

European Online Journal of Natural and Social Sciences 2013; Vol.2, No.2 Special Issue on Teaching and Learning. ISSN 1805-3602

www.european-science.com

Iranian EFL Teachers' Familiarity, Attitudes and Willingness towards **Different Internet Tools and their Applications**

Reza Khany (Corresponding author) Department of English, Ilam University, Ilam, Iran Khani Reza@yahoo.com and

Marzieh Ghoreyshi

Department of English, Ilam University, Ilam, Iran

Abstract

The purpose of this study was to explore the Iranian EFL teachers' familiarity, attitudes and willingness toward applying different internet tools in their classrooms. It also investigated the platform problems and teachers' main concerns towards integrating these tools. Accordingly, 263 EFL teachers who were randomly selected from different institutes in three Iranian provinces were asked to answer the researchers-made questionnaire. The results revealed that EFL teachers 1) are highly familiar with most of the internet tools; 2) have highly positive attitudes towards using and integrating internet tools in their classrooms; 3) are willing to use these technologies for developing certain language skills competency; and 4) are highly concerned about culturally inappropriate materials and students' internet dependability and autonomy. Furthermore, it was found that the results were affected by variables such as teachers' age and educational degree. Finally, it was concluded that in spite of the EFL teachers' positive attitudes and willingness towards these tools, still they are facing some challenging concerns about the application of the given tools due to some cultural and platform problems.

Keywords: Internet technology, Teachers' familiarity, Teachers' attitude, Teachers' willingness

1. Introduction

Rapid developments in information technologies have influenced education, and thus they have led to alteration in the structure and implementation of education (Donmus, 2010). Numerous studies have investigated the use of different types of technologies and their integrations in education in recent years (Albirini, A. (2006); Cheung, W., & Huang, W. (2005); Charsky, & Ressler (2011); Dewiyanti, S., Brand-Gruwel, S., Jochems, W., & Broers, N. J. (2007); Echeverr; Améstica; Gil; Nussbaum; Barrios; Leclerc, (2012); Traud, Mucha, & Porter (2011)).

These studies have covered different areas in internet-based language of pedagogy such as attitudes towards computer assisted language learning (CALL) (Albirini, 2006; Demetriadis et al., 2003; van Braak, Tondeur, & Valcke, 2004), gender differences and CALL (Shapka & Ferrari, 2003; Volman, van Eck, Heemskerk, & Kuiper, 2005) and teacher and learner training in CALL (Galanouli, Murphy, & Gardner, 2004; Tan, Hu, Wong, & Wettasinghe, 2003).

Most of the technological devices and systems have been deployed in classrooms, with the goal of improving the quality of the education in general and teaching and learning quality in specific (Echeverr; Améstica; Gil; Nussbaum; Barrios; Leclerc, (2012); Traud, Mucha, & Porter (2011); Voogt, Tilya, & van den Akker, 2009; Williams, Linn, Ammon, & Gearhart, 2004). In this regard, there are a large number of studies which focus on integrating different internet tools in the classroom and teaching processes, e.g., Northocote & Kendle (2011) conducted a study about online environments of social networks. They found that due to the online environments of social networks,

Openly accessible at http://www.european-science.com

they could suggest practical online interfaces and informal learning to learners in online learning environments. Social networks such as Facebook, Google plus, My space are considered as effective educational tools with their specific features such as peer feedback, good compliance with the social context and interaction tools (Mason, 2006).

In another study, Cheng, Wub, Liao and Chan (2009) conducted an experimental study about the applying a competition game in the classrooms. The findings revealed that the effect of individual ability differences was reduced in the same opportunity tactic. And similar to more-able students, less-able students could perform and achieve the goal in the same opportunity.

Furthermore, Sanpraset (2009) carried out a study about deploying Learning Management System in the classroom and found that it enhances learner autonomy, specifically in cultural; it also lets learners to see multimedia lectures, interact with their teachers and their peers in learning communities, download course materials, take online quizzes and deliver their homework and assignments (Malikowski et al, 2007; Georgouli et al, 2008; Hamuy and Galaz, 2010).

In the same line, Sadaf, Newby and Ertmer (2012) investigated pre-service teachers' behavioral, normative, and control beliefs concerning their intentions to use Web 2.0 technologies in their classrooms. The results recommended that pre-service teachers' intentions to use Web 2.0 technologies are associated to their beliefs about the value of these technologies for improving learners' learning and engagement, its ease of use, its ability to meet the learners' needs, the participants' high self-efficacy in use, and its potential for affording learners anytime/anywhere access to learning and interaction. Sanchez, Marcos, Gonzales, and GuanLin (2012) found that teachers have a highly positive attitude toward ICT but its use in class is scarce due to teachers' innovative processes.

Although much has been written and many researches with different directions have been carried out on the use of computer assisted language learning in language education, but it still lacks a comprehensive study about the integrating and use of different internet tools and their applications in the classrooms in Iranian EFL context. It also seems not to have a clear picture of how and to what of extent Internet tools are applied by Iranian EFL teachers in their classrooms, on one hand and the effect of teachers' demographical variables such as age, education and gender on integrating these internet tools on the other hand. Hence, with regard to the essential role of the EFL teachers in language classrooms and learning particularly in formal education setting, this study addresses the following questions:

- 1. To what extent are the Iranian EFL teachers familiar with internet tools and their application?
- 2. What is the Iranian EFL teachers' attitude towards the effectiveness of Internet tools and their application on EFL learners' performance?
- 3. To what extent are the Iranian EFL teachers willing to use internet tools in their classes?
- 4. What are the restrictions and problems for using the Internet tools in classrooms?
- 5. Is there any relationship between teachers' demographic variables such as age, education and gender with the participants' familiarity and attitudes towards the use internet tools?

2. Methodology

2.1. Sample

In order to answer the questions posed in the study, the participants of this study were randomly selected from various institutes in three Iranian provinces Mazandaran, Kermanshah, Ilam during 2012-2013 academic years. The final sample included 263 Iranian EFL teachers of which 123 were male and 140 were female. 140 (45.6%) teachers were Bachelors, 110 (41.8%) were Master and 33 (12.6%) were Ph.D.

2.2. Instrument

A researcher-made questionnaire was designed to assess the teachers' familiarity, attitude and willingness towards internet applications and their use and also about the existing problem on using the internet and teachers' concerns. The questionnaire was comprised of four main sets of items: teachers' familiarity (both in yes/no and likert scale), teachers' attitudes (in likert scale), teachers' willingness (in likert scale), and 2 open-ended items about teachers' concerns and the existing problems. Then, a pilot study was administered and the questionnaire was distributed among 34participants. According to collected data, specific modifications were done to make the items more accountable. This questionnaire was responded using a 5-point Likert scale with labels from 1 (very much) to 5 (very little)

2.3. Internet tools under study

Literature bounds with different internet tools with different labels covering such tools. After a thorough study and technical analysis of the characteristics of each of these internet tools and their applications the following categories were selected for the current study (Figure 1). The schematic representation of the tools includes: social networks (Facebook, Google plus, Myspace and twitter); chat rooms (Yahoo messenger, Skype, Oovoo, Ekko and Boost cam); email (Yahoo mail, Gmail, Hot mail and American online); Web (Web page, Blogging, Wikies); file sharing (4share, Rapid share (podcast & vodcast), Ushare and YouTube (vodcast)); Learning Management Sharing(LMS) (Moo, Moodle, WizIQ (online learning); avatar (videogame, call of duty and Grand Theft Auto game); and Non-gaming virtual world (second life, active world and TMUV).

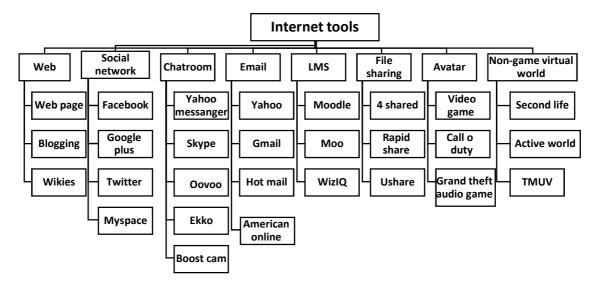


Figure 1. Framework of different internet tools.

2.4. Data analysis

To fulfill the main purposes of this study, Frequency and Pearson correlation coefficient conducted as the statistical methods in this study. Frequency was employed to display teachers' familiarity, attitudes and willingness towards internet tools and their applications. Pearson correlation coefficient was utilized to examine the relationship between teachers' demographic variables and their familiarity and attitude toward the above mentioned tools.

3. Results

The following tables report the frequency distribution of the participants' responses about the familiarity, attitudes, and willingness towards different internet tools and about teachers' concerns on the use of the aforementioned internet applications. It will be noteworthy that only responses with a rating of 1 (very much) will be discussed.

The following table demonstrates the frequency of teachers' familiarity towards different internet tools. Teachers were found to be highly familiar with social networks which are followed by Facebook, Google plus, Twitter and My space and the least familiar with LMS which was followed by Moodle, Moo and WizIQ.

Table 1. Frequency and percentage of EFL teachers' familiarity with different internet tools

Rank	Very much	much	average	little	Very little	frequency
Social network	30.7%	26.0%	32.7%	9.7%	3.0%	100.0%
Chartroom	28.7%	23.0%	26.7%	.0%10	10.7%	100.0%
Web2	27.3%	26.0%	31.1%	9.9%	5.7%	100.0%
Avatar Email	23.1% 17.8%	31.6% 20.8%	36.0% 23.7%	7.8% 19.1	1.5%	100.0% 100.0%
Non-game	12.7%	16.4%	27.4%	22.0%	8.7% 1 21.4%	100.0%
File sharing	10.4%	16.0%	326.7%	23.7%	23.2%	100.0%
LMS	1.3%	0.6%	16.3%	31.8%	50.0%	100.0%

As the above table presents, the highest teachers' familiarity is associated to social network and the lowest one is connected to LMS. (30.7%) of the responses rated social network a 1 on the questionnaire. It is interesting to note that most of the teachers were not familiar with LMS which is considered as one of the most significant tools in these days.

The second question of the study was concerned with the teachers' attitudes towards the effectiveness and practicality of each internet tool. As it is shown in Table 2, teachers' most positive attitudes was towards social networks with Facebook, Google plus, My space and Twitter and teachers' least positive attitude was allocated to LMS with Moodle, Moo and WizIQ.

Table 2. Frequency and percentage of EFL teachers' attitudes towards the effectiveness of different internet tools

Internet tools	Very much	much	average	little	Very little	frequency
Social network	37.4%	29.0%	23.9%	7.2%	2.5%	100.0%
Email	36.9%	28.3%	21.9%	6.7%	5.3%	100.0%
Chartroom	22.3%	26.0%	37.1%	9.9%	7.7%	100.0%
Web2	6.0%	13.6%	30.2%	31.6%	18.3%	100.0%
File sharing	19.8%	%20.8	29.7%	17.1%	0.7%1	100.0%
Nongame	12.7%	19.2%	30.3%	24.9%	22.9%	100.0%
Avatar	18.6%	20.0%	326.7%	19.7%	15.2%	100.0%
LMS	0.0%	0.0%	12.3%	31.8%	56.0%	100.0%

As the above Table provides, a total of 3% rated social network a 1 on the scale. It is surprising that no one rated LMS as 1.

The third question of the study addressed teachers' willingness toward using different internet tools. They were inclined mostly to use social networks in their classes. Surprisingly, no one interested very much to use LMS in learning processes.

Table 3. Frequency and percentage of teachers' willingness towards using different internet tools

	to dis					
Internet tools	Very much	much	average	little	Very little	frequency
Social network	34.7%	31.7%	26.7%	13.0%	4.0%	100.0%
Chartroom	29.7%	25.0%	23.7%	.0%13	7.7%	100.0%
Web2	20.3%	26.0%	32.1%	16.9%	10.7%	100.0%
Avatar	16.1%	21.6%	29.0%	17.8%	14.5%	100.0%
Email	13.8%	19.8%	23.7%	23.0%	8.7%1	100.0%
Non-game	11.7%	13.4%	23.4%	29.0%	22.4%	100.0%
File sharing	7.4%	11.0%	24.7%	28.7%	26.2%	100.0%
LMS	0.0%	0.0%	13.3%	31.8%	55.2%	100.0%

As the above Table reports, about (34.7%) of the teachers were willing very much to integrate social network in their classrooms.

Teachers' main concerns about using and integrating internet tools and their applications in the classrooms and the platform problems are illustrated in Table 4.

Table 4. Teachers' main concerns about applying internet tools and the existing problems

Teachers' opinions		Frequency
Problems with using internet tools	Lack of the appropriate tools and platform in classrooms and financial problem	26.7%
	Internet low speed and frequent disconnection	23.3%
Teachers' concerns about applying internet tools	Culturally inappropriate materials Learners' Internet dependability and losing their autonomous	20.3% 16.4%
	Learners' Internet addiction and ignoring their books	13.2%

As Table 4 indicates, one of the biggest problems in integrating internet tools is associated to inappropriate platforms in the classrooms and financial problems. Teachers were mainly concerned about culturally inappropriate materials and also students' dependability to internet which may contribute to low achievements in learning processes.

According to Table 5, there is direct correlation between the teachers' academic degree and their level of familiarity with different internet tools and the use of them in the classroom. Pearson correlation coefficient was applied to measure the relationship.

Table 5. The relation between the teachers' educational level and their familiarity towards internet tools

Internet tools	Correlation coefficient		Teachers' education
Carial materials	.424	C: - (+ +-:11)	000
Social network		Sig. (two-tailed)	.000
Web	.365	Sig. (two-tailed)	.000
Email	.341	Sig. (two-tailed)	.000
Chat room	.269	Sig. (two-tailed)	.000
File sharing	.252	Sig. (two-tailed)	.000
Avatars	.229	Sig. (two-tailed)	.000
Non-game	.169	Sig. (two-tailed)	.003
LMS	.137	Sig. (two-tailed)	.018

As the above Table shows, all the correlations are statistically significant. The highest correlation is associated to social network and the lowest one is connected to LMS.

Table 6 illustrates the relationship between teachers' age and their familiarity and use of different internet tools and their application. It is noteworthy to mention that all the correlations are negatively significant.

Table 6. The relation between teachers' age and their familiarity towards internet tools

Internet tools	Correlation coefficient		Teachers' age
Social network	356	Sig. (two-tailed)	.000
Web	335	Sig. (two-tailed)	.000
Email	323	Sig. (two-tailed)	.000
Chat room	261	Sig. (two-tailed)	.000
File sharing	281	Sig. (two-tailed)	.000
Avatars	279	Sig. (two-tailed)	.000
Non-game	173	Sig. (two-tailed)	.003
LMS	140	Sig. (two-tailed)	.001

As the above Table demonstrates, the highest negative relationship is linked to social network and the highest one is related to LMS.

4. Discussion and conclusion

Four questions were raised in this study which investigated the Iranian EFL teachers' familiarity with internet tools, their attitudes towards the effectiveness of internet tools on learners' performance and learning, their willing to use these tools and teachers' main concerns on using and integrating these tools in classrooms and the existing problems.

Taking the result of the first question into consideration, the familiarity of Iranian EFL teachers towards different internet tools is high. 98.7% of teachers personally access to computer or laptop and Internet tools and use it regularly. The analysis of teachers' responses indicated that teachers were aware of most of these existing technologies and their benefits in this field of education. They were highly familiar with social networks and chat rooms while their familiarity with LMS was found a little. Teachers' high familiarity with social networks such as Facebook or twitter might be

due to its various uses in daily life and in education which fosters and facilitates interactions, collaborations and communications between learners and teachers

. As LMS is viewed as a tool that manages all facets of the learning processes and its main merits include control over registered users, establishes a safe environment for learning, learner center, shared information for communities and inclusive access, propose opportunity for institutions to maintain connection with previous learners and associate with future (Pandey & Pandey, 2009). It also ameliorates one of these three main concerns, namely, distributing and assigning course materials, recognizing different learning styles among learners and educators, and establishing single learning atmospheres for the applied rehearsals of particular exercises (White and Larusson, 2011). Iranian EFL teachers' low familiarity to Learning Management System indicates that they couldn't take advantages of all the benefits of LMS in their classroom which will foster both learning and teaching processes. Accordingly, curriculum developers and educational officials must take this issue into account and attempt to solve the existing problem by holding some classes to train the EFL teachers and introduce LMS and its benefits and prepare its platform.

Regarding the second question, the finding shows that Iranian EFL teachers have a positive attitude towards the use of most of these internet tools in EFL classrooms. From the data presented in Table 2, one could come to the point that social network and chat room were the most useful tools. EFL teachers believe that integrating such tools will improve learning skills such as writing, reading, speaking and grammar. It also helps learners to be familiar with culture of the target language speakers and engage them in real and authentic tasks and situations that absolutely are useful for their future needs. This highly positive attitude is due to teachers' high familiarity with such tools and their awareness about the effectiveness and practicality of such tools in EFL classes. Among these tools, LMS was found to be the least useful one. Iranian EFL teachers' too low familiarity with LMS seems to highly affect their views towards the integrating and use of the given tool in the classrooms. Taking LMS significant benefits in education into account, it really requires an emergent action toward the existing problem.

The third research question in the study focused on Iranian EFL teachers' willingness towards using internet tools. Findings (Table 3) demonstrated that Iranian EFL teachers were highly willing to integrate most of these internet technologies in their classrooms and encourage their learners to use them so as to improve their learning. One of the major goals of supplementing internet tools such as virtual games, social networks, chartrooms, emails, file sharing and webs in the classroom pedagogy will be to increase learners' motivation and their interest in, boost their confidence in their ability to master, and to feel satisfied from learning that material (Charsky & Ressler, 2011) which all of the above mentioned factors will lead to increase in learning processes.

The last question addressed the problems which did not allow the teachers to use these technologies and internet tools in their EFL classrooms. Lack of the appropriate and sufficient technologies and platforms in institutes, institutes' little financial budgets to support using internet tools, internet low speed and its' frequent disconnection were considered as the major problems. Some of these problems lead to real impediment in the way on integrating these tools in EFL classrooms.

Teachers were concerned about the effects of such internet tools on learners such as exposure to culturally inappropriate materials which are projected in internet, learners' dependability to these tools, ignoring their books and losing their autonomous. However, according to Chafe (1999) and Kataoka (2000) some of these concerns are global. Hence, teachers could eliminate these concerns by planning their courses meticulously and setting their educational goals clearly.

The effect of EFL teachers' demographic features on their familiarity towards internet technologies was investigated, too. As it is demonstrated in Table 4 there was a direct relationship between

teachers' educational level and their familiarity with internet tools and their applications. Teachers with higher degrees were more familiar with internet tools.

As revealed in the Table 5, the relation between teachers' age and their familiarity with internet tools and their applications was examined. It was found that there is a negative relationship between teachers' age and their familiarity. In other words, younger teachers were more familiar with internet tools. These days, by wide spreading of internet tools and technologies both in daily life and educational setting, people are forced to learn and use such tools more and more; consequently, younger teachers are more familiar with such tools and technologies than older ones due to the lack of these tools in the past.

Although these internet tools facilitate both teaching and learning processes, but it is important that EFL teachers does not view them as magic stick that could solve all the educational problem but consider it as "a motivational, enabling and empowering that could benefit both EFL teachers and students" (Al-Mekhlafi, 2004) .

Taking all of these findings into accounts, Iranian EFL teachers are somehow highly familiar with the new technologies and have highly positive attitudes towards the integrating them into class-rooms to improve their learners' different skills. They also are willing to use these technologies too. Thus, the only problem not to use and integrate them in the class is that the institutes are not equipped so well with the appropriate platforms and technologies. While the teachers are prepared to use and have the necessary information and knowledge, there are not the primary equipments to apply them in the classrooms. So, the policy makers and the managers of institutes should pay more attentions on the existing problem and try to find a practical solution for these them.

5.Limitations of the study and further research

The main limitation concern to the sample which was just from three provinces in Iran, and then it is a little difficult to generalize the findings. The second limitation is that the data gathered through one questionnaire; however, more instruments such as survey or interview could be employed.

Further research studies might be carried out to investigate the level of EFL teachers' ICT knowledge and their viewpoints upon the problems and limitations of using Intern tools in class-rooms. Or investigate the extent to which these Internet tools are available in classrooms. The merits and demerits of using these Internet tools from both teachers' and learners' viewpoints should be examined. And a multi-method collecting data is applied to investigate the extent to which these tools are really used in the classrooms.

References

Albirini, A. (2006). Teachers' attitudes towards information and communication technologies: The case of Syrian EFL teachers. *Computers & Education*, 47, 373–398.

Al-Mekhlafi, A. (2004). The effect of interactive multimedia on learning English as second language. *Journal of language and learning*, 2 (2), 88-113.

Chafe, A. (1999). Effective use of internet in second language education: Benefits, challenges and guidelines for teachers. Retrieved February 18, 2009 from http://www.cdli.ca/~achafe/Internetinclassroom.html

Charsky, D., & Ressler, W. H. (2011). "Games are made for fun": Lessons on the effects of concept maps in the classroom use of computer games. *Computers & Education*, 56(3), 604-615.

Cheung, W. & Huang, W. (2005). Proposing a framework to assess Internet usage in university education: An empirical investigation from a student's perspective. *British Journal of Educational Technology*, 36(2), 237–253.

Cheng, H. N.H., Wub, W. M.C., Liao, C. C.Y. & Chan, T. (2009). Equal opportunity tactic: Redesigning and applying competition games in classrooms. *Computers & Education* 53, 866–876.

Demetriadis, S., Barbas, A., Molohides, A., Palaigeorgiou, G., Psillos, D., Vlahavas, I., et al. (2003). "Cultures in negotiation": Teachers' acceptance/resistance attitudes considering the sion of technology into schools. *Computers & Education*, 41, 19–37.

Dewiyanti, S., Brand-Gruwel, S., Jochems, W., & Broers, N. J. (2007). Learners experiences with collaborative learning in asynchronous computer-supported collaborative learning environments. *Computers in Human Behaviour*, 23(1), 496–514.

Donmus, V. (2010). The Use of Social Networks in Educational Computer-Game Based Foreign Language Learning. *Procedia - Social and Behavioral Sciences, Volume 9, 2010*, 1497-1503.

Echeverr, A., Améstica, M. Gil, F., Nussbaum, M., Barrios, E. & Leclerc, S. (2012) . A framework for the design and integration of collaborative classroom games. *Computers in Human Behavior* 28 (2012) 1170–1177.

Galanouli, D., Murphy, C., & Gardner, J. (2004). Teachers' perceptions of the effectiveness of ICT-competence training. *Computers and Education*, 43, 63–79.

Georgouli, K., Skalkidis, I., & Guerreiro, P. (2008). A Framework for Adopting LMS to Introduce e-Learning in a Traditional Course. *Educational Technology & Society*, 11(2) 227–240.

Hamuy, E., & Galaz, M. (2010). Information versus communication in course management-system participation. *Computers & Education*, 54(1), 169-177.

Huang, H.M. and Liaw, S(2005). Exploring user's attitudes and intentions toward the web as a survey tool. *Computers in Human Behavior: Procedia Computer Science*, 21(5), 729-743.

Kataoka, K. (2000). *Computer for English language learning in Japan school*. Retrieved from Microfiche, Eric database.

Kao and Tsai (2009). Teachers' attitudes toward web-based professional development, with relation to Internet self-efficacy and beliefs about web-based learning. *Computers & Education* 53, 66–73

Klein, J. D., & Freitag, E. T. (1991). Effects of using an instructional game on motivation and performance. *Journal of Educational Research*, 84, 303-308.

Klein, J. D., & Freitag, E. T. (1991). Enhancing motivation using an instructional game. *Journal of Instructional Psychology*, 18, 111-117.

Kyriazis A. & Bakoyannis S. (2003). The use of new technologies in education, coexistence of instruction and technology. Athens, Greece.

Malikowski, S. R., Thompson, M. E., & Theis, J. G. (2007). A model for research into course management systems: Bridging technology and learning theory. *Journal ofEducationa lComputing Research*, 36(2), 149–173.

Northocote, M., & Kendle, A. (2000, 19 August). *Communication Skills for Online Students:* An online module for university students and lecturers. Paper presented at the Western Australian Institute for Educational Research Forum 2000, Edith Cowan University, Perth, Western Australia.

Northocote, M. & Kendle, A. (2001). *Informal Online Networks for Learning: Making Use of Incidental Learning Through Recreation*. Retrieve April 12, 2010 from http://www.aare.edu.au/01pap/nor01596.htm.

Pandey, S.R. & Pandey, S. (2009). *Developing a more effective and flexible learning management system (lms) for the academic institutions using Moodle*. Paper presented at International Conference on Academic Libraries – Technology, policy and innovation. Delhi, India, 249-254.

Sadaf, A., Newby, T.J., & Ertmer, P. A. (2012). Exploring pre-service teachers' beliefs about using Web 2.0 technologies. *Computers & Education*, 59, 937–945.

Sanchez, A., Marcos, J., Gonzales, M., & GuanLin, H. (2012). *Procedia - Social and Behavioral Sciences* 46, 1358 – 1364.

Sanpraset, N. (2009). The application of a course management system to enhance autonomy in learning English as a foreign language. *System*, 38(1), 109-123.

Shapka, J. D., & Ferrari, M. (2003). Computer-related attitudes and actions of teacher candidates. *Computers in Human Behavior*, 19, 319–334.

Tan, S. C., Hu, C., Wong, S. K., & Wettasinghe, C. M (2003). Teacher training on technology-enhanced instruction – a holistic approach. *Education Technology & Society*, *6*, 96-104.

Traud A. L., Mucha, P. J. and Porter, M. A. (2012). Social structure of Facebook networks. *Physica* A 391 4165–4180. Available online from http://arxiv.org/abs/1102.2166.

Van Braak, J. (2001). Factors influencing the use of computer mediated communication byteachers in secondary schools. *Computers and Education*, 36, 41–57.

Van Braak, J., Tondeur, J., & Valcke, M. (2004). Explaining different types of computer use among primary school teachers. *European Journal of Psychology of Education*, 19, 407–422.

Volman, M., Van Eck, E., Heemskerk, I., & Kuiper, E. (2005). New technologies, new differences. Gender and ethnic differences in pupils' use of ICT in primary and secondary education. *Computers & Education*, 45, 35–55.

Voogt, J., Tilya, F., & van den Akker, J. (2009). Science teacher learning for MBL-supported student-centered science education in the context of secondary education in Tanzania. *Journal of Science and Education and Technology*, 18, 429-428. William, D., Coles, L., Wilson, K., Richardson, A., & Tuson, J. (2000). Teachers and ICT: Current use and future needs. *British Journal of Educational Technology*, 31, 307-320.

Williams, M., Linn, M. C., Ammon, P., & Gearhart, M. (2004). Learning to teach inquiry science in a technology-based environment: A case study. *Journal of Science Education and Technology*, 13(2), 189-206.

White, B. & Larusson, J. A., (2011). *Seeing, thinking, and doing: strategic directives for learning management systems*. In E-learn Proceedings: World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education, Chesapeake, VA: AACE, pp. 1279 - 1288.