MERIT RESEARCH JOURNALS
www.meritresearchjournals.org

Merit Research Journal of Education and Review (ISSN: 2350-2282) Vol. 2(1) pp. 008-014, January, 2014
Available online http://www.meritresearchjournals.org/er/index.htm

Full Length Research Paper

Synchronous of ICT and E-Learning in Yemen: Impact and Usability

Dr. Gamal Ahmed Ahmed Abdullah Alawi

Department of Educational Technology, Taiz University, Taiz, Yemen

E-mail: gamalalawi@yahoo.com

Abstract

This paper concentrates on the information and communication technology tools and e-learning channels to qualify pre-service and in-service teachers. It offers a good correlation between ICT, e-learning and their usability on learning. The research with 200 participants' curriers out and establishes a model using AMOS program which can explain 91% of learning with good model fit. This model can infer the effect of ICT, E-Learning on learning in Yemen. The subjects make use of different elements with multiple techniques such as multimedia, Internet and Intranet in full time and multi-tasks such searching, browsing, downloading (audio, video and appropriate software), copying, listening and watching associate text, audio and video respectively. It encourages teachers to use chat room for more discussion in the category of online co-operative learning and finally report their information in different styles on www.

Keywords: ICT, E-learning, Usability, Information, Technology, Teachers

INTRODUCTION

Technologies have significant effect on learning and teaching when appropriate approaches will be the process of learning and teaching. Therefore, integrating technology into the classroom is one of important approach to develop better understanding of basic concepts provided for learning.

Teachers have a critical role to teach students how to use technology as a tool to help their learning. Students use ICTs to build knowledge and to communicate with others. According to the improvement of the equipment and software, the complicated technology such Intranet and Internet can be supported for distributing beater learning (Moore, 1990 (cited in Vahideh Z. M. and Mohammad R. K., 2011)). Teachers should use and believe the technology in a way to support curriculum rather than prevail it.

However, technology integration has been emphasized in teacher training and professional development (Lawless and Pellegrino, 2007). It has been criticized that teachers have not been provided with adequate support that goes beyond learning specific technology skills (Llorens, Salanova, and Grau, 2002). The most important elements of using technology for teaching is teacher beliefs which have been addressed to understand teaching practices (Kagan, 1992; Kane, Sandretto, and Heath, 2002; Ng, Nicholas, and Williams, 2010; Pajares, 1992). Therefore, it considered as an indicator for creation behaviors in classrooms to support effects of beliefs on the way of teaching including the impact on which decision making.

Teacher beliefs are considered as one of the most important constructs for teacher education (Kagan, 1992; Pajares, 1992). If the authority considers as a source of knowledge, the teacher who believes that may not use perspective open-ended approach such as WebQuest (Dodge, 1997) which encourages students to explore many sources.

Teacher-centered and student-centered approaches to instruction refer to the teacher beliefs about effective ways of teaching (Chan and Elliott, 2004). Activities used

to promote learning and emphasized it to be indicated by the teacher-centered approaches where as the engagement of students with the activities referred to student-centered approaches.

ICT, learning, integrating technology and skills

ICT and learning

ICT provides opportunities to access information using multiple information resources and viewing it from many perspectives, therefore, fostering the learning environments. ICT may also make complex processes easier to understand through simulations that contribute learning environments. ICT may function as a facilitator of higher-order thinking and active learning (Alexander, 1999; Jonassen, 1999). The use of ICT may support co-operative learning and reflection about the content (Susman, 1998). Furthermore, ICT may serve as a tool to curriculum differentiation, providing opportunities to adapt the learning content, tasks and capabilities of each student and by providing tailored feedback (Mooij, 1999; Smeets and Mooij, 2001). In learning, tasks are presented to students, active and co-operative learning are simulated and the curriculum is adapted to the needs and capabilities of students. Therefore, as a results many teachers apply various elements of powerful learning in their classes (Smeets, 2005).

Skills in ICT

The selection and use of technology' software has a significant impact on the learning area. This led to that the skills of teacher related to ICT use play an important role (Smeets et al., 1999; Veen, 1995).

ICT skills are one of the goals of educational that have generally been adopted in secondary schools now. Thus, students are increasingly encouraged to use the Internet, e-mail and the computer, e.g. for looking up information on the www for projects, doing homework, preparing and presenting tasks and co-operative learning and communicating with classmates (Cox et al., 2004; Somekh et al., 2002). Poor skill in using the computer and the Internet is likely to put a student in a disadvantaged position of competitiveness. Large-scale has repeatedly shown that both access to, and use of, the computer and the Internet is heavily determined by educational level, income, age, gender and minority status (Fuchs and Woessmann, 2004; Livingstone, 2002; National Telecommunications and Information Administration, 2000; Novak and Hoffman, 1998; Papastergiou and Solomonidou, 2005; Reddick, Boucher, and Groseilliers, 2000).

Students may gain digital skills at school as well as at home. However, researchers have paid little attention to the type of use of ICT at home (Comber et al., 2002; Cox et al., 2004; Lauman, 2000). Some researchers have studied the way students use and perceive computers differently at home and in school. Students use the computer and the Internet at home often more than they do at school (van Braak and Kavadias, 2005; Kerawalla and Crook, 2002; Livingstone, 2002; Meredyth, Russell, Blackwood, Thomas, and Wise, 1999; Ruthven, Hennessy, and Deaney, 2005; Selwyn, 1998; Somekh et al., 2002).

Integrating technology and teaching

Integrating technology in teaching practices is often found to be best in its benefits for better learning (Baker, Gearhart, and Herman, 1993; Becker and Ravitz, 2001; Cuban, 2002; Parr, 2003).

Though it is acknowledged that there are many examples for practice in the use of ICT integration by educators, the benefits of computer technology in schools is not universal and concerns about the level and effectiveness of its integration remain a cause for concern in many countries. For instance, Becker and Ravitz (2001) found that teachers of 4^{th} – 12^{th} grade students (9–18 years old) in schools in the USA that only 17% of science teachers, 25% of English teachers, 11% of mathematics teachers and 13% of social studies teachers made weekly use of computers. Furthermore, the use of computers did not facilitate the development of a deeper understanding of improving students' abilities to tackle difficult topics, concepts, or change existing approaches to teaching methods.

Teacher's understandings of how ICT contributes the learning environment usually have an important impact on using technology in the classroom (Drenoyanni and Selwood, 1998; Higgins and Moseley, 2001; Hokanson and Hooper, 2000; Niederhauser and Stoddart, 2001).

Objectives

1.1. To analyze the impact of ICT on learning
1.2. To analyze the relationship between ICT and E-learning
1.3. To see the impact of E-learning on learning

METHODOLOGY

The materials of Berkeley Digital Library (BDL) and Google search engine (GSE) provide flexible way for selecting elements that teachers and students need for school. Thus, the focus is on skills related to searching, browsing, gathering, navigating, reading, writing, and extracting information. Therefore, the proposed structure

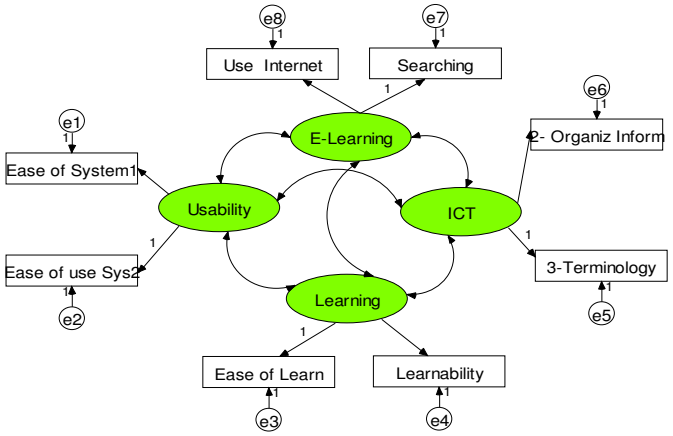

Figure 1. Research Model

model aims to measure the learning for higher education in Yemen country. It consists of e-learning, usability and information and communication technology (ICT) attributes. Figure 1 illustrates this model above.

Participants

A total of 200 undergraduates (pre-service teachers) in English Language Teaching Department in Taiz University were interesting in the learning and using of Internet and digital library web sites.

All of them had enough knowledge of Internet and had used and searched Internet before this study. However, they had no idea of using digital libraries web sites, so they were trained for about two months to use Berkeley Digital Library (BDL) web site correctly for browsing, searching, using different multimedia software, looking for important information etc.

Data collection

Berkeley Digital Library (BDL) Web Site and Google search engine (GSE) were used as a sample in this study, which included online teaching (multimedia), Journals, and Magazines.

Selection of task

Different tasks were assigned to participants, such as searching (videos, audios, papers, and e-books), copying (PDF papers or e-books), downloading (audios or videos), watching (academic videos), writing (abbreviation of them in five lines for each), and listening (to some academic audios and writing abbreviation of them in five lines for each). Thus, they were asked to watch a video, listen to an audio, and read a text at times in the Internet laboratories (Al-Saeed Library).

The tool (Questionnaire)

In order to collect data the following tools were used.

- Questionnaire on digital library developed by the investigators. This questionnaire consisted of five parts. Part 1 included questions on Web-based experience (Internet), which consisted of twelve (12) questions. Second part (containing questions on ICT) consisted of ten (10). The third part consisted of fifteen (15) questions seeking learners' comments and opinions and concentrated on the e-learning and the fourth part consisted of fourteen (14) questions seeking for usability of the system. Finally, the fifth part consisted of nine (9) questions seeking for learning attitudes.
- Interview conducted by the investigator having three questions, seeking information about learners' need, learning activities available and the importance of the digital library and Internet in learning English language.

At the end of their allotted training timeframe, the participants were asked to complete their questionnaires. ICT was measured by organization of information and information terminology. E-Learning was measured via searching (videos, audios, papers, and e-books), copying (PDF papers or e-books), downloading (audios or videos), watching to some academic videos and listening to some academic audios. Learning was measured by learnability and ease of use and usability was measured by the ease of use of the system.

Research Model and Hypotheses

H1: E-Learning has positive effect on learning
H2: ICT has positive effect on learning
H3: Learning has positive effect on usability
H4: E-Learning has positive effect on usability
H5: E-Learning has positive effect on ICT

Instruments

Fifteen questions were concerning e-learning (α=.833). Ten question were concentrating on using ICT for education (α=.906). Nine questions were concerning for learning (α=.801). Fourteen questions were testing the usability of ICT and E-learning tools (α=.781) and fifteen questions were concerning the use of Internet to distribute information of deeper subjects to participants (α=.899).

To specify the structure between observed indicators and latent constructs and test the validity of measurement model, a confirmatory analysis (CFA) is performed. Furthermore, structural equations modeling among latent constructs are examined to test the conceptual structural equation model (SEM). The CFA and SEM are conducting using AMOS software.

DATA ANALYSIS AND RESULTS

Internet experience

The results showed that 70% (140 participants) of participants had Internet experience and 30% (60 participants) had no Internet experience. Experience1: The instances of using Internet in a week (once only=5%, 2 times=15%, 3 times=20%, more than three times=30%, and never=30%). 2) Particular day for browsing the Internet (Friday=50%, Sunday=30%, and Thursday=20%). 3) Searching most of the information from the Web Site (yes=59%, no=41%), Attached to Internet Specific Journals (yes=30%, no=70%), Specific Magazines (yes=50%, no=50%), Specific Digital Libraries (yes=40%, no=60%), and Specific Web-site (yes=43%, no=57%), and Experience2: preference of web-site for Availability of information under one site (yes=30%, no=70%), Availability of information in short time (yes=55%, no=45%), Getting Multimedia (yes=30%, no=70%), Searching and browsing (yes=90%, no=10%) and using help facilities (yes=40%, no=60%).

The online collaborative is one of the tasks the students are performing to bring to their class short curriculum with the help of their teachers. Therefore, one of the multi-tasks that was requested to the participants was to connect to BDL in academic multimedia part and watch General Psychology Video lecture and perform some tasks at the same time such as downloading, watching and listening, and writing a brief note of it. Then they were asked to open the chat room and discuss with their classmates about the notes, and search the BDL web site or others such as Google search engine, Gigabeia, etc. to collect the important terms of their new curriculum and reporting the results to their teachers. Hence, the participants were free for chatting during the moment, in private chat room, or just cross talking within the same chat room. The result of this working was that 25% of the participants failed to complete the full tasks whereas 75% successfully completed the full tasks.

Measurement model and analysis

To achieve the SEM analysis procedures two stages should be applied related to Anderson and Gerbing, (1988); and Williams and Hazer (1986). The first stage involves performing the confirmatory factor analysis and reliability analysis specific to dimensions and items. The second stage involves verification of all assumptions of the study through SEM.

For this study AMOS 5 used for analysis and applied the maximum likelihood method to evaluate the measurement model and the structure model, therefore, it is suitable to check whether the path coefficient of variable is significant, and validate the hypothesis.

The study employed the following eight indexes to evaluate the fit of model: chi-square with degrees of freedom, the probability (P), the goodness of fit index (GFI), the adjusted goodness of fit index (AGFI), the comparative fit index (CFI), the normed fit index (NFI), root mean error (RMR) and the root mean square error of approximation (RMSEA). For a good fit of model, the GFI, CFI, IFI and NFI should be greater than 0.9, the AGFI should be greater than 0.8 and RMSEA should be less than 0.08, and the chi-square with degrees of freedom should be less than or equal to 3 (Bagozzi, Lee, and Van Loo, 2001, Hair, Black, Babin, Anderson, and Tatham, 2009). Doll, Xia, and Torkzadeh (1994), Baumgartner and Homburg (1996) indicated that if GFI and AGFI are between 0.80 and 0.89, the model has reasonable fit. Table1 showed the result which obtained by this study and it is inferred that the measurement model is good fit.

The criteria evaluation measurement model suggested by Fornell and Lacker (1981) was adopted in this study:

All factor loadings should be significant and greater than 0.5;

1. The composite reliability (CR) should be greater than 0.7; and
2. The average variance extracted (AVE) should be greater than 0.5.

According to Table 2, all the values of factor loading are greater than 0.5 and are significant (p = 0.001). The CR values within 0.60–0.94 are between 0.6 and 0.7 and greater than 0.7. The AVE values within 0.51–0.94 are greater than 0.5. These three conditions are coincident with good convergent validity. The Crombach's alpha for a coefficient of each construct is greater than 0.7, including usability (0.781), learning (0.801), e-learning (0.833), and ICT (0.906), conforming to the high reliability required by Guieford (1965). It concludes that the measurements of items of this study are coincident.

The discriminate validity is also measured by recommendations of Fornell and Lacker (1981). The square root of AVE between dimensions should be

Table1. Goodness of Fit

Goodness-of-Fit	CMIN/DF<3.0	P	RMR<0.09	GFI>0.90
	2.479	0.117	0.004	0.912
AGFI>0.80	IFI>0.90	CFI>0.90	RMSEA<0.08	NFI>0.90
0.811	0.978	0.977	0.050	0.947

Table 2. Convergent Validity and Construct Reliability

Construct	Item	Factor Loadings	Item Reliability	Delta	Construct Reliability (CR)	Average Variance Extracted (AVE)	Crombach's Alpha
Usability	Ease of System1	1.01	1.0201	-0.0201	0.87	0.87	0.781
	Ease of Use 2	0.85	0.7225	0.2775			
Learning	Ease of Learn	0.74	0.5476	0.4524	0.73	0.73	0.801
	Learnability	0.96	0.9216	0.0784			
ICT	Terminology	0.94	0.8836	0.1164	0.94	0.94	0.906
	Organization Info.	1.00	1	0.0000			
E-Learning	Searching	0.60	0.36	0.64	0.60	0.51	0.833
	Use Internet	0.90	0.81	0.19			

Table 3. Discriminant Validity

	Squared Multiple Correlations (IC)	SIC
Ease of System1	1.02	0.0104
Ease of Use 2	0.72	0.5184
Ease of Learn	0.55	0.3025
Learnability	0.93	0.8649
Terminology	0.89	0.7921
Organization Info.	1.01	1.0201
Searching	0.06	0.0036
Use Internet	0.66	0.4356

greater than correlation coefficient. Table 3 used to conform that the measurement of discriminate validity is applied.

Structural equation modeling and hypotheses testing

The models testing results are shown in figure 2 below:

1. In e-learning and learning, it is found that e-learning has positive effect on the learning (Υ=0.91, t=2.259, P=0.024<0.05).
2. In ICT and learning, it is found that ICT has positive effect on the learning (Υ=0.64, t=2.788, P=0.005<0.01).
3. In learning and usability, it is found that learning has positive effect on the usability (Υ=0.70, t=2.700, P=0.007<0.01).
4. In e-learning and usability, it is found that e-learning has positive effect on the usability (Υ=0.90, 2.878, P=0.004<0.01).
5. In e-learning and ICT, it is found that e-learning has positive effect on ICT (Υ=0.76, t=2.894, P=0.004<0.01).

According to the results above and analysis presented in figure 2 H1, H2, H3, H4, and H5 were supported.

DISCUSSION AND CONCLUSION

This study tends to identify the usability, e-learning and ICT diffusion in universities by English language teaching students (pre-service and in-service teachers). The findings of the study show that the use of e-learning and

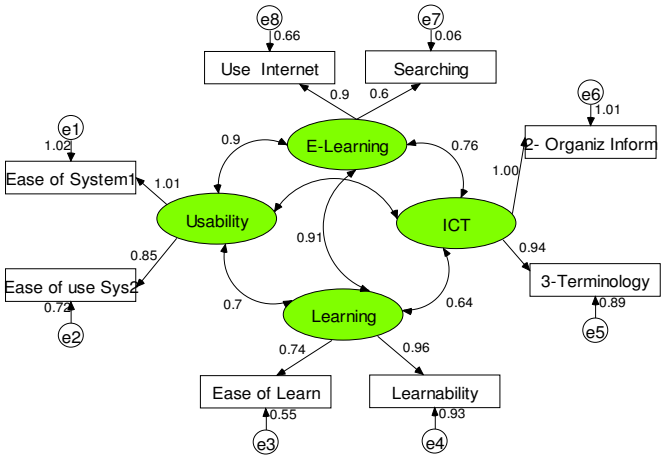

Figure 2. Standardized Research Model

ICT techniques is getting more widespread in higher education that the students make use of them mostly as a means of educational technology and communication and for doing research about the Internet. This study has investigated the underlying relationships between usability, e-learning and ICT which support online teaching for higher education. All hypotheses postulated by the structural models are supported. As a result, the e-learning with associated activities has a strong positive effect on the learning in higher education. Having its stronger impacts on reading, listening, and watching activities it is emphasized that it is required to use e-learning in Universities particularly for receiving knowledge through multimedia in academics and research. Using the Internet connection of many Journals and Magazines encourages faculty members of higher education and researchers to interact with these means. Therefore, it is significant that multimedia as a technique or a tool within the e-learning and ICT should be more widespread, and faculty members in higher education should be supported with technical and technological equipments and the process should be institutionalized via the policies and strategies of Universities.

REFERENCES

Alexander JO (1999). Collaborative design, constructivist learning, information technology immersion, and electronic communities: a case study. *Interpersonal Computing and Technology:* An Electronic J. the 21st Century 7 (1–2).

Anderson JC, Gerbing DW (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103(3)*, PP 411– 423.

Bagozzi RP, Lee KH, Van Loo MF (2001). Decisions to donate bone marrow: The role of attitudes and subjective norms across cultures. *Psychology and Health, 16(1)*, PP 29–56.

Baker EL, Gearhart M, Herman JL (1993). *Evaluating the apple classrooms of tomorrow: The UCLA evaluation studies*. Retrieved 09 February 2011 from

Baumgartner H, Homburg C (1996). Applications of structural equation modeling in marketing and consumer research: A review. Int. J. Res. Market. 13(2), PP 139–161.

Becker HJ, Ravitz JL (2001). Computer use by teachers: Are Cuban's predictions correct? *In Paper presented at the 2001 annual meeting of the American educational research association, Seattle, Washington*. Retrieved 09 February 2011 from http://www.crito.uci.edu/tlc/findings/conferences-pdf/aera_2001.pdf.

Chan KW, Elliott RG (2004). Relational analysis of personal epistemology and conceptions about teaching and learning. *Teaching and Teacher Education, 20*, PP 817-831.

Comber C, Watling R, Lawson T, Cavendish S, McEune R, Paterson F (2002). *ImpaCT2: Learning at home and school: Case studies*. Coventry, GB: Becta.

Cox M, Webb M, Abbott C, Blakeley B, Beauchamp T, Rhodes V (2004). *A review of the research literature relating to ICT and attainment*. London: Becta.

Cuban L (2002). *Oversold and underused. Computers in the classroom*. Cambridge: Harvard University Press.

Dodge B (1997). Some thoughts about WebQuests. Retrieved July 30, 2010, from San Diego State University, Educational Technology Department. Website. http://webquest.sdsu.edu/about_webquests.html.

Doll W, Xia W, Torkzadeh G (1994). A confirmatory factor analysis of the end-user computing satisfaction instrument. *MIS Quarterly, 18(4)*, PP 453–461.

Drenoyanni H, Selwood D (1998). Conceptions or misconceptions? Primary teachers' perceptions and use of computers in the classroom. *Education and Information Technologies, 3*, PP 87–99.

Fornell D, Lacker DF (1981). Evaluating structural equation models with unobservable variables and measurement error. J. Market. Res. 18(1), PP 39–50.

Fuchs TH, Woessmann L (2004). *Computers and student learning: Bivariate and multivariate evidence on the availability and use of computers at home and at school*. Mu¨nchen, Germany: Institute for Economic Research.

Guieford JP (1965). *Fundamental statistics in psychology and education*. New York: McGraw-Hill.

Hair JF, Black B, Babin B, Anderson RE, Tatham RL (2009). *Multivariate data analysis*. New Jersey: Prentice Hall.

Higgins S, Moseley D (2001). Teachers' thinking about Information and Communications Technology and Learning: Beliefs and outcomes. *Teacher Development, 5(2)*, PP 191–210.

Hokanson B, Hooper S (2000). Computers as cognitive media: Examining the potential of computers in education. *Computers in Human Behavior, 16*, PP 537–552.

http://www.cse.ucla.edu/CRESST/Reports/TECH353.pdf.
Jonassen DH (1999). Computers as mindtools for schools: Engaging critical thinking (second ed.). Englewood Cliffs, NJ: Prentice Hall.
Kagan DM (1992). Implications of research on teacher belief. *Educational Psychologist, 27(1)*, PP 65-90.
Kane R, Sandretto S, Heath C (2002). Telling half the story: a critical review of research on the teaching beliefs and practices of university academics. *Review of Educational Research, 72(2)*, PP 177-228.
Kerawalla L, Crook C (2002). Children_s computer use at home and at school: context and continuity. Brit. Edu. Res. J. 28(6), PP 751–771.
Lauman DJ (2000). Student home computer use: A review of the literature. J. Res. Technol. Edu. 33(2), PP 196–203.
Lawless KA, Pellegrino JW (2007). Professional development in integrating technology into teaching and learning: knowns, unknowns, and ways to pursue better questions and answers. *Review of Educational Research, 77(4)*, 575.
Livingstone S (2002). *Children_s use of the Internet. A review of the research literature*. London: School of Economics and Political Science.
Llorens S, Sllanova M, Grau R (2002). Training to technological change. J. Res. Technol. Edu. 35(2), PP 206-212.
Meredyth D, Russell N, Blackwood L, Thomas J, Wise P (1999). *Real time: Computers, change and schooling*. Canberra: Department of Employment, Education, Training and Youth Affairs.
Mooij, T (1999). *Guidelines to Pedagogical Use of ICT in Education*. Paper presented at the 8th Conference of the 'European Association for Research on Learning and Instruction' (EARLI). G€oteborg, Sweden.
National Telecommunications and Information Administration (2000). *Falling through the net: Toward digital inclusion*. Washington, DC: Department of Commerce.
Ng W, Nicholas H, Williams A (2010). School experience influences on pre-service teachers' evolving beliefs about effective teaching. *Teaching and Teacher Education, 26*, PP 278-289.
Niederhauser DS, Stoddart T (2001). Teachers' instructional perspectives and use of educational software. *Teaching and Teacher Education, 17(1)*, PP 15–31.
Novak TP, Hoffman DL (1998). *Bridging the digital divide: The impact of race on computer access and Internet*. Nashville, TN: Vanderbilt University.
Pajares MF (1992). Teachers' beliefs and educational research: cleaning up a messy construct. *Review of Educational Research, 62(3),* PP 307-332.
Papastergiou M, Solomonidou C (2005). Gender issues in Internet access and favourite Internet activities among Greek high school pupils inside and outside school. *Computers and Education, 44(5)*, PP 377–393.
Parr J (2003). *A review of the literature on computer-assisted learning, particularly integrated learning systems, and outcomes with respect to literacy and numeracy*. Retrieved 09 February 2011 from http://www.minedu.govt.nz/index.cfm?layout=documentand documentid= 5499and data=l.
Reddick A, Boucher C, Groseilliers M (2000). *The dual digital divide: The information highway in Canada*. Ottawa: Public Interest Advocacy Centre.
Ruthven, K., Hennessy, S., and Deaney, R. (2005). Incorporating Internet resources into classroom practice: Pedagogical perspectives and strategies of secondary-school subject teachers. *Computers and Education, 44(1)*, PP 1–34.
Selwyn N (1998). The effect of using a home computer on students_ educational use of IT. *Computers and Education, 31(2)*, PP 211–227.
Smeets E (2005). Does ICT contribute to powerful learning environments in primary education? *Computer and Education V (44)*, PP 343 – 355.
Smeets E, Mooij T (2001). Pupil-centred learning, ICT, and teacher behaviour: observations in educational practice. Brit. J. Edu. Technol. 32(4), PP 403–418.
Smeets E, Mooij T, Bamps H, Bartolom_e A, Lowyck J, Redmond D, Steffens K (1999). *The Impact of Information and Communication Technology on the Teacher*. Nijmegen, the Netherlands: University of Nijmegen, ITS. http://webdoc.ubn.kun.nl/anon/i/impaofina.pdf.
Somekh B, Lewin C, Mavers D, Fisher T, Harrison C, Haw K (2002). *ImpaCT2: Pupils' and teachers' perceptions of ICT in the home, school and community*. Coventry, GB: Becta.
Susman EB (1998). Co-operative learning: a review of factors that increase the effectiveness of computer-based instruction. J. Edu. Comput. Res. 18(4), PP 303–322.
Vahideh ZM, Mohammad RK (2011). Influences of digital classroom on education. *Procedia Computer Science V (3)*, PP 1178–1183.
Van Braak JP, Kavadias D (2005). The influence of social-demographic determinants on secondary school children_s computer use, experience, beliefs and competence. *Technology, Pedagogy and Education, 14(1)*, PP 43–60.
Veen W (1995). Factors affecting the use of computers in the classroom: four case studies. In D. Watson and D. Tinsley (Eds.), *Integrating information technology into education* (PP 169–184). London: Chapman and Hall.
Williams LJ, Hazer JT (1986). Antecedents and consequences of satisfaction and commitment in turnover models: A reanalysis using latent variable structural equation methods. J. Appl. Psychol. 71(2), PP 219–231.