Gender and teacher attitude toward digital literacy programme in Kisii county primary schools

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ABSTRACT

Digital technologies have been associated with improved and enriched learning experiences which include more student-centered learning. These technologies have made teaching and learning experiences more interesting. In view of the crucial role of digital technologies in enhancing learning, this study sought to assess teacher attitudes towards the Digital Literacy Programme (DLP) in Kisii County based on gender differences. Does the gender of the teachers involved in the Digital Literacy Programme in Kisii County affect their readiness to uptake and implement the program? A survey research design was applied in the study. The population of the study constituted of 1,420 standard one and two teachers selected from randomly sampled schools of the county. The sample size was determined using the Fisher formula and the sample consisted of 302 standard one and two teachers. Purposive sampling was used to select the specific teachers. Simple random sampling was used to select the specific schools to include in the study and proportionate sampling was used to determine the number of respondents from each school. Self-administered questionnaires were used to collect data. To ascertain the reliability of the research instruments, a pilot test was carried out and a Cronbach's alpha coefficient of 0.76 was realized. Data were analyzed quantitatively using descriptive statistics in SPSS. The study established that difference in gender has no effect on the teachers' attitude to the Digital Literacy Programme..

Introduction

The Integration of digital technologies in schooling is positioned as a mechanism for educational re-forms via transformation of teacher practice (Hammond, 2013). On account of its recognized potential for learning support and development of learning skills, competencies and proficiencies (Hernández, 2017; Muralidharan, Niehaus, & Sukhtankar 2017; Tarhin, Hone, & Liu, 2015; Yilmaz, 2016), digital technologies have been prioritized in the education programmes of many countries both in the developed and the developing world. The government of Kenya introduced integration of digital technologies in teaching at primary school level in 2014 in the Digital Literacy Programme (DLP).

Digital technologies have been fronted as crucial in mediating learning and facilitating change in schools. They have been known to improve standards and facilitate personalized learning. Rationales for the integration of digital technologies include improving standards; increasing vocational relevance; contributing to knowledge-based economies; enriching learning experiences; transforming pedagogy to make it more student-centered, constructivist in nature, and with a focus on higher-order learning; and facilitating personalized learning (Fullan, 2013; Somekh, 2007).

Published literature from Kenya shows sparse availability of studies on integration of digital technologies especially in primary schools. It is very important for the Kenyan education sector stakeholders to have the current status of infiltration and application of digital technologies in the curriculum in primary schools and the implication it has on gender.

Most teachers may not have covered or learnt about digital technologies in their teacher preparation programmes and hence the teachers attitude towards the same also needs to be established. In the present context, it becomes necessary to explore attitude of teachers towards use of digital technologies in teaching with a gender perspective.

Therefore, the purpose of this study was to find answers for the following research questions:

i. *Does background knowledge and access of digital technologies differ according to gender?*
ii. *Does attitude of the teachers to Digital Literacy Programme differ with respect to gender?*

Literature Review

Theoretical and Conceptual Background

Teachers' Use of Information Technology

As the use of IT becomes more important in the educational setup, many studies have been conducted and identified factors that influence teachers' IT use. These include teachers' IT knowledge and skills (Eteokleous, 2008; Goktas, Gedik, & Baydas, 2013; Hohlfeld, et al., 2008), inadequate training (Copley & Ziviani, 2004) their motivation, workload and lack of time (Abuhmaid, 2011; Chigona, et al., 2014; Cullen & Greene, 2011; Guoyuan, et al., 2011; Lee, 2011; Neyland, 2011; Slaouti & Barton, 2007) anxiety (Buabeng-Andoh, 2012) teaching experience (Gorder, 2008; Wong & Li, 2008) technology access, updated software and hardware (Plomp, et al., 2009; Slaouti & Barton, 2007; Yildrim 2007) technical expertise and support (Chigona & Chigona, 2010; Salehi & Salehi, 2012; Yilmaz, 2011) etc. are some of the key elements identified for the successful adoption and integration of technology.

The teachers place and role when introducing a new curriculum or technology into the education system cannot be gainsaid. No significant progress can be achieved unless all factors surrounding the teacher are well considered, investigated and taken care of.

Teachers' attitude towards Information Technology

Because of their critical role in the implementation process, teachers' attitude towards IT should be the focus of studies at the early stages of technology implementation.

It is assumed that positive disposition towards technology is a prerequisite for successful pedagogical use of technology as according to the Diffusion of Innovations Theory (Rogers, 1995) people's attitude towards a technology is one of the key elements to its adoption. On a similar note the Technology Acceptance Model (TAM) (Davis, 1989) also conveys the same message of having a positive attitude towards a technology before acceptance of the technology.

Appropriate use of IT cannot be accomplished without active involvement and support of teachers who are capable of exploiting the profound possibilities that IT can offer for the teaching-learning process. The level of success in its integration in schools is not dependent on quality or sophistication of the technology or by its sheer existence in the classroom but rather on the teachers' support and attitude (Bitner & Bitner, 2002; Romano, 2003) and on the teachers' readiness and positive disposition (Deniz, 2007).

An important factor behind the resistance of the teachers in infusing the information technologies to education despite the facilities available in their schools and classrooms is their negative attitude towards technology (Lloyd & Albion, 2005). They may see technology as threatening and overwhelming (Phelps & Ellis, 2002) or fear looking foolish or incompetent in front of their students (Nunan & Wong, 2005). This negative attitude can cause teachers to doubt the usefulness of IT in teaching and therefore disinclined to use technology in their teaching (Hennessy, Ruthven, & Brindley, 2005). Past history has showed that many promising technological innovations fail to attain their promises due to the negligence of the end-users' attitudes and needs (McCarthy, 1998).

Factors including knowledge and skills, training, motivation, workload, lack of time and teaching experience among others may influence attitude to use of Information Technology in teaching. With the introduction of IT into education, a new dimension of "gender inequalities" has caught attention. This gender divide has emerged along the lines of previously existing social divides. The orthodox and conventional gender disparities that existed in science related subjects have been extrapolated into IT. Over the years, a stereotypical view concerning technology use and gender has been developed, which is, relative to men and boys, women and girls might have more negative attitude towards technology and technology use, and they would be less actively engaged in technology-related activities and behaviors (Islahi & Aligarh). Society views technology as highly technical and part of a male domain and use of IT tools perceived as a masculine activity (North & Noyes, 2002). The possibility of gender of teachers to influence response to the use of digital technologies in implementing learning is needful of assessment.

Gender Groups' Attitude towards Technology

In recent years, there has been a growing interest in studying the gender groups' attitude towards technology (Ardies, Maeyer, & Gijbels, 2015; Potvin & Hasni, 2014; Teo, Milutinovic, & Zhou, 2016). Society views technology as highly technical and part of a male domain and use of IT tools perceived as a masculine activity (North & Noyes, 2002).

Research has described a variety of ways in which women lag behind men in the ownership of technology and the development of technological skills. For example, men own and use technology more than women, spend more time online, take more technology

classes, and show more motivation to learn digital skills (Cooper, 2006; Correa, 2010; Fallows, 2005; Livingstone & Helsper, 2007; Pinkard, 2005; Tezci, E., 2009). They have more experience and make more use of Internet than women for a wide range of activities, particularly those that require greater technological skills such as job searching, e-banking, and posting or uploading material (Fallows, 2005; Hargittai & Walejko, 2008). There is a tendency to find greater anxiety among the females than males about technology use (Durndell & Haag, 2002; Schottenbauer et al., 2004).

Methodology

The study was descriptive in nature. Target population of the study comprised of primary school teachers from Kisii County, Kenya. A sample of 302 teachers including 124 (41.1%) males and 178 (58.9%) females working in 249 different primary schools was drawn from the target population by purposive convenient sampling technique. Since the study intended to look into the gender difference, purposive sampling was used to ensure that a proper representation of male and female teachers was there. The age of the participants ranged from 22 to 56 years. The participants had 1 to 33 years of teaching experience in primary schools.

Sample size determination

Sample size was determined using the fisher formula:

$$n = \frac{z^2 p(1-p)}{\sigma^2}$$

Where; z -Statistical constant (1.96)

p - Prevalence of undetermined population (0.5)

σ - Error of margin (0.05)

After substitution, n = 384.16 (~384)

Using the finite population correction factor

$$n_1 = \frac{n}{1 + \dfrac{n}{N}}$$

The sample size was 302 standard

one and two teachers.

Sampling procedures

Purposive sampling was used to select schools that have already implemented the Digital Literacy Programme and the teachers involved in the programme. Simple random sampling was used to select the specific schools to include in the study and purposive proportionate sampling was used to determine the number of respondents based on gender.

Research instruments

Two research instruments were applied in this research; self-administered questionnaires, and observation schedules. The variable of attitude was determined by Likert based five-point (strongly disagree, disagree, no idea, agree, and strongly agree) self-rating Attitude towards Information Technology (ATIT) scale developed by Nasrin and Islahi (2011). The scale comprised of 20 items with 12 positive statements and 8 negative statements. The scale aimed to evaluate teachers' attitude toward DLP in the areas of (i) significance in life (4 items) which had items like "I find DLP to be very applicable in life.", (ii) usefulness for student (6 items) which had items like "DLP motivates the pupils to learn.", (iii) productivity for teaching (5 items) which had items like "I find DLP worthless for my teaching.", and (iv) teacher's interest and acceptance (5 items) which had items like "I would like to learn more about the use of digital technologies in making my teaching effective for DLP".

Reliability

To establish the reliability of the research instruments a pilot-test was carried out in three primary schools in Nyamira County and the Cronbach's alpha was used to measure the internal consistency of the instruments. A Cronbach's alpha coefficient of 0.76 was realized any items falling below 0.7 were eliminated to improve the reliability.

Data analysis

The survey data was analyzed qualitatively and quantitatively using descriptive statistics in SPSS version 22 and results presented in tables.

Results

The sampled teachers comprised of 179 (58.7%) female and 124 (40.7%) male.

Gender and background knowledge and Access to digital technologies

The study first sought to find out the level of exposure and knowledge of the teachers to digital technologies. Whether there is a gender divide as concerns training in computer on the one hand and access to computer resources was investigated. Table 1 gives a summary of all the responses to these factors.

Table 1: Background Knowledge and Access to Digital Technologies

Queries into Computer Knowledge and Use	Female (n₁=178)		Male (n₂=124)	
	Frequency	Percentage	Frequency	Percentage
Prior Training in Computer	122	68.5	83	66.9
With Only Basic Computer Skills	120	67.4	89	71.8
Daily Use Computers	12	6.74	46	37.1
Occasionally Use Computers	47	26.4	69	55.6
Own smartphones	125	70.2	100	80.6
Daily Use of Internet	67	37.6	58	46.8
Occasionally Use Internet	95	53.4	73	58.9

A majority of the teachers 67.8% have prior training in computer with 68.5% of the females and 66.9% of the males responding to the affirmative. However most of them 67.4% female and 71.8% male have only basic skills including Microsoft word and internet search using Google. Other computer applications including Microsoft Access, PowerPoint and Excel are not known to them. Only 19% of the teachers use computers daily and only 38% use them occasionally. Out of these a paltry 7% of the females use the computers daily with only 26.2% using them occasionally.

A fair number 69.8% of the females and 80.6% of the males own smartphones and it can therefore be assumed that they have more exposure to internet use, however only 37.4% of the female teachers and 46.8% of the male use internet daily. Occasional use of internet by the teachers is also only moderate with 53% of the female and 58.9% of the males recording thus.

Gender and Attitude of the teachers to Digital Literacy Programme

Teacher attitude towards DLP was measured in terms of (i) Significance in Life, (ii) Usefulness for Pupils, (iii) Productivity for Teaching, and (iv) Teachers' Interest and Acceptance. All 302 participants responded to all items, no missing data was found in the survey. Table 2 to table 5 give the summary of the responses.

Table 2: Significance in Life

	Mean	Std. Deviation	Degree	%
Female Teachers	2.0857	1.06747	Low	41.7
Male Teachers	2.2500	1.25071	Low	45.0

Both gender of teachers reported a low rating for DLP's significance in life with the female teachers posting a 41.7% approval rating as compared to 45.0% for the male teachers.

Table 3: Usefulness for Pupils

	Mean	Std. Deviation	Degree	%
Female Teachers	3.4167	1.07902	Medium	68.3
Male Teachers	3.5405	1.34566	High	70.8

The male teachers' approval rating for DLP's usefulness for pupils was slightly higher than that of the female teachers. Both gender of teachers however agreed that to a large extent (above 68%) DLP was useful to the pupils.

Table 4: Productivity in Teaching

	Mean	Std. Deviation	Degree	%
Female Teachers	3.0278	1.52102	Medium	60.6
Male Teachers	3.4054	1.11703	Medium	68.1

The Degree of approval for DLP's Productivity in Teaching was medium. The female teachers approved it at 60.0% and their male counterparts at 68.1%.

Table 5: Teachers' Interest and Acceptance

	Mean	Std. Deviation	Degree	%
Female Teachers	3.8919	.77401	High	77.8
Male Teachers	3.7027	1.35123	High	74.1

Female teachers reported a higher interest and acceptance for the Digital Literacy Programme with an approval rating of 77.8% whereas that of the male teachers was 74.1%.

Overall the degree of approval was higher for male teachers in Significance to Life, Usefulness to Pupils and Productivity for teaching but lower than that of the female teachers when it came to interest and acceptance. Female teachers were more interested and in acceptance of DLP than their male counterparts. The findings however depict a near equal attitude to DLP from both the male and female teachers. The difference in attitude towards DLP between male teachers and female teachers is therefore minimal.

Discussion

This study purposed to better understand existing attitudes toward information technology on part of the teachers and especially whether gender difference in attitude towards Digital Literacy Programme implemented in Kisii County primary schools in Kenya exists.

Firstly, the study investigated into the background knowledge and access to digital technologies of the teachers involved in DLP in an attempt to find out what gender differences existed. According to Kularski C. and Moller S., 2012, the digital divide is composed of a skill gap and a gap of physical access to Information Technology (IT) and the two gaps often contribute to each other in circular causation. Without access to technology, it is difficult to develop technical skill and it is redundant to have access to technology without first having the skill to utilise it. The study established that there is no much difference between the female teachers and male teachers as concerns prior training in computer use and applications. On access to digital technologies the study found out that male teachers have a slight edge on their female counterparts on both daily and occasional use of computers and access to internet.

Attitude towards IT was measured in terms of (i) significance in life, (ii) usefulness for students, (iii) productivity for teaching, and (iv) teacher's interest and acceptance. The teachers scored the lowest on the 'Significance in Life' subscale. The other three subscales scored in the medium to high degrees with teachers' 'Interest and Acceptance' scoring highest after being approved as high by both female and male teachers. The results suggest that the participants were having an interest in information and technology and were more acceptable but comparatively did not find DLP significant in life. It calls for more research by educationists to find out why teachers did not find DLP significant in life even after showing great interest and acceptance for the programme. Earlier studies on attitude to digital technology by male and female teachers exhibited a case of high negative attitude by female teachers as opposed to male teachers (Dupagne & Krendi, 1992; Kay, 1992; Koohang, 1987; Wozney et al., 2006). This is in contrast to the findings of this study. This could mean that the gender stereotype where women were slow to uptake new technology and especially IT technology has become a thing of the past with more women considering themselves competent enough to embrace technology. The minimal difference in attitude towards DLP between genders is consistent with the studies that show that gender differences no longer exist (Bakr, 2011; Gujjar et al., 2013; Khan, 2013; Rajpoot & Rajpoot, 2011; Sainz, et al., 2016; Wong & Hanafi, 2007; Yusuf, 2011). Difference in attitude from earlier studies can be attributed to more exposure of males to digital technology but with increased development and investment in IT the exposure to this type of technology has now been accorded to females as much as it is to the males. Kirkpatrick and Cuban (1998) noted that the gender gap was narrowed when both genders were exposed to the same amounts and types of experiences when using computers. This opinion is also supported by Kay (2006) and Koh, Chai and Tsai, (2010).

Conclusions

In view of the findings of this study it can be concluded that the gender divide as concerns background knowledge and access to computer resources and attitude to the DLP is minimal and can be therefore be ignored. Whereas earlier studies showed a significant divide it can be presumed that overtime with increased development and investment in digital technologies the divide has been narrowed down. This study therefore further postulates that based on background knowledge of computers, access to computer resources and attitude to digital technologies both the male teachers and the female teachers implementing the digital literacy programme in Kisii County primary school have no difference.

One limitation of the study on which the arguments are based was its sample, which included only teachers of primary schools of Kisii County. This imposes a limitation on the generalizability of the findings. More research with bigger and more diverse samples across the country is recommended.

Another limitation is on the methodology. This study was descriptive in nature; other studies should be conducted with use of mixed methods of data collection. Qualitative techniques, such as interviews and focus groups, would explore more if any differences exist in the way female teachers and male teachers relate to technology and if there are any variations in their pattern of handling and usage of technology.

This study used a few selected variables that were assumed to affect the attitudes of teachers towards technology. A systematic investigation of other aspects and how they interact to impact on teachers' attitudes, acceptance, and extent of use of technology as a tool for instructional purposes and professional development is recommended.

The findings from this study confirm that gender has little impact on teachers' attitudes towards use of digital technologies. Other studies should be done with more focus on the development of effective models and frameworks in the learning and implementation of instructional and assessment technologies within the digital arena.

Finally, though there is minimal gender divide as concerns attitude to DLP both male and female teachers scored lowly on the variable 'Significance in Life'. It is recommended that increased sensitization of the teachers is done to enable them appreciate the value of DLP in relation to real life situations.

References

Abuhmaid, A. (2011). ICT Training Courses for Teacher Professional Development in Jordan. The Turkish Online Journal of Educational Technology, 10(4), 195-210.

Ardies, J., De Maeyer, S., & Gijbels, D. 2013. Reconstructing the Pupils Attitude towards Technology-survey. Design and Technology Education: An International Journal, 18 (1), 8-19.

Bakr, S. M. (2011). Attitudes of Egyptian teachers towards computers, Contemporary Education Technology, 2(4), 308-318.

Bitner, N. & Bitner, J. (2002). Integrating technology into the classroom: eight keys to success. Journal of Technology and Teacher Education, 10(1), 95-100.

Buabeng-Andoh, C. (2012). Factors Influencing Teachers' Adoption and Integration of Information and Communication Technology into Teaching: A Review of the Literature. International Journal of Education and Development using Information and Communication Technology, 8(1), 136-155.

Chigona, A. & Chigona, W. (2010). Capability approach on pedagogical use of ICT in schools. TD: The Journal for Transdisciplinary Research in Southern Africa, 6(1), 209-224. doi:http://hdl.handle.net/10394/3617

Chigona, A., Chigona, W., & Davids, Z. (2014). Educators' motivation on integration of ICTs into pedagogy: Case of disadvantaged areas. South African Journal of Education, 34(3), 01-08.

Cooper, J. (2006). The digital divide: The special case of gender. Journal of Computer Assisted Learning, 22(5), 320-334.

Copley J. & Ziviani, J. (2004). Barriers to utilisation of assistive technology with children who have multiple disabilities. Occupational Therapy International, 11(4), 229-43.

Correa, T. (2010). The participation divide among "online experts": Experience, skills, and psychological factors as predictors of college students' web content creation. Journal of Computer-Mediated Communication, 16(1), 71-92.

Cullen, T. A. & Greene, B. A. (2011). Preservice teachers' beliefs, attitudes, and motivation about technology integration. Journal of Educational Computing Research, 45(1), 29-47.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319-340, doi:10.2307/249008

Deniz, L. (2007). Prospective class teachers' computer experience and computer attitude. International Journal of Social Sciences, 2(2), 116-122.

Durndell, A. & Haag, Z. (2002). Computer self-efficacy, computer anxiety, attitudes towards the Internet and reported experience with the Internet, by gender, in an East European sample. Computers in Human Behavior, 18(5), 521-535. http://dx.doi.org/10.1016/ S0747-5632(02)00006-7

Eteokleous, N. (2008). Evaluating computer technology integration in a centralized school system. Computers & Education, 51(2), 669-686. doi:10.1016/j.compedu.2007.07.004

Fallows, D. (2005). How men and women use the Internet. Pew Internet and American Life Project. Retrieved on from 01 October 2017 http://www.pewInternet.org/Reports/ 2005/How-Women-and-Men-Use-the-Internet.aspx

Fullan, M. (2013a). Great to excellent: Launching the next stage of Ontario's education agenda.Retrieved from www.edu.gov.on.ca/eng/document/reports/.

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, 211- 222. doi:10.1016/j.compedu.2013.05.002

Gorder, L. M. (2008). A study of teachers' perceptions of technology integration in the classroom. The Delta Pi Epsilon Journal, 50(2), 63-76.

Gujjar, A. A., Naemullah, M., & Tabassum, R. (2013). A study of the attitudes of student teachers toward use of computer. Pakistan Journal of Commerce and Social Sciences, 7(2), 346-353

Guo, R. X., Dobson, T. & Petrina, S. (2008). Digital natives, digital immigrants: An analysis of age and ICT competency in teacher education. Journal of Educational Computing Research, 38(3), 235-254

Guoyuan, S., Valcke, M., van Braak, J., Tondeur, J., & Zhu, C. (2011). Predicting ICT integration into classroom teaching in Chinese primary schools: Exploring the complex interplay of teacher-related variables. Journal of Computer Assisted Learning, 27(2), 160-172. doi:10.1111/j.1365-2729.2010.00383.x

Hargittai, E. & Walejko, G. (2008). The participation divide: Content creation and sharing in the digital age. Information, Communication & Society, 11(2), 239-256.

Helsper, E. J. & Eynon, R. (2010). Digital natives: Where is the evidence? British Educational Research Journal, 36(3), 503-520

Hennessy, S., Ruthven, K., & Brindley, S. (2005). Teacher perspectives on integrating ICT into subject teaching: Commitment, constraints, caution, and change. Journal of Curriculum Studies, 37(2), 155-192.

Hernández, R. (2017). Impact of ICT on Education: Challenges and Perspectives. Journal of Educational Psychology - Propósitos y Representaciones, 5(1), 337-347.

Hohlfeld, T.N., Ritzhaupt, A.D., Barron, A.E., & Kemker, K. (2008). Examining the digital divide in K-12 public schools: Four-year trends for supporting ICT literacy in Florida. Computers & Education, 51(4), 1648-1663. doi:10.1016/j.compedu.2008.04.002

Hohlfeld, T. N., Ritzhaupt, A. D., Barron, A. E., & Kemker, K. (2008). Examining the digital divide in K-12 public schools: Four-year trends for supporting ICT literacy in Florida. Computers & Education, 51(4), 1648-1663.

https://www.computer.org/csdl/proceedings/iset/2017/3031/00/08005405.pdf

Inan, F. & Lowther, D. (2010). Factors affecting technology integration in K-12 classrooms: A path model. Educational Technology Research and Development, 58(2), 137-154.

Kay, R. H. (1992). An analysis of methods used to examine gender differences in computer-related behaviour. Journal of Educational Computing Research, 8(3), 323-336.

Kay, R. (2006). Addressing gender differences in computer ability, attitudes and use: The laptop effect. Journal of Educational Computing Research, 34(2), 187-211.

Khan, S.H. (2013). Attitude of prospective teachers and prospective teacher educators' towards the usage of information and communication technology and its related technologies in colleges of teacher education. Scholarly Research Journal for Interdisciplinary Studies, 2(8), 368-381.

Kirkpatrick, H. & Cuban, L. (1998). What the research says about gender differences in access, use, attitudes and achievement with computers. Educational Technology, 38(4), 56-61.

Koh, J. H. L., Chai, C. S., & Tsai, C. C. (2010). Examining the technological pedagogical content knowledge of Singapore pre-service teachers with a large-scale survey. Journal of Computer Assisted Learning, 26(6), 563-573.

Lee, N. (2011). Teachers' motivation to integrate technology: A study of expectancy-value, perceived instrumentality, and prosocial goals (Unpublished doctoral dissertation). University Of Oklahoma. Retrieved on 03 June 2018 from Dissertations & Theses @ University of Oklahoma. (Publication No. 3488211).

Livingstone, S. & Helsper, E. (2007). Gradations in digital inclusion: Children, young people and the digital divide. New Media and Society, 9(4), 671-696.

Lloyd, M. & Albion, P. (2005, March). Mistaking the tool for the outcome: Using activity system theory to understand the complexity of teacher technophobia. Paper presented at the International Conference of the Society for Information Technology and Teacher Education (SITE). Phoenix, Arizona.

McCarthy, P.J. (1998). Teacher attitudes toward computers and the relationship between attitudes toward computers and the level of involvement with computers among New York City special education teachers (Unpublished doctoral dissertation). Columbia University Teachers College, New York, DAI 59/01A.

Muralidharan, K., Singh, A., & Ganimian, A. J. (2017). Disrupting education? Experimental evidence on technology-aided instruction in India. NBER Working Paper No: 22923. Retrieved on 01 October 2017 from https://www.nber.org/papers/w22923.pdf

Nasrin and Islahi, F. (2011). Manual for attitude scale towards information technology for teachers. Agra: Manasvi.

Neyland, E. (2011). Integrating online learning in NSW secondary schools: Three schools perspectives on ICT adoption. Australia Journal of Educational Technology, 27(1),152-173

North, A. S. & Noyes, J. M. (2002). Gender influences on children's computer attitudes and cognitions. Computers in Human Behavior, 18(2), 135-150.

Nunan, D. & Wong, L. (2005). Innovation and change: Information technology and inservice teacher edu- cation. In C. Davison (Ed.), Information technology and innovation in language education (pp. 195- 227). Hong Kong, China: Hong Kong University Press.

Phelps, R. & Ellis, A. (2002, July). A metacognitive approach to computer education for teachers: Combining theory and practice for computer capability. Paper presented at the Linking learners: Australian Computers in Education Conference (ACEC 2002), Hobart, Tasmania.

Pinkard, N. (2005). How the perceived masculinity and/or femininity of software applications influences students' software preferences. Journal of Educational Computing Research, 32(1), 57-78.

Plomp, T., Anderson, R. E., Law, N., & Quale, A. (Eds.). (2009). Cross-national information and communication technology: Policies and practices in education. Charlotte, NC: Information Age.

Potvin, P. & Hasni, A. (2014). Interest, motivation and attitude towards science and technology at K-12 levels: A systematic review of 12 years of educational research. Studies in Science Education, 50(1), 85-129.

Rajpoot, V.K.S. & Rajpoot, O. (2011), Attitude of teachers towards educational technology, International Journals of Multidisciplinary Research Academy, 1(1), 40-46.

Rogers, E. M. (1995). Diffusion of innovation (4th ed.). New York: The Free press.

Romano, M. T. (2003). Empowering teachers with technology. Lanham, MD: Scarecrow Press.

Sainz, M., Meneses, J., Fabregues, S., and Lopez, B. (2016). Adolescents' gendered portrayals of occupations in the field of information and communication technologies. International Journal of Gender, Science and Technology, 8(2), 181–201.

Salehi, H. & Salehi, Z. (2012). Integration of ICT in language teaching: Challenges and barriers. Proceedings of the 3rd International Conference on e-Education, e-Business, e-Management and e-Learning (pp.215-219). Hong Kong: IPEDR.

Schottenbauer, M.A., Rodriguesz, B.F., Glass, C.R., & Arnkoff, D.B. (2004). Computers, anxiety and gender: an analysis of reactions to the Y2K computer problem. Computers in Human Behavior, 20(1), 67-83.

Slaouti, D. & Barton, A. (2007). Opportunities for practice and development: newly qualified teachers and the use of information and communication technologies in teaching foreign languages in English secondary school contexts. Journal of In-service Education, 33(4), 19.

Somekh, B. (2007). Pedagogy and Learning with ICT Researching the art of innovation. London and New York Routledge.

Teo, T., Fan, X., & Du, J. (2015). Technology acceptance among pre-service teachers: Does gender matter? Australasian Journal of Educational Technology, 31(3), 235-251.

Teo, T., Milutinovi C. V., & Zhou, M. (2016). Modelling Serbian pre-service teachers' attitudes towards computer use: A SEM and MIMIC approach. Computers & Education, 94(7), 77-88.

Tezci, E. (2009). Teachers' effect on ICT use in education: The Turkey sample. Procedia Social and Behavioral Sciences, 1(1), 1285-1294. http://dx.doi.org/10.1016/j.sbspro.2009. 01.228

Wong, E.M.L. & Li, S.C. (2008). Framing ICT implementation in a context of educational change: a multilevel analysis. School Effectiveness and School Improvement, 19(1), 99-120.

Wong, S. L. & Hanafi, A. (2007). Gender differences in attitudes towards information technology among Malaysian student teachers: A case study at Universiti Putra Malaysia. Educational Technology & Society, 10 (2), 158-169.

Wozney, L., Venkatesh, V., & Abrami, P.C. (2006). Implementing computer technologies: Teachers' perceptions and practices. Journal of Technology and Teacher Education, 14(1), 173-207.

Yilmaz, N.P. (2011). Evaluation of the technology integration process in the Turkish education system. Contemporary Educational Technology, 2(1), 37-54.

Yilmaz, R. M. (2016). Educational magic toys developed with augmented reality technology for early childhood education. Computers in Human Behavior, 54, 240-248.

Yusuf, M.O. (2011). Student-teachers' competence and attitude towards information and communication technology: A case study in a Nigerian University. Contemporary Educational Technology, 2(1), 18-36.