Global Scientific JOURNALS
GSJ: Volume 10, Issue 2, February 2022, Online: ISSN 2320-9186
www.globalscientificjournal.com

Preparing Teachers and Learners For the 21st Century Technologies in Education

Abraham Orji(Ph.D;DLS), Uduak Idoghor(Ph.D;B.L)
Department of Curriculum Studies & Educational Technology,
Faculty of Education, University of Port Harcourt, Nigeria.

Abstract
There is a paradigm shift in educational institutions worldwide. The 21st Century has come with a new educational trend that is critically replacing the traditional method of educating the citizens. This paper reviewed some related literature on the need for teachers' technological competency, and what it takes for the teachers and students/learners to cope with the present instructional strategies in educational institutions. The paper further looked into teachers' possibilities of harnessing the available technologies devices for educational use. From the teachers, school, and the school administrators' angles, the paper generally examined and enumerated the major technological and other challenges inhibiting teachers' quick technological acceptance and adaptation in our educational institutions. Additionally discussed and listed are major technological tools required for teachers' to function efficiently and embrace the technology of the present time. The government role on teachers' technological/computer competence was in addition discussed. Also reviewed are the technological benefits of adopting or using these technological devices in teaching and learning processes. Finally, the authors made some salient suggestions/recommendations on how teachers and learners could adequately and totally embrace the technological advances to improving teaching and learning at all levels of our educational institutions.

Keywords: Online communication, Paradigm shift, New technologies, Distance Education, and Online learning.

Introduction/Review of Related Literature
There is no doubt that the integration of ICT has become fundamental in the education sector. Saimi and Yamat (2021) affirmed that there is a need for educators'/teachers' to acquire skills and achieve certain level of ICT competency in order to function efficiently. In recent times, the conventional methods of teaching and learning in all levels of educational institutions have started giving way to technological inventions and/or innovations. The technological age, as observed by Dikusar (2018) is witnessing the gradual erasure of classroom borders. The COVID-19 pandemic has yet added another dimension to it. The citizens, who are confined to educational establishments, are now shifting from the confines of the classroom set-ups to classrooms without walls.

The impacts of new technologies on our educational institutions cannot be over-emphasized. Nigerian governments at various levels need to do the needful to re-awaken our dwindling

education system to compete with the global standards. Our education institutions need to be designed in such a way that they can prepare and equip members of the society (teachers and learners) to harness the available resources for effective and a better instructional delivery in our educational institutions.

The world we know yesterday is not the same world we know today. The 21st Century has ushered us into a completely new world. We are in a world of critical thinking and creativity; a world of technological advances; a world that has given rise to a new way of thinking, and a new way of doing things as never done before in history. Unfortunately, we (Nigerians) are not fully prepared/ready to harness these technological advances to our potential advantage.

Educationally, the 21st Century has offered us numerous technologies to enhancing our educational advancements in all ramifications. But, how have we actually ventured into harnessing these new technologies for our educational gains? If this is not yet the case, what is the way forward for our learners and teachers' for the full utilization of these technological innovations for our advantage? These are additional critical questions that need cogent answers or solutions to race with time.

The questions that need urgent attentions are:

i. What shall Nigerian government do to harness these technological advances to her educational advantage?
ii. What role should the teachers' play to harness the ICT resources?
iii. What role should the learners/students as well play to harness the ICT resources?

Government's Role for Teachers' Technology Competences

To emphasize the need for technology competencies of teachers in a technological age, (Guillo and Guillo, 2017) cited an example in the Philippines, where the National ICT Competency Standard was established for teachers' to show support to guarantee the significance of Information and Communication Technology (ICT) competency in education among teachers

and students The programme, as the scholars declared demonstrates that ICT competency is highly required among teachers and to prepare them for future education, particularly at a time of the COVID-19 pandemic, where much emphasis is being placed on online programmes globally.

As strongly stressed by the Malaysian Ministry of Education, the Nigerian government at all levels of the education system should emphasize on training and retraining of teachers to make certain that the use of Information and Communication Technology is maximized for distance and self-paced learning to expand capacity and allow for more customized learning for the pupils (Ministry of Education 2013). Additionally, and as emphasized by Saimi and Yamat (2021), there is a need to determine the possible factors which influence or inhibit the level of ICT competency among teachers at all levels of the education system.

There is also the need to focusing on the encouragement of digital literacy and ICT competency in modern times. To ginger, the teachers' technological competencies for the future digital education, the Nigerian government, like the Malaysian government, with the help of the Ministry of Education should design and establish a programme that will identify the needs and the level of ICT competencies of all levels of teachers' to fulfilling their technological needs (Saimi & Yamat, 2021). Nigerian government should also initiate an education policy that will change to the new paradigm shift by moving towards an education that is associated with the use of technology as propounded by (Saimi & Yamat, 2021).

Just as highlighted by Aziz and Rahman (2017), the scholars emphasized the need for continued preparation and upgrading of information on recent developments in Information and Communication Technologies and software for not only to the teachers but also to the students to ensure that the mixture of ICT and teaching activities becomes more refined. Government policymakers and educationists should create an ICT policy, which will cater to teachers' ICT needs in schools. The aforesaid policy would as well help the teachers to implement and

integrate ICT more in the classroom/lessons as well as improving their ICT competency skills (Saimi & Yamat, 2021).

Teachers' Role in Acquisition of Technology/Computer Competency

There is no contradiction that there are novices ICT teachers in the school system, and there are teachers that display negative attitudes on ICT competency skills. Boahen (2013) observed that teachers go through the challenge of using tools and technology not earlier known or studied to deliver lessons to students, noting that lots of time would be taken by the teachers to have firsthand knowledge on how the tools function and their response tested for effective instructional delivery. Nonetheless, there is no doubt that the level of teachers' technological competencies will invariably reflect on the quality of any form of digital education programme initiated by any government or organization.

Luque, Abdurrahman and Prakosa (2020) have highlighted the importance of having competency in technological or computer skills required in modern times, and as well affirmed that the competency standards for human capital are necessary for developing the skills required in the modern era. There is no gainsaying that there is a huge gap in terms of readiness and knowledge in ICT among teachers, especially in Nigeria. Therefore, to maximize the full integration of Information and Communication Technologies (ICTs) in our educational institutions at all levels, the teachers' readiness in terms of skills, competency, and knowledge in ICTs tools or software is a must (Saimi & Yamat, 2021).

The teachers' in reality need a sufficient level of ICTs competencies to function efficiently in the envisaged or future classless classroom. To maximize the integration of ICT in our educational institutions will definitely require the teachers' readiness in terms of skills, competency, and knowledge in ICT tools or software (Saimi & Yamat, 2021). The scholars emphasized that it is only logical to witness the integration of ICT in the classroom when the teachers' are supplied

with an ample level of ICT competency. Aziz and Rahman (2017) have further stressed that teachers are required to use the technology regularly in the classroom to improve their digital literacy and ICT competency skills. Therefore, the teachers can only display a successful application of the ICT system if they have a suitable level of ICT competency and a positive in attitude handling the technology (Kamaruddin, Abdullah & Idris, 2017).

Students'\Learners' Role in Acquisition of Technology/Computer Competences

It is a fact that the present children are born in a technological age, but these technologies must be present and made accessible to them for effective utilization in their educational endeavours. Though born in a technological society, it is not an overstatement that millions of students do not have computers and Internet connections in their various homes. Also, some students from low-income families and those that dwell in remote areas may not as well have the same opportunities as their counterparts in the cities. As Sargrad (2020) observed, even if schools provide computers and Internet connections for their students, the other students with little or no computer knowledge will be operating at lower levels of computer literacy than students who are familiar with the use of computers.

Therefore, to gain access to these technologies, our children should be encouraged to attend schools to enable them to adequately acquire the needed technical skills required to fit into the technological society. Our students/learners at all levels of our education system need to be motivated by the government and the teachers as well to be computer literate, and as well familiarize themselves with the technologies of future education. Since nations, organizations, and institutions are racing to get technology and Internet access to learners who have no access to these resources, there is a need for Nigerian governments at all levels to make these resources available to the citizenry

The 21st Century Technologies in Education

ICT has become an important part of most organizations and businesses these days (Zhang & Aitman, 2007). Bransford, Brown and Cocking, 2000; Grimus, 2000, and Yelland (2001) declared that modern technology offers many means of improving teaching and learning in the classroom. Given the above, most of the technologies are with us today, and we must be acquitted with them and their various uses in the education sector. Turner (2005) has mentioned some of these technologies in use in the education sector as follows:- Computers, laptops, wireless laptops, tablet PCs, World Wide Web, scanners, CD burners, USB drives, digital cameras, and digital video cameras, PDAs, as well as video and DVD players.

Others are video, e-mail, desktop conferencing, online programs, such as WebCT and Blackboard, as well as video conferencing to teach. Similarly, social media sites are not excluded from these technologies used to facilitate teaching and learning processes. Modern teachers should familiarize themselves with these technologies and be competent with their usage in the 21st Century education industry.

The 21st Century Technology Skills for Teachers

At the dawn of this century, educators at all levels of the education system have witnessed the light speed in the area of educational technology, and technology (Turner, 2005). The digital immigrant teachers) find it difficult to catch up with the fast-moving computer-based society. These technologies are continuously evolving, and we need to be familiar with them to cope with modern trends. As a result, Turner (2005) has enumerated 20 basic technology skills every educator should know. As Turner (2005) further put it, and as the present time demands, this is not a time for our educators to be technology illiterate. Teachers/Educators need to acquire enough technology competence to cope with the technical competence of the digital age (millennium) students/learners.

Consequently, the scholar (Turner, 2005) has comprehensively listed the 20 technology skills that every teacher/educator should possess to function excellently in a technology-based society. Therefore, the technology skills necessary for today's educators are as listed hereunder. 1. Word processing 2. Spreadsheets 3. Database 4. Electronic presentation 4. Web navigation 5. Web site design 6. E-mail management 7. Digital cameras 8. Digital cameras 9. Computer network knowledge applicable to your school system 10. File management & windows explorer 11. Downloading software from the web (knowledge including ebooks) 12. Installing computer software onto a computer system 13. WebCT or blackboard teaching 14. Videoconferencing 15. Computer-related storage devices (knowledge: Disks, CDs, USB drives, Zip disks, DVDs, etc.). 16. Scanner knowledge 17. Knowledge of PDAs 18. Deep web knowledge 19. Educational copyright knowledge. 20. Computer security knowledge.

Generally, today's teachers/educators, as Turner (2005) affirmed should be able to accomplish some tasks with Word processor software. There is no doubt that most of the materials used in the conventional classroom will be converted to online texts; consequently, and as Turner (2005) emphasized, our teachers/educators should be able to use a word processing program to accomplish any written tasks on time. They should be able to type with a spreadsheet program to compile grades and chart data, and the database program to create tables, store and retrieve data, and as well query data.

Today's teacher should be able to use one of the most popular software, such as PowerPoint to present his lesson/lecture. He should easily log on to the Internet to collaborate with colleagues, search, download some electronic materials and as well upload materials for himself and the students for teaching and research purposes. A digitally skilled teacher should be able to send and receive email attachments, visit and teach with some social media sites, such as WhatsApp.

Need for Massive Computer Literacy/ICT Competency for Teachers

Technology is constantly reshaping the world. It is on this note that Fort (2017) rightly stated that it has become exceedingly difficult for us to keep abreast with the continually evolving computer-based technology, which the teachers are not excluded from. Similarly, Obiozor (n.d.) also noted that whether we leave in the urban or rural community, that all citizens worldwide require modern ICT knowledge skills for growth and survival at home, become productive in the workplace and achieve community development goals.

Globalized, there is no doubt the knowledge of ICT skills are critical to the success of enhancing national development of any country. Obiozor (n.d.) also noted that every nation/people is constantly faced with the challenges of ICT in different sectors of human development, community improvement, and nation-building.

In view of the above, the need for computer literacy, which is the engine or powerhouse of the new technologies, is no more in doubt. The present situation demands teachers to be technologically compliant to remain relevant in their chosen careers. Modern teaching and learning demand the use of synchronous and asynchronous technological devices. Some of these devices that require technical competence are mobile devices, such as Tablets, desktop PCs, and laptop PCs, email, WWW, desktop conferencing, video conferencing.

Others include hardware, such as computers, printers, scanners, video recorders, television, radio, and digital cameras; as well as the software and systems needed for communication, such as the Internet and e-mail among other computer-related technologies (Bialobrezeska & Cohen, 2003 in Obiozor (n.d.). These technological devices cannot be used without the knowledge of computer skills to manipulate the same to manage educational programmes.

Need for Massive Computer Literacy/ICT Competency for Students/Learners

In recent times, many initiatives and investments as declared by Ficklen & Muscara (2001), Becker & Riel (2000); and Cattagni and Farris (2001) have been undertaken to integrate ICT into education. Time has gone when Nigerians private businesses, public agencies, and government offices could not conduct transactions with some technological devices, such as the use of computers, electronic filing systems, ATMs, iPods, and access the World Wide Web and other information and communication technology network with ease (Obiozor, n.d.). Several studies have been conducted on how to integrate ICT into education.

In modern times, the education industry has globally gone online, and Nigerians will not remain behind to watch. Hence, there is a need for contemporary students/learners to acquire the technologies of the time. Atchoarena and Esquieu (2002) believe that rudimentary intermediate-level ICT skills necessary to function optimally in basic computer-related environments are crucial to national competitiveness in a developing context.

Though present students/learners are born in a technological society, most of them are computer illiterate and are yet to acquire the technological know-how, especially in the rural communities where ICT tools are not readily available due to several factors, like lack of electricity, computer network, poor training skills, and motivation (Obiozor, n.d.). The acquisition of major technological gadgets will enable digital learners/students to harness the dividends of the technological age. Therefore, there is a need for urgent ICT sensitization and support for learners to cope with the present digital education.

Major Technological Barriers inhibiting Teachers' ICTs' Competency and Integration

There is no gainsaying that teachers', school system, and the school administrators', all contribute to barriers inhibiting teachers' ICTs' competency and integration in educational institutions. The use of technology in the education sector has come to stay with us, and there is

nothing anyone can do to withhold it. Yet, Askar & Usluel (2002); Zhao, Pugh, Sheldon, & Byers (2002); Firek (2003); Keengwe, Onchwari, & Wachira (2008); and National Education Association [NEA] (2008) have declared that the effective integration of ICT into education has occasionally been extremely difficult and problematic.

In Nigerian context, Opara and Ituen (2009) have lamented that Nigeria is trying in the area of ICT development, but affirmed that there are still some loopholes affecting its total advancement. The World Bank, as cited by Opara & Ituen (2009) as well, pointed out that the supply of ICT skills represents an integral component of the overall national development trajectory of countries in a globalized world.

Research findings by Raman and Yamat (n.d.) also revealed that among the barriers teachers' 'face in integrating ICT in teaching and learning processes, particularly in teaching English lessons are: - (i). Hesitancy in integrating ICT (ii). Amount of workload (iii). Lack of time (iv). Age (v). Teaching experience, and (vi). Lack of ICT skills. These, the scholars declared are some of the barriers encumbering teachers' incorporation of ICT in their teaching.

In the same development, Researchers, as identified by Lawson and Comber (1999); Williams, Coles, Wilson, Richardson and Tuson (2000); Pelgrum, 2001; Ertmer, 2001; and Hew and Brush (2007) have enumerated several barriers as it affects the teachers, the schools system, and the administrators that affects the successful Information and Communication Technology intgegration in schools.

These factors as idntified by the above scholars are: - (i) lack of appropriate support and training (ii) attitude of teachers towards innovation (iii) the role of ICT coordinator (iv) the attitudes of senior administrators (v) lack of knowledge, skill and support (vi) lack or insuffient ICT infrastructure (vii) access to technology (viii) implementation time, and technical support (ix) content and training (x) resources (xi) lack of computers (xii) teachers lack of knowledge.

Others are (xiii) teachers beliefs, implementation and edurance (xiv) lack of teachers ICT skills (xi) lack of confidence, and inaproprate teacher-training (xii) low motivation for using new technologies (xiii) poor quakity, and inadequate maintenance of hardware (xiv) limited access to ICT equipment (xv) lack of apropriate trainig software (xvi)) lack of project experience (xvii) lack of technology-related management (xviii) lack of learship skills, and (xix) lack of time-tabling structure (xx) old and insufficient hardwar (xxi) and technology integration plan.

Similarly, in a study conducted by Goktas, Gedik and Baydas (2013) on the barriers encountered by Turkish primary school teachers in the integration of ICT indicates that 'lack of hardware', 'lack of appropriate software materials', 'limitations of hardware', 'lack of in-service training', and 'lack of technical support' were the most important barriers. Others are Lack of technical Support, Lack of basic knowledge/skills for ICT, Lack of knowledge/skills for ICT integration, Lack of appropriate Physical environment, Lack of appropriate course content and instructional programs, Lack of appropriate administrative support, and lack of time (Post, 2000).

However, the aforesaid barriers have been categorized into internal and external (Ertmer, Addison, Lane, Ross, & Woods, 1999). The external, the scholars affirm encompass hardware and software inadequacies, and lack of technical support and time. While the internal barriers include attitudes and beliefs toward the uses of technology in education and the teaching approaches used by schools. Lack of design thinking by teachers has been added as the third factor (Tsai & Chai, 2012). Furthermore, rapid advancements in ICT have as we4ll been identified as a factor that can cause some problems in the integration process.

Based on the above premises, there is a need for the Nigerian government to fast-track the wide usage and exploitation of ICT tools in the country to facilitate and promote growth, and as well strengthen ICT development to powering all sectors of the economy. Nigerian immigrant

teachers must, as matters of necessity embrace the technological skills or competence to fit into the present e-education regardless of some hitches.

Summary

Technology has come to stay with us, and we must make use of it to remain relevant in this present electronic/digital age. The authors have reviewed some of the related literature on the subject matter, reviewed the need for teachers' technological competency and what it takes for the teachers and students/learners to cope with the present instructional strategies in our educational institutions. The authors have as well listed major technological tools required for teachers' to function efficiently and embrace the technology of the time. The government's role in teachers' technological/computer competence was discussed. Also reviewed are the technological benefits and challenges encountered by teachers while using these technological devices in teaching and learning processes. However, suggestions/recommendations to ameliorating the identified technological problems were proffered.

Conclusion and Recommendation

As mentioned earlier, Opara and Ituen (2009) lamented that Nigeria is trying in the area of ICT development, but avowed that there are still some loopholes affecting its total advancement. In the same vein, the World Bank has as well stressed that the supply of ICT skills represents an integral component of the overall national development. Therefore, the scholars, as a matter of necessity recommended the following measures:- i. There is every serious need for Nigerian government to make haste the wide use and exploitation of ICT tools and skills to facilitate and promote growth, and development in all sectors of the economy. ii. Sufficient in-service training and re-training, motivation, encouragement, flexible time and task arrangement for teachers. iii. Nigerian higher institutions should solicit support for ICT facilities, such as computers, internet/web-based, and e-learning instructional resources from wealthy individual, local and foreign agencies. iv. ICT-based educational material (Ozgur, 2021) should be organized for our

immigrant teachers. v. Teachers should be given adequate opportunities to attend conferences, workshops, and seminars on the use 21st Century technological devices for effective instructional delivery to boast online education in all sectors of the education system in Nigeria. vi. Finally, ICT-based curriculum should be part of the teacher training programmes (Ozgur, 2021).

Conclusively, governments in advanced and developing societies should as a matter of urgency strive to create opportunities for her citizens to participation in skills acquisition, ICT training, and total application and use of ICT tools to solving problems and promote national growth/development.

References

Askar, P., & Usluel, Y. K. (2002). Perceptions of teachers about the characteristics of computers in the diffusion process of technology. H. U. Journal of Education, 22, 14–20.

Atchoarena, D. & Esquieu, P. (2002, January). "Private technical and vocational education in sub-Saharan Africa (SSA): Provision patterns and policy issues," revised final report, prepared by the International Institute for Educational Planning for The World Bank, Paris.

Aziz, N. S., & Rahman, N. (2017). Use of ICT in indigenous primary school classroom: A case study of teachers' expectations and experiences. In *2017 International Conference on Research and Innovation in Information Systems (ICRIIS)* (pp. 1-4). IEEE.

Bialobrzeska, M. & Cohen, S. (2005). Managing ICTs in South African schools: A guide for school principals. Braamfontein: South African Institute for Distance Education.

Becker, H. J., & Riel, M. M. (2000). Teacher professional engagement and constructive-compatible computer usage (Report no. 7). Irvine, CA: Teaching, Learning, and Computing. Online: Retrieved February 2005, from http://www.crito.uci.edu/tlc/findings/report_7/.

Bialobrezeska & Cohen (2003) in Obiozor, W. E. (n.d.). Identification of ict for development in Nigeria: utilization, literacy efforts and challenges. Awka-Nigeria: Nnamdi Azikiwe University.

Boahen, S. (2013). E-teaching administrative system. Retrieved 1 July, 2017 from https://www. theseus. fi/handle/10024/55812

Bransford, J.; Brown, A. L., & Cocking, R. R. (2000) (Eds.). How people learn: Brain, mind, experience and school.(2nd). Washington DC., DC: National Academy Press.

Cattagni, A., & Farris, E. (2001). Internet access in U.S. public schools and classrooms: 1994–2000 (NCES 2001–071). U.S. Department of Education. Washington, DC: National Center for Education Statistics

Dikusar, A. (2018). The use of technology in special education. Retrieved 27 June, 2021, From https://elearningindustry.com/augmented-reality-for-special-needs-learning

Ertmer, P. A. (2001). Responsive instrutional design: Scaffolding the adaption and change Process. Educational Technology, 41: p. 33-38.

Ficklen, E., & Muscara, C. (2001). Harnessing technology in the classroom. American Educator, 22–29.

Firek, H. (2003). One order of ed tech coming up. You want fries with that? Phi Delta Kappan, 84, 96–597.

Fort, A. (2017). 8 Computer Skills For Every Teacher To Master. Retrieved 1 July, 2021 from https://elearningindustrycom/8-computer-skills-every-teacher-to-master

Goktas, Y., Gedik, N. & Baydas, O. (2013). Enablers and barriers to the use of ICT in primary schools in Turkey: A comparative study of 2005–2011 Computers & Education 68 (2013) 211–222.

Grimus, M. (2000). ICT and multimedia in primary school. Paper presented at the 16th conference on educational uses of information and communication technologies, Beijing, China.

Guillo & Guillo, 2017 in Saimi, N., & Yamat, H. (2021). Factors influencing ict competency skills among esl primary school teachers. *International Journal of Academic Research in Business and Social Sciences*, 10(1), 220-236.

Hew, K. F. & Brush, T. (2007). Integrating technoloty into k-12 teaching and learning: Current knowledge gaps and reccommendataions for furture research. Educational Technology Research and Development. 55: p. 223-252.

Kamaruddin, K., Abdullah, C. A. C., & Idris, M. N. (2017). Integrating ICT in teaching and learning: A preliminary study on Malaysian private preschool. *International Journal of Academic Research in Business and Social Sciences*, *7*(11), 1236-1248.

Keengwe, J., Onchwari, G., & Wachira, P. (2008). Computer technology integration and student learning: barriers and promise. Journal of Science of Education Technology, 17,560–565.

Lawson, T. & Comber, C. (1999). Superhighways technology: Persons factors leading to successful integration of information and communications technology in schools and colleges. Jornal of Information Technology and Teacher Education, 8: p.41-53.

Luque, J., Abdurrahman, S. F., & Prakosa, P. W. B. (2020). Competency standards as a tool for human capital development: assessment of their development and introduction into TVET and certification in Indonesia 1-64.

Ministry of Education Malaysia (2013). Malaysia Education Blueprint 2013-2025 (Preschool to post-secondary education).

National Education Association [NEA]. (2008). Technology in schools: The ongoing challenge of access, adequacy, and equity. Washington, D.C.: Policy Brief, NEA Policy and Practice Department. Online: Retrieved January 2013, from http://www.nea.org/assests/ docs/PB19_ Technology08.pdf.

Obiozor, W. E. (n.d.). Identification of ICT for development in Nigeria: Utilization, literacy efforts and challenges. *International Journal for Education, Science & public policy in*, Africa (IJESPPA), Bloomsburg, PA 17815, USA.

Opara, S & Ituen, I (2009). Nigeria's ICT sector: Growth, gains and challenges. The Punch Newspaper, *121* Sunday, 5 Apr 2009. Retrieved October 28, 2021 from http://www. punchng.com/Articl.aspx?theartic=Art2009040422503735

Pelgrum, W. J. (2001).Obstacles to the integration of ICT in education: Results from a

worldwide educational assessment. Computer Education, 37: p. 163-178.

Saimi, N., & Yamat, H. (2021). Factors influencing ICT competency skills among ESL primary school teachers. *International Journal of Academic Research in Business and Social Sciences*, 10(1), 220-236.

Sargrad, S. (2020). Why computer literacy matters during the covid-19 pandemic. Retrieved 28 June, 2021 from https://www.forbes.com/sites/scottsargrad/2020/09/16/why-computer-literacy-matters-during-the-covid-19-pandemic/?sh=2297559158d7

Turner, L. (2005). 20 technology skills every educator should have. Retrieved 27 June, 2021, From https://thejournal.com/articles/2005/06/01/20-technology-skills-every-educator--have.aspx

Williams, D. L; Coles, K. W; Richardson, A. & Tuson, J. (2000). Teachers and ICT: Current use and furtue needs. British Journal of Educational Technology. 31: p. 307-320.

Yelland, N. (2001). Teaching and learning with information and communication technology in the early childhood and primary years of schooling. Australia: Department of Education, Training, and Youth Affairs.

Zhang, P. & Aikman, S. (2007). Attitudes of ICT acceptance and Use. In Jack, J. (Ed.). *Human-computer interaction, Part I,* pp. 1021-1030. Syracuse, NY: Spring-Verlag Berlin Heidelberg.

Zhao, Y., Pugh, K., Sheldon, S., & Byers, J. L. (2002). Conditions for classroom technology innovations. Teachers College Record, 104(3), 482–515.