

From zero to hero: A longitudinal study of ICT attitudes in relation to language teaching in the technology era

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Abstract

In this longitudinal study, how EFL instructors understand the use of computer technologies and their attitudes towards ICT (Information and Communication Technologies) are investigated. The aims are to define the instructors' attitudes, explain the relationship between instructors' attitudes and their ICT use, and specify the ICT needs of their language teaching using two types of data collection instruments. In the initial study conducted in 2017, the first questionnaire measured ICT use with the participants' demographic features and the second aimed to identify instructors' attitudes towards ICT. Additionally, some instructors were interviewed to get a more in-depth understanding of their attitudes and ICT use. After 7 years, the same research setting is used with the same data collection instruments to analyze the effects of technological developments of the era regarding instructors' ICT use in language teaching and moreover, the frequency of use and familiarity with AI tools have also been analyzed in the second phase of the study. The findings reveal that nearly all participants regard ICT as an invaluable tool for their teaching and have moderately positive attitudes towards using it for professional reasons compared to the previous study results. Variables such as age, teaching experience, and computer skills play no more significant role than past data. However, instructors' primary ICT need is still training. After the COVID-19 period, they feel more secure with their technology use due to the forced online and henceforth, hybrid teaching practices and teacher training courses supported by their institution. The results of this study have pedagogical implications for teacher education, English teachers and language schools.

Keywords: teacher training in CALL; ICT and language teaching; teachers' attitudes towards CALL; longitudinal.

1. Introduction

Integrating Information and Communication Technologies (ICT) and Artificial Intelligence (AI) in language teaching has become crucial in modern education. The departure point of these technologies is early Computer-Assisted Language Learning (CALL) methodologies. The umbrella term CALL was initially divided into three phases. According to Warschauer (2000), behavioristic CALL's initial phase was founded on behaviorist theory, which was used in education in the 1960s and 1970s and included repetitive language drills. With the help of this drill and practice software, the learner is provided access to the computer, acting as a tutor and receiving instructional materials (Taylor, 1980). Within this paradigm, PLATO (Programmed Logic for Automatic

Teaching) was one of the most likely CALL tutoring systems; it consists of translation-related assessments, grammar rule explanations, and drills (Ahmad et al., 1985). Then, as personal computers became more popular, additional communication software became available, opening up new possibilities for individual users. The communicative CALL, which was the second phase and implemented in the 1980s-1990s, was affected by these changes and focused on communicative approach. Finally, this phase paved the way for the third one, which is called integrative CALL thanks to multimedia computers and the internet. Following the advent of the internet, nowadays, we can experience today's technology, such as ICT and AI in language teaching.

ICT in language education offers significant advantages regarding access to up-to-date resources and individualized instruction. However, the integration of ICT, at the same time, presents challenges such as digital risks, content-sensitive issues, ethical use, and adequate teacher training (Popov & Popova, 2020). Therefore, the success of technology interaction in terms of ICT and AI tools heavily depends on educators' attitudes and their skills to effectively use these tools because the modern classroom settings have been transformed, moving away from traditional methods to integrative and engaging environments supported by ICT (Alkamel & Chouthaiwale, 2018). With the introduction of AI more recently, language education tools and environments have further revolutionized. For example, in educational contexts, AI applications include intelligent tutoring systems, personalized learning platforms, automated grading systems, and language learning tools. Recent studies have strongly suggested that language learners have positive attitudes towards AI tools for language learning, which plays a significant role in maximizing second and foreign language acquisition (Chen et al., 2023; Wang et al., 2022) whereas educators' attitudes towards the use of ICT are still under-researched area although attitudes, ICT experience and ICT competence appear to play a determining role in the technology integration (Pozas & Letzel, 2023). In addition to these factors, educators' familiarity with AI tools is important since the continuous evolution of ICT and AI in language education underscores the importance of preparing educators to integrate these technologies into their teaching practices effectively and to navigate their teaching in the age of AI. With these aims in mind, the current study aims to report on a longitudinal study that examined the relationship between instructors' attitudes and their ICT use and specified their ICT needs for their language teaching.

2. Method

2.1. Context and participants

The purpose of this cross-sectional study is to assess the seven years frame whether there are any attitudinal changes towards the use of ICT in the teaching process after the lecturers experienced the COVID-19 pandemic. The pandemic means online teaching for the full 2020-2021 academic year and following that period, the higher education institution in the current study decided to follow an adaptation of a hybrid model of teaching that means three-day face-to-face and two-day online teaching per week. That is to say, during the last quadrennial period, the traditional academic year at universities has given its place to compulsory online teaching due to the pandemic. Since then, hybrid teaching models have become popular for university language teaching programs. The current study was conducted at a language center, which belongs to one of the state universities in Turkey, and adopts the longitudinal experimental design to follow instructors' ICT attitude change over time and additionally, for the second phase, the frequency of use and familiarity with AI tools have been analyzed. To this end, the following research questions were addressed:

1. Have lecturer attitudes towards ICT changed in seven years, including the pandemic and the transition to hybrid teaching programs? If so, how?
2. Do relationships exist among the variables such as age, teaching experience and computer skills?
3. What has played the most significant role in developing EFL instructors' technology skills over the seven years?

In terms of institutional choice, the researcher's workplace was chosen as a research setting, a School of Foreign Languages at a public university in Turkey. This higher education institution offers compulsory and optional extensive English classes for students before they start studying their majors. This English language education

lasts for two semesters, approximately nine months. All classrooms have computers with internet access, a sound system and projectors. The i-tool versions of course materials, including e-book versions and audio files, are available for teaching on all classroom computers. In total, 30 instructors teaching English as a foreign language (EFL) participated in the study. Of all participants, 25 were female, and 5 were male. 2 instructors are between 20–29 years old, and 2 other instructors are 30–39. The rest of the 26 participants are in the age category of 40–50 years old. This can be reflected in teaching experience: except 3 participants, all instructors ($n=27$) seem to have more than 11 years of teaching experience. In the earlier work with the same research setting, the initial group involved 63 participants (see Öztürk, 2017). Due to the pandemic deaths, early retirement factors, and institutional changes, the number of instructors working has shrunk in recent years. Thus, for the second data collection period, the number of participants is comparably lower over 7 years. In comparison to the first phase of the study, almost half of the participants out of 30 instructors are the same people in the second phase.

2.2. Data collection instruments

There is a five-point scale questionnaire administered in Öztürk (2017). The same questionnaire was replicated with the same number of items but with a slight modification of adding a new subsection related to familiarity with AI tools such as ChatGPT, Bing AI, OpenAI playground, Bard AI, DialoGPT, Google Translate, Grammarly, Duolingo, and DeepL. Participants were asked to consent and complete the parts related to the demographic values. They were expected to rate questionnaire items measuring the level of attitudes towards ICT, ICT use and needs on a five-point Likert scale with one open-ended question at the end of the survey, which asks about specifying the most important thing related to their development of technology skills during their last 7 years of teaching. The questionnaire was conducted in English, and the familiarity with AI tools section was newly employed in the present study to provide a more detailed analysis of current familiarity with AI tools. The study was administered from January to June 2024 using Google Forms.

2.3. Data analysis

The Shapiro-Wilk test was used to assess whether the variables follow a normal distribution. Variables were reported as mean±standard deviation values, and the results of normality tests showed that the data was normally distributed. According to the data normality, parametric tests such as an independent t-test were used for the group comparison of mean scores and for the variables such as age, teaching experience and computer skills, one-way ANOVA was used. Regarding qualitative data, answers were color-coded, and thematic analysis was performed.

3. Results

3.1. Quantitative data results

The collected data results are presented in this section, starting with the quantitative data results. To find out instructors' attitudes towards using ICT, the Cronbach Alpha for the attitude questionnaire was 0.92. For the comparison of mean scores of instructors between 2017 and 2024, an independent t-test was used, and the statistical findings are shown in Table 1. The results revealed significant differences in mean scores between 2017 and 2024 regarding seven attitude statements out of 38 attitude items in the questionnaire. A closer inspection of the table shows that the first attitude sentence, which highlights that ICT use is beneficial regarding reaching goals of academic programs, yielded significant results ($M=4.74$ in 2017 and $M=4.43$ in 2024; two-tails: $t(91) = -2.145$, $p = .035^a$). It was found that the attitudes regarding reaching the goals of academic programs were more positive in the past. The data revealed that instructors have mildly less positive attitudes regarding ICT use to get the aimed results in their teaching. The next attitude item with significant results is the seventh statement ($M=2.58$ in 2017 and $M=1.83$ in 2024; two-tails: $t(91) = -4.137$, $p < .001$) that 'I find it difficult to use ICT in the class'. Since this is a reverse-coded item, the results suggested that the participants felt more experienced with ICT after seven years and developed positive attitudes towards using it in class. Moreover, there are a few other reverse items with significant differences in mean scores between 2017 and 2024 in terms of finding ICT use in the class time-consuming ($M=2.14$ in 2017 and $M=1.70$ in 2024; two-tails: $t(91) = -2.244$, $p < .027$), finding ICT use not suitable

for the country ($M=2.15$ in 2017 and $M=1.53$ in 2024; two-tails: $t(91) = -3.365$, $p=.001$), no need to know about ICT application field ($M=2.09$ in 2017 and $M=1.60$ in 2024; two-tails: $t(91) = -2.649$, $p=.01$) and thinking that ICT limits teachers' creativity ($M=2.34$ in 2017 and $M=1.83$ in 2024; two-tails: $t(91) = -2.721$, $p=.008$). It can be observed that the overall attitude of the respondents regarding these questionnaire items appears more positive than that of the former research. Turning back to the results with the non-reversed attitude statements, the last significant questionnaire item is number 30, which stated that ICT is a source of confidence and courage for teachers ($M=3.52$ in 2017 and $M=4.13$ in 2024; two-tails: $t(91) = 2.254$, $p=.027$). Statistically analyzed data suggest a moderate increase in attitudes towards ICT centering around the instructors' creativity, courage and confidence, classroom use, the necessity of the knowledge in ICT applications and the suitability of ICT for the country.

Table 1. Descriptive statistics for the attitude questionnaire.

	Subjects	n	Mean	SD	df	t	p
1.I find ICT use useful regarding reaching goals of academic programs.	1**	30	4.433	0.971	91	-2.145	.035 ^a
	2***	63	4.746	0.439			
2. ICT use in the class causes extra work.*	1	30	2.367	1.159	91	-1.845	.068
	2	63	2.857	1.216			
3. I think that ICT use in the class increases teacher's success.	1	30	4.233	0.817	91	-0.405	.687
	2	63	4.302	0.733			
4. I believe that lessons with ICT draw students' attention.	1	30	4.233	1.073	91	-1.423	.158
	2	63	4.524	0.840			
5. I think ICT instruments are expensive.*	1	30	3.633	1.066	91	0.472	.638
	2	63	3.508	1.256			
6. ICT use in education is luxury for our country.*	1	30	2.067	1.172	91	-1.783	.078
	2	63	2.476	0.965			
7. I find it difficult to use ICT in the class.*	1	30	1.833	0.747	91	-4.137	< .001
	2	63	2.587	0.854			
8. I find it time consuming to use ICT instruments in the class.*	1	30	1.700	1.022	91	-2.244	.027
	2	63	2.143	0.820			
9. I believe that ICT support makes learning easier.	1	30	4.400	0.814	91	0.209	.835
	2	63	4.365	0.725			
10. I want to use audio-visual materials in my classes.	1	30	4.767	0.504	91	0.646	.520
	2	63	4.698	0.463			
11. I think ICT use in the lesson increases students' success.	1	30	4.567	0.679	91	0.788	.433
	2	63	4.429	0.837			

Table 1. Descriptive statistics for the attitude questionnaire.

	Subjects	n	Mean	SD	df	t	p
12. I think that thanks to ICT use, students will join the lesson in an active way.	1	30	4.233	1.006	91	1.513	.134
	2	63	3.825	1.302			
13. I think that ICT will contribute a lot to educational science.	1	30	4.467	0.900	91	1.446	.152
	2	63	4.159	0.987			
14. It is my dream that our students have computer assisted education.	1	30	4.333	0.844	91	1.104	.272
	2	63	4.111	0.935			
15. ICT is not suitable for our country.*	1	30	1.533	0.819	91	-3.365	.001
	2	63	2.159	0.846			
16. I believe that ICT increases the quality of education.	1	30	4.433	0.679	91	1.099	.275
	2	63	4.222	0.941			
17. I think that ICT becomes a rival for a teacher.*	1	30	1.800	1.095	91	-1.756	.082
	2	63	2.143	0.759			
18. I think that ICT use makes students passive.*	1	30	2.033	1.066	91	-1.378	.172
	2	63	2.317	0.858			
19. I believe that audio visual materials increase the long-term learning.	1	30	4.567	0.626	91	1.121	.265
	2	63	4.397	0.708			
20. I find it difficult to use ICT in crowded classes.*	1	30	2.567	1.305	91	-1.285	.202
	2	63	2.937	1.294			
21. I think that one of the biggest problems of our education system is the ineffective use of ICT.	1	30	3.433	1.040	91	-0.449	.654
	2	63	3.556	1.305			
22. I think all teachers should always be informed about ICT.	1	30	4.267	0.828	91	-0.359	.721
	2	63	4.333	0.842			
23. I do not need to know about ICT application field.*	1	30	1.600	0.894	91	-2.649	.010
	2	63	2.095	0.817			
24. I believe that it is not necessary to use ICT to reach the special learning goals.*	1	30	2.033	1.217	91	-1.152	.252
	2	63	2.302	0.961			
25. I like using ICT instruments in my classes.	1	30	4.433	0.679	91	0.955	.342
	2	63	4.254	0.915			

Table 1. Descriptive statistics for the attitude questionnaire.

	Subjects	n	Mean	SD	df	t	p
26. I believe that classes will be more productive with ICT opportunities.	1	30	4.367	0.964	91	0.339	.736
	2	63	4.302	0.816			
27. I believe that ICT is not necessary for all types of classes.*	1	30	2.933	1.337	91	1.041	.301
	2	63	2.651	1.166			
28. I have felt the lack of not using ICT since I started teaching.	1	30	2.667	1.241	91	-1.612	.111
	2	63	3.079	1.112			
29. It is my great pleasure to have class with ICT support.	1	30	4.233	0.898	91	0.293	.770
	2	63	4.175	0.908			
30. I think that ICT is a source of confidence and courage for teachers.	1	30	4.133	0.819	91	2.254	.027
	2	63	3.524	1.366			
31. I think that ICT limits teachers' creativity.*	1	30	1.833	0.791	91	-2.721	.008
	2	63	2.349	0.883			
32. I believe that ICT increases motivation in the class.	1	30	4.133	0.937	91	-1.389	.168
	2	63	4.397	0.814			
33. I believe that the use of ICT instruments requires some skills.*	1	30	4.100	0.712	91	0.823	.413
	2	63	3.952	0.851			
34. I believe that ICT applications are necessary for more effective education.	1	30	4.333	0.758	91	0.401	.690
	2	63	4.254	0.950			
35. I think that ICT use increases teacher's responsibility.*	1	30	3.767	0.898	91	1.211	.229
	2	63	3.444	1.317			
36. I think that one of the prerequisites of being a good teacher is the effective use of ICT.	1	30	4.000	0.910	91	1.316	.192
	2	63	3.683	1.162			
37. I think that ICT limits students' creativity.*	1	30	2.100	0.923	91	-1.402	.164
	2	63	2.413	1.042			
38. I believe that teacher must be dominant in the class while ICT is being used.*	1	30	2.567	0.935	91	-0.574	.567
	2	63	2.714	1.250			

*reverse items

** the dataset related to group of instructors in 2024

*** the dataset related to group of instructors in 2017

In terms of age groups 20-29, 30-39 and 40-50, a one-way between subjects ANOVA was conducted and no significant differences were found between age and attitudes [$F(2, 27) = 0.636, p = 0.537$]. Similarly, a one-way within subjects ANOVA was used to compare the effect of working experience with the categorization of working years such as 1-5, 6-10 and 11+ years of experience, there was no significant difference between the groups [$F(2, 27) = 0.580, p = 0.567$]. Finally, the participants in the study were also asked about their computer competency level and it was taken as a factor to see whether it had positive or negative effect on attitudes. The computer competency level of the participants was categorized into three main groups as followed: low, medium, high in the questionnaire. None of the participants stated the low computer competency level unlike the previous study held in 2017. Therefore, there were only two groups of answers regarding the computer competency: medium and high. Based on the answers revealing medium and high computer competency level, we can support the idea that instructors believe they are more advanced now with their computer after seven years. An independent-samples t-test was performed to compare attitudes of those who are in medium and those who are in the high computer competency group. The results indicated that there was no significant difference in the score of those who have medium ($M=3.77, SD=0.51$) and those who have high ($M=4.12, SD=0.33$); $t(28) = -1.775, p = .087$ computer skills. Interestingly, the variables such as age, working experience and computer competency level were observed to be significant outcome in the previous study in 2017 (Öztürk, 2017). As a result, the single most striking observation to emerge from the data comparison was the fact that maximizing the ICT use contributed in a great way to the positive attitudes of instructors and the variables appear to play no big role among EFL instructors over the years.

When the participants were asked about the frequency of their uses and their familiarity with AI tools, which is an additional section and only implemented in the second phase of the study, Figure 1 shows us the results in percentages. Google Translate (33%) and ChatGPT (37%) appear to be the most familiar AI tools for university lecturers and these two AI tools have the highest frequency of usage. When carefully checked, BardAI (70%), DeepL (70%) and DialoGPT (77%) seem to be the most unfamiliar AI tools for the participants with the lowest frequency of usage.

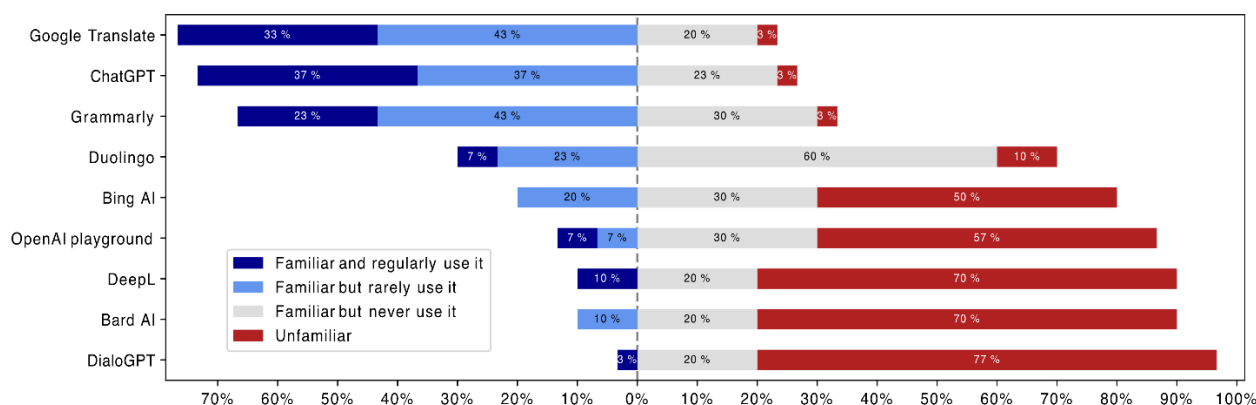


Figure 1. The percentages of the frequency of use and (un)familiarity with AI tools

3.2. Qualitative data results

The study aimed to identify the primary factors influencing the development of technology skills among educators over seven years. It was based on responses to an open-ended question that asked what has played the most significant role in developing their technology skills. A content analysis of the responses revealed seven key themes: pandemic/online teaching, personal interest, experience and practice, training and courses, technology and tools, necessity and accreditation and institutional requirements.

Fundamentally, most respondents (53.33%, $n=16$) indicated that the COVID-19 pandemic and the subsequent shift to online teaching platforms played a significant role in developing their technology skills. Comments highlighted

the need to adapt to various online platforms such as Microsoft Teams, Google Jam, Canvas, and Google Forms, along with creating digital teaching materials. Many respondents also attended training courses and workshops designed to facilitate effective online teaching.

Next, a significant proportion of respondents (16.67%, n=5) attributed the development of their technology skills to their interests. These individuals expressed a strong intrinsic motivation to enhance their technological competencies, further fueled by the challenges and opportunities presented by the pandemic.

Moreover, some respondents (6.67%, n=2) emphasized the importance of hands-on experience and continuous practice in developing their technology skills. This theme underscores the value of experiential learning and the iterative process of improving skills through regular use and application. Similarly, 6.67% (n=2) of respondents identified formal training and courses as crucial to their technological development. These included institutional training sessions and external seminars to enhance digital literacy and pedagogical effectiveness in an online environment. Thus, teacher training seems to be a crucial element and a particular need for the professional development of EFL instructors, which is in line with the previous study by Öztürk (2017).

Last but not least, specific technologies and tools contributed to the development of technology skills for 10% (n=3) of respondents. This theme includes using Learning Management Systems (LMS), AI-assisted platforms, and other hybrid teaching tools that facilitate a more dynamic and interactive learning experience. An additional 10% (n=3) of respondents cited necessity as a driving factor for developing technology skills. This theme highlights the adaptive response to external pressures, such as the need to ensure continuity of education during the pandemic and the broader digital transformation in education. Finally, one (3.33%) respondent mentioned accreditation processes and institutional requirements as motivating factors. This includes mandatory online teaching and seminars by the Continual Professional Development Unit (CPDU) at their schools as part of their professional obligations.

4. Discussion

The current investigation of attitudes towards ICT regarding the first research question has confirmed that over the seven years, EFL instructors have developed moderately positive attitudes towards ICT use in their teaching with particular emphasis on creativity, bravery, and confidence, classroom use, the importance of having an understanding of ICT applications, and the appropriateness of ICT for the nation in comparison to the former study results reported by Öztürk (2017). In fact, it is also possible that experienced teachers, especially after seven years, are even willing to combine traditional teaching strategies with ICT in their teaching. Considering the second research question in terms of the relationship between variables such as age, working experience and computer competency level, they have no significant role since it can be seen that nearly all EFL instructors have positive attitudes towards ICT use and are aware of its benefits. Part of these results coincides with those revealed by García-Martínez et al. (2020), according to whom work experience was not a predictor variable. To sum up the findings related to third question, this study reveals several key factors influencing the development of technology skills among educators. The most significant factor was the COVID-19 pandemic, which necessitated a rapid and extensive shift to online teaching platforms. Over half of the respondents highlighted the pandemic as a crucial catalyst for their technological skill development. This aligns with existing literature that underscores the transformative impact of the pandemic on educational practices globally (Bond, 2020; Daniel, 2020). The abrupt transition to online teaching required educators to quickly adapt to various digital tools and platforms, underscoring the critical role of external pressures in driving technological proficiency. However, their need for ICT training is still a central theme in supporting ICT use since participants identified formal training and courses as instrumental in developing technology skills, which aligns with other studies (Pozas & Letzel, 2023). Another research also supports this by indicating that targeted professional development programs can significantly enhance educators' technological competencies (Lawless & Pellegrino, 2007). Such training provides structured learning opportunities and resources, enabling educators to keep pace with rapidly evolving technological advancements. The respondents also noted experience and practice as key to their technological advancement. This reflects Kolb's (1984) experiential learning theory, which emphasizes learning through experience and iterative practice.

Engaging with technology regularly helps educators refine their skills and build confidence in using digital tools effectively. Based on the results, the study showed that familiarity with the recent AI tools is very low. Therefore, teacher training programs should offer special training focusing on the integration of AI tools into language teaching.

5. Conclusions

In conclusion, the findings of the recent study highlight the multifaceted nature of technological skill development among educators, driven by a combination of external pressures and personal initiative. We can confirm that the pandemic is an external pressure which caused personal initiative in terms of self-development of instructors' own ICT skills. Fundamentally, adopting longitudinal study design, we were able to identify the positive attitudinal change regarding specific themes such as creativity, bravery, and confidence, and that the variables such as age, teaching experience and computer skills seem to be no more predictor variables. Therefore, the further research might focus on the inclusion of new themes in terms of ICT attitudes as well as the other type of variables such as self-reported ICT skills rather than demographic variables. There is a clear need for ongoing support and training for educators, particularly in leveraging technology for effective teaching and learning, including the latest developments in AI tools. As a result, continuous professional development is essential in creating positive attitudes. By addressing these points, institutions can better prepare educators for the evolving demands of the digital age. The insights gained from this study have important implications for educational institutions and policymakers.

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