Impact of Virtual Learning Space in Teaching Learners with Moderate Intellectual Disability

Udeme Samuel Jacob[1], Jace Pillay[2]

[1]Postdoctoral Research Fellow, South African Research Chair in Education and Care in Childhood, Faculty of Education, University of Johannesburg

[2]South African Research Chair in Education and Care in Childhood, Faculty of Education, University of Johannesburg, South Africa

Email:[1]udeme01@gmail.com, [2]jacep@uj.ac.za

ABSTRACT

Nigeria, just like all other countries of the world has been impacted by the global pandemic, COVID-19, leading to the implementation of lockdown measures. The advent of virtual learning spaces are considered the best alternative learning platform because of the need to save academic programme. This paper examines the position of virtual learning spaces in ensuring that learners with intellectual disability are not excluded from instructional experiences due to the global crisis caused by the transmission of COVID-19. In education, virtual learning space has been defined as a computer-simulated location or space where learners with intellectual disabilities can learn and communicate without requiring physical contact. The use of virtual learning spaces during the lockdown will most likely ensure that they are not excluded from learning activities. This would also contribute to an expansion in learning opportunities so that more learners can have access to educational programmes, often beyond the conventional learning environment, thus facilitating the advancement of knowledge and acquisition of skills required to work efficiently in the modern world. In addition to highlighting the various ways in which virtual learning spaces could improve learning, challenges that are likely to be confronted in their use were also identified.

Introduction

Nigeria hopes to continue educating her citizens during the period of a global pandemic may not feasible. This calls for an urgent improvement in the quantity and quality of instruction that will enable teachers to interact with learners using alternative learning platform known as virtual learning space. Budgetary allocation to primary education and educational facilities in Nigeria since the beginning of the 4th republic is significantly low with the repercussion on smooth transition from the regular face-to-face classroom interaction to virtual learning space in most parts of the country due to COVID-19 lockdown. Investment in infrastructural facilities such as the internet and virtual learning solution was not adequately funded by successive government in Nigerian at all levels which would have made it a viable mode of teaching because of the need to minimized the spread of COVID-19. The closure of schools as a step towards preventing the rapid spread of COVID 19 has brought to light various social and economic issues, including the readiness of the educational system is embrace a virtual learning space for learning activities [1, 2] and access to education, virtual learning and disability. Interestingly, VLS will also enhances the motivation and active participation of learners in the learning process (3, 4) if properly implemented.

The ease with which virtual learning space can be used to enhanced knowledge transfer and the global nature of our society [5] for easy teaching of learners even in their remote location during lockdown makes it a good approach. This method of teaching may not be easily adopted due to lot of knowledge gaps still existing among teachers VLS experiences (2). The implication is that transition from conventional mode of teaching to VLS will likely not be consistent across various groups of learners while the expectations of what to teach learners with moderate intellectual disability may not be realistic. However, prolong school closure on learners with moderate intellectual disability will be more severe if VLS were not adopted for the purpose of engaging in learning activities because of their exclusion from most activities in the community and within the family.

The term intellectual Disability (ID) is used for describing a condition that occurs during the developmental period (before 18 years), the resultant consequence of the disorder is a severe sub-average intellectual capacity that exists simultaneously with deficits in two or more adaptive areas such as conceptual, social and practical [6,7] with an IQ under 70. Learners with moderate intellectual disability may not possess adequate knowledge of virtual learning space needed to exploit the various platform that will be used for teaching [8] which is the impact of poor adaptive skills. This may be due, in part, to the incidence of a 'digital divide' that is evident both geographically and socially. Although, human society has over the years been transformed into what is known as a global village due to technological advancement both computer and internet connectivity.

Such effect would have been felt in all aspects of human endeavour socioeconomically, politically and to some extent the educational sector [9] if virtual solution was properly

deployed for teaching and learning of learners. This is true because an integral part of human society is the virtual learning space to information dissemination [10]. After all, it usage is relevant to every aspect of human endeavour and significant relationship with higher efficiency, productivity, and achievement in academic tasks, "including the quality of cognitive, creative and innovative thinking" [11]. The implication is that virtual learning space is an imperative response to achieving "education for all" since leaving any learner behind due to the 'digital divide" will be inappropriate for their development.

The conventional method of face-to-face teaching has significantly been challenged due to the need for social distancing to contract the Corona Virus. The use of an alternative teaching model should put learners with intellectual disability into consideration so as not to exclude them such as virtual learning space. In the learning situation that virtual learning space is used quality of education quality, "learning opportunities" and access to education can improve [8]. Curriculum mapping (breaking curricula into simple teaching and evaluation sections), student progress monitoring, online instructor and student support, digital communication (e-mail, shared conversations, chat, blogging) and Internet connections to external curriculum tools are key components of the virtual learning environment. It is important to note that knowledge components associated with Information and communication technology (ICT)-literacy are part of the basic foundation for professional development in knowledge-driven societies for efficient teaching of learners with intellectual disability. The devastation occasioned by the spread of COVID 19 has led to a shift from physical to virtual learning spacing for learners in an attempt to minimise the impact of the virus on the populace. Globally rapid changes have been experienced due to the pervasiveness of ICT leading to a significant transformation in technology, social, political, and economic [8].

However, there has not been a positive impact on education in Nigeria and most developing countries as a result of the penetrating influence of virtual learning space. There is no dispute about the benefits of virtual learning space on the availability and reliability of learning, teaching and research [8]. Moreover, virtual learning space will provide opportunities for effective communication among learners, teachers and non-teaching staff when teaching and learning either in a formal or informal setting [9]. According to [10] the use of VLS in the dissemination of information to learners should not be seen as one size fits all but should be based on the content of the curriculum to be taught and available technology at the time of teaching. The implication is that other factors should be considered before the incorporation of technology in the provision of instruction such as teaching pedagogy and construction of learning experiences.

Concept of Virtual Learning

A virtual learning environment is an online approach that can be adopted for teaching learners in their remote location [11] which in turn eliminates face-to-face contact. Instructional content for virtual learning environments will have to be tailored to the mental age of learners with intellectual disability due to their inability to think logically and learn abstractly which may be one major characteristic of virtual learning. [12] reported that some studies revealed that the "use of Computer system or web-based system can assist in providing certain interactive educational games" to learners with intellectual disability that will enable learners to easily identify or differentiate shapes and score them at the same time or at the end of the learning activity in process enhancing knowledge acquisition for them. It should be noted that virtual teaching should be done in a 'friendly learning environment' while the teacher minimize teaching in abstraction because of the difficulty learners with intellectual disability has in remembering abstract information and following social rules. The teacher can achieve this by assisting learners to listen to stories using images and videos known as Expressive, Creative and Aesthetic Development (ECAD) using a web-based or computer system.

The development of the literacy skills of learners with intellectual disability is no doubt important because it will help them have a better view of their community and contribute meaningfully to society. A vital consideration, therefore, of the importance of education in national development and the need to ensure that learners, regardless of their intellectual impairment, are not excluded from learning [8] makes it imperative for teachers to develop instructional content for virtual learning space to suit the deficits in adaptive behaviour of learners with intellectual disability. Therefore issues such as proper course structure, efficient time management, content modification, self-assessment, professional development, blended learning, task-oriented exercises, and efficient communication between participants (teacher and learners) will enhance teaching learners with intellectual disability using virtual learning space.

The goal of using a virtual learning environment is to provide an interactive gateway for learners to access information and explore the world at the same time. Equal opportunity is provided for learners with intellectual disability regardless of location through access to the internet to stimulate learning and interact with the teacher [11]. For instance, the iPod (and the iPhone) is designed to perform numerous but complex educational activities, most of which are required to be done to achieve different educational goals, especially in the area of literacy skills [13]. Virtual learning space makes the use of technological devices that provide a simple pushbutton-type of interface for users to accesses information on the internet [11]. This has led to multiple emerging mobile applications becoming increasingly acceptable as educationally relevant teaching tools for the development of spoken and written expertise among individuals with intellectual disability [13].

The main purpose of using virtual learning space in learning according to [14] is to ensure that knowledge is disseminated in such a way that it be applied to solving simple problems. In effect VLS are seen as tools "for post-industrial age and the foundations for knowledge economy" due to the ease with which it can be used in facilitating knowledge transfer and acquisition [15]. Virtual learning in recent times has become a common means of providing

instruction to learners particularly due to the need for social distancing to contain the spread of coronavirus.

The virtual learning environment provides opportunities teachers a different way of presenting instruction other than the face-to-face interaction, However, evaluation activities are often restricted, both in the scope and form in which they are performed in a virtual community [16,17]. Group presentations conducted via the conventional face-to-face approach of knowledge dissemination may not be feasible using virtual learning space [18-20] but additional opportunities "for summative assessment will be possible" [16,17,21,22], which may not be obtainable through face-face contact.

Social Distancing and Learners with Intellectual Disability

The difficulty that learners with intellectual disability may experience due to isolation and social distancing will particularly be noticed in mutual classroom instruction through group practice, symposium and evaluations [22-24]. Personal challenges likely to be confronted include anxiety when a teacher uses virtual learning space for the first time because they do not feel comfortable with the use or lack the skills required to effectively manage it to teach; (viewpoint) inconsistency in evaluation, particularly in "cohort" tasks; and (inherent) weakness or difficulty in relationships with peers, especially in teaching strategies.

Despite the best intentions of educators to provide learning experiences that unbiased and fair-handed to learners irrespective of the teaching platform, most teachers appear anxious and inadequately prepared to teach via wholly (or mostly) online especially when such a platform are unknown to them [21, 25-28]. This will result in the exclusion of learners with intellectual from the learning situation due to their levels of competency and proficiency in using various types of virtual learning tools.

A main characteristic of learners with intellectual disability that would somehow preclude them from engaging in the relevant learning experience through a range of Learning Management Systems (LMS) [17] are significant deficiencies both in mental capacity and social competencies as demonstrated through lack of logical, social and functional coping skills required for daily living.

Traditional teaching approaches generally take on group activities, which are a key element in the education sector that promotes the development of appropriate interpersonal and accessible employable skills. Moreover, barriers that can prevent successful use of VLS for teaching learners with moderate intellectual disability apart from those typically linked to group assignment would generally segregate learners from participating in learning task, This is due to their inability to access learning material and get connected to learning interface. This set of additional factors helps to further prevent learners with intellectual disabilities who would have built up the skills needed for multitasking when faced with various challenges to excellence.

It is therefore important to discuss the targeted inclusion of such communities and approaches to make it easier for them to participate [29]. In addition to the development of social relationships by improving learners' experience through virtual space, the different variables that can potentially play

a critical role in the achievement of learners with intellectual disabilities in the digital environment include learning capacity and intrinsic motivation. As noted [30], it is crucial for teachers using virtual learning space to use teaching strategies to ensure that learners are adequately challenged when compared to their higher-level cognitive abilities, rather than simply transferring content to them. Based on the benefits and flexibility that can be derived from virtual learning space because various opportunities for assessment is provided which can adopt different types of technologies when compared to the technological limitation associated with traditional, face-to-face class interaction and teaching methods [20, 31-33]

Impact of ICT or web-based system on Education of Learners with Intellectual Disability

Some of the likely impacts of virtual learning classroom include:

- Mobile devices are assumed to provide consistency across different learning situations, allowing learners to make correlations about what they experience, capture, access, and think about overtime, location, and people [34].

- The level of motivation of learners with intellectual disability will increase when virtual learning tools is used for teaching them which in turn will contribute to cognitive and social development [35]. The use of virtual learning tools will enhance self-concept and attitudes towards the learning of learners with intellectual disability.

- Recent findings on the impact of iPad applications on critical thinking and general educational outcomes among learners grouped at-risk have revealed that practical significance was reported for adopting iPad applications to assist in teaching skills related to "alphabet knowledge and number concept" [36]. Levels of spoken communication and cooperation of learners with intellectual disability will likely improve as a result of using a web-based or computer system for teaching because complex speech and the development of fluency will be encouraged through this mode of teaching.

- Various learning processes such as cognitive, sensorial, or mobility domains will be improved as a result of developing applications that are both appropriate and adaptable [37] for a virtual learning experience. Learners with intellectual disability with the use of a web-based system can interact more frequently with their peers by participating turn-taking that is a learner with responding to questions or perform a task while others wait for their turn.

- Learners with intellectual disability can be taught how to narrate they are using a web-based computer system as they draw and colour pictures or move objects and characters around the screen. The time spent on learning should be a maximum of 10 – 20 minutes if the teaching on a web-based computer system or technology is to have a positive impact on them to minimize boredom.

- Other impacts of the VLS include the potential of both teachers and peers to provide "real-time" assistants, the adaptation of the teaching strategy to meet the individual needs of the learner, and the acquisition of skills required by learners to play a more participatory role in designing of the learning environment, each of which contributes to justify the inclusion strategies of learning online in education [38]

and by doing this the teacher have been able to provide the necessary support to learners with intellectual disability who would have been secluded from learning due to the social distancing that comes with pandemic like COVID 19.

Problems Associated with Virtual Learning Classroom

Various reasons can be attributed to teachers' resistance to using virtual learning equipment to provide instruction to learners with intellectual disability. Such resistance could be natural due to the tendency to want to avoid new ways of doing things. The reason for teachers resistance of adopting virtual learning space according to [39], can be associated with internal factors such as competencies skills possessed by the teachers to manipulate the equipment satisfactorily and attitude of teachers towards the integration of virtual technology in lesson delivery while external factors include in-service training on the use of the tools, appropriate hardware and software are not readily available and inadequate teaching equipment. Submissions based on research findings identified teachers' confidence in using some of the devices, beliefs about the value of technology and the ability of learners to comprehend the instructional content were internal factors serving as barriers to teachers' utilization of virtual equipment [40].

Moreover, [42] noted that the negative attitude of teachers is responsible for the slow adoption of innovative technologies in providing instruction to learners with intellectual disability, especially in developing countries such as Nigeria which is supported by [38] who argued that lack of interest in online teaching resources and the complexity of pre-service skills development for teachers are factors associated with refusal of teachers to use ICT tools for educational purposes. Furthermore, the successful use of VLS cannot be ensured without the availability of ICT resources (social media, Internet, e-mail, computer or cell phone that are internet-enabled, etc.) and the energy needed to power the devices. The power supply in most urban areas is epileptic or inconsistent while most areas in the rural areas in Nigeria are not connected yet to the national grid for the supply of electricity. Challenge will be confronted inefficient incorporation of most technological devices in providing virtual learning programme because alternative sources of power supply in Nigeria is not visible among most Nigerian due to the poverty level of the people. Most Nigerians in rural areas do not have access to constant mobile service and telecommunications facilities just like electricity. Even, network services in urban centres for mobile lines are not adequate to serve the growing population. An individual that have access to services complain of epileptic supply and will therefore make the integration of a virtual classroom learning environment for learners with intellectual disability difficult.

Furthermore, the dial-up cost for most Nigerians is on the high side due to the poor state of the mobile network. The introduction of GSM in August, 2001 have not improved access with the cost not affordable to most parents of learners with intellectual disability who will be responsible for ensuring their children can learn during this period. It should be noted that Nigerians have been pauperised by the poor state of the nation's economy making it relatively difficult for most middle-income earners to afford basic gadgets required for the virtual classroom experience. Thus, devices needed for accessing virtual learning space among most Nigerians might not be affordable because it is seen as luxury goods by most families. The resulting impact is that the integration of online resources such as e-mail, newsgroups, world-wide-web, etc. to provide necessary learning experiences to learners with intellectual disability during the lockdown period in Nigeria may be difficult.

In some situations basic ICT infrastructures required for functional and effective virtual learning environments are inadequate. The results of research conducted in 2002 by Nigerian who are American based Information Technology Professionals have shown that it could take around 50 years for Nigeria to close the gap with America based on the current ICT penetration concerning the number of personal computers (Pc) available per household. [9] because the cost of PC is a challenge to most families. Finding a solution to these problems is crucial and will go a long way to enhance access to virtual learning space by learners with intellectual disability at their convenient. Efforts should be made in both rural and urban areas to intensify improvement of "electricity, telecommunication and other communication facilities" [43]

The issue of "one size fits all" mode is specifically highlighted in collaborative learning activities (group work) because it allows identifying individual differences between and across groups. The reason may be due to the application of generalised pedagogical assumption that is linked with collaborative learning activities in virtual learning space because the focus is not on delivery rather on task/content [24]. Along these lines, the presumption that learners will both know and have the option to participate in group tasks irrespective of the mode of teaching prevails because if the notion that one-size-fits-all should be adopted. Learners with intellectual disability access and participation in virtual learning space can be affected by personal factors [29]. Commitments such as caring for siblings or expectation to perform various house chores can prevent parents from giving required support to a learner with intellectual disability to participate regularly in "scheduled tutorials/live sessions" [17].

Moreover, the same way that virtual learning space provides flexible and convenient learning experiences to learners it can also result in distraction and inability to participate effectively in scheduled learning tasks which may be due to "personal factors that impede learners' ability to participate include [17]. Some of the software applications available are not designed for the benefits of learners with intellectual disability. The applications are rarely designed to solve learning challenges [44] but as potential solutions to business. It is neither trivial nor obvious to convert some of the applications for virtual learning space because it will require stakeholders in the educational sector to identify affordability and difficulty that may likely be confronted so that the application can be repurposed to meet specific pedagogical goals of specific content areas. Focusing on VLS alone can lead to the assumption that students are taking technological related courses and impact on learning rather than on the topic they are expected to study [45].

Recommendations

1.   Access to virtual learning space and internet should be sufficiently made for students with intellectual disability so that learning will be seamless/

2.   The quality of digital content should be meaningful and culturally based on efficiency.

3.   It is important that teachers possess the required knowledge and skills required to ensure that learners with intellectual disability are assisted to learner using the virtual learning space. Therefore focus should **be** placed on the training and professional development of the teachers.

4.   Crucial infrastructure should be invested because the quality infrastructure will help enhance the interaction between learners and teachers. The implication is that investment should be wisely done to achieve set goals.

Conclusions

Nigeria is faced with the challenge of deploying information and communication tools that could be used for the implementation of virtual learning for learners with intellectual disability based on some of the problems that have been discussed above. Exploring some of the suggested solutions so as to mitigate identified challenges associated with sing VLS for teaching by government and stakeholders is crucial. This will result in teachers of learners with intellectual disability adoption of VLS for teaching not only during a situation that requires social distancing, but as a way of enhancing classroom instruction. Apart from socio-economic difficulties that have impeded IT development, the prevailing infrastructure on the ground is another factor affecting IT development in the country. Moreover, it is important that manpower development is embarked on through regular workshops and training so that teachers are conversant with virtual learning modes of teaching.

Funding

Acknowledgments

References

[1]   P, Karp. M, McGowan. Clear as mud' schools ask for online help as coronavirus policy confusion persists. *The Guardian*. 2020

[2]   J. J. Duderstadt. A University for the 21st. Century. Ann Arbor, MI: The University of Michigan Press 2000

[3]   American Psychiatric Association Diagnostic and statistical manual of mental

[4]   disorders. (5 th ed). Washington, DC: APA. 2013.

[5]   X, Ke. J. Liu. Intellectual Disability. Geneva: International Association for Child and Adolescent Psychiatry and Allied Professions. 2012

[6]   H., Littlejohn. Improving continuing professional development in the use of ICT. Journal of Computer Assisted Learning, 18, 166-174. 2002

[7]   S. A. Onasanya, R. A. Shehu, R. O. Oduwaiye. L. A. Shehu. Higher institutions Lecturers' attitudes towards integration of ICT into teaching and research in Nigeria. *Research Journal of Information Technology*, 2(1), 1-10. 2010

[8]   P. O. Nwachukwu. Appraising the relationship between ICT usage and integration and the standard of teacher education programmes in developing economy. *International Journal of education and Development using ICT*, 2 (3). 2006

[9]   C. M. Anikweze, A. C. Kanu, Information and Communication

[10]   Technology (ICT) and 21st Century Education in Nigeria *International Journal of Innovation and Research in Educational Sciences* 5(1), 2349–5219 2018

[11]   M. O. Yusuf. "Information and Communication Technologies and Education: Analyzing the Nigerian National Policy for Information Technology". *International Education Journal* 6(3), 316-321. 2005

[12]   J. Orlando, and C. Attard. Digital natives come of age: The reality of today's early career Teachers using mobile devices to teach mathematics. *Mathematics Education Research Journal, 28*, 107–121. 2015

[13]   N. L. Yusoff, Virtual Learning Space for Kindergarten Dissertation submitted in partial fulfillment of the requirements for the Bachelor of Technology (Hons) (Business Information System) 2008

[14]   BBC News. Is five too soon to start school? News Channel: Education Available:

[15]   http://news.bbc.co.uk/1/hi/education/7234578.stm [accessed: 3rd November, 2014] 2008

[16]   G. Kokkalia, A. S. Drigas. A. Economou, A Mobile Learning For Preschool Education *International Journal of Interactive Mobile Technologies* (iJIM)M 10 (4), 57 – 64. 2017

[17]   G. Aribisala/ *The influence of Science instruction supported with computer to the success of the students and to the attitude of the students against computer*. Ankara. Ankara University Social Science Institute (Unpublished Master Thesis). 2006

[18]   A. Ajayi. "Towards effective use of information and communication technology for teaching in Nigerian

colleges of education. *Asian J. Inf. Technol.* 7(5): 210 – 214. 2008

[19] C. Williams, B. A. Cameron. K. Morgan, Supporting online group projects. *NACTA Journal, 56*(2), 15–20. 2012

[20] Gillett-Swanm. The Challenges of Online Learning Supporting and Engaging the Isolated Learner *Journal of Learning Design 10* (1); 20 – 30. 2017

[21] M. Cazan. S. E. Indreica. Need for cognition and approaches to learning among University students. *Procedia-Social and Behavioural Sciences Journal, 127*, 134–138. 2014

[22] N, Milman. Differentiating instruction in online environments. *Distance Learning*, *11*(4), 21–23. 2014

[23] N. P. Napier, S. Dekhane. S. Smith. Transitioning to blended learning: Understanding student and faculty perceptions. *Journal of Asynchronous Learning Networks, 15*(1), 20–32. 2011

[24] D. Jaques. G. Salmon. *Learning in groups: A handbook for face-to-face and Online environments*. Abingdon, UK: Routledge. 2007

[25] Zapalska. D. Brozik. Learning styles and online education. *Journal of Campus Wide* Information *Systems, 23*(5), 325–335. 2006

[26] R. Davidson. Wiki use that increases communication and collaboration motivation. *Journal of Learning Design, 8*(3), 94–105. 2015

[27] C. R. Graham. M. Misanchuk. Computer-mediated learning groups: Benefits and challenges to using group work in online learning environments. In T. S. Roberts (Ed.), *Online Collaborative Learning: Theory and Practice* (pp. 181–202). Hershey, PA: Idea Group. , 2004

[28] J. Little-Wiles. L. L. Naimi. Faculty perceptions of and experiences in using the blackboard learning management system. *Conflict Resolution and Negotiation Journal, 4*(1), 1– 13. 2011

[29] R. Rucker. S. Downey. Faculty technology usage resulting from institutional migration to a new learning management system. *Online Journal of Distance Learning*

[30] *Administration.* Retrieved from http://www.westga.edu/~distance/ojdla/spring191/ruc ker_downey191.html 2016

[31] S. W. Schmidt, C. M. Tschida, E. M. Hodge. How faculty learn to teach online: What administrators need to know? *Online Journal of Distance Learning Administration*. Retrieved from

[32] http://www.westga.edu/~distance/ojdla/spring191/sch midt_tschida_hodge191.html 2016

[33] G. Thorsteinsson. Examining teachers' role in using virtual learning environment to support conventional education in Icelandic schools. *Journal of Educational Technology*, *10*(2), 15–20. 2013

[34] T. A. Stoessel, M. Ihme, M. Barbarino, B. Fisseler, S. Sturmer. Sociodemographic diversity and distance education: Who drops out from academic programs and why? *Research in Higher Education*, *56*, 228–246. 2015

[35] E. C. Boling, M. Hough, H. Krinsky, H. Saleem M. Stevens. Cutting the distance in distance education: Perspectives on what promotes online learning experiences. *Internet and Higher Education*, *15*, 118–126. 2012

[36] R. Benson. C. Brack *Online learning and assessment in higher education: A planning guide*. Oxford, UK: Chandos Publishing 2010

[37] J. Broadbent. W. Poon. Self-regulated learning strategies and academic achievement in online higher education learning environments: A systematic review. *The Internet and Higher Education, 27*, 1–13. 2015

[38] H. G. Crawford-Ferre, L. R. Weist, Effective online instruction in higher Education. *The Quarterly review of Distance Education, 13*(1), 11–14. 2012

[39] Y. Rogers, S. Price. How mobile technologies are changing the way children learn. In A. Druin (Ed.) Mobile technology for children: Designing for interaction and learning (pp 3 - 22). Burlington, MA: Elsevier 2009

[40] C. Chiong, C. Shuler. Learning: Is there an app for that. In Investigations of young Children's usage and learning with mobile devices and apps. New York: The Joan Ganz Cooney Center at Sesame Workshop 2010

[41] J. Stephenson, L. Limbrick. A review of the use of touchscreen mobile devices by People with developmental disabilities. *Journal of autism and developmental disorders*, pp. 1-15. 2013

[42] Brown Mand Harmon M iPad Intervention with At-Risk Preschoolers: Mobile Technology in the Classroom *Journal of Literacy and Technology* 56, pp. 1535-0975 2013

[43] T. Anderson. Toward a theory of online learning. In T. Anderson and F. Elloumi (Eds), *Theory and Practice of Online Learning* (pp. 33–60). Athabasca, AB: Athabasca University Press. 2004

[44] P. O Tanneri, S. S. Seferoglu. Instructional use of information technologies teachers' Resistance to the use of new technologies. *International Journal of Technologies in Learning*. 19(3). 60 – 68 2013

[45] S. Dexter, K. R. Seashore, R. E. Anderson, Contributions of Professional Community to Exemplary Use of ICT. *Journal of Computer Assisted Learning*. 18, pp. 489-497 2002

[46] G. P. Newhouse. Applying the concerns-based adoption model to research on computers in classrooms. *Journal of Research on Technology in Education*, 33(5), n5. 2001

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

[48]   J, Keengwe, G. Onchwari. Constructivism, technology, and meaningful learning. Handbook of research on instructional systems and technology, 51-64. 2008

[49]   UNESCO. "Manual for Pilot Testing the Use of Indicators to Assess Impact of ICT Use in Education." Retrieved 101/02/2006 from http://www.unescobkk.org/education/ict/resource 2003

[50]   Y. Zhao. (Ed.). *What teachers should know about technology: perspectives and practices.* Greenwich, Information Age. Retrieved from www.eric.ed.gov/ericwebportal/recorddetail?accno=ed479083zhao.educ.msu.edu/vita 2003

[51]   G. Antifaiff. Integrating technology into the curriculum. *Educational communications and technology.* Retrieved from

[52]   http://Www.Usask.Ca/Education/Coursework/802papers/Antifaiff/Antifaiff 20