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Impact of Flipped Classroom Integrated with MOOCs on Intermediate EFL Learners' Self-Regulated Writing Strategies*

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Abstract

This study aimed to examine the impact of flipped classroom (FC) integrated with Massive Open Online Courses (MOOCs) on EFL learners' use of self-regulated learning (SRL) strategies in writing. To this end, 60 intermediate college students, who were homogenized by a placement test, were selected and randomly divided into experimental and control groups. The treatment for the experimental group (flipped classroom integrated with MOOCs), took place in three phases, namely before class, in class, and after class. Before class, the materials and sources were delivered via Moodle application, a MOOC-based educational program. In class, the students participated in group discussions and an interactive feedback session. After class, they received online support. The participants in the control group attended the traditional face-to-face writing course, without the use of any technology-based instruments. They underwent only two phases: in-class and after-class activities. Before the treatment, an SRL strategies questionnaire was administered to all the participants. The same questionnaire was again administered to them at the end of the treatment. The results of ANOVA revealed that flipped classroom integrated with MOOCs had a statistically significant positive effect on the experimental group's overall use of SRL strategies. Similarly, the method, performance, and social environment SRL dimensions improved significantly in the experimental group. Flipped classroom integrated with MOOCs may provide valuable insights for EFL contexts, particularly by encouraging self-regulated learning and reducing teacher workload, which can support the development of academic writing skills.

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Introduction

Non-native speakers of English still seem to have great difficulty in acquiring and developing practical writing skills in higher education (Arefsadr & Babaii, 2023; El-Soussi, 2021; Kurk & Atay, 2007; McCarthey & Ro, 2011; Müller, 2015; Pyo, 2020). As McCarthey and Ro (2011) noted, despite all the attempts to improve students' writing in higher education, at least as far as teaching methods of writing are concerned, there have not been many changes and improvements in students' writing skills, probably because most teaching methods are still traditional (McCarthey & Ro, 2011). The problem may be rooted in conventional banking systems of education that students are always waiting for others to tell them what to do (Ihejirika, 2017).

Additionally, there can be numerous other reasons why writing is difficult for university students. For example, they may have problems with time constraints (Arefsadr & Babaii, 2023; Arefsadr et al., 2022; Weigle, 2002), coherence and cohesion (Yao, 2014), and the linguistic aspects of writing such as vocabulary and grammar (Meslissorgou & Frantzi, 2015; Pyo, 2020). Arefsadr and Babaii (2023), for example, found that essay writing was difficult for IELTS candidates mainly because of insufficient time, unfamiliar topics, excessive pressure to use advanced vocabulary and grammar, and even ambiguous task instructions. An interesting point is that almost all these reported problems seem to be cognitive.

However, what seems to be under-researched is that the difficulty of writing may also be rooted in the fact that university students may fail to take cognizance of or sufficiently use some higher-order *metacognitive skills* such as self-regulated learning (SRL) strategies. To investigate this, first, it is important to see what SRL strategies are. Having analyzed and considered numerous previous definitions of language learning strategies, Oxford (2017) provided a comprehensive definition of second language (L2) learning strategies, whose opening sentence reads "L2 learning strategies are complex, dynamic thoughts and actions, selected and used by learners with some degree of consciousness in specific contexts to regulate multiple aspects of themselves" (p. 48). This highlights that L2 learning strategies involve not only thoughts but also actions aimed at regulating or managing one's thoughts within particular contexts. Essentially, learning strategies are closely related to self-regulation (Oxford, 2017) because learners have to consciously think about which strategies to use in their particular circumstances (Oxford, 2017).

As far as writing is concerned, Zimmerman and Risemberg (1997) defined self-regulation in writing as the self-motivated feelings, thoughts, and actions that language learners use to achieve their goals, including developing their writing skills. This means that even if university students of English as a Foreign Language (EFL) are good at vocabulary and grammar, they may still need to manage their thoughts and emotions to be successful writers. This is so probably because SRL puts individuals in charge of their learning of cognition, metacognition, motivation, and behavior (Zimmerman, 1990). It is, therefore, important to familiarize students with SRL (Aghaie & Zhang, 2012; Cohen, 2011), especially in writing to become more independent of teachers (De Silva & Graham, 2015).

To meet learners' needs in modern times, higher education institutions have considered innovative online and technology-based teaching and learning approaches (Cha & So, 2020). One of these approaches is flipped learning, also referred to as *flipped classrooms* (FCs). It is usually explained as flipping or changing what usually happens in the class with what usually happens at home in such a way that learner's study new lessons at home mainly through instructional videos provided by teachers, and then they do their homework in the class, thereby making an inversion in the learning process (Hwang et al., 2015; Lage et al., 2000). One way to increase this independence from teachers seems to be the FCs, especially because in the FCs, students have to take more responsibility for their learning and watch instructional videos by themselves, relying on themselves to understand new materials. This can increase their self-confidence and autonomy (Afrilyasanti et al., 2016), which seem to be important characteristics of good writers. The literature on FCs widely reports the benefits of this inversion or flipping (Turan & Akdag-Cimen, 2020; Van Alten et al., 2019).

However, FCs can have their disadvantages, one of which is the extra workload created for teachers as they need to spend a lot of time preparing materials (Mehring & Leis, 2020), especially videos. As Leis et al. (2015) noted, "preparation for flipped classrooms can be very time-consuming" (p. 39). It is, therefore, necessary to see how teachers can benefit from the advantages of the FCs for increasing their students' independence, in particular, and use of SRL strategies, in general, without more workload for themselves.

According to recent studies (e.g., Hung et al., 2019), the FCs are not limited to a single method. Rather, they can be mixed with different resources based on the circumstances. For instance, there is an increasing interest in examining how well Massive Open Online Courses (MOOCs) and the FCs can work together as resources to improve learning and teaching (Mellati & Khademi, 2019), especially because the problem of creating videos, which is the heavy workload for teachers, may be solved if the teachers of the FCs can use already available videos created by professional instructors for MOOCs or other courses. Additionally, both the FCs and MOOCs require learners to engage in activities outside of the classroom in a way that the majority of educational materials are delivered online and practiced before class sessions, which can require students to take more responsibility for their learning.

All this is the rationale behind integrating the FCs with MOOCs as it can be a unique type of blended learning that may have the potential to increase students' use of SRL strategies, autonomy, and independence, in particular, and meet 21st-century language learners' and language teachers' needs, in general. In other words, by integrating the FCs with MOOCs, not only can teachers take advantage of the benefits of both approaches by compensating for the disadvantages of each approach with the advantages of the other one, they may also be able to increase their students' understanding and use of SRL strategies, thereby making a valuable contribution to overcoming the difficulties that EFL university students usually experience in writing.

The present study, then, aimed to investigate these issues by exploring whether flipped classroom integrated with MOOCs could affect university EFL learners' use of SRL strategies and how this could improve their academic writing skills. To this end, the following research question was developed.

Research question: Does the flipped classroom integrated with MOOCs, as opposed to traditional classroom, have any statistically significant impact on intermediate EFL learners' use of self-regulated learning strategies in writing?

Literature Review

The Flipped Classrooms

The flipped classrooms seem to be well-studied in higher education. In a meta-analysis, Van Alten- et al.- (2019) analyzed 114 studies in different academic domains that compared traditional classes with flipped ones. They found that FCs were generally more effective than the traditional classrooms. However, concerning university students' satisfaction with the FCs, they did not find any statistically significant differences. In another meta-analysis more directly related to language teaching and learning, Turan and Akdag-Cimen (2020) analyzed 43 studies and found only one study that showed FCs were not better than traditional ones. Thus, the effectiveness of FCs, as compared to traditional classrooms, seems to be a well-supported fact in the context of language teaching.

In addition, concerning university students' writing skills, there is also a promising picture for the FCs. Several studies compared traditional writing classes with flipped ones, showing that the FCs could better contribute to the development of students' writing skills (e.g., Ekmekci, 2017; Leis et al., 2015; Pavanelli, 2018). In the context of Iran, Fathi and Rahimi (2022) investigated how effectively FCs may improve Iranian university EFL students' writing complexity, accuracy, and fluency. They found that FCs were more effective than traditional ones in students' fluency and global writing performance in writing.

Similarly, Raza Khan and Zulfiquar (2022) investigated the impact of flipped learning on EFL students' writing abilities. They divided the students into two groups of experimental and control. The experimental group received flipped learning instruction in both asynchronous and synchronous settings, whereas the control group received instruction in writing exclusively in the synchronous setting. Results of the post-test indicated that the experimental participants surpassed the control participants in writing. Similarly, Challob (2021) explored how flipped learning affected EFL students' writing abilities, motivation, and autonomy. He found that flipped learning created a collaborative and user-friendly learning environment. As a result of flipped learning, students' English writing abilities, motivation, and autonomy improved. In another study, Buitrago and Díaz (2018) guided learners in crafting a compare-and-contrast essay through flipped writing workshops, demonstrating the success of the flipped approach in composition writing within an L2 context. Thus, it seems that FCs are probably more effective than traditional classrooms considering teaching writing.

MOOCs

Research on MOOCs has a long history. MOOCs rose to popularity when the New York Times called 2012 the year of the MOOC (Pappano, 2012). This was due to MOOCs sharing common features with other online courses, such as flexibility in terms of time and location for learning. However, they possess unique characteristics, notably their massive scale, which can include thousands of participants (McAuley et al., 2010). They are mainly *open* in the sense of being free of charge except for getting some formal certificates (Lee et al., 2019), and finally, they

are actual *courses* with a structured curriculum (Tschofen & Mackness, 2012). Therefore, MOOCs can offer affordable and flexible learning opportunities to language learners.

As stated above, numerous studies have examined the effectiveness of MOOCs. Ghemmour and Sarnou (2016), for example, found that MOOCs increased students' productivity and that both students and teachers showed positive attitudes toward them. Shirkhani and Poorhadian (2024), who investigated the effects of MOOCs, on EFL learners' reading comprehension, reported that only the former (i.e., the MOOCs) had positive effects on their participants' reading comprehension. Yaşar (2020) also showed that MOOCs significantly enhanced EFL students' communication skills similar to what Gilliland et al. (2018) found in that MOOCs increased interaction among language learners. Additionally, Zubkov (2022) found that MOOCs can have good potential for significantly developing EFL learners' writing skills. MOOCs, then, seem to have been effective in EFL contexts.

Nonetheless, MOOCs are not without their limitations. Since an instructor cannot naturally interact with thousands of students, a lack of direct learner-teacher interaction, a lack of enough or any teacher feedback can be among the main limitations of MOOCs (Gilliland et al., 2018; Margaryan et al., 2015). For example, by analyzing 76 MOOCs, Margaryan et al. (2015) reported that in none of the MOOCs they analyzed, instructor feedback was provided. They further showed that the quality of the instructional design of most MOOCs was low and that most of the MOOCs they analyzed (67 out of 76), were not designed to solve any particular problems. Furthermore, since MOOCs usually have participants from all over the world and form heterogeneous groups of learners (Jitpaisarnwattana et al., 2019), the influence of such courses on local universities is not clear.

These issues, namely the lack of enough (or any) learner-teacher interaction and especially teacher feedback and the unclear local applications of MOOCs may be addressed by blending MOOCs with in-person physically-held courses. This has been one of the reasons behind integrating MOOCs with the FCs in this study, because it was assumed that the FCs may provide the necessary feedback and interaction needed for writing courses, which are not usually provided in MOOCs. A review of some studies on such integration has been presented below.

The Flipped Classrooms Integrated with MOOCs

The FCs can be integrated with MOOCs in a number of ways. For example, after analyzing the ways MOOCs can be integrated with other courses, Cha and So (2020) presented a framework that comprised three forms of integration: *formal MOOC learning,* which does not have any in-person instruction to get an academic certificate; *formal blended MOOC learning*, in which MOOCs are used to replace or complement some aspects of formal courses; and *non-formal or informal MOOC learning*, in which students are not given any credits or certificates (Cha & So, 2020). In another study, Wang and Zhu (2019) compared MOOC-based flipped learning with traditional learning in a chemistry class, showing that the participants in the MOOC-based flipped classroom outperformed those in the traditional classroom. In addition, Yaşar (2020) explored how MOOCs could affect the learning outcomes and English communication skills of EFL students. The results indicated that the use of MOOCs significantly improved EFL students' English communication skills. Moreover, Ghemmour and Sarnou (2016) studied the

impact of MOOCs on teaching and learning EFL contexts. Through this study, researchers were able to explore a completely new aspect of EFL teaching and learning in Algeria, where the adoption of MOOCs in Algerian universities is a major concern. The results of Ghemmour and Sarnou's (2016) study demonstrated that MOOCs could increase students' productivity and that both students and teachers demonstrated positive attitudes toward teaching MOOCs. In another study, Li, et al. (2015) also integrated a MOOC and flipped classroom in an undergraduate course, showing that the integration was very well-received by the participants.

Integrating the FCs with MOOCs, then, seems to benefit various language skills, including writing, which is very important in higher education. Overall, integrating the FCs with MOOCs seems a promising approach to learning, especially because, as Dalipi et al. (2017) asserted, MOOC-based learning encourages independent and self-paced learning, and the FCs encourage self-organization and personal learning, all of which seem indispensable for effective learning.

As both the FCs and MOOCs necessitate participants to be self-study autonomous learners, and because one of the aspects of being a successful self-study learner is to have SRL strategies, it seems necessary to investigate the effectiveness of integrating the FCs with MOOCs on learners' use of SRL strategies in writing.

Self-Regulated Learning and Self-Regulated Learning Strategies in Writing

Zimmerman (1989) suggests that self-regulated learners are self-motivated, use metacognition, manage their efforts, and do not rely much on teachers and others for learning. SRL is, therefore, closely related to self-regulation and metacognition in a way that Lajoie (2008) contended that the terms metacognition, self-regulation, and self-regulated learning are often used interchangeably (Lajoie, 2008).

SRL encompasses various aspects. Andrade (2012), for example, outlines six dimensions: (a) *method*, which relates to learning strategies, (b) *motive*, which shows goals and reasons for learning, (c) *time* in the sense of time management, (d) *performance*, which refers to evaluation, reflection and revision of goals, (e) *physical environment*, which should be conducive to learning, and finally (f) *social environment*, which can promote cooperation with other learners and willingness to get help (2012, 117). In the current study, these dimensions have been used to investigate the impact of integrating flipped classroom with MOOCs on EFL university students' use of SRL strategies.

In another study, closely related to the present study, Abadikhah et al. (2018) investigated EFL students' attitudes to SRL strategies in academic writing in the Iranian context. They used a questionnaire with 60 items that addressed the six dimensions of SRL discussed above. Table 1 clarifies what these dimensions refer to.

Table 1. *Dimensions of SRL Strategies (Adopted from Abadikhah, et al., 2018, p. 6)*

Dimensions	Scales	More information on the scales
Motive	Goal-setting, self-efficacy	"Specifying intended actions or outcomes" (Zimmermann, 1998,76) "Belief in one's capabilities to successfully perform an activity" (Brown, 2007)
Method	Task strategies	"Analyzing tasks and identifying specific, advantageous methods for learning" (Zimmermann, 1998, 76)
Time	Time management	"Estimating and budgeting use of time" (Zimmermann, 1998,77)
Performance	Self-evaluation, self-consequence	"Setting criteria and using them for judging oneself" (Zimmermann, 1998, 76) "Making personal rewards or punishments contingent on accomplishments'' (Zimmermann, 1998, 76)
Physical environment	Environmental structuring	"Locating places to study that are quiet or not distracting" (Dembo & Eaton, 2000, 483)
Social environment	Help-seeking	"Selection of particular models, teachers, or books to help oneself to learn" (Zimmermann, 1998, 76)

Abadikhah et al. (2018) found that the *method* and *social environment* dimensions of SRL were the most highly regulated ones. They were followed by *physical environment*, *performance*, and *motive*. *Time* was the least regulated dimension of SRL strategies, suggesting that managing time was the most important problem that their participants experienced in writing.

The application of SLR in writing seems to be instrumental in mitigating the difficulties that EFL students face in writing. In this regard, there are several studies that have shown some positive relationships between SRL and better writing performance. Teng and Zhang (2018), for example, investigated the effect of SRL strategies on university EFL learners' writing performance, reporting that SRL strategies were positively related to writing performance. Zhou and Hiver (2022) also explored the relationship between self-regulated writing strategies and Chinese college students' second language writing engagement, showing that the use of SRL strategies positively correlated with students' engagement in their writing classes, and hence helped them to avoid procrastinating their writing tasks.

SRL strategies in the context of writing have also been investigated in MOOCs, particularly because MOOCs usually require learners to apply SRL to determine *the how* and *the what* of learning (Hood et al., 2015). Milligan and Littlejohn (2016), for example, explored SRL in a MOOC and found noticeable differences in the individuals' application of SRL. In another study, Hood et al. (2015) investigated the effect of context on SRL strategies in a MOOC setting, suggesting that context can play a significant role in the application of SRL strategies, especially as far as self-efficacy is concerned. Along the same line, Littlejohn et al. (2016) explored learners' motivation and their use of SRL strategies in a MOOC, showing that motivation behind participation in a MOOC can influence the use of SRL strategies.

Despite the literature on MOOCs and SRL strategies, it seems that few studies, especially in the context of Iran, have focused on MOOCs when integrated with the FCs and how such

integration may influence learners' use of SRL strategies. To fill such a gap, the present study aimed to investigate the impact of flipped classrooms integrated with MOOCs on Iranian EFL learners' use of SRL strategies in writing.

Method

Participants

Sixty Iranian intermediate EFL learners (24 males, 36 females) participated in the present study. Their ages ranged from 20 to 30, and they were all native speakers of Persian. They were sophomores of English literature and English translation at a major university in one of the major cities of Iran. The participants were selected non-randomly based on the convenience sampling method but were then grouped into control and experimental groups randomly.

Materials and Instruments

In this study, the following materials and data collection instruments were utilized. First, Longman Academic Writing Series 3 (Oshima & Hogue, 2017) was employed to teach writing during the writing course. Second, the Oxford Placement Test (Allan, 2004) was used to homogenize the participants at the beginning of the study. The third instrument was the SRL Strategies Questionnaire (Abadikhah, et al., 2018; Zimmerman, 1994), which was validated and customized for the Iranian context. The questionnaire included 60 items on a 5-point Likert scale ranging from 1=never to 5=always and covered the following six dimensions: physical environment, performance, social environment, method, motive, and time. Finally, the fourth instrument was the Moodle platform, which formed the backbone of the MOOC-based educational program in this study.

Procedure

First, by convenience sampling, sixty college students whose English proficiency was tested by the Oxford Placement Test created by Allan (2004) to be intermediate were selected as the participants of the study. The OPT consists of 200 items assessing EFL students' vocabulary and grammar, as well as their reading and listening skills. The reliability index of the entire test was 0.89, and for the individual subsections, reliability indices ranged from 0.81 to 0.86 (as checked by Fathi & Rahimi, 2020).

The participants were, then, randomly divided into the experimental group, that is, flipped classroom integrated with MOOCs, and the control group, which received traditional face-to-face writing instruction. Following the researchers' explanation of the study's goals, the participants were asked to sign a consent form for participating in the study.

Subsequently, the SRL strategies questionnaire was translated from English to Farsi, and, to confirm its content validity, the items of the questionnaire were proofread and modified by the researchers and two Ph.D. holders in TEFL for any required changes. Furthermore, to estimate the reliability of the questionnaire, it was piloted among 15 non-participants, and the Cronbach-alpha reliability index was calculated, which turned out to be 0.91. After preparing the questionnaire, the participants were asked to fill it in at the beginning of the study, which took them 25 to 30 minutes to complete.

Next, the participants of the experimental group underwent a single session to receive instruction on working with the online program and the Moodle application in order to mitigate their potential performance discrepancies because of varying levels of familiarity with the online platform. All this was done by one of the researchers.

The treatment for the experimental group took place in three phases: before class, in class, and after class. Before class, the materials and resources, including written texts and some videos, were delivered via Moodle application, a MOOC-based educational program. The study integrated the FCs with MOOCs mainly in this phase, through the use of the Moodle application. Throughout the course, instructional materials for the experimental group consisted of writing assignments presented via videos. Additionally, some short tasks and sometimes quizzes were used in this phase to check participants' comprehension of the points raised concerning writing.

In the class phase, the instructional session started with a 20-minute introduction to the teaching contents which was supplemented by clarifications provided by the teacher. Afterward, the teacher completed teaching videos, the online test, and a subsequent assessment to check immediate comprehension and application of the newly introduced concepts. This usually took about 25 minutes. Then, the participants engaged in group discussions for 20 minutes, considering challenges and reflecting on the issues raised during the previous phase to foster collaborative problem-solving skills and reflective thinking. Next, a 20-minute interactive feedback session enriched the process where participants worked in pairs under the guidance of the teacher. The instruction process facilitated a deeper understanding of the material through various writing tasks and assignments that the teacher presented (e.g., rewriting and editing paragraphs). The conclusive stage of the in-class phase was the students' submission of their written responses, providing the application of the acquired knowledge. Therefore, the learners could learn the writing contents at home and complete homework assignments in class, contrary to traditional classroom practices.

In the after-class phase, the students communicated with each other online, asking each other questions about their understanding of videos. If they could not comprehend some points presented in the videos, they could ask their teacher, who provided online support in the form of briefly explaining the difficult-to-understand points.

The participants in the control group studied the writing course face-to-face, without any technology-based instruments. They underwent only two phases, namely in-class and after-class activities. A daily quiz and review of grammar concepts from the previous lesson were followed by a teacher-centered lesson. The materials were presented in the form of traditional paper-and-pencil format with various classroom activities such as corrective feedback, peer corrections, paired and group activities, and so on. The course consisted of teaching all the same contents (topics and lessons) that were taught to the participants in the experimental group in six 90-minute sessions.

After class time, the learners were required to complete several related writing tasks as homework. These tasks included paragraph writing, writing apt topic sentences and conclusions, and revising writing for grammatical errors. It is also to be noted that all the class

sessions of both the experimental and the control group were taught by the same teacher, who is one of the researchers of this study.

After the treatment, the same SRL strategies questionnaire was given to the participants of both groups to see if the treatment of flipped classroom integrated with MOOCs had any effects on the experimental group participants' use of SRL strategies. Finally, to ensure the validity of the results, before and after conducting all the statistical tests, the choice of statistical tests and all the results were checked by two experts, a statistician as well as a university professor of applied linguistics. The results are reported below.

Results

The results of the independent samples *t*-test, which was run to see if there was any statistically significant difference between experimental group participants' total SRL strategies scores with those of the control group participants at the beginning of the study, showed that the experimental group participants' mean score (M = 103.56, SD = 29.24) was not different from that of the participants of the traditional group (M = 114.80, SD = 26.26) in a statistically significant way, with $t(58) = 1.56$, $p = .12$. In other words, the groups were more or less homogeneous concerning their SRL strategies at the beginning of the study.

After the treatment, a one-way ANOVA was run to compare the experimental group and control group at the beginning and end of the study. Table 2 shows the results of descriptive statistics based on mean and standard deviation.

Table 2. *Descriptive Statistics Based on Mean and Standard Deviation*

	FMOOC group mean & standard deviation before the treatment		FMOOC group mean & standard deviation after the treatment		Traditional group mean & standard deviation before the treatment		Traditional group mean & standard deviation after the treatment	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Overall SRL Strategies	103.56	29.24	148.16	39.48	114.8	26.26	119.73	32.89
Motive	41.03	10.19	41.00	13.14	39.00	8.84	38.43	10.57
Method	13.83	5.09	22.86	9.82	11.93	3.28	13.46	3.15
Time	22.20	7.62	24.80	10.23	20.10	7.19	25.23	9.14
Performance	31.33	8.77	49.26	17.56	31.63	10.17	44.10	13.09
Physical environment	13.66	4.92	13.66	2.96	11.00	4.90	13.53	4.50
Social environment	12.56	3.77	17.70	5.40	12.46	3.09	14.23	3.75

Note: FMOOC stands for the flipped-MOOC or the experimental group.

As seen in Table 2, the experimental group's improvement in different subcategories of SRL strategies was greater than that of the control group after the treatment in all subcategories of self-regulation. Table 3 shows the results of the ANOVA test based on the degree of freedom and the significance value (only the between-groups results have been reported).

Table 3. *Results of ANOVA*

	Sum of Squares	df	Mean Square	*F*	Sig.
SRL strategies	32421.267	3	10807.089	10.327	.000
Motive	163.533	3	54.511	.467	.706
Method	2216.958	3	738.986	20.631	.000
Time	517.500	3	172.500	2.313	.080
Performance	7426.867	3	2475.622	14.995	.000
Physical environment	155.067	3	51.689	2.671	.051
Social environment	537.492	3	179.164	10.677	.000

As Table 3 shows, for the total *SRL strategies* as well as the *method*, *performance*, and *social environment* dimensions, the significance value is significant at .000, and, therefore, there was a statistically significant difference in the means of total SRL strategies and the method, performance, and social environment dimensions between the groups. More technically put, for the total use of SRL strategies ANOVA result was F (3,116) = 10.327, p = .000, with an effect size of .21, which is a large effect size. For the method, performance, and social environment dimensions, the results were F (3,116) = 20.631, p = .000, F (3,116) = 14.995, p = .000, and F (3,116) = 10.677, p = .000, respectively. Their effect sizes were also .34, .27, and .21, respectively, all showing large effect sizes. To see where the differences lie, a post hoc test was run, whose results are shown in Table 4. In this table, only the significant results (without their repetitions) have been reported.

Table 4. *The Significant Results of the Post hoc Test.*

Dependent Variable	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.
SRL strategies	FMOOC2	FMOOC1	44.60	8.35	.000
		Traditional1	33.36	8.35	.002
		Traditional2	28.43	8.35	.011
Method	FMOOC2	FMOOC1	9.033	1.54	.000
		Traditional1	10.93	1.54	.000
		Traditional2	9.40	1.54	.000
Performance	FMOOC2	FMOOC1	18.13	3.31	.000
		Traditional1	17.63	3.31	.000
	Traditional2	FMOOC1	12.96	3.31	.002
		Traditional1	12.46	3.31	.004
Social environment	FMOOC2	FMOOC1	5.13	1.05	.000
		Traditional1	5.23	1.05	.000
		Traditional2	3.46	1.05	.016

Note. FMOOC1 means the flipped-MOOC group at the beginning of the study, and FMOOC2 means the flipped-MOOC group at the end of the study. Similarly, Traditional1 means traditional group at the beginning of the study, and Traditional2 means traditional group at the end of the study. The mean difference is significant at the 0.05 level.

The comparisons shown in the Scheffé post hoc test revealed that the four groups of scores (FMOOC1, FMOOC2, Traditional 1, and Traditional 2) were different in a statistically significant way in the following comparisons.

The total use of SRL strategies by FMOOC2 or the experimental group at the end of the study with a mean of 148.16 was higher than the total use of SRL strategies by FMOOC1 (*M* = 103.56, *P* = .000), Traditional 1 (*M* = 114.8, *P* = .002), and Traditional 2 (*M* = 119.73, *P* = .011) in a statistically significant way.

Concerning the method dimension, the use of method strategies by FMOOC2 or the experimental group at the end of the study with a mean of 22.86 was higher than the use of method strategies by FMOOC1 (*M* = 13.83), Traditional 1 (*M* = 11.93), and Traditional 2 (*M* = 13.46), all at the *P* = .000 significance level.

As for the performance dimension, the use of performance strategies by FMOOC2 at the end of the study with a mean of 49.26 was higher than such use by FMOOC1 (*M* = 31.33) and the Traditional 1 (*M* = 31.63), both at the *P* = .000 significance level. FMOOC1 compared to Traditional 2 was significant at *P* = .002, and Traditional 1 compared to Traditional 2 was significant at *P* = .004.

Finally, regarding the social environment dimension, the use of social environment strategies by FMOOC2 with a mean of 17.70 was higher than such use by FMOOC1 (*M* = 12.56) and Traditional 1 (*M* = 12.46), both at *P* = .000. The use of social environment strategies by FMOOC2 (*M* = 17.70) was also higher than such use by Traditional2 (*M* = 14.23) in a statistically significant way at *P* = .016.

Flipped-MOOC group participants' uses of SRL strategies were different from such uses by the participants of the control group in the total use of SRL strategies and the dimensions of *method* and *social environment*. Concerning the *performance* dimension, the experimental group was not different from the control group in a statistically significant way at the end of the study (*P* = 492). However, the experimental group participant's use of performance strategies at the end of the study was different from such use by the same group as well as the control group at the beginning of the study.

Discussion

As reported in the results section, the findings revealed that flipped classrooms integrated with MOOCs could increase the experimental group participants' use of SRL strategies in writing, in general, and the *method*, *performance*, and *social environment* dimensions, in particular. This is partly in line with the results of Abadikhah, et al.'s (2018) study. They reported the obtained means of their participants' use of SRL strategies based on high means (ranging from 3.5 to 5.0), moderate means (between 2.5 and 3.4), and low means (between 1.0 to 2.4). They found that the dimensions of *method* and *social environment* had the highest means and were the most regulated SRL strategies compared to the other dimensions. As for the overall use of SRL strategies, the results are similar to the results of Ishartono, et al.'s (2022) study that reported the positive effects of blended learning and flipped-MOOC learning on SRL strategies.

By considering the questions that are related to every one of the method, performance, and social environment dimensions, which were significantly affected by flipped-MOOC learning, some inferences may be drawn as to why flipped classroom integrated with MOOCs could positively affect the use of SRL strategies and these dimensions. To start with, these

dimensions seem to have some points in common. For example, questions related to the method dimension are mainly about pre-writing activities such as idea generating and using graphic organizers, and post-writing activities such as revising and rereading one's writing. These activities are cognitive when they are performed, and metacognitive when they are thought of as strategies that are consciously or intentionally adopted to improve one's writing (Oxford, 2017). In other words, the flipped MOOC classes seem to have the potential to promote both cognitive and metacognitive strategies.

Moreover, questions pertinent to the performance dimension are mostly about goal-setting, rewarding oneself when the goals are met, and asking for help and feedback. These questions also seem to be mainly based on metacognitive SRL strategies (Moyer, 2014; Oxford, 2017). One possible reason why the flipped-MOOC classes could positively influence the use of SRL strategies is that contrary to MOOCs, which are usually devoid of instructors' feedback, in the FCs or the flipped-MOOC classes, students could get some instructive feedback on their performance, which can be reflected in the asking-for-help aspect of the performance dimension. Likewise, regarding the social environment dimension, most of the questions were about using resources and getting help from friends to improve one's writing, which again can show instances of metacognitive SRL strategies which can promote collaborative behaviors (Zimmermann, 1998).

Therefore, blended learning classes, especially flipped-MOOC ones, may enhance learners' use of SRL strategies in writing, especially the more metacognitive ones. This may be attributed to the inherent demand placed on learners within these classes to take responsibility for their learning and effectively manage it (Bursa & Kose, 2020), both of which may be considered metacognitive, forming essential components of SRL strategies. As Conde Gafaro (2019) also maintained, MOOCs are more suitable for those learners who can regulate their learning, because MOOC learners usually select what, when, and how to study, and this requires them to take more responsibility for their learning (Conde Gafaro, 2019). As also maintained by Tschofen and Mackness (2012), in MOOCs, learners are usually autonomous and can manage their learning by creating conceptual and social connections that meet their needs. All this may, then, explain why the flipped-MOOC classes may contribute to the use of more metacognitive strategies.

Limited as it may be, it is, then, hoped that the present study has made some valuable contributions to EFL writing course through exploring the impact of the integration of MOOCs with flipped classrooms. In this regard, one significant finding is that using MOOCs can reduce teachers' workload through various pre-existing instructional videos and materials. This helps teachers focus more on guiding students during in-class activities rather than creating content from scratch. Moreover, the integration of MOOCs and FCs provides a more self-directed learning environment through encouraging students to develop self-regulated learning strategies. These strategies are important for improving academic writing skills, which needs continuous effort and reflection.

Conclusion

The study confirms that blended learning especially in the form of integrating the FCs with MOOCs has the potential to positively affect the use of metacognitive dimensions of SRL

strategies in writing. Since metacognitive strategies and self-regulated strategies are closely related and sometimes interchangeably used (Oxford, 2017), providing some opportunities for the development of one of them may mean providing opportunities for the development of the other one too.

Moreover, it seems that there is a dual and reciprocal relationship between SRL strategies and blended learning, including flipped-MOOC learning, in that SRL strategies may enhance learners' performance in the FCs (Magen-Nagar & Cohen, 2016; Silva, et al., 2018), and the other way around, that is the FCs and blended learning may enhance and contribute to the use of SRL strategies or at least some dimensions of them, as shown in this study (see also Abadikhah, et al., 2018; Silverajah, et al., 2022).

The obtained results of the present study may have valuable implications. To start with, the study may highlight the importance of blended learning and encourage EFL teachers to integrate technological tools and platforms into their teaching, especially because integrating the FCs with MOOCs can help teachers reduce their workload by using already available and freely downloadable videos in MOOCs. Further, and as far as language learners are concerned, the FCs integrated with MOOCs may create a more conducive-to-learning environment for them to develop their academic writing skills, especially because the difficulty of writing may also stem from the lack or insufficient use of some higher-order metacognitive skills such as SRL strategies. Moreover, researchers may further explore how MOOCs and FCs can work together as resources to improve learning and teaching, especially in an English academic writing course.

The present study highlights potential areas for future research, many of which relate to the limitations of this study. For example, the participants of this study were limited to university students majoring in English translation or literature. Investigating the impact of the FCs integrated with MOOCs on SRL strategies among learners with majors other than English and in non-academic contexts may yield different results. Additionally, expanding the sample size of the participants with different proficiency levels could provide a more comprehensive picture of the impact of this form of blended learning on EFL learners' writing skills. Yet, despite its limitation, it is hoped that the present study has shed some light on the impact of the FCs integrated with MOOCs on EFL learners' use of SRL strategies.

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