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Writing metacognitive strategy-based instruction through flipped classroom: an investigation of writing performance, anxiety, and self-efficacy

Rahele Khosravi¹, Adel Dastgoshadeh² and Kaveh Jalilzadeh^{3*} 

*Correspondence:
kaveh.j@iuc.edu.tr

¹ Department of English,
Kurdistan University, Sanandaj,
Iran

² Department of English,
Sanandaj Branch, Islamic Azad
University, Sanandaj, Iran

³ School of Foreign Languages,
Istanbul University Cerrahpasa,
Istanbul, Turkey

Abstract

This study aimed at exploring the effect of implementing writing metacognitive strategies via flipped classrooms on the Iranian EFL learners' achievement, anxiety, and self-efficacy in writing. The study involved 45 intermediate learners of both genders, selected using a random convenience sampling method. The participants' English proficiency was measured by the Preliminary English Test, and they were placed in two groups: experimental group (23 learners) and control group (22 learners). In the former group, the students were exposed to 5 distinct types of metacognitive strategies over the course of 10 flipped classroom sessions, while the latter group received writing metacognitive strategy-based instruction in a traditional classroom setting. The data collection process involved administering the Second Language Writing Self-Efficacy Scale, two intermediate writing tasks, and the Second Language Writing Anxiety Scale. The collected data were analyzed using a one-way ANCOVA. The findings evidenced considerable enhancement in the writing performance of the students who underwent instruction through flipped classrooms in comparison to those in the traditional classroom refsetting. Furthermore, the results demonstrated that the utilization of writing metacognitive strategies in flipped classrooms resulted in a substantial rise in students' writing self-efficacy, while simultaneously leading to a decrease in their writing anxiety.

Keywords: Flipped classroom, Metacognitive strategy, Writing anxiety, Writing self-efficacy

Introduction

In recent decades, the field of education has experienced substantial and transformative changes in its landscape, with writing gaining increased attention as a vital mode of communication and a marker of academic success in higher education. Scholars such as Kellogg (1999) have emphasized the role of cognitive processes and strategies in shaping the success of writers. A writer's ability to effectively employ strategies, procedures, and cognitive frameworks within the confines of their working memory plays a pivotal role in the writing process. As a result, students aiming to become proficient writers need

to not only choose appropriate strategies but also execute them effectively. (Bai et al. (2014) and Chien (2012) in their studies emphasized on a positive association between the application of writing strategies and the development of writing proficiency.

Traditionally, writing instruction has often focused on the end product, the written text itself. However, a shift has been advocated towards a more process-oriented approach in educational settings (Chien, 2012; Silva & Brice, 2004). This shift aligns with the recognition that the strategies employed during the writing process greatly influence the outcome. An effective approach to teaching these strategies is Strategy-Based Instruction (SBI), which has been shown to significantly impact learners' strategy utilization, both in terms of quality and quantity (Hu, 2005; Ong & Zhang, 2013; De Silva, 2015; Stavropoulou, 2023).

Among the array of strategies, metacognitive strategies are particularly notable as advanced cognitive abilities, as underscored by O'Malley and Chamot (1990). These tactics encompass tasks like devising plans, overseeing progress, and making assessments. Regarding writing, metacognitive strategies assume a vital role. Individuals possessing adept metacognitive skills exhibit self-reliance, self-governance, and adeptness in strategizing, overseeing, and assessing their writing undertakings (LV & Chen, 2010).

However, teaching metacognitive strategies demands substantial time investment. Traditional classroom setups often allocate significant time to elaborate on these strategies, leaving students to grapple with the writing process independently outside of class (Muldrow, 2013). To address this challenge, educators are seeking innovative instructional methodologies that not only foster learning but also motivate students towards excellence (Johnson et al., 2014). An influential educational direction that tackles this issue is student-focused learning, where the flipped model has garnered significant attention. This approach is a distinct form of blended learning (Strayer, 2012; Namaziandost, et al., 2020), recognized as one of the most prevalent and effective methods (Tucker, 2012).

Flipped learning, introduced by Bergmann and Sams (2012), represents a departure from conventional teaching approaches. This model restructures the roles of homework and classroom activities. In the conventional method, new material is presented in lectures, while students engage in practice at home. Flipped classrooms contribute to students' engagement with new content at home through teacher-provided resources, such as videos, and engage in skill practice and application in the classroom. This approach aligns well with learner-centered principles and offers a dynamic and interactive learning environment that optimizes classroom time for engagement and active learning (Knowles, 1975).

While the notion of the flipped classroom has garnered acknowledgment across diverse academic domains, its utilization in second language (L2) education has not been extensively investigated (Lee & Wallace, 2018; Chung et al., 2019). Several studies have highlighted its favorable influence on academic performance, student engagement, and the acquisition of skills (Lee & Wallace, 2018; O'Flaherty & Phillips, 2015). Moreover, several research endeavors have provided empirical support for the advantages of integrating the flipped model into blended learning settings. Noteworthy benefits include students' self-paced ability to learn (Altemueller & Lindquist, 2017; Andujar & Nadif, 2020; Namaziandost et al., 2020; van Alten et al., 2020), while according to Altemueller and Lindquist (2017) and Andujar and Nadif (2020), educators can effectively address

students' learning challenges as students come prepared with study materials prior to class participation. The outcomes of implementing a flipped classroom approach were investigated in Turan and Akdag-Cimen's (2019) study in an ELT domain which was an extensive systematic review. Their findings indicated that the utilization of the flipped classroom model in the context of ELT has the potential to not only enhance students' engagement, English language proficiency, interactions, and academic accomplishments but also to elevate motivation, higher-order cognitive skills, adoption of profound learning strategies, and competence in information and communication technology (ICT) skills. However, there is still little research, especially on L2 writing and the application of metacognitive strategies.

Therefore, the current study attempts to explore whether the flipped classroom model can increase EFL learners' awareness of writing metacognitive strategies and contribute to their writing performance and self-efficacy. By exploring this novel approach, the study contributes to both the flipped learning discourse and the pedagogy of L2 writing, shedding light on its efficacy and implications for language educators and learners in the twenty-first century.

Review of the related literature

Flipped classroom

The concept of the flip model, denoted by the acronym F-L-I-P, derives its principles from the notions of a flexible learning environment, an adaptive learning culture, deliberate instructional content, and proficient educators (Marshall & Kostka, 2020). This innovative pedagogical approach redefines the traditional classroom setup, positioning students at the forefront of learning while diminishing the centrality of the teacher within the physical classroom (Marshall & Kostka, 2020). By emphasizing a shift from teacher-centric to student-centric instruction, the flip model underscores the paramount importance of fostering active engagement in the learning process (Marshall & Kostka, 2020).

Within this framework, Marshall and Kostka, (2020) *state that the significance of intentional content creation by educators comes to the fore, as they assume a crucial role in steering the learning journey and producing pertinent resources to facilitate learning outside the traditional classroom setting. Additionally, the work of Egbert et al. (2015) provides a thorough elucidation of the components of flipped classroom content, which include the emphasis on meaningful tasks over mere busywork, the teacher's transformation into a supportive mentor rather than a mere director, heightened interactions centered around the instructional content, an overarching focus on holistic learning as opposed to conforming to traditional scholastic behavior, prompt feedback mechanisms to aid students' procedural and incremental growth, seamless incorporation of technology to amplify learning, and the provision of just-in-time instruction to cater to immediate learning needs.*

In a practical sense, the core essence of the flipped classroom model revolves around offering pre-recorded instructional lectures through online platforms, allowing students' self-paced access to and internalization of content before the scheduled class sessions (Marshall & Kostka, 2020). As a result, students can independently consume the lecture material prior to attending class, enabling classroom time to be repurposed for dynamic

interactive activities, including discussions which are carried out in group, student-centered lectures, as well as problem-solving tasks which are done collaboratively (Yilmaz & Baydas, 2017).

The notion of the flipped classroom paradigm is frequently viewed as a type of blended learning, which is characterized by amalgamation of two or more instructional approaches (Caner, 2012). Within this context, the conventional delivery of direct instruction within the classroom is transformed into a personalized learning experience in individualized settings, mediated by a variety of technological tools (Caner, 2012). Educators typically provide online resources such as video lectures or supplementary materials for independent study, which in turn liberates classroom time for meaningful interactions and higher-order cognitive activities (Yilmaz & Baydas, 2017).

In academic literature, Lage et al. (2000) refers to the flipped classroom as an inverted classroom to signify the inversion of traditional classroom activities with those occurring outside the class and vice versa. A more refined definition is offered by Bishop and Verleger (2013) that stipulates two essential elements for a flipped classroom: computer-assisted teaching for independent learning beyond the classroom and interactive group engagements within the classroom. Research indicates that adopting the flipped model yields several advantages. Firstly, Kim et al. (2014) indicated that it empowers students through self-directed and self-regulated learning, granting them access to instructional content beyond the classroom boundaries. In contrast to conventional pedagogies, the flipped classroom allows learners greater flexibility and agency in customizing their learning environments and self-managing their learning journey (Bruff et al., 2013).

Secondly, the interactive dynamics within the classroom are enriched, fostering dynamic teacher-student and peer-to-peer engagements (Adnan, 2017; Bergmann & Sams, 2012). Baldwin et al. (2019) claimed that implementing flipped online learning model has resulted in significantly higher scores among graduate students in Korea. Assessment was conducted through online quizzes and individual assignments linked to course video lectures. Similarly, in an Indonesian university setting, the flipped classroom model demonstrated efficacy in enhancing students' higher-order cognitive skills while actively participating in in-class activities (Riza & Setyarini, 2020).

Examining a case with sophomore English major students, Hsieh et al. (2017) employed the flipped approach to teach English idioms. Leveraging technology, learners interacted with idiomatic content via a smartphone app, contrasting with traditional in-person instruction. Mixed-method research encompassing pretest and post-tests, questionnaires, in-class observations, and interviews revealed that the flipped model, centered on theory-based online interaction, amplified motivation and engagement, effectively enhancing participants' idiomatic knowledge.

Huang and Hong's (2016) study, on the effect of flipping the classrooms in high schools in Taiwan, realized that the treatment group exhibited enhanced skills in English reading comprehension and proficiency in information and communication technology (ICT). The flipped approach offered opportunities for skill practice, optimized time utilization, and garnered positive feedback from students in a distance learning context.

Kostka and Lockwood (2015) underscore three key insights regarding the flipped classroom: its potential to cultivate autonomous language learning, its capacity to elevate higher-order cognitive skills, and its accommodation of diverse learning paces. This

perspective is corroborated by Husnawadi (2021) that examined the effectiveness of flipped classroom for fostering learners' autonomy and flexibility. His study indicated that flipping the classrooms fosters learners' autonomy and flexibility. Additionally, a study by Qader and Arslan (2018) pinpoints the effective role of flipped classrooms on students' performance and higher-order thinking skills compared to conventional methodologies.

To conclude, the notion of the flipped classroom, stemming from the F-L-I-P framework, involves establishing a versatile, learner-centered educational setting facilitated by purposeful content delivery and skilled educators. The model's impact spans improved autonomy, enhanced interactions, and increased performance, while concurrently promoting higher-order cognitive skills. Research across various educational settings underscores its efficacy in promoting engaged and effective learning experiences.

Strategies and writing

Learning strategies are categorized into two groups, as outlined by Oxford (1990): direct strategies and indirect strategies. According to Oxford (1990), strategies such as affective, social, and metacognitive do not have an impact on the target language directly are called indirect strategies. In addition, others classifications such as cognitive, memory, and compensation strategies that can influence the target language directly are referred to as direct strategies. Abdollahzadeh (2010) refers to cognitive strategies as the actual mental processes at work while writing a text. Metacognitive strategies, as described by Brown and Walker (1983), O'Malley and Chamot (1990), and Cohen et al. (1998), pertain to techniques employed for managing the learning process by students. These strategies serve to supervise, strategize, and assess their own learning journey.

Likewise, a research endeavor undertaken by De Silve (2015) illuminated the influence of writing strategies on Second Language (SL) writing. The study involved 72 undergraduate science program students who were instructed to employ specific strategies, including planning, formulating, self-monitoring, evaluation, and revision. Writing performance was found to be better in the treatment group than in the control group. Furthermore, it was observed that imparting strategy instruction positively impacted students' writing accomplishments. As a result, it is advisable that educators train the learners to use writing strategies effectively while writing.

Metacognitive strategies

Flavell (1979), recognized as an early advocate in introducing the metacognition concept, proposed that metacognition encompasses two elements: metacognitive knowledge and metacognitive experience. As outlined by Xing et al. (2008), metacognitive strategies are characterized as cognitive techniques that are employed to guide cognitive processes with the intention of achieving specific cognitive goals. Mu (2005) and Diaz (2013) classified metacognitive writing strategies into diverse categories, notably including Planning, Monitoring, and Evaluating taxonomies. Thus, employing metacognitive writing strategies prompts learners to deliberate on the writing process, encompassing its planning, monitoring, and self-evaluation. Furthermore, by implementing practices like planning, monitoring, and evaluating a composition, learners can effectively oversee, steer, regulate, and shape their writing output.

In addition, King (2004) defines metacognition in brief as “the way learners think about thinking”. And regarding writing skills, metacognition involves the way learners understand their writing processes, also the way they adapt their processes to evolving demands. The effect of strategies on learners’ writing performance and skills has also been studied previously. The writing was considered a product-based task which is simple. However, writing is nowadays viewed as process-based activity. Also, writing tasks as a process deals with cognitive, linguistic, affective, behavioral, and physical parts (Manchon et al., 2007). Additionally, Flavell (1979) defines metacognition as an umbrella term for metacognitive knowledge, experience, and strategies that assists us in understanding of the knowledge and cognition concerning cognitive phenomena. And also, Cohen (2011) defines metacognitive strategies as the deliberate actions that learners undertake to improve their learning process. Wenden (1998) states that learners can employ these strategies to “manage, direct, regulate, or guide their learning”.

Overall, using metacognitive strategies for writing proficiency development has remained under-researched. Recently, several studies have been carried out with focus on the effect of metacognitive strategies on teaching writing skills. A study was done by Surat et al. (2014) in which 18 learners attending secondary school took part as participants in Malaysia. In this research, the participants were instructed to engage in metacognitive reflection concerning the essays they composed. The findings showed that the learners had minimal comprehension of how the process of writing should be structured. These findings hold relevance for education and future research. During past decades, Williams (2012) and other studies have reported the facilitative role of writing skills in language development. In contrast to other skills, the improvement of writing performance often comes through rigorous practice. Hence, considering its characteristics, the flipped model offers teachers the chance to allocate their in-class time specifically for writing practice (Kormos, 2012). A study done by Cutumisu and Schwartz (2018) concluded that feedback plays a crucial role in a writing course. For example, Wigglesworth and Storch (2012) in their study reported that receiving feedback as well as working in pairs writing tasks amplifies learners’ chances to support each other’s advancement through scaffolding.

Another study, involving 102 Iranian TEFL undergraduate students, employed Structural Equation Modeling (SEM) to investigate the relationships between collaborative digital writing, online knowledge sharing, and metacognitive knowledge in writing. The findings supported the structural model and confirmed that online knowledge sharing mediates the connection between collaborative digital writing and metacognitive knowledge in writing. These results have important implications for improving knowledge sharing practices, attitudes toward collaborative digital writing, and the development of metacognitive skills in TEFL education (Farahian and Ebadi (2023)). Moreover, two significant studies focused on the role of metacognition in EFL writing. Sun et al. (2023) conducted a mixed-methods investigation, revealing that metacognitive experiences in writing vary among students of differing proficiency levels and serve as predictors of overall writing quality. In a similar vein, Yousef et al. (2023) explored the impact of integrating metacognitive techniques on EFL learners’ writing performance in the UAE, finding a significant improvement in the writing performance of the experimental group that received metacognitive-based writing training. These findings collectively

underscore the significance of metacognitive strategies in enhancing EFL writing proficiency, with implications for both theory and pedagogy in EFL writing instruction. Also, Teng (2023) used structural equation modeling to explore how metacognition, critical thinking, and academic writing relate in Chinese university students. The study involved 644 third-year students, assessing metacognitive writing strategies, critical thinking skills, and academic writing proficiency. Significant connections between these factors were found, offering valuable educational insights.

Writing anxiety

Writing is a cognitive and emotional process where thoughts and feelings interplay. The investigation into first language (L1) writing anxiety was spurred by Daly and Miller (1975), who highlighted the prevalence and potential negative impacts of writing anxiety on American students. Their work led to the term "writing anxiety" describing the distressing unease many learners experience when confronted with writing tasks. They also introduced the Daly-Miller Writing Apprehension scale (WAT), which triggered numerous studies on the nature and consequences of writing anxiety.

Lin et al. (2009) suggested that anxiety, although uncomfortable, can have positive aspects. It helps us recognize potential threats and prepares us to address them effectively by paying close attention. They emphasized the need to critically consider important matters. Consequently, teachers should adopt effective methods to help students feel more at ease while composing. Anxiety, a natural response caused by various factors in different situations like exams, public speaking, or job interviews, has become a significant aspect of education, especially in language learning. Kara (2013) posits that anxiety impacts the learning process. Similarly, Lin (2009) views anxiety as a sensation that triggers productive attitudes. It heightens our awareness of potential threats and readies us to handle them thoughtfully.

Lots of studies have addressed the effect of writing anxiety on EFL learners' writing performance. Research by scholars like Woodrow (2011), Rezai et al., (2014), as well as Nausheen and Richardson (2010), has consistently demonstrated that elevated levels of anxiety detrimentally affect both the quality of writing performance and the motivation to participate in writing activities. Nonetheless, it is worth noting that a moderate level of anxiety can potentially function as a motivator (Daud & Kassim, 2016). Writing anxiety can arise from diverse origins, including limitations in time (Kirmizi & Kirmizi, 2015), apprehension about receiving inadequate evaluations (Zhang, 2011), test-related stress (Yan & Xiaoging, 2010), and the dynamics between educators and students (Karakaya & Ulper, 2011).

Writing self-efficacy

The term 'self-efficacy', which denotes a social-learning and cognitive-behavioral perspective, was introduced by Bandura (1995) as the belief in one's ability to effectively manage future situations through planned actions. In simple terms, self-efficacy shows one's confidence in organizing and accomplishing tasks. For learners, high self-efficacy in writing can lead to increased effort, determination, and resilience when facing challenges in composing written tasks. Writing self-efficacy refers to learners' evaluation of their writing skills and their confidence in successfully accomplishing writing tasks. This

belief often falls into three categories: high, medium, and low, each corresponding to varying levels of confidence. Those with high self-confidence show a higher level of writing efficacy, seeing complex activities as stimulating challenges that they can overcome through cognitive strategies.

Different studies have explored the impacts of writing self-efficacy on writing performance which have consistently found that self-efficacious learners are more motivated, experience less apprehension, invest greater effort, and ultimately perform better in writing tasks. For instance, Sun and Wang (2020) discovered that EFL college learners with high writing self-efficacy and self-regulated learning strategies performed better in their writing tasks.

Woodrow (2011) studied the effect of self-efficacy and anxiety levels on the writing performance of college students in China and found that they greatly influenced writing performance. Importantly, writing self-efficacy turned out to mediate the relationship between writing anxiety and performance. In simpler terms, previous instances of unsuccessful writing experiences could result in anxiety, subsequently diminishing self-efficacy and, consequently, impacting overall performance. Zabihi (2018) illustrated that fluency, accuracy, and complexity narrative writing were significantly influenced by writing self-efficacy in second language (L2) context. Additionally, it indirectly influences performance by interacting with writing anxiety.

Han and Hiver (2018) investigated distinct motivational profiles related to writing and discovered that writing self-efficacy and self-regulation acted as counterweights to the rise in writing anxiety throughout a course. They proposed that providing genre-based writing instruction enhances learners' confidence while accomplishing writing tasks. Sun and Wang (2020) further advanced this research by demonstrating that second language (L2) writing proficiency is significantly affected by self-efficacy and self-regulation. Notably, self-efficacy for grammar strongly influenced performance, and self-regulation strategies like text review and self-evaluation were associated with better performance. Also, Zhou's study (2022) addressed the impact of instructional efforts targeting self-efficacy in writing performance. The study involved 50 Chinese undergraduates in a 10-week EFL integrated course. Results showed significant improvements in performance, transformation, and language control, with stable self-regulatory strategy and motivation. Consistent correlations emerged among motivation, self-regulatory strategy, transformation, and language control, and performance was moderately correlated with posttest self-efficacy. These findings highlight the importance of transformative processes in EFL learning, shaping learners' beliefs and positively influencing language acquisition and writing and reading regulation.

Overall, the role of writing self-efficacy in writing proficiency is widely acknowledged in the literature. Also, it is noted that learners' beliefs in their writing skills play an essential role in their success.

This study

To address these research lacunas, this study primarily sought to examine whether writing strategy-based instruction through the flipped classroom approach would facilitate two key aspects among second language (L2) learners: first, their writing performance, and second, their levels of anxiety and self-efficacy. These affective factors

hold significance within the L2 learning context. Therefore, the following questions were investigated:

1. Does writing metacognitive strategy-based instruction through flipped classroom significantly affect intermediate learners' writing performance?
2. Does writing metacognitive strategy-based instruction through flipped classroom significantly decrease intermediate EFL learner's writing anxiety?
3. Does writing metacognitive strategy-based instruction through flipped classroom significantly develop intermediate EFL learners' writing self-efficacy?

Participants

A sample of two intact classes with 45 students was selected by convenience sampling method (Dörnyei, 2007), from an English institute in Tehran, Iran as the participants of this study. The sample encompassed both male and female learners, with ages spanning from 17 to 24 years. The two intact classes chosen for the study were assigned randomly: one functioned as the control group ($N=22$), in a non-flipped classroom setting, while the other served as the experimental group ($N=23$), in a flipped classroom environment. All participants in both groups were assigned to successfully complete an intermediate writing strategy training course instructed by the same educator in the winter of the 2019 academic year. The instructor has previous experience in implementation of flipped classrooms for L2 learners. Prior to commencing the present course, certain learners had prior exposure to blended learning, yet none of them had encountered flipped classrooms in their educational experience. However, the participants received introductory explanations about flipped classrooms and their instructional design before the conduction of the flipped approach.

Instruments and materials

To collect the quantitative data and apply the treatment, the following instruments were used in this study.

Proficiency test

The participants' proficiency level was estimated using the Preliminary English Test (PET) which includes 200 items and measures learners' listening and reading comprehension and grammar and vocabulary. PET is considered as a reliable measure for placing language learners of intermediate levels.

Second language writing scale

Jacobs et al.'s (1981) writing scale was utilized to evaluate the students' essays, which follows an analytical scoring approach and encompasses five content criteria for evaluation of essays. These criteria include: communicative quality, organization, paragraphing, cohesion, and relevance and adequacy. Jacobs et al. (1981) outline five distinct subcategories within this scoring rubric, encompassing content criteria, organization criteria, vocabulary criteria, language criteria, and mechanics criteria. The scores provided by both raters and the graduate students were then subjected to Cohen's Kappa inter-rater

reliability test. This scoring rubric employed a 100-point system in which 20 points for vocabulary utilization, 25 points for language usage (primarily syntax), 30 points were designated for the writing's content, 20 points for writing organization, and 5 points for mechanics. Also, two trained raters independently evaluated 40% of the essays to ensure the inter-rater reliability of the essay scores.

Self-efficacy in writing scale (SWS)

Yavuz-Erkan's (2004) self-efficacy scale was used to measure students' writing self-efficacy in this study. Aligned with Bandura's (1977) self-efficacy concept, this scale includes a 21-item writing self-efficacy scale to gauge the degree of subjects' confidence in their writing competence. The items on the scale were rated using a four-tier Likert scale: Strongly Disagree, Disagree, Agree, or Strongly Agree, with each statement beginning with the phrase "I can...". The reliability and validity of the scale were estimated by Yavuz-Erkan (2004).

Second language writing anxiety inventory

Cheng's (2004) Second Language Writing Anxiety Inventory (SLWAI) was used to estimate learners' writing anxiety. This inventory was developed to assess the levels and different aspects of anxiety that individuals experience when participating in second language writing tasks. This scale consists of 22 items and measures anxiety levels in English writing which includes three aspects: somatic anxiety, cognitive anxiety, and avoidance behavior. The questionnaire employs a Likert-type response format with 5 choices: 1 (strongly disagree), 2 (disagree), 3 (undecided), 4 (agree), and 5 (strongly agree). The items are distributed across three categories: (1) Somatic anxiety (items 2, 6, 8, 11, 13, 15, and 19), (2) Cognitive anxiety (items 1, 3, 7, 9, 14, 17, 20, and 21), and (3) Avoidance behavior (items 4, 5, 10, 12, 16, 18, and 22). As the participants were English major students, the questionnaire was administered in English. The reliability and validity of SLWAI was established through correlation and factor analysis. To measure internal consistency, the Cronbach's Alpha formula was employed for the scale.

Materials

In the experimental group, students were presented with video or PowerPoint sessions that covered various metacognitive strategies based on O'Malley and Chamot's (1990) classification of writing metacognitive strategies. To reinforce comprehension and application, follow-up activities were assigned to ensure their grasp of these strategies. Subsequently, during class sessions, they practiced employing these metacognitive strategies while engaging in writing tasks. In contrast, the control group received lectures about writing metacognitive strategies, derived from O'Malley and Chamot's (1990) classification, delivered by their instructors during class. Due to the lecture-focused approach, students in this group didn't have dedicated time for practice in the classroom. Instead, they were given a writing task to complete at home. Finally, both groups were tasked with writing an essay to evaluate their application of the metacognitive strategies they had learned.

Procedure

The participants of this study were learners of two intermediate -writing classes at an English Institute in Tehran. First, a week before the commencement of the semester and the initiation of the intervention, the experimental and control groups underwent a PET assessment to ensure their homogeneity in language proficiency. The proficiency test was conducted because language proficiency is recognized as a potential factor influencing students' overall writing performance. Following the PET administration, the mean scores of both groups were compared to ensure that both groups had the same level of language proficiency before the start of the treatment. During the initial course session, students were assigned a pre-test writing task which involved composing a 45-min essay on the first topic. Subsequently, these essays were evaluated using Jacobs et al.'s (1981) scoring rubric. Meanwhile, both SWS (Second Language Writing Anxiety) and SLWAI (Second Language Writing Anxiety Inventory) were administered to gauge the initial levels of L2 writing anxiety and writing self-efficacy in both groups before the course commenced.

To achieve the study's objectives, the treatment group was taught the writing metacognitive strategies using a flipped classroom approach. This involved delivering three types of metacognitive strategies through PowerPoint presentations or videos across ten sessions. In addition, they were meant to do particular writing activities regarding the specific strategy which were presented to them. Furthermore, to ensure that students can implement the strategies, more activities were done in the classroom context. The other class, which served as a control group was provided by writing metacognitive strategies in the classroom, taught by the teacher. Consequently, the class time was partitioned into two segments: the first section for teaching strategies and the latter part dedicated to writing activities. The primary emphasis was on effectively applying writing metacognitive strategies. Over the course of these ten sessions, students were instructed in three categories of writing metacognitive strategies, namely planning, drafting, and monitoring, editing, and evaluating. Upon the conclusion of the intervention, the post-tests of the study were conducted, which included the writing task (topic b), as well as the administration of SWS (Second Language Writing Anxiety) and SLWAI (Second Language Writing Anxiety Inventory).

Learners in both groups participated in ten instructional sessions, each lasting one hour and fifteen minutes. In both groups, learners were exposed to the same three writing metacognitive strategies. However, the instructional methods differed: the treatment group experienced a flipped classroom approach, whereas the control group was taught following the traditional method, with the teacher delivering the writing metacognitive strategies within the classroom setting. In contrast, the treatment group was made familiar with the writing metacognitive strategies via flipped learning, utilizing videos and PowerPoint presentations. In the control group, students attended lectures in the classroom and practiced implementing the strategies at home. Conversely, learners in the treatment group not only learned the strategies but also immediately applied them to a writing task. Furthermore, they participated in supervised class sessions for additional practice, where teachers provided guidance and support.

Five writing metacognitive strategies were chosen following O'Malley and Chamot's (1990) framework. These strategies encompassed: planning (Advance Organizers,

Directed Attention, and Functional Planning), monitoring (Self-Monitoring), and self-evaluation.

In experimental group, each strategy was taught before attending the class through a video or PowerPoint. First, the strategy was described and explained completely and also it was exemplified by the teacher. Next, the learners were presented a model using the related strategy. Finally, learners were given a practical task to practice applying the strategy.

Then, learners attended the class in which they were presented with various tasks which could be done through implementing the chosen strategy. Additionally, learners were encouraged to share their perspectives on the utilization of these selected strategies with both their peers and the teacher. They were also prompted to evaluate the efficacy of these strategies based on their experiences. Then, the learners were engaged in composing various types of essays, including advantage and disadvantage, problem and solution, opinion essays, as well as compare and contrast essays, sourced from the "IELTS Advantage Writing Skills" book. In the subsequent sections, a detailed breakdown of the procedures carried out in both groups will be provided.

FLIPPED classroom

In this study, the Cognitive Academic Language Learning Approach (CALLA), developed by Chamot and O'Malley (1994), was employed to implement the writing metacognitive strategies. The metacognitive writing strategies employed in this study encompass planning (utilizing Advance Organizers, Directed Attention, Self-management, and Functional Planning), monitoring (through Self-Monitoring), and Self-Evaluation. Regarding Chamot and O'Malley's (1994) CALLA, the five stages of preparation, presentation, practice, monitoring and evaluation, expansion, and teacher's assessment were followed in the present study to apply the above strategies. The five stages were as follows. There might be some variations in the stages of strategy instruction due to implementing flipped classroom.

Guidance regarding "the how" of strategy instruction can be found in the work of Chamot and O'Malley (1994). The primary focus of their approach is represented in the "Framework for Strategic Instruction" (See Fig. 1).

Following Tamer Mohammad Al-Jarrah et al. (2019) we added the last stage which was teacher's assessment.

Teacher's assessment teacher assesses learners' writing as well as their strategy use.

During these 10 sessions, Nguyen and Gu's (2013) the instructional procedure was taken into account to teach writing metacognitive strategies (planning, monitoring, evaluation) to the learners. Consequently, learners were asked to write various essay types (advantage and disadvantage, problem and solution, opinion essay, compare and contrast) implementing these strategies. They practiced setting goals, selecting learning strategies, relate to their prior knowledge, reflecting on their strategy use, monitoring and evaluating their writing process. They were trained to compose topic sentences, introduction, body, and conclusion paragraphs. Further, they were trained to use proper writing mechanics. Also, they got familiar with a list of vocabulary and phrases relevant to each topic and essay type. Various chunks were introduced to them which helped

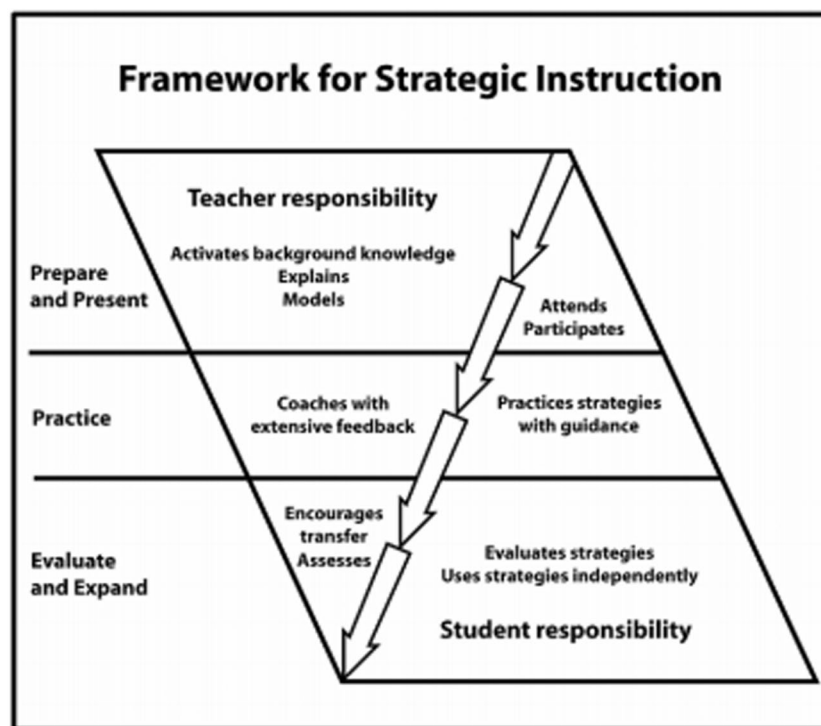


Fig. 1 Framework for Strategy Instruction

them start or link ideas. Moreover, they gained the ability to observe and evaluate their writing performance and their strategy use (Figs. 2 and 3).

Each session, learners worked on an essay topic from the IELTS Advantage Writing Skills book to apply what they have learned previously also they were supposed to do some after-class homework.

Non-FLIPPED classroom

Students in the non-flipped classroom covered the same course book, tasks, and materials. They followed the same instructional procedure except for the videos and power points which were given to be watched out of the classroom. Instead, the learners in the control group received teacher explanations about strategies. Simultaneously they were given various tasks to check their understanding of the strategies. They planned, monitored, and evaluated their writings in the class. They were provided by the planning strategy explanation, the aim of implementing this strategy. They learned the importance of setting a goal and the way to set achievable goals. Further, they were trained to identify the task requirements and also to brainstorm ideas, draw content maps, choose proper language writing mechanics both individually and collaboratively. Then, they were taught various ways to monitor their writing task and check the break downs and overcome their problems. In the end, they were given different types of evaluations and an explanation of the way it is done. Each session after the explanation of each strategy and providing them with a model, learners had few minutes to follow a writing task, but due to lack of time most of the tasks had to be done after class individually. Each

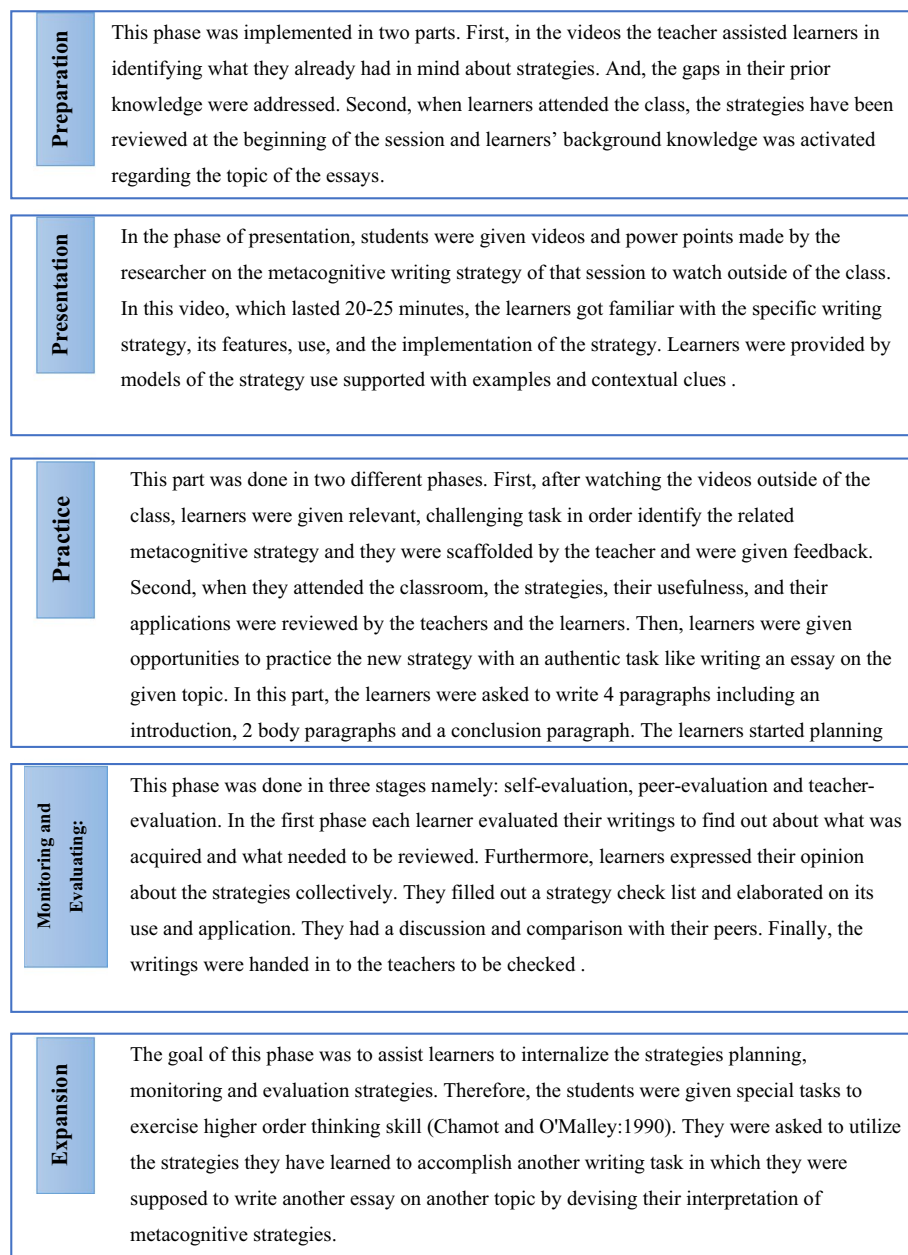


Fig. 2 The five basic stages of Chamot and O'Malley's (1994) CALLA conducted to implement the writing strategies in the flipped classroom

session, they were given a task to do as homework. The whole instructional process of both flipped and non-flipped classrooms is presented below.

Results

To insure the participants' homogeneity in general language proficiency, they took the Preliminary English Test (PET). The performance of both groups was compared using analysis of covariance (ANCOVA). As it can be seen in Table 1, there was no significant disparity in the PET scores of the two groups ($M = 61.26$, $SD = 13.36$) and the control

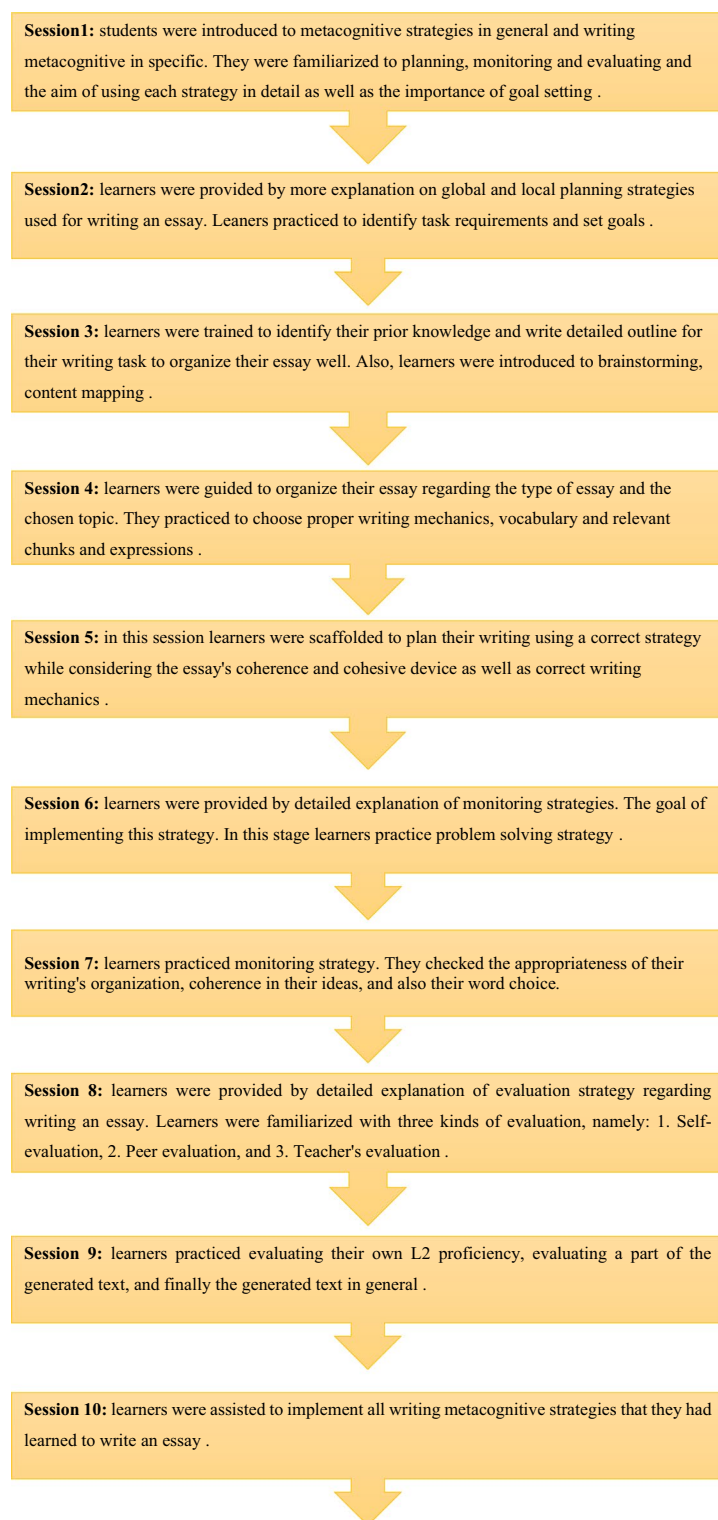


Fig. 3 The ten-session metacognitive writing strategy instruction in the flipped WSBIWSBI classroom

Table 1 Results of the PET for Each Group

Groups	M (SD)	T	Sig.
Experimental	61.26 (13.36)	— .613	.475
Control	62.98 (12.83)		

Table 2 Descriptive statistics for pre- and posttest scores

	Group	N	Mean	Std. deviation	Std. error mean
Pre.writing	Experimental	23	50.2609	10.63108	2.21673
	Control	22	54.5455	12.59526	2.68532
Post.writing	Experimental	23	69.3478	8.77294	1.82928
	Control	22	62.2273	12.83200	2.73579
Pre.efficacy	Experimental	23	20.3478	4.83462	1.00809
	Control	22	20.0455	3.25470	.69390
Post.efficacy	Experimental	23	25.0217	5.02376	1.04753
	Control	22	22.0227	3.31834	.70747
Pre.anxiety	Experimental	23	19.8478	5.16420	1.07681
	Control	22	21.0000	4.50661	.96081
Post.anxiety	Experimental	23	18.9130	3.50212	.73024
	Control	22	21.8864	5.21201	1.11120

group ($M = 62.98$, $SD = 12.83$); $t = -0.613$, $p > 0.05$). This suggests that both groups had a comparable level of general English proficiency before the commencement of the study's treatment.

Addressing the research questions

Table 2 below displays the descriptive statistics which show that the mean scores for both variables increased from the pre-test to the post-test. However, for a more conclusive understanding of these statistical changes, inferential statistics were used.

In order to test the assumption of normality, a one-sample Kolmogorov–Smirnov (K-S) test was executed on the scores obtained before and after the test. Within the context of the one-sample Kolmogorov–Smirnov (K-S) test, a significance level exceeding 0.05 suggests that the data conforms to a normal distribution. As illustrated in Fig. 4, the outcomes of the one-sample Kolmogorov–Smirnov (K-S) test revealed that the data displayed a distribution that adhered to normality.

Afterward, to answer the first research question and find out whether writing meta-cognitive strategy-based instruction through flipped classrooms significantly affected intermediate learners' writing performance, ANCOVA was performed. As outlined by Pallant and Manual (2007), ANCOVA is suitable for pre-test/post-test designs. This includes scenarios such as comparing the effects of distinct interventions by measuring before and after outcomes for each group. In ANCOVA, pre-test scores are treated as covariates to account for any initial disparities between the groups. This helps to ensure that the observed effects are not solely attributed to pre-existing differences.

Table 2 shows that the mean score of treatment group's pretest stood at 50.26. Remarkably, this score surged to 69.36 for the posttest writing performance. Similarly,

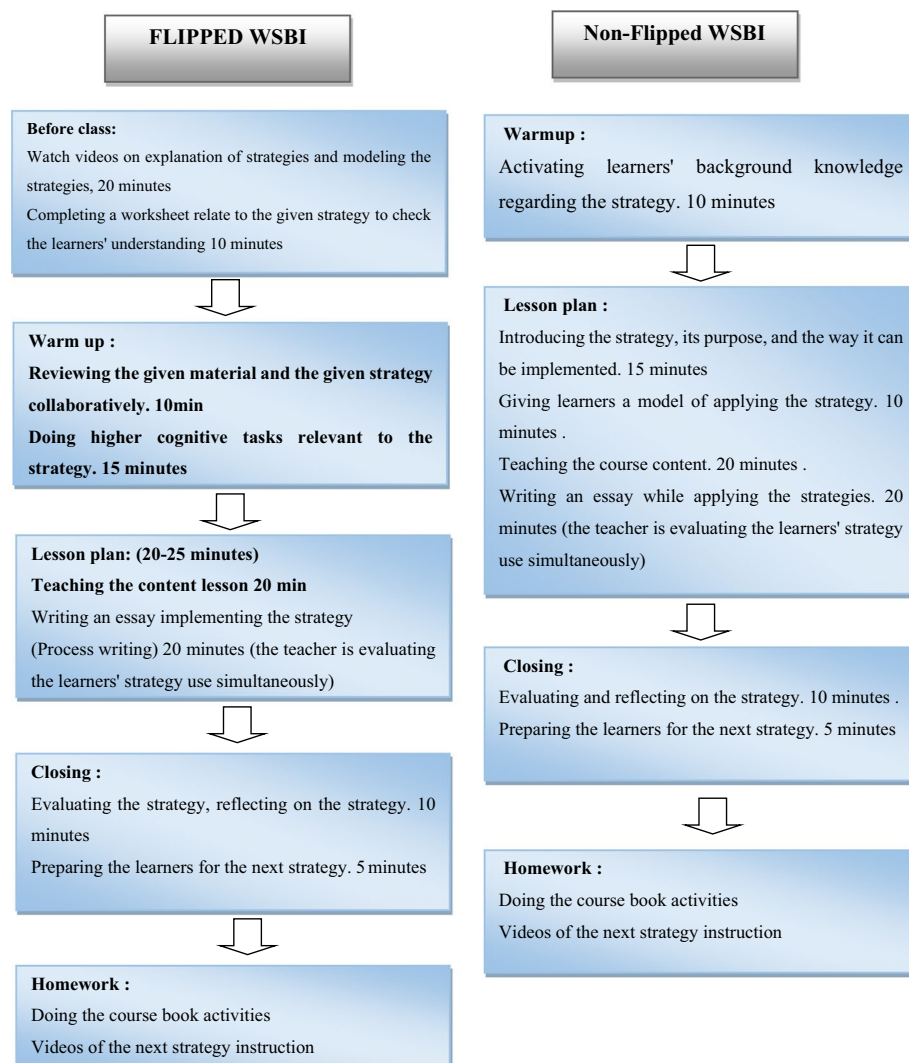


Fig. 4 Flipped and non-flipped classroom instructional processes

the control group's pretest mean score, which was 54.54 before the intervention, rose to 62.22 on the posttest. Consequently, it is evident that both instructional approaches improved writing proficiency in both groups (Fig. 5).

However, in order to identify which group has experienced a greater gain, ANCOVA was carried out. For this ANCOVA analysis, the independent variable was the type of instruction (flipped or traditional), while the dependent variable was the scores on the timed writing performance task conducted after the study's conclusion. The students' scores on the pretests were included as covariates in this analysis to account for their initial performance differences. Also, before conducting the ANCOVAs, the researchers employed several preliminary tests to ensure various assumptions of the covariate were not violated. These assumptions were as follows: normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement.

As it is shown in Table 3, a statistically significant difference is observed in the two groups' writing performance on the posttest, $F(1, 42) = 15.41$, $p = 0.00$, partial eta

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The categories defined by Group = Experimental and Control occur with probabilities 0.5 and 0.5.	One-Sample Binomial Test	.200 ¹²	Retain the null hypothesis.
2	The distribution of pre.motivation is normal with mean 20.200 and standard deviation 4.09.	One-Sample Kolmogorov-Smirnov Test	.200 ¹²	Retain the null hypothesis.
3	The distribution of post.motivation is normal with mean 23.556 and standard deviation 4.49.	One-Sample Kolmogorov-Smirnov Test	.200 ¹²	Retain the null hypothesis.
4	The distribution of pre.efficacy is normal with mean 20.411 and standard deviation 4.83.	One-Sample Kolmogorov-Smirnov Test	.200 ¹²	Retain the null hypothesis.
5	The distribution of post.efficacy is normal with mean 20.367 and standard deviation 4.62.	One-Sample Kolmogorov-Smirnov Test	.200 ¹²	Retain the null hypothesis.
6	The distribution of Pre.writing is normal with mean 52.356 and standard deviation 11.70.	One-Sample Kolmogorov-Smirnov Test	.200 ¹²	Retain the null hypothesis.
7	The distribution of Post.writing is normal with mean 65.867 and standard deviation 11.40.	One-Sample Kolmogorov-Smirnov Test	.200 ¹²	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

¹Lilliefors Corrected

²This is a lower bound of the true significance.

Fig. 5 Normality of data

Table 3 The Results of ANCOVA for writing performance scores

Source	Type III Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared
Corrected model	2870.321 ^a	2	1435.161	21.143	.000	.502
Intercept	2181.713	1	2181.713	32.142	.000	.434
Prewriting	2300.202	1	2300.202	33.887	.000	.447
Group	1046.028	1	1046.028	15.410	.000	.268
Error	2850.879	42	67.878			
Total	200,950.000	45				
Corrected total	5721.200	44				

squared = 0.26). This finding indicates that the learners in the experimental group had a greater development in their writing performance compared to the learners in the control group. This strongly suggests that writing metacognitive strategy-based

instruction through flipped classrooms significantly enhanced the intermediate learners' writing ability.

The second research question revolved around whether writing metacognitive strategy-based instruction through flipped classrooms effectively decreased EFL learners' writing anxiety. The descriptive statistics (see Table 2) reveal that in the experimental group, the participants' mean score for writing anxiety dropped from 19.84 in the pretest to 18.91 in the posttest. Conversely, writing anxiety mean score of the participants in the control group was 21 in the pretest, rising slightly to 21.88 in the posttest. Hence, it becomes evident that the implementation of flipped instruction led to a reduction in writing anxiety among the participants.

Moreover, inferential statistics were used to answer the second research question. Another One-Way ANCOVA was conducted on the writing anxiety scores to examine the effects of the two types of interventions on the participants' writing anxiety. As evidenced in Table 4, the ANCOVA results based on the General Linear Modeling technique showed a significant difference between both groups' posttest scores related to writing anxiety in experimental and control group $F(1, 42) = 5.00, p = 0.031$, partial eta squared = 0.10. This result underscores that the writing metacognitive strategy-based instruction through flipped classrooms played a substantial role in decreasing the writing anxiety of Iranian intermediate EFL learners.

The third research question explored whether writing strategy-based instruction through flipped classrooms led to a significant enhancement in intermediate learners' writing self-efficacy in an EFL context. The treatment group's average pretest score on writing self-efficacy was 20.34 (refer to Table 2). Notably, this score rose to 25.02 in the posttest. Similarly, the pretest mean score on writing self-efficacy for the control group was 20.04, increasing to 22.02 on the posttest. Hence, it is evident that both instructional approaches significantly played a role in fostering an improvement in writing self-efficacy among the participants in both groups.

To determine which group experienced a greater improvement, an ANCOVA was performed. In this analysis, the type of instruction (flipped or traditional) was independent variable, while the scores reflecting writing self-efficacy evaluated after the culmination of the study was the dependent variable, and students' initial scores (pretest) were utilized as covariates.

Table 4 The Results of ANCOVA for writing anxiety scores

Source	Type III sum of squares	df	Mean square	F	Sig	Partial Eta squared
Corrected model	449,045 ^a	2	224,522	19.219	.000	.478
Intercept	162,687	1	162,687	13.926	.001	.249
pre.anxiety	349,637	1	349,637	29.929	.000	.416
Group	58,441	1	58,441	5.003	.031	.106
Error	490,655	42	11,682			
Total	19,605,750	45				
Corrected total	939,700	44				

After adjusting for the writing self-efficacy scores on the pretest, a statistically significant difference became evident between the two groups' scores on the posttest, $F(1, 42) = 7.54$, $p = 0.09$, partial eta squared = 0.15 (refer to Table 5). This outcome indicates that the participants in the treatment group exhibited a notably greater enhancement in their writing self-efficacy compared to those in the control group. This strongly indicates the effectiveness of the intervention in this study.

Discussion

This study sought to examine the impact of writing metacognitive strategy-based instruction through flipped classrooms on learners' writing ability, writing anxiety, and writing self-efficacy. It was hypothesized that writing metacognitive strategy-based instruction through flipped classrooms would positively influence intermediate learners' writing performance.

The results showed that the treatment significantly enhanced writing ability of the relevant group. This finding is in line with the view of the researchers including Afrilyasanti et al., (2016), Güvenç (2018), Soltanpour and Valizadeh (2018) who carried out similar studies and claimed that there is a significant relationship between writing performance and flipped instruction.

Additionally, this discovery aligns with the previous research findings in this domain, including Wen's (2008) Output-driven/Input-enabled model. Wen asserted that the flipped classroom approach was more effective than traditional methods in enhancing EFL students' academic writing skills. One plausible explanation for these results could be attributed to the inverse structure of the flipped classroom, where EFL learners were exposed to course content before class through videos, notes, and lectures, thereby enhancing their engagement and understanding.

As Faulkner and Green (2015) point out, the flipped classroom format offers students the advantage of accessing content lessons prior to attending class. This facilitates repeated viewing and seamless integration of activities before and during class which facilitates students' self-paced and convenient learning. Conversely, Mehring (2016) highlights that, unlike flipped classrooms, students in the non-flipped classroom may not have equal opportunities for active interaction with peers, course content, and instructors.

Table 5 The Results of ANCOVA for Writing Self-efficacy Scores

Source	Type III sum of squares	df	Mean square	F	Sig	Partial Eta squared
Corrected model	394.717 ^a	2	197.358	16.817	.000	.445
Intercept	201.482	1	201.482	17.168	.000	.290
pre.self-efficacy	293.583	1	293.583	25.017	.000	.373
Group	88.545	1	88.545	7.545	.009	.152
Error	492.894	42	11.736			
Total	25,856.500	45				
Corrected total	887.611	44				

Hsieh and Marek (2017) claimed that learners in the flipped classroom are capable of completing the class activities as a result of spending a great deal of time on before-class activities. Accordingly, students had a full engagement in a variety of class activities and were able to act effectively and efficiently. However, the students in the traditional classroom weren't engaged in the class activities efficiently as they were exposed to different tasks after that class, not before the class and they didn't attend the class well prepared. Besides, the class time was allocated to teaching the strategies. Therefore, there was no time for engaging activities to work on the high cognitive skills of the learners and the class activities were mostly teacher-centered.

The present study also aimed at comparing students' writing anxiety and writing self-efficacy across flipped and non-flipped classrooms. Therefore, in addressing the second and third research questions, this study aimed at comparing the two groups' post-test mean scores. This part of the study aimed to ascertain the extent to which the independent variable (our treatment: writing metacognitive strategy-based instruction through flipped classrooms) influenced the dependent variables (writing anxiety, writing self-efficacy). The outcomes invalidated the null hypotheses for both writing self-efficacy and writing anxiety, revealing a noteworthy disparity in performance between the experimental and control groups.

In relation to students' writing self-efficacy, the outcomes of this study demonstrated that the implementation of writing metacognitive strategy-based instruction through flipped classrooms led to an improvement in students' self-efficacy. These findings accord with previous research, such as Namaziandost and Çakmak (2020), Chigbu et.al. (2023), and Chen et al. (2020), which also substantiate the notion that technology-assisted learning diminishes learners' writing anxiety and elevates their writing self-efficacy.

Furthermore, with respect to students' writing anxiety, the study's findings unveiled a reduction in writing anxiety through flipped instruction. However, this outcome diverged from the conclusions drawn by Lakarnchua et al. (2020), whose study indicated that the learners' L2 writing anxiety was not significantly impacted by the flipped approach. Whereas, several researchers (e.g., Chang & Lin, 2019; Ho, 2020) have referred to the facilitative role of flipped approach in reducing learners' anxiety. The participants of flipped approach were able to cover the course lesson beforehand and watch the given videos as much as needed at their own pace and attend the class well prepared. We may argue that this inverted learning style helped learners to attend their classes which lead to a great deal of cooperation and collaboration which in turn reduced learners' anxiety.

Conclusion

This study underscores the efficacy of employing metacognitive strategy-based instruction to improve intermediate learners' writing performance within a flipped learning environment. By providing evidence that supports the superior results of writing metacognitive strategy instruction, this research adds to the existing literature on the benefits of flipped classrooms, indicating that teaching writing metacognitive strategies through flipped classrooms enhances learners' writing skills. When the flipped classroom is fully conducted, it facilitates learners' engagement and interaction in class as well as their independence and autonomy out of class. Additionally,

flipped classroom provides learners with the opportunity for the self-paced study of the course content and review of the lessons as much as needed which ensures their prepared class attendance. They are ready to take part in various interactive activities involving high cognitive skills and implementing useful strategies as flipped learning is a promising technique for enhancing a student-centered classroom and enables the teacher to give advice and instruction as students write compositions and apply different metacognitive strategies during class time.

Furthermore, when the content lesson is covered before joining the class, it benefits learners' self-efficacy and decreases their anxiety. As learners study the lessons and watch the videos and read the materials at their own pace, and are assisted by teachers, they can recognize their style of learning and cope with the barriers efficiently. Consequently, their self-efficacy is increased and they experience less anxiety in doing the class activities in a friendlier environment interacting with their classmate, having enough time to practice what they already acquired.

While the positive outcomes of incorporating writing metacognitive strategy-based instruction within flipped classrooms are highlighted, it is important for researchers to acknowledge that diverse learning environments, cultural contexts, and participant characteristics can yield varying learning outcomes. Therefore, it is advisable for language educators to adapt a similar study design to different EFL scenarios to gather additional evidence endorsing the efficacy of strategy utilization within flipped classrooms.

Researchers are able to test different approaches and theories and gain experiences by carrying out carefully-organized and controlled studies. Also, they can easily ignore external factors which might influence their results. As an instance, before deciding that implementing flipped classroom can affect X, Y or Z, it is essential to ensure the provision of flipped approach and no other factors. By doing this, the researcher ensures that one of the variables is eliminated. To date, no researcher claims that 'I controlled all variables in conducting a study,' due to the fact that all these studies are conducted on human beings and possibly there are uncontrolled variables that must be controlled, and practically it is impossible. Consequently, this study only focused on the writing skill of Iranian intermediate EFL students. Finally, a number of limitations are listed below in order to limit the effect of other variables.

- A. The current study was restricted to intermediate EFL students of only one language center in Iran.
- B. the current research was conducted on Iranian EFL learners whose mother tongue was Kurdish. Therefore, researchers can obtain different results by conducting this study on other languages.
- C. In the present study, only writing metacognitive strategies were used.
- D. This study only focused on two affective variables including: writing anxiety and writing self-efficacy; researchers can investigate the effect of flipped learning on the other affective variables. Pronunciation of the content words and other language skills and sub-skills were not paid attention to.
- E. The participants of the study were between the ages 17 to 24, thus the findings could not be generalized to learners with other ages.

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Author contributions

Almost all researchers contributed to all parts equally, including data collection, literature review, data analysis, and discussion parts.

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Availability of data and materials

Data will be available on reasonable request.

Declarations

Competing interests

The authors declare that they have no competing interests.

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