



## Technology and foreign language anxiety: Implications for practice and future research

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### Abstract

It is evident that technology plays an important role in the foreign language teaching and learning processes, whereas foreign language anxiety (FLA) is one of the considerable affective variables that influence adversely the aforementioned processes. However, how the use of technology affects FLA levels has not been drawn attention among researchers. It should be also stated that the results of current studies on the issue have been mixed. Thus, this study presents a brief research synthesis on the issue to make practical recommendations for target groups and researchers to guide further research. The study concludes that while research results have not reached a consensus, the use of technology has a reducing effect on FLA in the scope of the results obtained from the studies reviewed. Finally, the study ends with practical recommendations for target groups and researchers.

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### 1. Introduction

As Higgins (1995) states, technology plays a considerable role to facilitate the foreign language learning and teaching processes. To begin with, it has a great potential to develop communication and interaction in the target language, as it provides synchronous and asynchronous communication and interaction opportunities (Gorjian et al., 2011). Technology also presents immediate feedback and individualized instruction (Nagata, 1993). What is more, it helps learners and teachers deliver authentic content and instructional materials. On the other hand, as Godwin-Jones (2005) underlines, while “technologies offer intriguing opportunities for language professionals and learners” (p. 9), how its utilization in the foreign language learning process influences the level of anxiety is still an unanswered question due to several reasons. First, little attention has been paid to the effects of technology on FLA. Second, the results of the current studies indicate that its influences on FLA still have been mixed. Thus, this paper aims to present a brief review of research on technology effect on FLA. However, before presenting the research synthesis on the issue, anxiety in the foreign language-learning context is discussed.

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Anxiety, one of the most considerable variables in relation to the foreign language learning process, is the most influential affective variable affecting the mentioned process (Horwitz, 2001). In the broadest sense, anxiety is defined as an uncomfortable emotional state in which the individual perceives danger, feel powerless and tension before, after or during an expected danger (Blau, 1955). Among the types of anxiety, *trait anxiety* is an aspect of personality (Scovel, 1978), whereas *state anxiety* is experienced at a particular moment as a reaction to a specific learning situation (Spielberger, 1983). *Situation-specific anxiety* is the general orientation of anxiety in certain learning contexts in which learners perceive themselves linguistically incapable (Ellis, 2008). For Horwitz et al. (1986), FLA relates to language learning in classroom settings and is a distinct complex of behaviors, feeling and perceptions. Within the scope of foreign language learning, Gardner and MacIntyre (1993) define FLA as an apprehension experienced during a specific use of the target language through which the user is not proficient enough. Thus, FLA is under the category of situation-specific anxiety (Aydın, 2008). FLA has three sub-categories. When the learner lacks mature communication skills though she has mature thoughts and ideas, *communication apprehension* occurs. In other words, the learner has fear of communication with other learners, the teacher and native speakers. The learner experiences *fear of negative evaluation* when she feels incapable of a proper social impression due to evaluations by other students, the teacher and native speakers. This situation results in avoiding the use of the target language in the classroom and in social settings (Aydın, 2008). Last, *test anxiety* is an apprehension towards academic evaluations. In other words, the learner suffers consciously or unconsciously from test anxiety because of the fear of failing in tests (Horwitz & Young, 1991).

Several sources provoke FLA among language learners. For Young (1991), there exist six sources of FLA. Among those, personal and interpersonal aspects including self-esteem, social anxiety and competitiveness provoke anxiety. Learners' and teachers' beliefs about language learning are the other sources of FLA, whereas language testing constitutes a strong reason regarding anxiety. In addition, Yan and Horwitz (2008) point out that several factors that cause FLA are parental expectations, cultural and regional differences, class arrangement, learning strategies, comparison with classmates, motivation and interest in language learning. In addition, anxiety may have facilitative or debilitating effects on the foreign language learning process. In other words, research results show that FLA has mainly adverse effects on the foreign language learning process (Steinberg & Horwitz, 1986), while there are several studies indicating its positive effects (Brown, 2000). To sum up, it can be stated that *facilitative anxiety* is connected to the positive influences on the learning process, while *debilitative anxiety* has adverse effects on the process (Ellis, 2008).

In today's world, the use of technology has direct and profound effects on the foreign language learning process due to several reasons, whereas technology use may also affect FLA levels among learners. First, when the types of anxiety are considered, it is evident that the learner's personality, reactions to specific learning situations and certain learning contexts are also directly related to the utilization of technology in the foreign language learning process. In other words, the variables that can be seen as the sources of FLA are also the factors affecting technology use in the learning context. Second, today's technological changes and developments facilitate foreign language learning. This means that foreign language learning is not limited to classroom settings. In other words, while FLA is an affective state that was sourced by classroom settings, it is not possible to state that the use of technology in foreign language learning is not influenced by the learner's of behaviors, feeling and perceptions. Third, regarding anxiety types in the foreign language-learning context, language learners have needs and opportunities to use the target language, even though they are not proficient. Thus, learners may suffer from communication apprehension while using the target language in any technological environments. Furthermore, as technology also provides social environments, the learner may also feel incapable of a proper social impression due to evaluations by others. It should be also

underlined that technology brings opportunities for language testing that is one of the main elements of FLA. To sum up, it is obvious that any factor causing FLA may also have impacts on language learning in a technological environment. Thus, whether there is a relationship between the use of technology and FLA should be clarified due to two reasons. First, language teachers should raise their awareness of technology effect on FLA or vice versa. This is necessary to see the facilitative and debilitating effects of FLA before, during and after the use of technology. Second, as the number of research on the issue is too limited to draw conclusions, researchers need recommendations for their further research. To conclude, while anxiety in the foreign language context is still one of the popular issues, the relationship between technology and FLA has not been drawn attention among researchers. What is more, results obtained current research indicates that the relationship between the two still has been mixed and that there has not been a consensus. Thus, the purpose of this paper is to present a research synthesis to give practical recommendations for teachers and researchers to guide further research.

## 2. Method

For obtaining research papers to review, the journals listed in *Social Sciences Citation Index*, *Art and Humanities Index*, *Australian Education Index*, *British Education Index*, *Journal Indexed in ERIC*, *Scopus* and *Education Full Text Database Coverage List* were taken into account. The rationale behind the index selection procedure was that it seemed necessary to find the research papers in only high-quality journals regarding data accuracy, validity, and reliability. Another reason why the mentioned indexes preferred was to limit the journals that publish papers in the educational context. After a basic search including the keywords “foreign language anxiety”, “technology” and “computer” was performed in accordance with their titles and topics, the papers were saved and coded in a chronological order. The review included 27 research articles, two conference papers, and a Ph.D. dissertation. The reason why the conference papers and Ph.D. dissertation in addition to the research articles were included that the mentioned studies directly focused on the review issue and reported on research activities.

The research reviewed was published in the journal between 2009 and 2016. However, there was no decision to limit the review to the chronology of the papers. In other words, all of the studies on the research issue were included in the review. Then, the studies were analyzed in accordance with the distribution of research in journals, theses and conference papers, types of technology examined, research areas in relation to foreign language learning and teaching, topic related FLA and research designs of the studies. Then, the papers were analyzed in accordance with their contents. For this purpose, the studies were analyzed in accordance with the problem statements, aims, method, main conclusions and recommendations. Then, the summaries obtained from the papers were prepared and were categorized in accordance with their topics. Finally, the reviews were compiled and reported in the chronological order under the certain topics as given in the following section. Review results were presented under the title of Results.

Table 1 indicates the distribution of the research articles in accordance with scientific journals, numbers of the papers, authors and publication years. According to the values in the table, the articles were published in 20 journals. Of the articles, five of them appeared in Computer Assisted Language Journal, whereas each of other journals included only one paper. The journals that published only one paper were CALICO Journal, Education Media International, English Language Teaching, Foreign Language Annals, Foreign Language Education, i-Manager's Journal of Educational Technology, International Journal of Educational Technology in Higher Education, Internet Research, Journal of Educational Technology & Society, Journal of Educators Online, Language Learning & Technology,

Language Teaching Research, Modern Studies in English Language and Literature, Multimedia-Assisted Language Learning, ReCALL, System, TechTrends, The EuroCALL Review and Turkish Online Journal of Distance Education.

**Table 1.** Distribution of research in journals

Order of the journal	Journal Title	Number of the articles	Authors
1	Computer Assisted Language Learning	5	Amiryousefi (2016); Hsu et al. (2008); Levis and Atzert (2015); Wehner et al. (2011); Yen et al. (2015)
17	CALICO Journal	1	Scida and Jones (2016)
12	Education Media International	1	McIntosh et al. (2003)
16	English Language Teaching	1	Rahimi and Soleymani (2015)
15	Foreign Language Annals	1	Pichette (2009)
7	Foreign Language Education	1	JoohaeKim (2005)
20	i-Manager's Journal of Educational Technology	1	Yuzer et al. (2009)
11	International Journal of Educational Technology in Higher Education	1	Martin and Valdivia (2017)
10	Internet Research	1	Ku and Chen (2015)
19	Journal of Educational Technology & Society	1	Yanxia (2017)
14	Journal of Educators Online	1	Merc (2015)
2	Language Learning & Technology	2	McNeil (2014); Sun (2009)
6	Language Teaching Research	1	Baralt and Gurzynski-Weiss (2011)
8	Modern Studies in English Language and Literature	1	Kim (2009)
18	Multimedia-Assisted Language Learning	1	Song (2009)
13	ReCALL	1	Melchor-Couto (2017)
3	System	1	Arnold (2007)
4	TechTrends	1	Aydin (2011)
9	The EuroCALL Review	1	Kruk (2016)
5	Turkish Online Journal of Distance Education	1	Balcikanli (2012)
	Total	25	

Table 2 shows the Ph.D. the distributions of the dissertations and conference papers reviewed. In the table, one unpublished Ph.D. dissertation and two conference papers were listed. The only dissertation was carried out by Wehner (2014), while the conference papers were presented by Cho and Carey (2001) and Terantino (2014).

**Table 2.** Thesis and conference papers

Order	Type	Number	Authors
1	Unpublished Ph.D. Dissertation	1	Wehner (2014)
2	Conference paper	2	Cho and Carey (2001); Terantino (2014)
	Total	3	

### 3. Findings

This section consists of two subsections. The first subsection presents the findings on the types of technology investigated, research topics of the studies in relation to foreign language learning and teaching, issues of FLA and research designs of the studies reviewed. In the second subsection, research results on the relationship between technology and FLA were synthesized and presented. For this purpose, first, studies on e-learning effect on FLA were synthesized. Then, after findings on distance learning were presented, research on online testing effect on FLA was reviewed. After results on mobile learning effect on FLA were given, studies on the impacts of computer-mediated communication (CMC) on FLA were synthesized. Finally, studies on the effects of virtual learning environments on FLA and computer and internet anxiety were reviewed.

#### 3.1. Analysis of the studies

According to the data given in Table 3, research focused on a variety of fields in relation to the types of technology. However, studies mainly concentrated on computer-mediated communication environments and tools such as voice boards, Wimba, Skype, and wikis. In addition, five studies appeared on Second Life as a virtual communication environment. Research on e-learning and distance education focused on e-learning classes and applications distance teacher training, whereas two studies investigated computer-based testing environments. Finally, as shown in the table, only one study examined mobile phones.

**Table 3.** Types of technology investigated

Technology	Authors	Number of the studies
E-learning environments	E-learning classes JoohaeKim (2005)	2
	E-class application Yuzer et al. (2009)	
Distance education environments	Distance learning Pichette (2009)	2
	Distance teacher-training Merc (2015)	
Computer-based testing environments	Kim (2009); Yanxia (2017)	2
Mobile phones	Rahimi and Soleymani (2015)	1
Computer-mediated communication environments	Synchronous and asynchronous CMC Arnold (2007); Baralt and Gurzynski-Weiss (2011); Cho and Carey (2001); Martin and Valdivia (2017); McNeil (2014)	16
	Voice boards Hsu et al. (2008); McNeil (2014); Poza (2011); Song (2009); Sun (2009);	
	Wimba Cho and Carey (2001); McIntosh et al. (2003)	
	Hybrid format Scida and Jones (2016)	
	Skype Terantino (2014); Yen et al. (2015)	
Gamification	Wikis Ku and Chen (2015)	5
	Second Life Balcikanli (2012); Kruk (2016); Wehner; (2014) Wehner et al. (2011); Melchor-Couto (2017)	
Total		28

Table 4 demonstrates the numbers of the studies on the topics relating foreign language learning and teaching. According to the values in the table, studies mainly focused on basic language skills. However, it is also obvious that speaking skills constituted a special attention among researchers, while rare studies appeared on listening, reading and writing skills. In addition, only one study appeared on the background factors such as proficiency levels, academic background, and gender. In a similar way, one study examined teacher training, whereas testing was examined in one research activity.

**Table 4.** Topics of the articles related to foreign language teaching and learning

Topics	Authors	Number of the articles	%
Background factors	proficiency level, academic background, and gender JoohaeKim (2005)	1	3.57
Basic skills	Listening Rahimi and Soleymani (2015); Scida and Jones (2016) Amiryousefi (2016); Arnold (2007); Balcikanli (2012); Baralt and Gurzynski-Weiss (2011); Cho and Carey (2001), Hsu et al. (2008); Kruk (2016); McIntosh et al. (2003); Martin and Valdivia (2017); McNeil (2014); Melchor-Couto (2017); Pichette (2009); Poza (2011); Song (2009); Sun (2009); Terantino (2014); Wehner (2014); Wehner et al. (2011); Yen et al. (2015)	25	89.29
	Speaking		
	Reading Kim (2009); Yuzer et al. (2009)		
	Writing Chen (2015); Ku and Chen (2015)		
Teacher training	Merc (2015)	1	3.57
Testing	Yanxia (2017)	1	3.57
	Total	28	100

Table 5, shows the topics related to the types of FLA. First, it should be pointed out that research mostly focused on communication apprehension, while only two studies appeared on test anxiety. Interestingly enough, no study on fear of negative evaluation as one of the components of FLA. According to the table, studies also investigated listening, reading and writing anxiety. Last, one study concentrated on teaching anxiety, whereas two research activities focused on computer and internet anxiety that should be considered apart from FLA.

**Table 5.** Topics related to FLA

Topics	Authors	Number of the articles
Foreign language anxiety	Communication apprehension	17
	Test anxiety	
Basic skills	Listening anxiety	5
	Reading anxiety	
	Writing anxiety	
Teaching	Teaching anxiety	1
Computer use	Computer anxiety	5
	Internet anxiety	
Total		28

In Table 6, information on research designs, participants and sampling was presented. First, it can be noted that 14 studies used experimental research design, whereas eight descriptive studies were carried out. In addition, six of the studies used qualitative research design. Of those qualitative studies, only one included a case study. Second, when sample groups were considered, it can be seen that the participants in 24 research activities were university students, whereas only four studies used K-12 students as participants. Last, whereas 15 studies used purposeful sampling, randomized sampling was preferred in eight studies. In addition, only five studies included convenience sampling.

**Table 6.** Research designs of the studies

Design	Number	Total
Research design	Qualitative	5
	Non-case	
	Descriptive	8
	Experimental	14
Participants	University students	24
	K-12 students	4
Sampling	Convenience	5
	Purposeful	15
	Random	8

### 3.2. Research results

In this section, research results on the relationship between technology and FLA were synthesized and presented. For this purpose, first, studies on e-learning effect on FLA were synthesized. Then, after findings on distance learning were presented, research on online testing effect on FLA was

reviewed. After results on mobile learning effect on FLA were given, studies on the impacts of computer-mediated communication (CMC) on FLA were synthesized. Finally, studies on the effects of virtual learning environments on FLA and computer and internet anxiety were reviewed.

### 3.2.1. E-Learning

Research shows that the effects of e-learning environments on FLA are mainly positive. In one of the earlier studies, JoohaeKim (2005) aimed to investigate the existence of FLA in e-learning situations and to identify learners' background factors and anxiety levels. Horwitz' (1986) Foreign Language Classroom Anxiety Scale (FLCAS) was administered to 162 EFL learners. Results indicated that EFL learners did not experience FLA in e-learning classes. However, findings showed worry over e-learning education, learning style conflicts, test anxiety in online environments and learning style conflicts. In addition, the levels of e-learning anxiety were found to be correlated with the proficiency level in the target language, academic background, and gender. In another study, Yuzer et al. (2009) aimed at discovering the effects of an E-class application on reading and computer anxiety. In the study, the Foreign Language Reading Anxiety Scale was used to collect data from 26 EFL learners. Findings demonstrated that learners experienced a low level of reading and computer anxiety after the E-class application. To conclude, it can be pointed out that foreign language learners do not experience anxiety in e-learning environments, while they suffer from e-learning education itself, learning style conflicts and test anxiety in online environments. In addition, the use of e-learning environments also reduces reading and computer anxiety. As a final point, it should be underlined that the conclusions in relation to e-learning effect on FLA are limited to the findings obtained from only two studies.

### 3.2.2. Distance learning

Results on how distance learning influences foreign language learners' anxiety levels are confusing. In an earlier study that aimed to compare foreign language learners' anxiety levels in distance learning and face-to-face environments, Pichette (2009) found no significant difference between the two. In the second study, Merc (2015) reported on the experiences of a teacher trainee during a microteaching process in a distance teacher-training program in the English as foreign language (EFL) teaching context. In this qualitative case study, after collecting data from online dialog journals and open-ended questions before and after the practicum process, Merc (2015) concluded that the participants experienced foreign language teaching anxiety. In conclusion, while the results of the former study indicate no difference in terms of anxiety in distance learning settings and face-to-face environments, the findings in the latter demonstrate that EFL teachers suffer from teaching anxiety. Yet, the point that should be underlined is that those conclusions are limited to the results reached in only two studies.

### 3.2.3. Online testing

The results of two studies on the relationship between test anxiety and the use of technology are rather conflicting. In the first study reviewed, Kim (2009) focused on the relationship between foreign language reading anxiety and computer-based Test of English for International Communication Test (TOEIC). For this purpose, Horwitz' (1986) FLCAS, reading anxiety scale and computer-based TOEIC tests were administered to 281 adult learners studying at a university. Results showed that EFL learners had a high level of test and reading anxiety. In the second study, given that test anxiety constituted a considerable factor that could affect test-takers' performance, Yanxia (2017) examined test anxiety among 330 Chinese university students in a computer-based EFL testing environment. The adopted versions of Test Anxiety Scale developed by Sarason (1978) and the Attitude towards Computerized Assessment Scale by Smith (2003) were used to collect data. Findings demonstrated



that EFL learner perceived a low level of anxiety about the computer-based English test. To sum up, there is no a consensus on the effects of computerized test environment on FLA. In other words, while a computer-based EFL testing environment reduces anxiety, TOEIC tests cause a high level of reading anxiety in the EFL learning context. Again, it should be highlighted that the conclusions reached on the issue is limited to the results of only two studies.

#### 3.2.4. Mobile learning

The results of only one study that appeared on the effects of mobile learning environments of FLA show that the use of mobile phones for listening activities reduces listening anxiety. In this study, Rahimi and Soleymani (2015) investigated the effect of mobile learning on listening anxiety among 50 Iranian EFL learners enrolling in intermediate English courses. In this experimental study, the participants did listening activities by using podcasts on their mobile phones, whereas the ones in the control group did the same activities on their desktop computers. They found that there was a considerable difference between the groups. In other words, the ones who used mobile phones during the listening activities experienced a low level of FLA when compared to the ones in the control group. To conclude, it can be noted that the use of mobile phones reduces listening anxiety. Yet, it should be noted that the conclusion is limited to the findings obtained from only one study.

#### 3.2.5. Computer-mediated communication

Research shows that CMC reduces anxiety in the foreign language-learning context. In one of the earlier studies, for instance, Arnold (2007) examined the effect on synchronous and asynchronous CMC on communication apprehension. In this experimental study, after 44 foreign language learners were assigned to control and experimental groups, their self-reports, and pre- and post-test communication apprehension scores were used as the data source. Findings showed that learners experienced a low level of communication apprehension during CMC sessions. Several studies that were indirectly related to FLA focused on the effects of voice boards on speaking skills. For instance, Hsu et al. (2008) collected qualitative data regarding 22 EFL learners' perceptions of voice boards and found that students felt comfortable with the use of voice boards. Sun (2009) also focused on EFL learners' perceptions of voice boards and noted that use of voice boards reduced FLA. Similarly, Song (2009) suggested that voice board activities might lower the level of FLA. Results of the studies on the effects of Wimba voice boards also concluded that the level of FLA decreased. For instance, Cho and Carey (2001) found that the use of Wimba reduced anxiety level among Korean EFL students during oral interviews. Similarly, McIntosh et al. (2003) noted the anxiety-reducing effect of Wimba voice boards during the administration of oral proficiency tasks. However, the main limitation regarding the studies reviewed here is that the focus of those studies had not addressed the relationship between the affordances that learners use and FLA, as McNeil (2014) pointed out. Thus, McNeil (2014) focused on the sources of FLA in oral asynchronous CMC environments and the correlations between learners' perceptions of affordances in the mentioned environments and FLA. Fifteen Korean EFL learners participated in voice board tasks for eight weeks. Then, an adapted version of the FLCAS (Horwitz et al., 1986) was used to collect data. Results indicated that EFL learners did not feel overly anxious during completing their speaking tasks in asynchronous CMC environments. Last, Scida and Jones (2016) examined the effects of rehybridization of elementary level Spanish courses on foreign language learners' self-reported levels of anxiety. In the study, 39 students completed their courses in former hybrid format, whereas 70 participants completed the courses in redesigned hybrid format. The data were provided from pre- and post-tests of listening comprehension and linguistic knowledge, whereas learners' perceptions of the courses were considered as another data source. Findings indicated that participants' anxiety levels considerably decreased and that their listening comprehension skills and linguistic knowledge levels improved.

Research also indicates that CMC has no an anxiety-reducing effect. For example, Poza (2011), in a qualitative study, compared the anxiety levels in face-to-face and voice board contexts and suggested that there were no significant differences regarding the two environments. In a study directly focusing on FLA, Terantino (2014) aimed at comparing the levels of FLA during oral assessments administered face-to-face and via Skype video conferencing. After gathering data by administering the FLCAS (Horwitz et al., 1986) to 81 university students enrolled in Russian as a foreign language class and conducting interviews with eight students, he found that there was not a statistically significant difference regarding anxiety levels between the two contexts. In other words, findings showed that students' anxiety levels increased regardless of exam delivery mode. After implementing a computer-mediated task with Spanish as a foreign language learners, Baralt and Gurzynski-Weiss (2011) noted that anxiety levels did not considerably change regarding face-to-face and computer-mediated task, whereas they did not have strong preferences for one over the other. Last, as McNeil (2014) found in his study reviewed above, voice boards did not eliminate FLA. That is, learners' abilities, the environment, and the task worked in consort to decrease or increase the levels of anxiety.

Research focusing on Facebook, Skype and wikis shows positive effects on the levels of FLA. First, given that EFL learning has challenges due to cultural and environmental factors, emphasis on test scores and FLA, Yen et al. (2015) aimed to conduct an instructional course via Facebook and Skype through which learners performed role-playing based learning. Forty-two EFL learners participated in this conversation class. Results suggested that role-playing via Facebook and Skype had positive effects on learners' motivation and reduced their anxiety levels. Ku and Chen (2015) examined the Wiki effect on FLA during cross-cultural web-based collaborative learning sessions in a one-month Google Wiki activity. For this purpose, 49 high school students engaged in a transnational collaborative learning environment. Data obtained from the transnational collaborative learning anxiety inventory showed that learners' anxiety levels considerably decreased regarding social and FLA, while computer anxiety did not demonstrate any significant difference.

Interestingly enough, one study suggests that feedback in an online oral synchronous communication is better rated by anxious learners. As the relationship between corrective feedback and anxiety mostly was researched in face-to-face environments, Martin and Valdivia (2017) aimed to investigate the relationship between speaking anxiety and feedback in an online oral synchronous communication task. In the study, the Corrective Feedback Belief Scale and the FLCAS (Horwitz, 1986) were administered to 50 Spanish EFL enrolled in an intermediate EFL course designed to be an online learning environment. They found that recast and metalinguistic feedback were better rated by the participants who experienced a high level of anxiety.

### 3.2.6. Second Life

Research on the effects of Second Life as virtual learning environment on FLA demonstrates positive effects. Wehner et al. (2011), for instance, examined the relationship between virtual worlds and language learning. In this experimental study, students in the control group used the traditional curriculum, whereas the ones in the experimental group participated in an instruction in Second Life. The study concluded that language learners who used Second Life experienced a low level of FLA when compared to the ones who received traditional instruction. In another study, after investigating the effects of Second Life as a virtual learning environment among American and Turkish foreign language learners, Balcikanli (2012) noted that Second Life provided a less threatening foreign language-learning environment. In a qualitative case study, Wehner (2014) examined the relationship between anxiety and virtual worlds. For this purpose, he observed the two subjects' online experiences in Second Life. The study concluded that that avatar presence was a variable that affected participants' anxiety levels. Kruk (2016) investigated the changes in FLA in Second Life. Sixteen English philology

students participated in practice activities in Second Life. After a quantitative and qualitative analysis of data obtained from a background questionnaire and session logs, Kruk (2016) noted that students experienced a low level of FLA. Finally, Given that as Dickey (2005) pointed out, virtual learning environments where students might “feel ‘shielded’ behind their avatars (Rosell-Aguilar, 2005, p. 432) decreased anxiety, Melchor-Couto (2017) examined FLA levels among a group of foreign language learners who participated in oral interaction activities in Second Life. After providing quantitative and qualitative data, Melchor-Couto (2017) concluded that FLA levels among Second Life users decreased when compared to the ones in the control group. However, students’ comments showed that anonymity was not the only reason that reduced anxiety.

### 3.2.7. Computer and internet anxiety

Results on the relationship between computer and internet anxiety and foreign language learning are conflicting. In an earlier study, Lewis and Atzert (2000) noted that computer anxiety might have negative influences on foreign language learning in a computer-mediated learning environment. As previously reviewed, the study by Yuzer et al. (2009) concluded that EFL learners experienced a low level of reading and computer anxiety after the E-class application, while Ku and Chen (2015) found that computer anxiety among learners did not constitute a considerable variable regarding Google Wiki activity as a transnational collaborative learning environment. Given that little attention was paid to how task repetition characteristics influence accuracy, fluency, and complexity in a research context, Amiryousefi (2016) examined the differences between the task and procedural repetition. In this study, the relationship between computer anxiety and learners’ development of accuracy, fluency, and complexity in foreign language writing was a secondary purpose to research. The study used an experimental research design and included 70 Iranian EFL learners who assigned to task repetition or procedural repetition groups. In terms of computer anxiety, the Computer Anxiety Rating Scale was administered to the participants. The study concluded that there was no statistically significant difference between learners’ development regarding accuracy, fluency, and complexity in both procedures and computer anxiety.

The results of only one study on Internet anxiety among foreign language learning demonstrate that the internet is not a source of anxiety among foreign language learners. Given that little research has appeared on the demotivating potential of new technologies in foreign language research, Aydın (2011) focused on Internet anxiety among foreign language learners. In this descriptive study, after the Internet Anxiety Scale was administered to 155 EFL learners, a correlation analysis was provided to determine the relationship between certain variables and the levels of Internet anxiety. The study suggested that the Internet itself was not a source of anxiety among foreign language learners. On the other hand, computer ownership, Internet instruction, and Internet familiarity were that factors that considerably decreased the level of Internet anxiety, while age, gender and their academic achievement did not have any significant effect on internet anxiety.

## 4. Conclusions and Discussion

Several conclusions were reached in the study. First, e-learning situations do not provoke anxiety among foreign language learners. Speaking more specifically, research shows that e-learning situations reduce reading and computer anxiety among foreign language learners. Second, distance learning has no effects on anxiety levels among foreign language learners. On the other hand, when

the foreign language teaching context is considered, pre-service EFL teachers suffer from teaching anxiety in a distance-teaching environment. Third, foreign language learners perceive a low level of anxiety in computer-based testing environments; however, they suffer from reading anxiety in the mentioned environments. A fourth conclusion is that the use of mobile phones reduces listening anxiety. Fifth, foreign language learners experience a low level of communication apprehension during CMC sessions. In other words, learners feel comfortable with the use of voice boards and have a low level of listening and speaking anxiety during oral interviews and oral proficiency and speaking tasks. Similarly, role-playing activities via Facebook and Skype reduces FLA. Interestingly enough, research demonstrates that anxious learners better rate feedback in an online oral synchronous communication. On the other hand, research shows that the use of voice boards and Skype has no effects on reducing FLA. Sixth, the use of wikis as a transnational collaborative learning environment reduces anxiety levels among foreign language learners. Another conclusion is that foreign language learners experience a low level of anxiety in a virtual learning environment and perceive it a less threatening foreign language-learning environment. Last, foreign language learners experience a low-level computer anxiety during e-class applications, whereas computer anxiety does not constitute a variable regarding Wiki as a transnational collaborative learning environment and accuracy, fluency and complexity task repetition or procedural repetition activities. Nevertheless, research indicates that computer anxiety has negative influences on foreign language learning in a computer-mediated learning environment. Regarding internet anxiety, the internet is not a source of anxiety among foreign language learners. In other words, internet familiarity decreases the level of internet anxiety, whereas no correlation exists between the levels of internet anxiety and certain factors such as age, gender, and their academic achievement.

When the analysis of the articles is considered, several conclusions can be noted. The first conclusion is that research mainly focused on computer-mediated communication environments when the types of technology examined were taken into account. Several studies also investigated virtual communication environments, e-learning, distance education, computer-based testing environments and mobile phones. Second, when the foreign language teaching and learning contexts, it can be concluded that studies mainly focused on basic language skills, namely speaking, listening, reading and writing skills. To add, the background factors related to sample groups, teacher training and testing were other issues to research. The third conclusion is that, in terms of the components of FLA, research mostly concentrated on communication apprehension and test anxiety, while fear of negative evaluation, the third element of FLA did not attract any attention among researchers. Listening, reading and writing anxiety were other issues to research, whereas research activities focused on computer and internet anxiety. The last conclusion is that studies used experimental, descriptive and qualitative research designs, whereas the sample groups consisted of university students and K-12 students. As a final point, researchers preferred purposeful sampling, randomized samplings in their studies.

When the contents of the studies reviewed were taken into account, the following conclusions can be presented. First, e-learning situations do not provoke anxiety among foreign language learners. Speaking more specifically, research shows that e-learning situations reduce reading and computer anxiety among foreign language learners. Second, distance learning has no effects on anxiety levels among foreign language learners. On the other hand, when the foreign language teaching context is considered, pre-service EFL teachers suffer from teaching anxiety in a distance-teaching environment. Third, foreign language learners perceive a low level of anxiety in computer-based testing environments; however, they suffer from reading anxiety in the mentioned environments. A fourth conclusion is that the use of mobile phones reduces listening anxiety. Fifth, foreign language learners experience a low level of communication apprehension during CMC sessions. In other words, learners

feel comfortable with the use of voice boards and have a low level of listening and speaking anxiety during oral interviews and oral proficiency and speaking tasks. Similarly, role-playing activities via Facebook and Skype reduces FLA. Interestingly enough, research demonstrates that anxious learners better rate feedback in an online oral synchronous communication. On the other hand, research shows that the use of voice boards and Skype has no effects on reducing FLA. Sixth, the use of wikis as a transnational collaborative learning environment reduces anxiety levels among foreign language learners. Another conclusion is that foreign language learners experience a low level of anxiety in a virtual learning environment and perceive it a less threatening foreign language-learning environment. Last, foreign language learners experience a low-level computer anxiety during e-class applications, whereas computer anxiety does not constitute a variable regarding Wiki as a transnational collaborative learning environment and accuracy, fluency and complexity task repetition or procedural repetition activities. Nevertheless, research indicates that computer anxiety has negative influences on foreign language learning in a computer-mediated learning environment. Regarding internet anxiety, the internet is not a source of anxiety among foreign language learners. In other words, internet familiarity decreases the level of internet anxiety, whereas no correlation exists between the levels of internet anxiety and certain factors such as age, gender, and their academic achievement.

The conclusions reached in the study may relate to several factors. First and most importantly, it can be noted that technology itself may not be a single factor that increases or decrease FLA among learners. In other words, in the scope of the studies reviewed in this paper, it is evident that their learning styles, proficiency levels, and academic backgrounds may relate to the FLA levels. In addition, teaching and learning contents presented in technology-related environments may influence learners' anxiety levels. Second, given that the results regarding the effects of computer-based testing environments on anxiety are conflicting, it should be pointed out that test content and test-takers' performance levels seem considerable variables that change anxiety levels. Furthermore, as no consensus has been reached on the effects of the use of voice boards on FLA is considered, it can be stated that learners' abilities and the tasks they are involved are also influential in terms of FLA. For instance, while the use of avatars that provides anonymity is a factor that reduces anxiety, research shows that anonymity is not the only reason that reduced anxiety. To conclude, it should be strongly underlined that the use of technology is not the only factor that may influence the levels of FLA among learners. In a broader perspective, it is obvious that FLA relates to the certain factors in the scope of the foreign language learning contexts and processes.

#### 4.1. Implications for practice

Some practical recommendations regarding the conclusions of the study should be noted. First, teachers should aware of the anxiety-reducing effects of e-learning environments on the foreign language learning process. Thus, they should prefer e-learning environments to reduce the levels of foreign language rather than the traditional environments that provoke anxiety. Specifically, teachers should use them to decrease both reading and computer anxiety. In addition to e-learning environments, teachers should be aware of anxiety-reducing effects of distance learning environments. Teachers should also use computer-based testing environments to decrease anxiety levels. Second, foreign language teachers should allow their students to use mobile phones during listening activities, as the use of mobile phones reduces listening anxiety. Third, foreign language teachers should use CMC tools and environments to reduce communication apprehension, listening and speaking anxiety during oral interviews, speaking tasks, feedback sessions and role-play activities via Facebook and Skype. Fourth, foreign language teachers should be aware of the effectiveness of wikis as transnational collaborative learning environments on reducing FLA. To add, they should prefer virtual learning

environments in their teaching activities as they present less threatening foreign language-learning opportunities. Teachers should also consider anxiety-provoking effects of the utilization of technology in the foreign language learning process. For instance, they should prefer traditional testing environments regarding reading skills rather than computer-based testing. Teachers should guide their students on how to cope with computer anxiety that has negative influences on the on foreign language learning in computer-mediated learning environments. Last, prospective teachers suffer from teaching anxiety in a distance-teaching environment, teacher trainers should provide traditional teaching environments before the use of technology.

The effectiveness of technology in reducing anxiety directly relates to the content of pre- and in-service teacher training programs; thus, curriculum developers and policymakers should reorganize the pre- and in-teacher programs in terms of the positive effects of technology on the foreign language learning and teaching programs. For this purpose, the mentioned programs should include topics such as e-learning situations and environments, distance learning, computer-based tests and testing environments, smartphone applications, CMC tools, Web 2.00 tools and instant messaging software. More importantly, issues on the use of technology in the foreign language teaching and learning processes should depend on a strong theoretical background and practice. Else, it is evident that it will not be possible to integrate technology into the foreign language teaching and learning processes. In other words, it is obvious that the positive effects of technology can be provided if teachers are trained not only on social, psychological and pedagogical aspects of foreign language teaching and learning but also on the efficient use of technology in the mentioned contexts and processes. The use of technology that is internalized by teachers not only reduces anxiety among learners but also facilitates the foreign language learning and teaching processes. As the final point, the internalization of technology and its pedagogical usage in language teaching and learning will be possible after radical changes and detailed implementations regarding teacher-training programs.

#### 4.2. Implications for further research

Some recommendations for further research regarding the conclusions of the study can be listed. As the number of the studies on the technology effects on FLA is too limited to obtain conclusions, further research on the issue is strongly necessary. However, when the studies reviewed in this paper are considered, two drawbacks regarding research on the issue arise. First, studies do not focus directly on the technology effects on FLA; instead, they approach FLA as one of the variables in the studies. Thus, further research should directly focus on FLA as a dependent variable in relation to the use of technology in the foreign language teaching and learning processes. The second problem is that the studies focusing directly on the relationship between FLA and the use of technology do not compare the FLA levels technology-based environments and traditional settings. For instance, a study concentrating on the effects of computer-based tests on reading anxiety does not present data on reading anxiety regarding traditional examination settings. Thus, while the reading content provokes anxiety, a study may suggest that computer-based examinations cause anxiety among learners. In this sense, further research should be carefully designed to understand all of the factors increasing or decreasing anxiety instead of focusing on only one technology-based learning and teaching environment.

Given that as there has not been a consensus about the effects of the use of technology on language learners' anxiety levels and the results obtained from the current studies have been mixed, some more recommendations for further research can be made. First, researchers should perform qualitative studies for a better and deeper understanding of technology effect on FLA. Studies first should provide data from learners' and teachers' perspectives. In other words, research should aim to reach conclusions heuristically and holistically in natural settings. Else, it will not possible to define and

contextualize the facilitating and debilitating effects of technology on FLA. That is, research should deal with real concerns, problems and learners' and teachers' strategies to cope with FLA. By this way, it will be easier to understand and obtain the potential factors and variables affecting the technology use. To add, it is necessary to develop valid, reliable and specific scales in the scope of the technology effects on FLA. Second, descriptive and correlational studies are necessary to understand the factors and variables regarding the technology effects on FLA. The possible relationships between FLA and demographic, independent and extraneous variables can be observed through descriptive and correlational studies. Finally, after obtaining data on the potential and possible variables, research should carry out experimental studies in systematic and controlled settings focusing on certain variables derived from descriptive studies.

Much more research is warranted, as it is evident that current research seriously lacks data on some specific issues regarding the technology effect on FLA. In the broader perspective, given that research mainly focuses on computer-mediated communication environments, a variety of tools and environments that may relate to FLA should be investigated. In addition, listening, reading and writing skills and grammar and vocabulary knowledge areas require a special attention in relation to FLA and technology use. Within this scope, researchers should also focus on the relationship between technology effects on FLA and the teacher training and testing contexts. In the foreign language learning contexts, demographic factors such as age, gender, grade, social and educational backgrounds of learners and teachers should be investigated, as it is evident that research lacks on the relationships between these variables and technology effect on FLA levels. Research should also focus on the relationship between the utilization of technology and types of anxiety. In other words, whether technology provokes or reduces trait, state or situation-specific anxiety should be clarified. Furthermore, the relationships between the use of technology and communication apprehension, test anxiety and fear of negative evaluation should be researched. Speaking specifically, as no study has been performed on fear of negative evaluation, technology effects on fear of negative evaluation requires a special attention among researchers. As a final point, several research issues that have not attracted attention among researchers should be examined. Among those issues, how teachers' and learners' characteristics, language teaching methods and techniques, basic language skills and knowledge areas and language teaching materials relate to FLA and the use of technology should be clarified. In other words, given that current studies have focused on the relationship between FLA and certain aspects of technology such as e-learning, distance learning, computer-based testing, mobile learning, computer-mediated communication, collaborative and virtual learning environments, further research should focus on the relationships between FLA and various tools and environments such as authoring programs, online classrooms, discussion boards, online dictionaries and social media platforms.

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## Teknoloji ve yabancı dil kaygısı: uygulama ve araştırma için öneriler

### Öz

Teknolojinin yabancı dil öğretme ve öğrenme süreçlerinde önemli bir role sahip olduğu açık olmakla birlikte, yabancı dil kaygısının, bahsedilen süreçler üzerinde olumsuz etkilerde bulunan duyuşsal değişkenlerden biri olduğu da bilinmektedir. Ancak, teknolojinin yabancı dil kaygısı üzerinde nasıl etkilere sahip olduğu, araştırmacılar arasında yeterince dikkat çekmemiş bir konudur. Mevcut araştırmaların sonuçlarının ise bir uzlaş göstermediği de ayrıca vurgulanmalıdır. Bu nedenlere dayalı olarak, mevcut çalışma; sonraki araştırmalara yol göstermek ve hedef gruplara yönelik öneriler sunmak üzere konu ile ilgili yapılan çalışmalarının öz bir sentezini sunmayı amaçlamaktadır. Çalışma sonunda, teknoloji ve yabancı dil kaygısı üzerine yapılan çalışmaların bir uzlaş göstermediğini ancak gözden geçirilen çalışmalardan elde edilen sonuçlar ışığında teknolojinin yabancı dil

kaygısı üzerinde azaltıcı etkilere sahip olduğu bulunmuştur. Mevcut bulgular ışında çalışma, sonraki araştırmalar ve hedef gruplar için öneriler sunmaktadır.

*Anahtar sözcükler:* Yabancı dil öğrenimi; teknoloji, kaygı

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