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Enhancing pre-service English as a foreign language teachers' self-efficacious belief in the use of Web 2.0 tools

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ABSTRACT

This study aims to discover the impact of a technology-based course on the self-efficacy and knowledge levels of pre-service English as a foreign language (EFL) teacher about integrating Web 2.0 tools into the foreign language teaching process. The study also intends to determine the self-efficacy and knowledge levels of the pre-service EFL teachers. A quasi-experimental study design without a control group was employed. The participants are 48 third-year undergraduate English language teaching (ELT) students enrolled in a required "teaching English to young learners (TEYL)" course. A pre-and post-test design was used and data were collected from participants through the technology integration self-efficacy scale and self-reported knowledge scale. Some important conclusions and suggestions for teacher trainers and curriculum designers have been drawn from these findings. It was seen that pre-service EFL teachers' self-efficacy and knowledge levels were average at the start of the study. After the training on integrating Web 2.0 tools into the language teaching and learning process, the experimental process had a significant effect on the participants' knowledge and self-efficacy levels. Some important conclusions and suggestions for teacher trainers and curriculum designers have been drawn from these findings.

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1. INTRODUCTION

In an online survey conducted among 1,277 students between 9 and 17, students claimed to use websites and social networking services for almost as long as they watch television [1]. The survey result [1] indicates the seriousness of the students' use of internet technology. Considering that the new generation was born into a world dominated by internet technologies, it would not be unreasonable to think that they will use these technological tools intensively in all kinds of activities and educational environments as part of their daily lives. Moreover, the fact that the millennial generation is more conscious and capable of using technology compared to the previous ones makes the technology-based lessons an obligation rather than a choice because this is the common characteristic of these generations. Besides, as technology fosters a realistic and engaging environment and exposes kids to the outside world when appropriately utilized, a beneficial impact on learners' linguistic ability can be observed [2].

Undoubtedly, these realities make it imperative that teachers who will teach this new generation of students be skilled in the use of technology and the integration of technological tools into educational environments and skillfully use these tools in the classroom. Even though internet technologies today have

become an integral part of our lives, it must be addressed that there are still challenges in integrating them into education. According to Shihab [3], since today's students tend to disengage from traditional classrooms and cannot actively participate in collaborative learning, incorporating interactive technology into teaching methods can make educational environments more attractive and engaging. Sheingold [4] emphasized that the integration of technology into schools and classrooms needs to be well understood and that this can be achieved by training people to integrate these technologies into classrooms rather than simply showing them how to use the tools.

Since today's pre-service teachers have grown up with technology, they can be considered digital natives [5] and they are expected to be proficient at using both basic and social communication technologies [6]. However, Lei [6] highlights that despite their technological proficiency, they are not ready to employ Web 2.0 technologies in educational settings for educative purposes. We can attribute the reason for this discrepancy to the teacher training programs since they are not sufficient enough to provide adequate training about integrating digital tools into the language learning process, which are significantly necessary for classroom and post-classroom use in the 21st-century [7]-[13]. According to Waddoups *et al.* [14], university instructors must provide them with opportunities to get technology-enhanced teaching practices to prepare future teachers to integrate technology into their classrooms. In line with this, as most teachers and prospective teachers lack the expertise or experience necessary to integrate technology into instruction effectively, courses should be explicitly designed to teach how to do so [15].

On the other hand, Niederhauser and Perkmen [16] believe that both internal and external factors can lead to the challenge of integrating technology. While the opportunities to access technology are considered external factors, a complex system of ideas, attitudes, and dispositions concerning teaching, learning, and technology is represented by internal factors. They also comprise social cognitive traits like self-efficacy, performance expectancy, and curiosity, and personality traits like self-assurance and adaptability [16].

So far, there have been dozens of studies (e.g., [7], [9], [17]-[24]) pointing out the importance of technology in language teaching, and the significance of integrating technology into this process. Nowadays, the fact that it is impossible to ignore the value of technology in language teaching is the common point that most of these studies emphasize. Related studies are compiled under three themes and presented in the following paragraphs.

Integrating technology into foreign language education: There is a growing consensus nowadays that technology is an essential component of civilizations and that children need to be exposed to it early [25]. According to studies, young people who grew up with digital media are more likely to exhibit learning methods that are noticeably different from those of earlier generations [26]. However, as Prensky [5] claims, today's students are different from those for whom our educational system was intended. In other words, the existing education system is not suitable for the new generation. To offer learners a more profound education and to create highly skilled human capital with 21st-century skills, technology integration in the teaching and learning process is now viewed as critical and needed [27]. According to Miller [19], technology plays a crucial role in supporting the academic success of English language learners by providing an environment for collaboration, making course content more understandable, and offering authentic materials. Technology also connects students with native speakers and peers worldwide [28], and helps them manage their language learning experience, contributing to their learner identity [24].

Integrating technology into language teacher education: pre-service teachers must be prepared for technology integration, as sudden situations may require lessons to be continued online. However, being a 'digital native' [5] does not necessarily guarantee advanced digital skills [29]. In a study with 165 early career teachers, only 20% of teachers have online classes each week, and 70% never use digital tools. Experienced teachers also require specialized training, according to 2018-2019 national findings [30], with 51% of 11,200 K-12 teachers with over 16 years of experience wanting professional development in technology integration.

Integrating technology into education is necessary due to developments in educational technologies. In line with this idea, Ekmekçi [9] recommends a standardized computer-assisted language learning (CALL) course content for English teacher candidates to increase their ability to use technology in teaching. Aşık *et al.* [7] conducted research in Turkey, Poland, and Portugal, taking a critical approach to how future teachers are trained for information and communication technologies (ICT) integration. They suggest that teacher education programs could be reformed by improving ICT abilities and methods for better future teacher training.

Finally, it might be concluded that as part of the teacher training process, pre-service teachers must be allowed to create authentic activities for technology use in their classrooms. It is crucial to get them engaged in relevant activities so that they can employ Web 2.0 for their professional growth. Therefore, having teachers study Web 2.0 might be an effective strategy to assist them in comprehending it [31].

Integrating Web 2.0 tools into foreign language education: A wide range of tools enable users to communicate and share information. Since 2004, the phrase "Web 2.0" has evolved to refer to a broad

phenomenon: a trend toward a new form of user participation made possible via the tools, settings, services, and resources available on the web [32]. Web 2.0 technologies have three main characteristics that enable information sharing: user-initiated publishing, social sharing options with privacy controls, and social networking options for community building [33]. The Web 2.0 paradigm, with its open, collaborative, and contribution-based features, paves the way for future advancements in education. It appears that technological design and modern educational theory, which have long emphasized student-centered and interactive techniques, have finally come to a mutual understanding [34].

Recent studies (e.g., [23], [32], [35]) suggest that students are already using Web 2.0 technologies and techniques in educational settings, even though educational institutions are not actively encouraging it. In addition, Web 2.0-based blended learning strategies have been found to engage students more than traditional teaching methods. Thus, it is possible to say that Web 2.0 tools collaborate, communicate, and exchange knowledge to learn the language and build language abilities more quickly and efficiently, in addition to supporting more flexible, interactive, and effective language learning methods.

Self-efficacy and knowledge: Bandura [36] claims that none of the mechanisms underlying "human agency is more fundamental or pervasive than people's beliefs in their self-efficacy" to affect the things that have an impact on their lives. According to him, people's deep roots, especially their beliefs, profoundly impact their decision-making and action processes. Abbitt [37] describes self-efficacy as "a perception about one's abilities within a given domain". He further explains that although lower self-efficacy beliefs are an obstacle to pursuing a specific action, higher self-efficacy perceptions are strong motivators for it. In the study of Abbitt [37], in which "the goal was to explore the relationship between pre-service teachers' perceived knowledge and self-efficacy beliefs about their ability to use technology in the classroom successfully", the results imply that one can observe a constant evolving connection among knowledge of the technological domains and self-efficacy beliefs towards its integration over a single semester of teacher education.

According to Hao and Lee [10], the first step to creating learning settings equipped with technology should be to ease the worries of teacher candidates about integrating those tools into education. They examined the relationship between teacher self-efficacy, teacher knowledge, and individual differences to get a comprehensive insight into pre-service teachers' concerns about integrating Web 2.0 resources to improve the quality of learning and teaching. Furthermore, they concluded that incorporating Web 2.0 into teacher training programs would bring pre-service teachers experience that would help them become more competent and increase their sense of self-efficacy as teachers.

Ertmer and Ottenbreit-Leftwich [38] recommend using technology as a teaching aid to increase the self-efficacy of pre-service and in-service teachers. They suggest utilizing fieldwork and undergraduate classes as potential opportunities for this purpose. In addition, they advise teachers to reflect on effective teaching and expand their knowledge in this area. Self-efficacy is crucial for successfully integrating Web 2.0 tools into foreign language teaching. As emphasized by Bernacki and Walkington [39], personalized instruction hinges on the creation of tasks that are relevant and meaningful to students. By leveraging Web 2.0 tools, educators empower students to engage with real-world problems and access information in novel ways, thereby enhancing the authenticity and applicability of instructional tasks. However, the effective implementation of such tools necessitates a robust sense of self-efficacy among teachers and student teachers.

While the existing literature reveals the vital importance of technology integration in foreign language education, especially experimental studies on examining the direct impact of a specific training process on the integration of Web 2.0 tools on English as a foreign language (EFL) pre-service teachers' self-efficacy and knowledge on the integration of Web 2.0 tools are limited. Thus, this paper mainly focused on self-efficacy and knowledge, two internal factors in the technology integration challenge. Additionally, the present study is a quasi-experimental before-and-after study on pre-service EFL learners. Within the framework of these considerations, the following research questions were generated:

i) What are pre-service EFL learners' self-efficacy and knowledge levels on using Web 2.0 tools in the language learning and teaching process?
ii) Does a technology-based course at the undergraduate level affect pre-service EFL learners' self-efficacy and knowledge level on integrating Web 2.0 tools in the language learning and teaching process?

2. METHOD

2.1. Research design

This study used a before-and-after quasi-experimental study that is among quantitative research methods to focus on the relationship between learners' self-efficacy and knowledge and integration of Web 2.0 tools into the teaching and learning process. Among the several research methods available, this study type has been regarded as the most effective for delving into and establishing cause-and-effect

relationships between variables [40]. Therefore, the research was conducted as a quasi-experimental study to prove a cause-and-effect relationship, if there is one. Research aiming to evaluate interventions without using randomization is called quasi-experiments. Quasi-experiments seek to establish the causal relationship between an intervention and a result, much like randomized trials. Quasi-experimental studies can include pre- and post-intervention assessments in addition to control groups that are not randomly selected [41].

However, the control group, one of the primary aspects of the experimental studies, was not included in this study. In the planning phase of the study, it was arranged that one of the two groups enrolled in the teaching English to young learners (TEYL) course would be the control group and the other would be the experimental group. However, when a significant number of students in both groups showed a willingness to voluntarily take part in the group in which technology integration would be employed in the micro-teaching sessions, the researchers decided to conduct a pretest-posttest quasi-experimental study without a control group and all volunteer students were included in the study. In addition, to avoid any research bias, students were informed that participating in technology integration or using it in microteaching sessions would never be taken into consideration in the assessment and evaluation processes of the course.

2.2. Setting and procedure

Teacher education programs have made efforts in recent years to expand opportunities for teaching experiences by exposing pre-service teachers to a variety of teaching techniques [42]. In teacher training programs of English language teaching (ELT) departments, courses such as "teaching English to young learners" are offered to prepare pre-service teachers to be successful and introspective in their teaching roles with young learners. In the two semesters of the third year of the program, teacher candidates have to complete this compulsory three-hour weekly course. The study was conducted at a public university in Turkey during the spring semester of the 2021-2022 academic year. The research process took part in the course called TEYL in the ELT program. The micro-teaching presentations by the students are one of the course requirements. A separate course on the use of technology in education is offered as an elective course in this department. Besides, the technology utilization in other classes could be improved, if any, which means no role models are introduced to students in this circumstance.

Before the training sessions, which started around the middle of the spring semester, the objectives and steps of the process were explained to the participants as shown in Figure 1. First, the data collection tools were transferred to the online survey platform Google Forms and the relevant link was sent to the students at the beginning and end of the training session. The process lasted six weeks, consisting of three weeks of training and three weeks of workshop sessions in total.

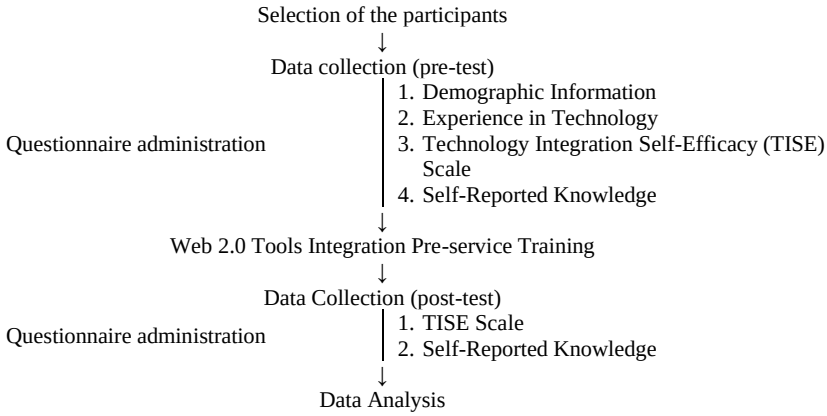

Figure 1. The procedure of the present study

In the selection of the Web 2.0 tools listed in Table 1, the fact that they are regarded as the most common in the integration into the English teaching and learning process was the fundamental reason. A 3-week training session, which teaches students how to use specifically selected tools gathered in 3 categories under the skills, learning management systems (LMS), and assessment sections are provided to the participants enrolled in a required TEYL course. Following each week of training, students were invited to present 10 minutes of their micro-teachings in groups of 3 or 4, which consisted of the Web 2.0 tools integrated into foreign language education in the TEYL course. In the meantime, they specifically focused on teaching language skills to young learners. This process was carried out under the supervision of the course professor.

Table 1. Detailed schedule of the experimental process

Date	WEB 2.0 tools		Category
Week 1	1. CommonLit	5. Animoto	Skills
	2. Pixton	6. Quizlet	
	3. Prezi	7. Khan Academy	
	4. Padlet		
Week 2	Students' Micro-Teachings which include tools belong to the "skills" category		
Week 3	1. Duolingo	4. Edpuzzle	LMS
	2. BrainPOP	5. Edmodo	
	3. Google Classroom	6. ClassDojo	
Week 4	Students' Micro-Teachings which include tools belong to the "LMS" category		
Week 5	1. Socrative		Assessment
	2. Quizizz		
	3. Kahoot		
Week 6	Students' Micro-Teachings, which include tools, belong to the "assessment" category		

2.3. Participants

The online survey was completed by 48 undergraduate pre-service teachers in the third grade. Inıtially, there were 60 participants in the study. However, 48 of them were obtained after excluding those who did not respond to the questionnaires and those who participated inconsistently in the pre-and post-tests. The participants' ages vary from 20-38 years, but 90% cover the 20–23-year age group. There were 29 female students (60.4%) and 19 male students (39.6%). This indicates that the study has a predominantly female demographic, with approximately two-thirds of the population being female.

2.4. Data collection instruments

48 participants completed a three-part questionnaire before the training session. The first part [43] had 9 questions about their demographics and technological experience. The second part contained the technology integration self-efficacy scale [44] with 21 statements on integrating technology into classroom instruction, each stating how much the respondent agrees or disagrees with the five sub-scales. Wang *et al*. [44] evaluated the survey's Cronbach's alpha coefficients to determine the scales' reliability and reported that the pre-survey alpha coefficient was 0.94 and the post-survey alpha coefficient was 0.96. As shown in Table 2, Cronbach's alpha value found in this study was $\alpha = 0.98$ for technology integration self-efficacy (TISE), yielding the same result in both the pre-test and post-test.

Table 2. Cronbach's alpha of TISE and self-reported knowledge

		Cronbach's Alpha	Cronbach's Alpha Based on standardized items	N of Items
TISE	Pre-test	0.98	0.98	21
	Post-test	0.98	0.98	21
Self-reported knowledge	Pre-test	0.75	0.75	16
	Post-test	0.75	0.75	16

The final part of the questionnaire includes a self-reported knowledge scale [45] about Web 2.0 tools. Its goal is "to determine the extent to which participants are familiar with such digital tools" using a four-point scale. Altıner [45] developed the scale and found Cronbach's alpha reliability value in her study as $\alpha = 0.79$. In the present study, as shown in Table 2, Cronbach's alpha coefficients have been found $\alpha = 0.75$ both in the pre-and post-test. All of these procedures were followed after the training session to observe the potential modification of the process.

2.5. Data analysis

The data collected for the research were analyzed using a statistical package for the social sciences (SPSS) version 26. The Shapiro-Wilk normality test was employed initially after the answers were ready for analysis. Considering the number of participants in the study ($n<50$), the normality test was performed with the Shapiro-Wilk since it is reported in the literature to provide stronger results [46]. The data from the self-reported knowledge scale displayed a normal distribution; however, the data from the TISE scale did not. Consequently, parametric and non-parametric tests were conducted in addition to descriptive analysis. For self-efficacy, the Wilcoxon signed rank test was employed; for knowledge, the paired sample T-test was utilized to assess how self-efficacy and knowledge values varied between the pre-and post-test.

3. RESULTS AND DISCUSSION

3.1. Pre-service EFL learners' self-efficacy and knowledge levels on using Web 2.0 tools in the language learning and teaching process

This section describes self-efficacy TISE and knowledge levels of pre-service EFL teachers on the technology integration into language learning and teaching. To get a clear picture of the case, the descriptive findings presented in Table 3 are drawn based on the responses to the demographic information form. Furthermore, the mean values of the data collected from the TISE and self-reported knowledge scales were calculated, as can be seen in Table 4.

Table 3. Descriptive findings

	Options	N	Mean
How long participants have used computers and internet technologies	1-5 years	4	8.33
	6-10 years	19	39.58
	More than 11 years	25	52.08
The length of computer/smartphone used daily	Less than an hour	1	8.33
	2-4 hours	21	39.58
	More than 5 hours	26	52.08
The self-reported proficiency of the students as an internet user	Basic	8	16.67
	Intermediate	27	56.25
	Advanced	13	27.08
Involvement in formal training or workshops by participants	Yes	18	37.50
	No	30	62.50
Attending a course in instructional technology	Yes	28	58.33
	No	20	41.67

Table 3 illustrates that 39.58% of participants reported using computer and internet technologies for 6-10 years, whereas slightly over half of all participants reported using them for more than 11 years. Remarkably, 8.3% of participants reported using computer and internet technologies for less than five years. As for daily use, just over half of the participants spend more than 5 hours using their computers or smartphones daily. 43% of participants indicate that they spend two to four hours per day on the computer/smartphone; the most striking aspect of the responses is the fact that only one participant reported that s/he spends less than one hour per day on these devices. Regarding the participants' internet-using competency, 13 students (27.1%) assessed themselves as fully competent, 27 (56.3%) as moderately competent, and the other 8 (16.7%) as low competent. Out of 48 people, only 18 (37.5%) received formal computer and internet technology training or attended a related workshop or conference. In general, 28 students (58.3%) out of 48 have taken an educational technologies course. As shown in Table 3, nearly 60% of the participants have taken an educational technology course. The remaining 40% have not taken a course in this field.

Table 4. Means of self-efficacy and self-reported knowledge of participants

	N	Mean	SD
Self-efficacy	48	3.26	0.92
Knowledge	48	2.15	0.39

As shown in Table 4, the mean score for pre-service teachers' self-efficacy was 3.26, and for knowledge, it was 2.15. Yurdakul [47] categorized the values of self-efficacy by dividing them into three ranges. According to this categorization, 1-2.33 is classified as a low range, 2.34-3.67 is average, and 3.68-5.00 is considered a high range. When the values obtained from this study are evaluated according to this categorization, both mean scores are defined as the "average" level of TISE. Since the self-report knowledge scale has a 4-point Likert scale design, a score of 2.15, which indicates the knowledge level of the prospective teachers, represents the average score (Table 4).

Although slightly more than half of the participants have been using technology for more than 11 years and nearly two-thirds of them rate themselves as intermediate competent as internet users, the results from TISE and self-reported knowledge scales show that despite being digital natives [5], they have an average level of efficacy and knowledge regarding the integration of technology into English language education. To put this dilemma in another way, these results reflect those of König *et al.* [29], who also found that the fact that the participants were born in the age of technology and spent a long time with technology did not guarantee that they would be successful in integrating technology into the educational context with the experience they gained in this process. As suggested by Usoro and Echeng [48] the learning environment,

teaching methods, and procedures must be altered for Web 2.0 tools to be utilized in the classroom. In other words, for pre-service and in-service teachers to use the Web 2.0 tools in the classroom efficiently, they may require direct support and guidance.

These findings are also in agreement with Aşık *et al.* [7] findings, which showed that the participants still have potential in this regard. However, technology integration is not yet at the desired level. Additionally, though initially, expectations from pre-service teachers who are supposed to be digital natives [5] are very different, this point cannot be ignored. This potential may arise from the fact that nearly 60% of the students had taken an elective course in instructional technology. To ensure that the knowledge and self-efficacy in using Web 2.0 tools will be at the desired level, the current course should focus on integrating technology into English language education and be made compulsory as suggested in the previous literature [7], [13].

The results may highlight how important self-efficacy is for teachers and student instructors to successfully incorporate Web 2.0 tools into foreign language instruction. Namely, external factors such as the pandemic may prompt initial engagement with digital technologies; the sustained and meaningful incorporation of these tools is intricately tied to educators' confidence in their ability to effectively utilize them. Teachers who possess a higher level of self-efficacy are more likely to persist in the integration process, as suggested by Bandura's [49] social cognitive theory. This aligns with the observations of Moorhouse [50], where teachers continued to use digital technologies even after the resumption of in-person teaching. The connection between self-efficacy and sustained technology integration is further substantiated by the study of Daşkın [51], which indicates that individuals with 6-10 years of experience, presumably having accumulated a certain level of self-efficacy in this process, exhibited the highest awareness of Web 2.0 tools.

3.2. The effects of a technology-based course on pre-service EFL learners' self-efficacy and knowledge levels on integrating Web 2.0 tools into the language learning and teaching process

To compare the values obtained in the pre-test and post-test, the Wilcoxon signed-rank test was applied for self-efficacy, and the paired sample T-test was applied for knowledge. It can be seen from the data in Table 5 that there were 48 participants whose TISE scores increased after the training compared to their scores before training, and there was not a single participant in the research group whose TISE scores declined or remained unchanged. 48 participants whose TISE scores increased following the training had a mean rank value of increasing (difference) 24.50. The mean TISE scores of the research group's participants before and after the training showed a statistically significant difference. Table 6 displays the pre-service teachers' knowledge level about Web 2.0 tools before the training session, while the mean score of knowledge was 2.15; after the training session, this value was 2.20.

Table 5. Wilcoxon signed the rank test for self-efficacy

TISE	N	Mean rank	Sum of ranks	Z	p
Negative Ranks	0	0.00	0.00	-6.205	0.00*
Positive Ranks	48	24.50	1176.00		
Ties	0				
Total	48				

*p<0.01

Table 6. Paired sample statistics of self-reported knowledge

	Mean	N	Std. Deviation	Std. Error means	t	df	Sig. (2-tailed)
Pre-test	2.15	48	0.39	0.05	-9.97	47	0.00*
Post-test	2.20	48	0.39	0.05			

*p<0.01

In addition, Table 6 illustrates that the values for knowledge were statistically significant (p<0.01). To determine the magnitude, the training process's effect size on TISE and knowledge was calculated. The effect size calculation was conducted manually since t-tests do not yield an effect size. Using the following formulas, the r effect size and eta squared value were determined:

For paired sample T-test: Eta squared $(\eta^2) = \frac{t^2}{t^2+(n-1)}$ r effect size $(r) = \sqrt{\frac{t^2}{t^2+dF}}$

For Wilcoxon signed rank test: r effect size $(r) = \frac{Z}{\sqrt{n}}$

For self-efficacy, the effect size was $r = 0.89$; for knowledge, the eta squared value was $(\eta^2) = 0.67$, and the r effect size was $r = 0.82$. The r value is between 0 (no effect) and 1 (perfect effect). In terms of how

the effect size of the r value should be interpreted, Cohen [52] has created a classification: 0.10-0.29 is considered to be the weak effect, 0.30-0.49 is considered to be the moderate effect and 0.50-1.0 is considered to be the large effect. According to the classification of Cohen [52], the difference in self-efficacy detected between the pre-test and post-test has a near-perfect effect ($r = 0.89$) and shows that 79% (r^2) of the total variance is explained by intervention, which is the training. The difference in knowledge has an average value between large and perfect effect size, and 67% of the total variance is explained by the intervention. The experimental process had an impact on the participants, which can be defined as a large effect [52].

Similarly, Lee and Lee [53] examined the pre and post-self-efficacy of pre-service teachers in an autonomous technology integration course in Korea using the same data collection tool and also demonstrated that the training had a substantial effect on the participants. However, the Korean trial had a full technology integration-focused intervention and more participants. Furthermore, corresponding to the preparation of micro-teachings in this study, lesson planning was a requirement of the course in the Korean study. This consistency between the two studies dramatically contributes to the literature, especially the view of Wang *et al.* [44], and demonstrates the significance of setting clear goals within this process, and to increase the efficacy of technology integration, pre-service teachers should be given goals. This can be done simply by explicitly tying class objectives to learning objectives [44], [53].

Furthermore, this study produced results comparable to Ekmekçi's [9] research, which had a similar purpose and looked at the effects of training a CALL-based curriculum on participants. Consistent with the previous study, the educational process in this present study improved participants' capacities to integrate technology with their pedagogical knowledge and skills. Similarly, in the context of a service-learning project, a requirement of the educational technology course in Maryland, Song [54] investigated pre-service teachers working in the elementary school setting to consolidate their technological knowledge. She discovered that these teachers' self-efficacy, views, and understandings about integrating technology grew. The only thing that both the studies of Song [54] and Ekmekçi [9] have in common and that differs in the present study is that this study's training process was merely a 6-week process and took place as incorporated into a field course TEYL in the curriculum rather than an entire technology integration-oriented course. However, it should not be misunderstood that this was done to integrate technology into TEYL rather than ELT in general. The point that should be taken into consideration is that the outcome was astounding even though this study was a part of the TEYL course, a component of the ELT curriculum. With these findings in mind, an explicit course on "technology integration in English language instruction" is anticipated to have more significant and meaningful effects. The study supports the fact that technology integration should start in undergraduate education and pre-service teachers should be supported and equipped with the necessary skills, as with the majority of studies in this field [22], [26], [29], so that pre-service teachers can take a significant step in that direction when they begin their professions.

4. CONCLUSION

As mentioned above, this study explores the relationship between self-efficacy, knowledge, and technology integration in language teaching among pre-service EFL teachers. It used a quasi-experimental before-and-after-test methodology and focused on the impact of a technology-based course at the undergraduate level, specifically targeting the integration of Web 2.0 tools. To start with, pre-service EFL teachers' self-efficacy and knowledge levels were average at the start of the study. However, following a 6-week training program on the integration of Web 2.0 tools, a noticeable increase was observed in both self-efficacy and knowledge levels. While the values remained within the average range, the improvement suggests that the training intervention had a positive influence on the participants. Recognizing and fostering pre-service teachers' knowledge level and self-efficacy in their capacity to effectively utilize these tools is important for ensuring the enduring and meaningful integration of technology in foreign language education is one of the most striking conclusions of the study. Next, calculating the effect size provided additional depth to the analysis, demonstrating a statistically significant impact of the training on the participants. Despite the relatively short duration of the intervention 6-weeks of training-, the observed effect size indicates that the training program made a remarkable difference in enhancing the self-efficacy and knowledge level of the pre-service EFL teachers. This result underscores the efficacy of targeted technology-based courses in influencing teachers' knowledge and self-efficacy. Lastly, it should be highlighted that this current study has once again revealed that technology integration is not at the desired level in foreign language education, and there are still shortcomings at the undergraduate level.

The following recommendations could be yielded, which teacher trainers, policymakers, and curriculum designers must take into consideration in light of the study's findings, particularly its findings regarding the knowledge and self-efficacy of pre-service teachers. First of all, the study's outcomes hold important implications for the design and implementation of teacher education programs, particularly those aimed at preparing EFL educators. Nevertheless, again, the necessity of a separate autonomous course at the

undergraduate level for integrating technology into foreign language teaching became evident. The wisest decision in institutions where this course already exists is to make it compulsory rather than an elective course with the evidence that the integration of technology-focused courses can catalyze fostering self-efficacy and augmenting knowledge levels, thereby equipping future teachers with the necessary skills to manage the language teaching and learning process in technology age.

Additionally, pre-service teachers should be given a chance to practice with technology in FLE and gain experience. This involves encouraging and supporting the pre-service teachers to use technology during the teacher training process as well as the faculty members who can provide such training in the departments. The heightened self-efficacy and knowledge levels resulting from the technology-based course are anticipated to translate into more confident and informed teaching practices. EFL teachers, equipped with a deeper understanding of technology integration, are likely to employ innovative pedagogical approaches that engage and motivate language learners. This, in turn, may contribute to improved language proficiency and overall educational outcomes.

Finally, one or more of the following three primary limitations seemed to affect the quality of this study on technology integration: i) short-term in duration, ii) limited participants, and iii) lack of a control group. First, regarding the short-term duration, this study was conducted in the spring semester of 2021-2022, and the experimental process took only 6 weeks. Since this study was believed to be a part of the TEYL course, it has been applied to both sections of this course; hence, a control group has yet to be established. Moreover, it was limited to 48 participants. Thus, the impact of a technology-based course on two distinct groups with comparable demographics still needs to be investigated. By these limitations, more extensive experimental and quasi-experimental studies can be conducted with more participants for future research.

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