV1IS7225.pdf.

Kler, S. (2014). ICT Integration in Teaching and Learning: Empowerment of Education with Technology. *Issues and Ideas in Education, 2(*2), 255-271. https://doi.org/10.15415/iie.2014.22019.

Lawrence, J. (2018). Factors Influencing Teachers' Integration of ICT in Teaching and Learning. *International Journal of Adult Vocational Education and Technology (IJAVET), 9*(2), 1-16. https://doi.org/10.4018/IJAVET.201804010.

Lawrence, J. and Tar, U. (2018). Factors that influence teachers' adoption and integration of ICT in the teaching/learning process. *Educational Media International, 55*(1), 79-105. https://doi.org/10.1080/09523987.2018.1439712.

Mathevula, M. and Uwizeyimana, D. (2014). The Challenges Facing the Integration of ICT in Teaching and Learning Activities in South African Rural Secondary Schools. *Mediterranean Journal of Social Sciences, 5*(20), 1087-1098. https://www.researchgate.net/publication/269954676.

Mbodila, M., Jones, T. and Muhandji, K. (2013). Integration of ICT in Education: Key Challenges. *Scholarly Journal of Mathematics and Computer Science, 2*(5), 54-60. http:// www.scholarly-journals.com/SJMCS.

Muslem, A., Yusuf, Y. and Juliana, R. (2018). Perceptions and Barriers to ICT Use among English Teachers in Indonesia. *Teaching English with Technology, 15*(2), 3-23. http://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.desklight-34ba375d-50d4-4341-9c9b-6e6fd275c1c0/c/ARTICLE1.pdf.

Mwanda, G. (2017). Integrating ICT into Teaching and Learning Biology: A Case for Rachuonyo South Sub-County, Kenya. *International Journal of Education, Culture and Society, 2*(6), 165-170. https://doi.org/10.11648/j.ijecs.20170206.12.

Ngeze, L. (2017). ICT Integration in Teaching and Learning in Secondary Schools in Tanzania: Readiness and Way Forward. *International Journal of Information and Education Technology, 7*(6), 424-427. https://doi.org/10.18178/ijiet.2017.7.6.905.

Njenga, L. (2015). *Challenges facing the integration of Information and Communication Technology in secondary schools in Thika division, Kiambu County*. [Masters Thesis, University of Nairobi]. http://erepository.mku.ac.ke/handle/123456789/2870

Raman, K. and Yamat, H. (2014). Barriers Teachers Face in Integrating ICT During English Lessons: A Case Study. *The Malaysian Online Journal of Educational Technology, 2*(3), 11-19. https://files.eric.ed.gov/fulltext/EJ1086402.pdf.

Razak, N., Ab Jalil, H. and Ismail, I. (2019). Challenges in ICT Integration among Malaysian Public Primary Education Teachers: The Roles of Leaders and Stakeholders. *International Journal of Emerging Technologies in Learning (IJET), 14*(24), 184-192. https://doi.org/10.3991/ijet.v14i24.12101.

Salam, S., Zeng, J. and Pathan, Z. 2(018). Impediments to the Integration of ICT in Public Schools of Contemporary Societies: A Review of Literature. *Journal of Information Processing Systems, 14*(1), 252-269. https://doi.org/10.3745/JIPS.04.0062.

Tedla, B. (2012). Understanding the importance, impacts, and barriers of ICT on Teaching and Learning in East African Countries. *International Journal for e-Learning Security, 2*(2), 199-207. https://doi.org/10.20533/ijels.2046.4568.2012.0025.

Tusiime, W. E., Johannesen, M., & Gudmundsdottir, G. B. (2020). Teaching art and design in a digital age: challenges facing Ugandan teacher educators. *Journal of Vocational Education & Training*, *7*(6), 1-21. https://www.tandfonline.com/doi/abs/10.1080/13636820.2020.1786439

Umar, I. and Hassan, A. (2015). Malaysian Teachers' Levels of ICT Integration and Its Perceived Impact on Teaching and Learning. *Procedia - Social and Behavioral Sciences, 197*(5), 2015-2021. http://creativecommons.org/licenses/by-nc-nd/4.0/.
.