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Online Language Learning Self-Efficacy and Anxiety: Do Types of Instruction Make a Difference?

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Abstract

Advances in technology and the occasional mishaps (like the outbreak of Covid-19) have necessitated a shift from the conventional face-to-face model of instruction to online instruction. Different online platforms have been developed for this purpose and several teaching methods have been adapted for online instruction. However, this shift has created both opportunities and challenges. On the one hand, it may have facilitated the teaching and learning process in several ways. On the other hand, it may also have negatively affected the learners' psychological traits like anxiety and self-efficacy. This study, following an experimental research design, aimed at comparing the potential effects of three online methods of language teaching including 'technology-mediated task-based language teaching (TMTBLT)', 'problem-based instruction online (PBIO)', and 'online flipped learning (OFL)' on EFL learners' online language learning self-efficacy and online foreign language anxiety (FLA). To this end, 120 male and female intermediate adult English students were selected through convenience sampling, screened based on their scores on Oxford Quick Placement Test (OQPT), a proficiency test, and randomly assigned to three experimental groups and one control group, each with 30 students. Each of the experimental groups was instructed for 15 sessions with one of the mentioned online methods, while the control group received conventional instruction. The telecollaborative foreign language anxiety scale (T-FLAS) and the online learning self-efficacy (OLSE) questionnaires were administered before and after the treatment to measure the levels of anxiety and self-efficacy, respectively. The collected data were analyzed using one-way ANCOVA. The results showed that all the three types of instruction were more effective than conventional instruction in improving the participants' self-efficacy and reducing their anxiety. In addition, PBIO was significantly more effective than the other two types of instruction in increasing self-efficacy, whereas TMTBLT was more effective than OFL in reducing anxiety. These findings can encourage L2 teachers and materials developers to go beyond the limits of conventional instruction and more willingly incorporate the mentioned types of instruction into their teaching and materials development practices.

Keywords: L2 anxiety, L2 instruction, L2 self-efficacy, online instruction

Introduction

In an era where digital technology continually transforms how we acquire knowledge, the traditional face-to-face classroom setting is no longer the sole gateway to language learning, as individuals all around the world now turn to online platforms. This shift creates several opportunities and challenges, reshaping the way both teachers and students understand and engage with language education. The 21st century teachers should be familiarized with the special demands of the online environment and be capable of conducting a class in this context. However, online instruction has got its own strengths and drawbacks. While some studies have reported that with the right type of support, online instruction can help learners increase their self-efficacy (Triana-Vera & López-Vargas, 2025) and reduce their FLA (Saffari et al., 2024), others have shown that the inability to establish face-to-face interaction, the burden of virtual communication, potential environmental distractions, and the absence of immediate, in-person feedback are only some of the limitations of online language teaching (Fondo & Jacobetty, 2020). The specific nature of the online context can lead to negative effects on students' psychological factors like foreign language learning anxiety (FLA) and language learning self-efficacy (Tuncer & Dogan, 2016). These factors are of paramount importance, as the former can easily hinder language learning (Fondo & Jacobetty, 2020) and the latter can facilitate it (Wong, 2005).

Self-efficacy is defined one's belief in their capabilities to organize things and take the courses of action that are required to successfully accomplish goals (Triana-Vera et al., 2025). Several researchers have reported that self-efficacy can influence learners' decision-making in the face of problems (Saez-Zevallos, et al., 2025), decrease anxiety level (Wang, 2024), and generally predict one's success or failure by affecting the amount of effort and persistence he/she puts into accomplishing a task (Bayat, et al. 2025; Zeldin & Pajares, 2000).

Meanwhile, FLA is a combination of certain feelings, behaviors, and beliefs that come from a specific learning context (Sun et al., 2025). FLA is a prevalent problem since one out of three foreign language learners experiences it (Kalani et al., 2025).

These learner factors are important areas of language learning that can affect learners' performance, willingness to communicate, motivation, language achievement, and higher academic performance (Zhiping & Paramasivam, 2013). This significance doubles in the online context, as it is more learner-centered (Sun, 2021). Nonetheless, some studies on online language learning have reported learners' fear of making mistakes and low self-confidence (Sayuti, et al., 2020; Syafiq, et al., 2021), which originate from low self-efficacy; other studies have reported learners' high anxiety in online language learning. For instance, Fondo and Jacobetty (2020) stated that FLA can be exacerbated in a virtual environment due to the added burden of online communication in a new context and technophobia. According to Fondo and Jacobetty (2020) and Kim (2009), FLA has a context-dependent and technology-dependent nature, which leads to experiencing more anxiety in online language classes. On the other hand, there are studies that suggest online instruction has the potential to alleviate FLA (Saffari et al., 2024) and boost learners' self-efficacy (Williams, 2022).

This means that although the advent of online instruction may have had many potentials in facilitating language learning and instruction, it has not been very influential in providing a comfortable environment in which learners feel high levels of self-efficacy and low levels of FLA. It may even have actually exacerbated the situation because previous research has yielded very mixed results. Therefore, a prevalent problem of the current online instruction is that it is characterized with high levels of FLA and low levels of self-efficacy. A major concern of educators and researchers, thus, has been how to boost language learners' online language learning self-efficacy and reduce their online FLA.

A variety of online teaching methods (types of instruction) have been developed over the past years to tackle problems including that of the present study. For manageability reasons, this study was carried out to compare the effects of three online instructional methods, namely TMTBLT, PBIO and OFL on learners' language learning self-efficacy and FLA. To this end, it addressed the following questions:

1. Are TMTBLT, PBIO, OFL, and conventional instruction differentially effective on learners' online self-efficacy?
2. Are TMTBLT, PBIO, OFL, and conventional instruction differentially effective on learners' online foreign language learning anxiety?

Review of Literature

Self-efficacy

One's belief about their own ability can affect many things, such as the actions one takes, the amount of effort one puts into learning, perseverance, amount of stress and success (Nur & Butarbutar, 2022). All of these elements can determine whether they can achieve a long-term goal (Panjie & Velarde, 2025).

Self-efficacy has been shown to both influence and be influenced by the learning conditions. For instance, previous research suggests that self-efficacy can affect learners' online learning performance (Rahmania, 2020), speaking ability (Quang et al., 2022), reading and listening ability (Mills et al., 2006), the choice of language learning strategies (Panjie & Velarde, 2025), using technology-based out-of-class language learning activities (Honarзад & Rassaei, 2019), and classroom engagement (Bayat et al, 2025). At the same time, several studies have shown that self-efficacy can be affected by experiencing authentic language (Lian et al., 2025), personality characteristics (Sultan & Kanwal, 2017), collaborative task-based instruction (Nur & Butarbutar, 2022), language learning strategies (Saez-Zevallos et al., 2025), learning satisfaction (Shen et al., 2013), and the type of feedback

(Zarei & Rezadoust, 2020) to mention just a few. Several other studies have specifically examined the effect of online methods of instruction such as computer-based learning environments (Triana-Vera & López-Vargas, 2025), CALL-mediated TBLT (Tavakoli et al., 2019), online problem-based learning (Moslemi Nezhad Arani et al., 2024), and online flipped learning (Fallah et al., 2020) on self-efficacy. However, each of the above-mentioned studies has examined the role of only one of the online methods of instruction of interest in the present study and has usually compared it with conventional face-to-face instruction, often reporting the superiority on the online instructional method in improving learners' self-efficacy in different language skills. The present study not only compared three of the most widely used methods of online instruction with conventional instruction, but also compared the three online instructional methods with each other to fill part of the existing gap in research in this area.

Foreign Language Anxiety (FLA)

FLA is a situational anxiety stemming from learners' worry about being unable to communicate due to linguistic limitations, which prevents learners from communicating and learning (Spielmann & Radnofsky, 2001).

FLA, in online mode, can stem from many sources, including the challenge of establishing an authentic social interaction in the new language (Fondo & Jacobetty, 2020), cultural differences (Moor, 2007), and technology-mediated communication during online interaction (Di Gennaro & Di Villarroel, 2019). Moreover, when learning through online technology, students can be affected far more seriously by negative emotions such as anxiety; their computer skills, learning process, productivity, social communication, and total well-being can all be affected by anxiety (Sultan & Kanwal, 2017).

Like self-efficacy, FLA can be both the cause and the effect of several other factors. Studies have shown that FLA can influence reading proficiency (Mills et al., 2006), speaking performance (Effiong, 2015), listening performance (Hwang et al., 2017) and foreign language enjoyment (Dewaele et al. 2017). Previous research has also shown that FLA can be influenced by factors such as personal attributes including self-efficacy (Sultan & Kanwal, 2017; Wang, 2024), type of tasks used in the class (Ramamurthy, 2019), type of assessment (Zarei & Shishegarha, 2024), feedback (Zarei & Rezadoust, 2020) and classroom context (Kim, 2009), which could include the type of instructional method. There are also studies directly showing the effectiveness of online instructional methods like online flipped instruction (Mohammaddokht & Fathi, 2022; Parvaneh et al. 2022; Qiu & Luo, 2022), problem-based learning (Moslemi Nezhad Arani et al. 2024, Zuraimee et al. 2022) and technology-mediated task based language teaching (Saffari et al., 2024; Triana-Vera & López-Vargas, 2025). However, the point is that each of the mentioned studies has considered one instructional method in the online environment and compared its effects with that of (usually) a face-to-face method. To the best of the present researchers' knowledge, the three online methods of instruction mentioned above have not been compared in any previous study, especially in terms of their effectiveness on FLA and self-efficacy.

Technology-Mediated Task Based Language Teaching (TMTBLT)

Emerging from the integration of TBLT and CALL, TMTBLT is a dynamic and evolving pedagogical approach that places emphasis on using the potentials of modern technology in language teaching. In this regard, Kern (2006, p. 162) stated that "technology provides sites for interpersonal communication, multimedia publication, distance learning, community participation, and identity formation". All of these can be realized through Web 2.0 technology, where learners can communicate using technological tools that give them the chance to send and receive information and feel like a part of a community (Gonzalez-lloret 2017). As learners get the opportunity to do something with language, the medium of technology conforms to the principles of experiential learning, which is the theoretical underpinning of task-based language teaching. Nevertheless, using technology as a medium for actualizing TBLT cannot happen haphazardly. Chapelle (2001) proposed a framework based on which educators can design tasks for CALL classes. According to this framework, the tasks that are used in the CALL atmosphere must be authentic, meaning-oriented, and tuned to the level and goal of language learners. Therefore, a task is suitable for the CALL context as long as it develops technological skills in learners in addition to having the essential characteristics of a well-prepared communicative task.

According to Gonzalez-lloret (2017), if properly integrated with technology, tasks can "help minimize students' fear of failure, embarrassment, or losing face" (p. 237). Consequently, it seems that TMTBLT can not only affect language acquisition, but also improve learners' psychological factors such as self-efficacy and anxiety. According to González-Lloret (2015), TMTBLT can ameliorate learners' anxiety level in an online environment. On the other hand, researchers like Lian et al. (2021), Rahmania (2020), and Honarзад and Rassaei (2019) concluded that learners' self-efficacy increases as a result of having online interaction and doing technology-based language learning tasks. Similarly, Quang et al. (2022) showed that task-based instruction in online teaching is more effective than traditional instruction in improving learners' self-efficacy. In another study, Tavakoli et al. (2019) compared CALL-mediated TBLT with conventional TBLT with regard to their effect on learners' perceived self-efficacy. Their result showed that CALL-mediated TBLT affects learners' perceived self-efficacy more than TBLT. Although research has been done to analyze the effect of TMTBLT on self-efficacy and anxiety, there seems to be insufficient research regarding the effective of different online instructional methods on learner variables such as self-efficacy and FLA.

Problem-Based Instruction (PBI)

Problem-based instruction (PBI) was first exclusively applied in medical education. Gradually other areas of education, like language education, started to use this approach (Hadi & Izzah, 2021; Hearn & Hopper, 2008).

Contrary to traditional instruction, PBI is completely learner-centered, and teacher is a facilitator. In the process of problem-solving, not only do learners learn content knowledge, but they also obtain skills like self-directed learning and higher-order thinking and real-life learning experiences (Isrokijah, 2020).

In a learner-centered setting like online education, PBIO can be an effective method. PBIO is a promising approach to develop content knowledge, communicative knowledge, critical thinking skills, and problem-solving skills in learners. However, online classes are not free from anxiety or other negative feelings like low self-efficacy (Di Gennaro & Di Villarroel, 2019; Fondo & Jacobetty, 2020). Thus, an effective online instructional method is one that helps students overcome their anxiety and increase their self-efficacy.

In this regard, Hwang et al. (2017) examined the impact of problem-based English listening computer games on students' English anxiety. Surprisingly, the result indicated that students' anxiety is influenced by neither problem-based computer games nor any other treatments. However, concerning self-efficacy, Choi et al. (2022) showed a significant positive effect of PBI on the self-efficacy students. Similarly, Masitoh and Fitriyani (2018) showed that students' self-efficacy increased significantly as a result of PBI.

Badali et al. (2022) compared problem-based e-learning method with the conventional direct learning approach. They found that academic self-efficacy increased as a result of using PBI in online classes. In second/foreign language learning, Zuraimee et al. (2022) reported that students' self-efficacy improved because of PBI.

Online Flipped Learning (OFL)

For over 50 years, Communicative Language Teaching (CLT) has been applied by language teachers to maximize interaction among students; however, in some teaching contexts, specifically the EFL context, CLT has not been as productive and effective as expected due to reasons such as insufficient student interaction time (Humphries & Burns, 2015; Lee & Wallace, 2018). For increasing productivity in CLT classes, the flipped learning method can be very helpful. This is because FL involves the reversal of traditional classroom-home activities (Chen Hsieh et al., 2017). The four main flipped learning principles, summarized under the acronym F-L-I-P, are *flexible environment*, *learning culture*, *intentional content*, and *professional facilitator* (Alharbi, 2015). Therefore, a thorough flipped class has flexibility in terms of space, type of group work, learning timeline, and teacher's expectations.

Online flipped learning has gained prominence in education, merging the principles of flipped classrooms with the advantages of digital platforms. A study by Gok et al. (2021) on the effect of OFL on foreign language reading anxiety (FLRA) and foreign language classroom anxiety (FLCA) showed that OFL could significantly decrease FLCA and FLRA. It appears that in spite of the great attention that researchers gave to the effect of FL on anxiety level in face-to-face classes (Amini et al., 2022; Mohammaddokht & Fathi, 2022; Parvaneh et al., 2020; Qiu & Luo, 2022), insufficient research has been dedicated to analyzing the effect of OFL on online FLA or to comparing online FLA under the influence of different online instructional methods. Another learner factor that has not received due attention from researchers is the effect of OFL on self-efficacy. This effect has been analyzed in face-to-face classes, and positive effects have been shown (Fallah et al., 2020; Fathi & Barkhoda, 2021); however, whether OFL can also be beneficial in terms of increasing learners' self-efficacy or if its effect is comparable to other online instructional methods is a matter of research.

Methodology

Participants

This study was conducted with 120 intermediate (53 males and 67 female) adult English students (with an age range of 19 to 40), who were selected through convenience sampling on the basis of their availability, and screened based on their scores on the Oxford Quick Placement Test (OQPT). The participants were randomly assigned to three experimental groups and a control group, each with 30 students.

Instruments

This study made use of one placement test and two questionnaires.

Oxford Quick Placement Test

The placement test was the OQPT, which was used to homogenize students in terms of their proficiency. OQPT is highly valid and has a reliability index of 0.9. The test includes 60 items measuring students' reading, grammar, and vocabulary. The items are in multiple-choice, fill-in-the-blank and multiple-choice cloze test format, where the students usually have to read the items and choose the best fitting options. It requires about 30 to 45 minutes to answer.

Online Learning Self-efficacy (OLSE) Questionnaire

The first questionnaire used to assess the participants' online learning self-efficacy was the online learning self-efficacy (OLSE) questionnaire adopted from Shen et al. (2013). This questionnaire contains 30 items on participants' beliefs about how capable they are to manage their online learning. This questionnaire has five dimensions, including interact socially with classmates, self-efficacy to complete an online course, handle tools in a course management system, interact with classmates for

academic purposes, and interact with instructors in an online course. Cronbach's alpha coefficients of these dimensions of online learning self-efficacy have been reported to be .93, .92, .93, .94, and .93, respectively (Shen et al., 2013).

Telecollaborative Foreign Language Anxiety Scale (T-FLAS)

The second questionnaire was the T-FLAS applied for assessing the participants' FLA. Designed for virtual learning environments, T-FLAS is a FLA scale in which some items are adapted from Horwitz et al.'s. (1986) Foreign Language Classroom Anxiety Scale (FLCAS) to make it suitable for online learning contexts. It includes 21 items containing three parts: 14 items of foreign language anxiety (FLA), 4 items on technophobia, and 3 items on online social interaction (Fondo & Jacobetty, 2020). This questionnaire has been reported to enjoy a high Cronbach's alpha coefficient of 0.96 (Fondo & Jacobetty, 2020).

Materials

Aside from video files, texts, and class PowerPoints, which were similar among the groups, there were other materials specific to each experimental group. For the TMTBLT group, specific TM-tasks were applied. Aligned with Gonzalez-Lloret (2015) definition of technology-mediated tasks, the TM-tasks in this study were goal-oriented, holistic, meaning-focused, learner-centered, and provoking reflective learning. For the PBIO class, special problem scenarios were designed for the participants to work on during each three-session package. These scenarios were real-world problems presented to the participants through PowerPoints, and they cooperated in groups of three to four to find ways to solve the proposed problem. In light of Hearn and Hopper's (2008) proposed features of problem scenarios, the scenarios used in this study were complicated, authentic, open to interpretation, and interwoven with participants' real-life issues. The material used in the OFL class included the pre-class PowerPoints sent to them through Skype and the worksheets provided for them through Google Docs. The pre-class PowerPoints consisted of a video-clip or a text and a word list containing the list of the target words in the video or text, their definitions, pictures, parts of speech, synonyms, and examples. The worksheets contained the target vocabulary exercises, such as matching and fill-in-the-blank items.

Procedure

Having given the OQPT, the participants with scores ranging from 30 to 47 (lower-intermediate to upper-intermediate) were chosen for the study. The participants were assigned to a control group and three experimental groups (TMTBLT, PBIO, and OFL). There were 17 sessions for each class, and each session took two hours. The first and last sessions were dedicated to familiarization with the course and filling out questionnaires, respectively. Every three sessions were dedicated to one specific topic. These sessions were held on the Adobe Connect platform, and Google Docs personal and group pages were used by the participants as they were doing different activities in and out of the class.

The TMTBLT class was designed based on the five pedagogical choices (*provide rich input, provide opportunities for focus on form, give negative/corrective feedback, promote collaborative learning, and promote language output*). Every session, the participants watched a video clip and received the wordlist of the clip as input. Then, they had pre-task activities for focus-on-form. Subsequently, they completed the tasks in collaboration, receiving corrective feedback from each other or the teacher. Next, they had post-task activities for more focus-on-form or language production. The tasks that they completed included brainstorming, fact-finding, sequencing, rank-ordering, classifying, matching, comparing and contrasting, or problem-solving that were sequenced based on González-Lloret's (2015) TM-task complexity criteria. Some examples of the TM-tasks applied in the TMTBLT class are as follows:

Brainstorming: Talk to each other and make a list of different problems with your country's education system on your group's Google Docs page.

Ranking: On the next page of the Google Docs, collectively rank these problems from the most important to the least important.

Compare and Contrast: Watch a video about the education system in Finland, and then compare it with the education system in your country. Make a list of differences between the two education systems on your group's Google Docs page.

In the PBIO class, the participants received a problem scenario dedicated to a topic every three sessions. On the first session, they watched a video or read a text, had a limited class discussion, and then read the problem scenario on the PowerPoint. They were then grouped into different break-out rooms on the Adobe Connect platform to work collaboratively to fill out the discussion chart in Google Docs. Gradually, in the course of these three sessions, they worked together synchronously (in Adobe Connect) or asynchronously (in Skype or Google Docs); they discussed and charged responsibilities based on the discussion table they filled out; and finally, they prepared a class presentation to be shared with the whole class on the third session of each topic. At the end of each discussion session, the participants were asked to fill out an evaluation table to assess their own work during the class. Examples of the scenarios used in this course are as follows:

Scenario 1: Husbands or wives with certain personality traits can ruin a marriage; the question is: What are the personality traits that can threaten a marriage, and how should they change?

Scenario 2: What are some problems that Iranian immigrants may face during the first years after immigration, and how should they deal with them in the course of time?

In the OFL class, three days before each session, the pre-class PowerPoints containing the video and the complete wordlist were sent to the participants, and the worksheet for that lesson was provided to them through their personal Google Docs page, shared with the teacher only. Having received the lesson of each day previously, the participants were ready to start class activities at the beginning of each session. Therefore, after a short review of newly learned items, the participants were guided to do different class activities designed based on cooperative language learning principles (Bolhuis, 2003; Shaaban & Ghaith, 2005). These activities were of different types, including jigsaw, four-corners, debate, round-robin, co-research, number heads together, write/pair/share, the fishbowl, team troubleshooting, tea party, and group presentation, adapted from Tedesco-Schneck (2013). The class activities were of the kinds that led to knowledge application, analyses and syntheses of ideas, interaction, decision-making, and problem-solving so that they provoked higher-order cognitive thinking. The followings are two parts of a jigsaw activity completed by the participants:

Activity 1: Expert group discussion: *In each group, each of you knows about only one part of the article. You are an expert in your specific part. In this activity, you will be grouped with students from other groups who are also experts in your part of the article. Get together with other experts and explain to each other about your shared part.*

Activity 2: Home-group discussion: *Get together with your home group and explain about your part of the article to them, and listen to their explanation about other parts that are empty for you. Try to fill out the empty parts of your article by listening to your friends.*

In the control group, although the materials were similar to those in the experimental groups, the classes were teacher-centered and lecture-based, with no group activities. In each session, first the teacher taught the texts as class readings or showed the video clips, then asked some comprehension-check questions using those vocabulary items, and then asked students to do some vocabulary exercises and drills.

Data Analysis

Data were collected through the T-FLAS (Fondo & Jacobetty, 2020) and the OLSE (Shen et al., 2013) questionnaires that the participants filled out once before and once after the course. One-way analysis of covariance (ANCOVA) was used to analyze the collected data.

Results and Discussion

Results of Online Self-Efficacy

To answer the question on self-efficacy, the participants' scores on the pretest and posttest of the self-efficacy questionnaire were compared. The descriptive statistics are presented in Table 1.

Table 1

Descriptive Statistics for Online Self-efficacy

Methods	N	Pretest (covariate)		Posttest		Adj. Mean
		Mean	SD	Mean	SD	
TMTBLT	30	118.27	5.741	132.97	9.099	133.028 ^a
PBIO	30	123.13	7.925	140.93	8.358	138.431 ^a
OFL	30	116.03	7.522	130.60	9.302	131.838 ^a
Control	30	116.10	6.651	117.10	8.281	118.303 ^a

Table 1 shows that the self-efficacy scores of all the experimental groups increased from pretest to posttest. Additionally, the posttest mean scores are different among the four groups. After checking all the relevant assumptions, an ANCOVA was used to see if these differences are statistically significant. The following table contains the result:

Table 2

Test Statistics for the ANCOVA on Online Self-efficacy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	10416.56 ^a	4	2604.14	40.78	0.000	0.58
Intercept	1876.21	1	1876.21	29.38	0.000	0.20

pretest	1582.49	1	1582.49	24.78	0.000	0.17
method	6076.48	3	2025.49	31.72	0.000	0.45

a. R Squared = 0.587 (Adjusted R Squared = 0.572)

Table 2 shows that after controlling for preexisting differences, method of teaching had a statistically significant effect of the participants' online self-efficacy, ($F_{(3,115)} = 31.72$, $p < 0.005$, partial eta squared = 0.45), with a strong effect size, suggesting that 45% of the variance among the groups could be accounted for by the treatments. Meanwhile, the covariate was statistically significant ($F_{(1,115)} = 24.78$, $p < 0.005$). To find out which groups have significant differences with one another, pairwise comparisons were made, the results of which are reported in Table 3. As it is shown in Table 3, all the three experimental groups have statistically significant differences with the control group, ($p < 0.005$). This indicates that all the three methods of TMTBLT, PBIO, and OFL could increase the participants' self-efficacy in online language learning better than conventional instruction.

Table 3

Pairwise Comparisons for Self-Efficacy

(I) method	(J) method	Mean Difference (I-J)	Sig. ^b
TMTBLT	PBIO	-5.403*	0.012
TMTBLT	OFL	1.190	0.568
TMTBLT	Control	14.725*	0.000
PBIO	OFL	6.593*	0.003
PBIO	Control	20.128*	0.000
OFL	Control	13.535*	0.000

Moreover, it turned out that PBIO ($M = 138.43$) was significantly more effective than TMTBLT ($M = 133.02$), ($p < 0.01$) and OFL ($M = 131.83$), ($p < 0.005$) in increasing self-efficacy. However, although TMTBLT could increase the participants' self-efficacy more than OFL, the difference was not significant. Based on this result, it can be interpreted that in online environments, PBIO is more effective in increasing students' self-efficacy level in comparison to TMTBLT and OFL.

Results of Online FLA

To answer the question on FLA, the scores of the participants on the pretest and posttest of online FLA questionnaire were compared. The descriptive statistics are provided in Table 4.

Table 4

Descriptive Statistics for Online Language Learning Anxiety

Methods	N	Pretest (covariate)		Posttest		
		Mean	SD	Mean	SD	Adj. Mean
TMTBLT	30	63.70	9.09	51.30	10.57	51.082 ^a
PBIO	30	60.53	8.78	54.43	11.64	55.398 ^a
OFL	30	60.47	8.46	56.37	12.51	57.356 ^a
Control	30	67.77	9.10	66.57	12.24	64.831 ^a

Table 4 shows that in all the experimental groups, FLA decreased. The table also shows differences among the mean scores of FLA in different groups. To find out if these differences are statistically significant, an ANCOVA was used. The result

is given in the following table. As it is shown in Table 5, significant differences are observed in the level of online FLA that the participants of the different groups experienced after the treatment after controlling for the preexisting differences ($F_{(3,115)} = 7.38$, $p < 0.005$, partial eta squared = 0.16), suggesting that 16 percent of the variations in the level of anxiety can be attributed to the method of instruction.

Table 5

Test Statistics for the ANCOVA on Online Language Learning Anxiety

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5196.90 ^a	4	1299.22	10.09	0.000	0.26
Intercept	2535.35	1	2535.35	19.69	0.000	0.14
preT	1270.23	1	1270.23	9.86	0.002	0.07
method	2852.18	3	950.72	7.38	0.000	0.16

a. R Squared = .260 (Adjusted R Squared = .234)

The table also indicates that the covariate was statistically significant, ($F_{(1,115)} = 9.86$, $p < 0.005$, partial eta squared = 0.07), but it accounted for 7% of the variations among the groups. Pairwise comparisons were made to locate the differences among the groups. Table 6 shows the result.

Table 6

Pairwise Comparisons for FLA

(I) method	(J) method	Mean Difference (I-J)	Sig. ^b	95% Confidence Interval for Difference ^b	
				Lower Bound	Upper Bound
TMTBLT	PBIO	-4.315	0.147	-10.166	1.535
TMTBLT	OFL	-6.274*	0.036	-12.126	-.422
TMTBLT	Control	-13.749*	0.000	-19.629	-7.868
PBIO	OFL	-1.958	0.505	-7.761	3.844
PBIO	Control	-9.433*	0.003	-15.480	-3.386
OFL	Control	-7.475*	0.016	-13.526	-1.423

According to Table 6, the differences between the experimental groups and the control group are significant. However, after controlling for pre-treatment differences, the mean difference between the TMTBLT and PBIO groups is not significant ($p > 0.14$), while the mean difference between TMTBLT and OFL classes is ($p < 0.03$). The difference between the PBIO and OFL groups is not significant ($p > 0.50$). This indicates that TMTBLT was statistically more successful than OFL in decreasing FLA level; however, although it was more successful than PBIO in decreasing anxiety level, the difference was not statistically significant. Meanwhile, although PBIO could decrease the participants' anxiety level more than OFL, the difference was not statistically significant.

Discussion

The findings of this study showed that all the three instructional methods were more effective in improving participants' self-efficacy than the conventional class. This finding is in line with that of a number of studies that have compared each of the online instructional methods of interest here with conventional instruction and concluded that selected online methods of instruction can improve self-efficacy better than conventional instruction. For instance, studies such as Ellis et al. (2019), Hamad (2013), Honarзад and Rassaei (2019), Lian et al. (2021), Nur and Butarbutar (2022), Quang et al. (2022) and Rahmania (2020) have confirmed the superiority of online TBLT to conventional instruction. With respect to the effect of PBI on self-efficacy, the findings of this study confirm those of Badali et al. (2022), Choi et al. (2022), Masitoh and Fitriyani (2018) and Zuraimie et al. (2022), all of which emphasized the positive effect of PBIO on students' self-confidence in using English. As for the effect of FL on language learners' self-efficacy, our findings are compatible with previous studies supporting the positive role of FL in improving students' self-efficacy (Fallah et al., 2020; Fathi & Barkhoda, 2021).

The students' high online language learning self-efficacy in all the three experimental groups can be attributed to Bandura's (1997) sources of self-efficacy. It seems that the students in all the three classes could benefit from the first two sources of self-efficacy (i.e., performance accomplishment and vicarious experience) more frequently than those of the conventional class. However, the way the participants in each of these groups experienced performance accomplishments was specific to each class. For instance, the participants in the TMTBLT class continuously did tasks that required them to listen, read, speak, write, search, and prepare an outcome in English, all in the online mode. Therefore, the sense of performance accomplishment was always present for them whether their cooperation was more or less than other participants. In the PBI class, the participants were required to get involved in tangible real-world problems, investigate the problems and their solutions, and propose reasonable solutions through collaboration with group-mates. These activities were in English; therefore, completing each of these steps gave students a deep sense of accomplishment in problem-solving skills, English skills, and online communication. Performance accomplishment in the OFL class was experienced as the students were in the constant process of collaboration, discussion, group decision making, and mutual interaction, which gave them the sense of accomplishment after finishing each cooperative learning activity.

Another finding was that although all the three methods had significantly positive effects on the learners' self-efficacy, the impact of PBIO was significantly more than the other two methods. A reason for this can be sources of self-efficacy. It appears that the first and second sources were more influential in the PBIO class participants' self-efficacy. Since their responsibility for every lesson was to conduct a real research about a tangible problem related to their lives, and they put all their effort and energy to discuss it, search about it, and finally present the findings in a PowerPoint presentation to the class, it is possible that they experienced a stronger feeling of accomplishment than the other groups due to the fact that they felt they were doing a serious problem-solving that was influential in their own lives, too. The second source, namely vicarious experience, was also influential in the participants' self-efficacy because they observed other groups' presentations before making their own.

Regarding FLA, the finding that TMTBLT significantly decreased anxiety level compared to the conventional online class is compatible with previous research carried out by González-Lloret (2015) and Ramamurthy (2019), who noted that TMTBLT ameliorated learners' anxiety level. Another finding was that, in comparison to conventional online instruction, PBIO significantly decreased language learners' anxiety level. This is incompatible with the findings of Hwang et al. (2017), who concluded that learner anxiety can neither be influenced by problem-based English learning nor by any other treatment.

With regard to OFL, our findings showed that it can significantly decrease FLA in comparison to conventional online instruction. This is compatible with several other studies (Amini et al., 2022; Mohammaddokht & Fathi, 2022; Parvaneh et al. 2022; Qiu & Luo, 2022), which have also shown the beneficial effects of FL on decreasing FLA. However, all the mentioned studies were in face-to-face context. One of the few studies in the online context is Gok et al. (2021), which found evidence of the positive effect of FL on decreasing anxiety.

The lower level of anxiety in the experimental groups in comparison to the conventional class can be attributed to the lack of some sources of anxiety in these classes that were present in the conventional class. One possible source of anxiety is using whole class activities instead of group activities (Effiong, 2015). Almost all the activities, except for warm up, in all the three experimental classes were group work, and therefore, the students felt safe making mistakes or asking questions because the risk of losing face was low. Working in groups also prevented them from being exposed to other sources of anxiety such as teacher correction (Sánchez & Sánchez, 2017) and put them in situations where they could gradually overcome communication apprehension and fear of negative evaluation, which are, according to Horwitz et al. (1986), two main sources of anxiety. Moreover, since before each main task, they had the chance of watching the video or reading the text of the day, and the vocabulary list was sent to them, the feeling of lack of vocabulary, which is a source of anxiety (Liu, 2007), may have not been felt deeply. Furthermore, another main reason for students' anxiety may be low self-efficacy, which was high in all the three classes, thus decreasing the level of anxiety.

Beside the reasons for lower anxiety level, common to all the experimental groups, there were reasons specific to each group. For instance, in the TMTBLT class, the TM-tasks were designed in a way that the participants felt less cognitive load and more enjoyment in the class; this could lead to a lower anxiety level (Dewaele, et al., 2017). Additionally, in the OFL class, since the students received the material of each session three days earlier, they had more time for reading and watching and practicing the target vocabulary; therefore, they felt less anxious.

With regard to the differences in the FLA level of the experimental groups, the observation that the FLA level was lower in the TBLT class in comparison to the other two classes can be attributed to the fundamental differences between TBLT, PBIO, and OFL, and to the types of tasks applied in each of these three groups. First, the main focus of TBLT is on speaking skills as its outcome, and little attention is given to the cognitive processes taking place in learners' minds (Hearn & Hopper, 2008); in contrast, in PBI, the focus is on fostering problem-solving skills and critical thinking. Therefore, the tasks in TBLT are cognitively less challenging than activities in PBI. Secondly, teachers' help in TBLT is more than PBI since teachers try to simplify tasks to keep the flow of conversation among students, but teachers in PBI do not give much information about the problem so that the students struggle more with the problem (Hearn & Hopper, 2008). On the other hand, in the OFL class, guided, self-directed learning was chosen for out-of-the-class activities, and cooperative learning was chosen for the in-class activities. Activities selected for out of the class, based on Bloom's (1964) classification, required simple cognitive thinking (i.e. comprehension); however, activities for inside the class were based on more complex cognitive thinking (Shen & Xu, 2015), which according to Bloom's classification, lead to higher-order thinking. Thus, the activities in the OFL class were also

challenging for students. Therefore, it appears that TM-tasks in the TBLT class were cognitively less challenging for students, and that may have been the reason why the participants experienced a lower FLA.

Conclusions and Implications

From the results of this study about self-efficacy, the researchers of the current study came to the conclusion that, using any of the methods examined here, teachers can give students the experience of working in collaboration with others to fulfill a common goal so that they can feel self-accomplishment as well as vicarious accomplishment and gradually become self-efficacious. Furthermore, the empirical findings in this study provide a new understanding of PBIO; due to dealing with serious problems and solving them in the PBIO class, students can feel even more self-efficacious after attending this class. Therefore, teachers who know their students are not self-efficacious enough to believe in their own abilities in learning a new language through online environments can adopt PBIO as the main instructional method of their online classes.

Regarding online FLA, it can be concluded that for students who suffer from high anxiety in language learning, especially in online language classes, one of the aforementioned methods can be used by the teacher to ameliorate their anxiety. However, for those students whose anxiety problems seem to be more serious and unavoidable, the TMTBLT method can be used, which has a stronger effect on students' anxiety due to the lower cognitive load and higher enjoyment level.

This study showed that all three methods of TM-TBLT, PBIO, and OFL can improve self-efficacy and decrease FLA in language learners in an online environment. In an environment where there is no direct access to students to see when they feel stressed or incapable of doing a task, the least the teachers can do is to use all or any of the TM-TBLT, PBIO, and OFL methods to control students' negative feelings indirectly. All of these methods can be used within one course to help students overcome their lack of self-efficacy or high level of anxiety, while at the same time giving variety to class activities for students who get bored with any single method.

The findings can have implications for different stakeholders such as teachers, learners, and material developers. Students with low belief in their own abilities, and those who experience excessive anxiety in online classes can become self-efficacious and learn language more effectively in an online class that is based on the principles of TMTBLT, PBIO, or OFL. This study enables teachers to make informed decisions about appropriate methods that suit their students. In addition, material developers are encouraged to produce new syllabi and materials that suit the online environment and are in accordance with principles of TMTBLT, PBIO, or OFL.

Nevertheless, there were several limitations in the study that may limit the generalizability of the findings and call for further research in the area. One obvious limitation is that convenience sampling can potentially threaten external validity. Due to this limitation, it is suggested that the study be replicated with stratified or random sampling. Another limitation is the duration of the treatments. The treatment sessions lasted for 15 sessions for practicality reasons. However, 15 instructional sessions may be insufficient to observe stable changes in psychological traits like self-efficacy and anxiety. Interested researchers can use longitudinal follow-up studies to overcome this inadequacy. Sample size can also be a limitation. The researchers had access only to 120 participants. The larger the sample, the more generalizable the results will be. Therefore, replication studies are suggested with larger samples.

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