

**Research Paper****Exploring the impact of online flipped peer dynamic assessment on EFL learners' reading comprehension skills**Sajad Velayati 

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**Abstract**

This study explores the impacts of online flipped peer dynamic assessment (OFPDA) on Iranian EFL learners' reading comprehension skills, drawing on Vygotsky's sociocultural theory of mind (SCT). It also examines the long-term impacts of utilizing OFPDA to boost the participants' reading comprehension skills. Then, learners' attitudes toward implementing OFPDA in promoting learners' reading comprehension skills are investigated. A sample of 72 Iranian female EFL learners in a private institute who participated in an online reading comprehension course was recruited through convenience sampling. The students were divided into flipped ( $n = 36$ ) and non-flipped groups ( $n = 36$ ). The two groups followed the DIALANG, pre-test, flipped instruction (for the flipped group), traditional teaching (for the non-flipped group), immediate post-test, and delayed post-test procedure. Additionally, one-third of the flipped participants were voluntarily invited to a focus group interview. The data were analyzed using three independent sample t-tests, two repeated measure ANOVAs, and a content analysis approach. Quantitative findings indicated that the flipped group significantly outperformed the control group regarding reading comprehension skills. Besides, the results of the focus group interview revealed that the students had favorable attitudes toward the OFPDA. The implications for L2 educators and learners are discussed in the light of the literature.

**Keywords:**

Iranian EFL learners, online flipped peer dynamic assessment, reading comprehension skills, sociocultural theory of mind, Vygotsky

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## Introduction

English language teaching (ELT) has been globally perceived as highly crucial and a primary concern (Chen Hsieh et al., 2017). For many years, English language practitioners have been striving to develop a teaching methodology to enhance English language skills more effectively and efficiently, adapt to students' evolving needs, and encourage them to engage in more collaborative and individual activities both in and outside the classroom (Zhao & Yang, 2023; Zou, 2020). Flipped learning reverses the traditional classroom process by delivering instructional content online before class (Chen Hsieh et al., 2017). This approach enables students to engage in problem-solving or collaborative learning activities during class, with the instructor offering support and guidance.

The advancement of Mobile Assisted Language Learning (MALL) and learning management systems (LMS) has promoted the integration of flipped methodology across various subjects and educational levels (Andujar & Nadif, 2020). MALL has been welcomed as a novel approach to language education, allowing learners to engage in language learning at any time and in any location (Ebadi & Bashir, 2020; Lai & Zheng, 2018). MALL encompasses any educational experience facilitated through telecommunications technologies, such as mobile phones, smartphones, personal digital assistants (PDAs), and tablet PCs, all ideal for informal out-of-class learning (García Botero et al., 2018; Hsu, 2013). Many studies have implemented flipped principles to develop EFL learners' language skills or sub-skills through telecommunications technologies (e.g., Gok et al., 2021; Khazaie & Ebadi, 2023; Webb & Doman, 2019). In a flipped classroom, learners can complete their pre-class assignments, often in video clips, at their own pace and without feeling stressed or frustrated, allowing them to be fully prepared for the class activities (Fathi & Rahimi, 2022).

Flipped methodologists (e.g., Bishop & Verleger, 2013; Chang & Lin, 2019; McLaughlin et al., 2016; O'Flaherty & Phillips, 2015) asserted that students used various technology-based tools to learn the course content before attending the class. Although providing course content in the form of podcasts/vodcasts, screencasts, annotated notes, and recorded videos assists the students in learning content at their own pace and without stress, there are still some significant issues with pre-class activities in the flipped method, such as teacher's unavailability, time-consuming nature of flipped activities and lack of instant feedback from teacher/peer (Aghaei et al., 2019; Lee & Martin, 2020). Online peer dynamic assessment (OPDA) (Rezaei et al., 2022), rooted in Vygotskian sociocultural theory (SCT) and the concept of Zone of Proximal Development (ZPD), can be implemented to resolve the mentioned issues by offering graduated and contingent support linked to their current Zone of Proximal Development (ZPD).

Flipped method researchers attempt to deliver the course content via various technological tools and audio, visual, or audio-visual presentations such as podcasts/vodcasts, screencasts, annotated notes, and recorded videos before class to mediate learners reaching their ZPDs. The ZPD is conceptualized as the difference between what learners can achieve independently and what they can accomplish with the assistance and guidance of more capable peers (Vygotsky, 1978). Besides, mediation is a supportive mechanism that allows students to do tasks they cannot perform independently (Rassaei, 2021). L2 researchers and educators believed that flipped pre-class activities assist the learners in engaging them in interactive, student-centered tasks that foster autonomy, including collaborative assignments, presentations, self- and peer-assessment, and group problem-solving within in-class activities (Chen Hsieh et al., 2017; Chuang et al., 2018). Lee & Wallace (2018) asserted that learners need to be inspected by a more capable person (peer/instructor) in pre-class activities to guide learners in reaching the course goals. The previous studies have confirmed the effects of MALL on language learning experiences by implementing dynamic assessment (DA) principles (Ebadi & Bashir, 2020; Ko, 2019; Rassaei, 2021; Rezaei et al., 2022; Torang & Weisi, 2023) and multiple studies have verified the effects of flipped methodology on learning experiences via technological tools (e.g., Al-Said et al., 2023; Andujar et al., 2020; Challob, 2021). Concerning the mentioned lacunas and the growing call for merging OPDA and flipped methodology, the researchers aim to examine the short-term and long-term efficiency of Online Flipped Peer Dynamic Assessment (OFPDA) on EFL learners' reading comprehension skills. The following research questions guided the current study:

- Does OFPDA lead to improving Iranian EFL learners' reading comprehension skills?
- Does OPDA lead to improving Iranian EFL learners' reading comprehension skills in terms of long-term retention?
- What are the Iranian EFL learners' attitudes toward the effectiveness of OFPDA?

## Literature review

### Flipped learning

Jacot et al. (2014) highlighted that the flipped classroom often incorporates authentic, inquiry-based, exploratory, experiential, and collaborative learning. Regarding these features, the flipped model is grounded in Vygotsky's Zone of Proximal Development (ZPD) (Vygotsky 1978). The ZPD represents the distance between learners' current developmental level (ZAD), as assessed by independent problem-solving tasks, and their potential abilities, as determined by problem-solving with guidance from more skilled peers. Lee and Martin (2020) asserted that the concept of "scaffolding" (Wood & Middleton, 1975) has become closely associated with the ZPD. Green (2015) expounded

that scaffolding is a specific educational practice within pedagogy that ensures learners receive adequate support in their learning process, assisting them in bridging the gaps between their existing knowledge and the unfamiliar course content.

R'ezaei et al. (2022) argued that OPDA integrates social and cultural contexts rooted in Vygotsky's SCT. Vygotsky (1978) asserted that individual, social, and contextual elements influence learning. According to Vygotsky's SCT, "social interactions within the learner's social context significantly influence an individual's cognitive development. Lantolf and Thorne (2006) emphasized that the primary goal of social interactions is to help concepts transition from the social level to the individual level.

OPDA (Rezaei et al., 2022) has emerged as a new approach to overcome the limitations of one-on-one dynamic assessment (e.g., the limit of participants, Estaji & Farahanynia, 2019), group dynamic assessment (GDA) (e.g., restriction of including various constructs, Azizi & Farid Khafaga, 2023) and computerized dynamic assessment (CDA) (e.g., absence of high-quality ZPD-based mediation, Estrada-Araoz et al., 2023). Besides, the limitations of the flipped model, such as the teacher's unavailability, the time-consuming nature of flipped activities, and the lack of instant feedback from the teacher/peer (Aghaei et al., 2019; Lee & Martin, 2020), can be ameliorated by applying OPDA. Regarding the flipped model's robust underpinnings, OFPDA as a new approach in the L2 context needs to be explored.

### **Studies on flipped reading classroom**

L2 researchers have investigated the effects of the flipped classroom model on learners' academic achievement (Fraga & Harmon, 2014; Tseng et al., 2018) as well as language skills such as reading (Samiei & Ebadi, 2021), speaking (Chen Hsieh et al., 2017), listening (Ahmad, 2016) and writing (Zou & Xie, 2019). Reading comprehension (RC) is an essential cognitive ability that encompasses linguistic sub-skills (e.g., grammar, pronunciation, and vocabulary), cognitive skills (e.g., working memory, De Beni & Palladino, 2000), and metacognitive skills (both in terms of control and knowledge), and especially, skills that involve a deeper level of understanding, such as the capacity to make inferences (Channa et al., 2015). The emergence of modern social technologies, such as the Internet and mobile phones, has provided educators and learners with numerous information sources, allowing them to fulfill their research and teaching requirements (Kukulska-Hulme, 2009). Recent attention has been directed towards the impact of integrating various technological tools and programs to streamline the process and enhance the development of L2 reading comprehension skills in terms of the flipped model (Samiei & Ebadi, 2021; Huang & Hong, 2016).

Samiei and Ebadi (2021) conducted a mixed-methods study to investigate the impact of the WebQuest-based flipped classroom on EFL learners' inferential reading

comprehension skills. The findings indicated that the WebQuest-based flipped classroom successfully enhanced the inferential reading comprehension skills of the learners, and the delayed post-test scores also validated its sustaining impact. They asserted that a standard limitation of many flipped classroom studies, as emphasized by Guo (2019), is the disparity between the theoretical benefits of the flipped classroom and its actual effectiveness in practice, as teachers lack the means to guarantee that students have comprehended the pre-class WebQuest materials, which are essential for implementing the flipped classroom.

Khazaie and Ebadi (2023) conducted a study using a quasi-experimental design to investigate the potential of augmented reality game-supported flipped classrooms for English for Medical Purposes reading among 464 students at the Isfahan University of Medical Sciences. The study was conducted in two phases. In the quantitative phase, participants watched pre-recorded lectures on English for Medical Purposes reading and completed assessments. Following this, they worked in small groups to practice reading using either Commercial-Off-The-Shelf games or self-made augmented reality games under the supervision of their teachers. In the qualitative phase, focus-group interviews were conducted to gather students' perceptions of English for Medical Purposes reading in the augmented reality game-supported flipped classrooms. The study findings indicated that learning English for Medical Purposes in self-made augmented reality game-supported flipped classrooms improved reading abilities in academic and professional settings compared to learning in Commercial-Off-The-Shelf game-supported flipped classrooms. Additionally, students who engaged in reading practice within heterogeneous small groups demonstrated more significant progress, surpassing those in small homogeneous groups. Participants also expressed positive perceptions regarding the hands-on learning experience and the customization of self-made augmented reality games in flipped classrooms.

## Methodology

### Design

This study utilized a sequential exploratory mixed-methods approach, integrating quantitative and qualitative data sources. This design allowed the researchers to comprehensively understand the quantitative results by conducting a detailed qualitative data analysis (Riazi, 2016). The researchers gathered quantitative data through pre-test-intervention-immediate post-test-delayed post-test procedures for two groups, while qualitative data was obtained through a focus group interview. Hence, the current study aimed to investigate the impact of OFPDA on boosting Iranian EFL learners' reading comprehension skills quantitatively and qualitatively.

### 3.2. Participants

This study involved 83 Iranian EFL female learners at a private single-gender language institute, selected through convenience sampling following Ary et al.'s (2018). As Mackey and Gass (2016) recommended, the researchers focused exclusively on female students to eliminate potential gender-related influences. The participants were Persian native speakers aged 17 to 20 who attended an online reading preparation course to prepare for the language discipline of the Iranian University Entrance Exam (IUEE), which encompasses five significant disciplines: mathematics, experimental sciences, human sciences, art, and language. The language section of the IUEE included six components: grammar, vocabulary, sentence structure, language functions, cloze test, and reading comprehension. In addition to the institute's standards, the participants' proficiency levels were assessed using DIALANG, an online diagnostic assessment system available at <https://dialangweb.lancaster.ac.uk/>. The results were based on the Common European Framework of Reference for Languages (CEFR) and indicated that 72 participants had a B1 level of proficiency. Following this, the participants were randomly and equally assigned to either the control (non-flipped) (n = 36) or experimental (flipped) groups (n = 36), with the assurance that their data would be kept confidential and used solely for research purposes.

### **Instruments**

The researchers collected the required data using the instruments below.

### **Reading tests**

The students' reading comprehension skills were evaluated using three reading tests: a pre-test, an immediate post-test, and a delayed post-test. The pre-test questions sourced from IUEE were considered valid multiple-choice items (Khodi et al., 2021), evaluating the students' reading comprehension skills prior to the intervention sessions. Besides, the test was subsequently administered to 20 EFL learners who were not involved in the test development process and were classified as B1 proficiency level by the DIALANG test. The reliability of the test was determined using Kuder-Richardson 20 ( $KR-20 = .78$ ). The same pre-test was used as an immediate post-test after the intervention sessions to evaluate the effects of OFPDA on boosting the learners' reading comprehension skills. Two weeks after the immediate post-test, a delayed post-test from Phillips (2001) was administered to assess the long-term retention of the learners' reading comprehension skills. As Toroujeni (2021) stated, tests of this book (i.e., Longman Complete Course for the TOEFL Test: Preparation for the computer and paper tests) are considered valid and reliable. It is essential to note that all the tests encompassed two texts and 15 multiple-choice items.

### Focus group interview

In the current research, a focus group interview was included as another instrument for data collection. One-third of learners from the experimental group (i.e., twelve learners) were randomly selected to participate in an Adobe Connect video conference, where they discussed their attitudes regarding the effectiveness of OFPDA on boosting their reading comprehension skills. The second researcher facilitated the discussion and prompted the learners to express how OFPDA had influenced their reading comprehension skills. The interview was conducted in Persian, the learners' native language, to avoid misunderstanding, and it was recorded, transcribed, and translated into English for further analysis. It should be noted that the focus group interview was administered after the intervention sessions and lasted about two hours.

### Adobe Connect platform, WhatsApp application, and Digiform

The Adobe Connect platform offers a wide range of tools to facilitate effective and collaborative interactions between instructors and learners. Rezai et al. (2022) noted that these tools encompass attendee management, document and screen sharing, note-taking, video, whiteboard, and polls. Furthermore, the platform supports dynamic content creation through multimedia, animated presentations, and audio and video feeds. It also enables high-quality video conferencing with live video participation from students.

WhatsApp is a messaging application that is available for free and is owned by Facebook. It requires an internet connection to function, enabling users to exchange text, voice, picture, and multimedia messages and make voice and video calls. Rambe and Chipunza (2013) noted that learners perceived WhatsApp as allowing them to express themselves freely in an unrestricted environment. Therefore, considering the applicability and feasibility of the WhatsApp application and familiarizing learners with this application beforehand, the researchers decided to use WhatsApp as another instrument in the current study.

Digiform, available at <https://digiform.ir/>, is an enhanced version of Google Form designed to help teachers and researchers prevent student cheating. It requires students to turn on their webcams to continue answering questions, adding an extra security layer. Digiform is a user-friendly instrument and supports various question types. Additionally, the test results are automatically sent to the creator of the test (i.e., the second researcher), providing convenient access to assessment data.

### Data collection

The current study involved several steps. First, the researchers certified that the learners had both the WhatsApp application and the Adobe Connect platform installed on their mobile phones. Second, the researchers utilized DIALANG, an online diagnostic system available at <https://dialangweb.lancaster.ac.uk/>, to assess the learners' homogeneity during the first session. The DIALANG results, according to CEFR), which ranges from

A1 to C2 proficiency levels, revealed that 72 out of 83 students were at the B1 level. Subsequently, during the second and third sessions conducted via Adobe Connect, the teacher (i.e., the second researcher) introduced and elaborated on OFPDA, explaining how the learners could apply it to boost their reading comprehension skills. For this purpose, the instructor offered some PowerPoint slides demonstrating the precise steps for implementing OFPDA and emphasized certain points, such as giving specific feedback and maintaining respect during the spoken mediation process. As the researchers adhered to the interactionist approach of dynamic assessment (DA) (Poehner, 2009), where mediations are negotiated during the mediation process, there were no pre-determined mediations to offer during the interactionist mediation procedure. Therefore, the researchers introduced four regulatory scales (Aljaafreh & Lantolf, 1994; Davin & Donato, 2013; McNeil, 2018; Poehner et al., 2015) from the literature to illustrate how mediations should be delivered during the mediation process. It is vital to mention that all the mediation typologies were organized from the least explicit to the most explicit.

Demonstrating mediation typologies helps learners support their peers in collaboratively developing the necessary reading comprehension skills through providing contingent, graduated, and dialogic mediations (Aljaafreh & Lantolf, 1994). In the next step, during the fourth session, the learners were asked to complete the reading comprehension pre-test sourced from IUEE in Digiform. The next move consisted of four-week interventions with sixty-minute sessions held twice a week (sessions 5 to 12). Previously prepared reading comprehension assignments in the form of videos were implemented as the pre-class material of the flipped group. The videos used to present the content of each session were derived from YouTube and specific online courses held previously. The videos provided explanations of concepts, such as finding the main idea directly and indirectly, answered questions, vocabulary questions, and overall review questions followed by tangible instances based on Phillips (2001), and varied in length from 5 to 15 minutes. Since the concepts of the reading section in IUEE align with those in Phillips' book (2001), the institute selected this book as the coursebook. Also, categorizing reading comprehension skills in Phillips' book helped the researchers organize the entire intervention sessions. Learners in the flipped group were expected to watch the videos and do OPDA via two-member WhatsApp groups according to the prepared worksheets before the class. In other words, the learners engaged in two-member video calls to exchange spoken mediation and cooperatively supported each other in practicing various tasks designed by the teacher in advance while addressing difficulties in their reading comprehension skills through graduated, contingent, and dialogic mediations. It is worth noting that the learners had to record the OFPDA sessions and send them to the teacher. Then, the researcher/teacher encouraged the students to engage in various problem-solving activities in the classroom. Completing the students' worksheets and participating in various collaborative activities within the flipped group assured the researcher/teacher that the students had watched the videos before class. Each

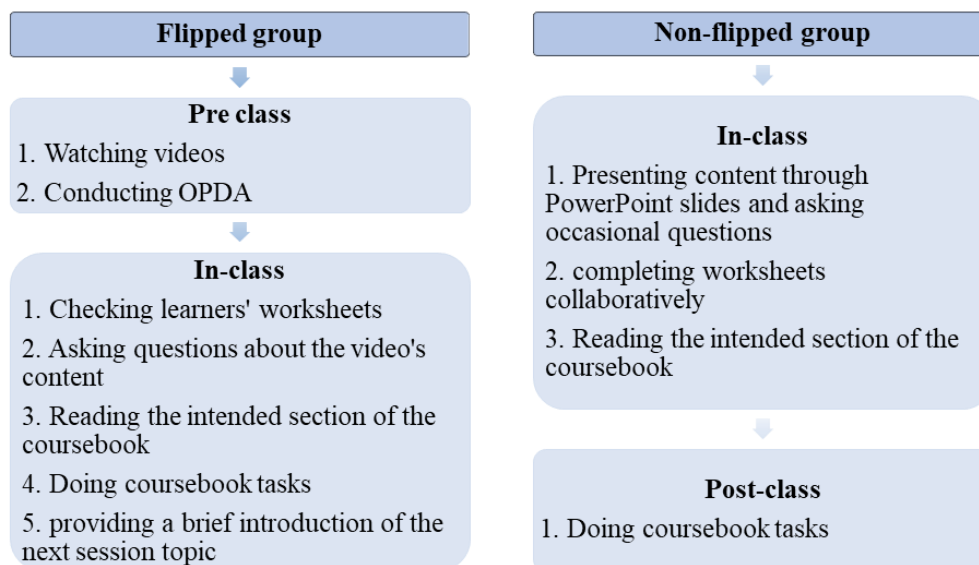


online in-class session of the flipped group consisted of checking learners' worksheets (10 minutes), asking questions about the video's content to investigate the learners' understandings (10 minutes), reading the intended section of the coursebook and doing coursebook tasks (30 minutes), and providing a brief introduction of the next session topic (10 minutes) (See figure 1). It should be noted that the flipped group did not have post-class homework. Instead, the flipped learners were required to watch the video lectures and do OFPDA for the next session.

The non-flipped group practiced the same material and content except for the videos. That is to say, each online session of the non-flipped group consisted of presenting content through PowerPoint slides and asking occasional questions (30 minutes), completing worksheets collaboratively (20 minutes), and reading the intended section of the coursebook (10 minutes) (See figure 1). The coursebook tasks were used as the non-flipped group's post-class homework. It should be emphasized that the non-flipped group did not have pre-class activities such as watching videos and conducting OPDA. It is worth mentioning that all the flipped and non-flipped sessions were held through Adobe Connect.

During the thirteenth session, a post-test reading assessment was conducted using Digiform to evaluate the learners' reading comprehension skills at the end of the instruction. Following the initial post-test, a delayed post-test was carried out using Digiform three weeks later to assess the learners' ability to sustain their reading comprehension skills in a more challenging context. For this purpose, a comprehensive reading test from Phillips (2001) was utilized. It is worth mentioning that the researchers, with the assistance of two test developers, reduced the number of questions to 15 to ensure consistency with the pre-test and immediate post-test. In the last phase of the study, a focus group interview was held with one-third of the learners in the flipped group.

**Figure 1.** *Schematic representation of flipped and non-flipped groups.*



### Data Analysis

The study utilized a mixed-methods approach to gather and evaluate quantitative and qualitative data. To address the first research question (i.e., the quantitative section), independent sample t-tests were employed to compare results between two independent groups (Dornyei, 2007). Consequently, three independent sample t-tests were used to identify potential differences in learners' reading comprehension skills. For the second research question, two repeated measure ANOVAs were used to determine differences in learners' reading comprehension skills at three different points in time.

Regarding the third research question (i.e., the qualitative section), a focus group interview was employed to comprehend the learners' attitudes toward OFPDA. The interview was conducted in Persian, the participants' native language, and was video-recorded. It was then transcribed and translated into English for analysis. The qualitative data was analyzed using content analysis, following the approach outlined by Mackey and Gass (2016), which emphasizes understanding interactions among individuals. The researchers employed open, axial, and selective coding stages (Dornyei, 2007) to analyze the data. The transcribed interviews were thoroughly reviewed during the open coding stage to understand them. Central themes were identified and confirmed in the axial coding stage, and participants' attitudes were categorized under these themes in the selective coding stage. Additionally, a member-checking technique (Creswell, 2007) was used to ensure the credibility of the participants' responses. This involved returning the transcribed interviews to the participants for further review and potential adjustments.

## Results

### Quantitative section

#### Pre-test, immediate post-test, and delayed-post-test between the two groups (T-test)

Three independent sample t-tests were conducted to assess whether the OFPDA helped Iranian EFL learners boost their reading comprehension skills. As indicated in Table 1, the pre-test scores of the non-flipped and flipped groups did not show a statistically significant difference ( $p = .76$ ). This is in line with the results of the Dialang test showing that the two groups are homogeneous.

The second independent sample t-test examined potential differences in immediate post-test scores between the non-flipped and flipped groups. As shown in Table 1, there is a statistically significant difference between the two groups ( $p = .04$ ). This implies that the application of OFPDA led to a substantial improvement in the reading comprehension skills of the flipped group ( $M = 9.78$ ) compared to the control group, which was taught through a teacher-driven approach ( $M = 8.50$ ).

The third independent sample t-test was carried out to confirm any differences in the delayed post-test scores of the non-flipped and flipped groups. As indicated in Table 1, there is a notable difference in the performance of the two groups in the delayed post-test ( $p = .04$ ).

**Table 1.** Independent sample T-tests on Pre-test, Immediate Post-test, and Delayed Post-test.

Test	Group	N	Mean	SD	Sig.(2-tailed)
Pre-test	Non-flipped	36	6.97	2.92	.76
	Flipped	36	7.17	2.63	
Immediate post-test	Non-flipped	36	8.50	2.98	.04
	Flipped	36	9.78	2.33	
Delayed post-test	Non-flipped	36	7.42	2.50	.04
	Flipped	36	8.56	2.23	

#### Pre-test, post-test, and delayed-post-test differences for the non-flipped group (ANOVA)

Two Repeated Measures ANOVAs were carried out to assess the impact of OFPDA and traditional teaching on the reading comprehension skills of Iranian EFL learners at three different time points. Table 2 reveals the descriptive statistics for analyzing the non-flipped group's pre-test, post-test, and delayed post-test. Also, table 2 shows the mean

scores for the pre-test ( $M = 6.97$ ), post-test ( $M = 8.50$ ), and delayed post-test ( $M = 7.42$ ).

Mauchly's test of Sphericity was administered to evaluate the assumptions of the repeated-measures ANOVA test. The results in Table 3 show that Mauchly's test statistic was  $\chi^2(2) = 14.658$ , with a corresponding p-value of 0.001. Since the p-value is less than 0.05, it indicates that the assumption of Sphericity was not assumed. Consequently, the Greenhouse-Geisser correction was utilized in the "Tests of Within-Subjects Effects" ANOVA to adjust the degrees of freedom in the repeated-measures ANOVA (See Table 4).

**Table 2.** *Descriptive Statistics for the Pre-test, Immediate Post-test, and Delayed Post-test of Non-flipped Group*

	Mean	SD	N
Pre-test	6.97	2.92	36
Immediate post-test	8.50	2.98	36
Delayed post-test	7.42	2.50	36

**Table 3.** *Results of Mauchly's Test of Sphericity for Non-flipped Group*

Measure: Reading							
Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon <sup>b</sup>		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
PPD	.650	14.658	2	.001	.741	.766	.500

**Table 4.** *Tests of Within-Subjects Effects for Reading Comprehension Skills of Non-flipped Group*

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
PPD	Sphericity Assumed	44.463	2	22.231	16.520	.000
	Greenhouse-Geisser	44.463	1.481	30.017	16.520	.000
	Huynh-Feldt	44.463	1.531	29.037	16.520	.000

	Lower-bound	44.463	1.000	44.463	16.520	.000
Error	Sphericity Assumed	94.204	70	1.346		
(PPD)	Greenhouse-Geisser	94.204	51.844	1.817		
	Huynh-Feldt	94.204	53.593	1.758		
	Lower-bound	94.204	35.000	2.692		

The Greenhouse-Geisser correction revealed significant differences in the non-flipped group's mean scores for reading comprehension skills at three different time points ( $p < 0.05$ ), indicating variations between at least two-time points. Although the results showed significant differences in the mean scores at two-time points, the specific locations where these differences occurred were not apparent. The Bonferroni post hoc test was performed to address this issue, and the results are outlined in Table 5. The pre-test and immediate post-test results indicated significant differences ( $MD = 1.528$ ,  $p = 0.00$ ), implying that traditional teaching enhanced the Iranian non-flipped EFL learners' reading comprehension skills. As indicated in Table 5, there were significant differences between the immediate and delayed post-test results of the non-flipped group ( $MD = 1.083$ ,  $p = 0.00$ ). That is, Iranian non-flipped EFL learners were unable to apply their reading comprehension skills from traditional teaching to more complex contexts. Additionally, as Table 5 indicates, no statistically significant differences existed between the pre-test and delayed post-test ( $MD = .444$ ,  $p = 0.51$ ).

**Table 5.** Results of Post hoc Comparisons for Reading Performance of Non-flipped Group

(I) PPD	(J) PPD	Mean Difference (I-J)	Std. Error	Sig. <sup>b</sup>	95% Confidence Interval for difference	
					Lower Bound	Upper Bound
1	2	-1.528*	.305	.000	-2.294	-.762
	3	-.444	.317	.510	-1.242	.354
2	1	1.528*	.305	.000	.762	2.294
	3	1.083*	.175	.000	.642	1.524
3	1	.444	.317	.510	-.354	1.242
	2	-1.083*	.175	.000	-1.524	-.642

The mean difference is significant at the .05 level.

**Pre-test, immediate post-test, and delayed-post-test differences for the flipped group (ANOVA)**

The second Repeated Measure, ANOVA was conducted to evaluate the impact of OFPDA on the reading comprehension skills of Iranian EFL learners at three different time points. Table 6 discloses the descriptive statistics for analyzing the flipped group's pre-test, immediate, and delayed post-test. The mean scores for the pre-test ( $M = 7.17$ ), immediate post-test ( $M = 9.78$ ), and delayed post-test ( $M = 8.56$ ) are indicated in Table 6.

**Table 6.** *Descriptive Statistics for the Pre-test, Immediate Post-test and Delayed Post-test of Flipped Group*

	Mean	SD	N
Pre-test	7.17	2.63	36
Immediate post-test	9.78	2.33	36
Delayed post-test	8.56	2.23	36

Mauchly's test of Sphericity was used to assess the assumptions of the repeated-measures ANOVA test. The outcomes depicted in Table 7 indicate that the statistic of Mauchly's test was  $\chi^2(2) = 16.726$ , and the associated p-value was 0.00. As the *p-value* is below 0.05, it can be inferred that the assumption of Sphericity was not assumed. Hence, the Greenhouse-Geisser correction was administered in the "Tests of Within-Subjects Effects" ANOVA to adjust the degrees of freedom, as shown in Table 8.

**Table 7.** *Results of Mauchly's Test of Sphericity for Flipped Group*

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon <sup>b</sup>		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
PPD	.611	16.726	2	.000	.720	.743	.500

**Table 8.** *Tests of Within-Subjects Effects for Reading Comprehension Skills of Flipped Group*

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
PPD	Sphericity Assumed	122.889	2	61.444	38.944	.000
	Greenhouse-Geisser	122.889	1.440	85.319	38.944	.000

	Huynh-Feldt	122.889	1.485	82.726	38.944	.000
	Lower-bound	122.889	1.000	122.889	38.944	.000
Error (PPD)	Sphericity Assumed	110.444	70	2.095		
	Greenhouse-Geisser	110.444	50.412	2.191		
	Huynh-Feldt	110.444	51.992	2.124		
	Lower-bound	110.444	35.000	3.156		

The Greenhouse-Geisser correction revealed statistically significant variations in the mean scores for reading comprehension skills of the flipped group at three distinct time intervals ( $F_{(1,440, 50.412)} = 38.944, p < 0.05$ ). Therefore, the Bonferroni post hoc test was performed to illustrate the precise locations of these variances (See Table 9).

**Table 9.** Results of Post hoc Comparisons for Reading Performance of Flipped Group

(I) PPD	(J) PPD	Mean Difference (I-J)	Std. Error	Sig. <sup>b</sup>	95% Confidence Interval for difference	
					Lower Bound	Upper Bound
1	2	-2.611*	.348	.000	-3.486	-1.736
	3	-1.389*	.329	.000	-2.217	-.561
2	1	2.611*	.348	.000	1.736	3.486
	3	1.222*	.183	.000	.762	1.683
3	1	1.389*	.329	.000	.561	2.217
	2	-1.222*	.183	.000	-1.683	-.762

As Table 9 indicates, the Bonferroni post hoc test results showed statistically significant variances between the pre-test and immediate post-test ( $MD = 2.611, p = 0.00$ ) and between the pre-test and delayed post-test ( $MD = 1.389, p = 0.00$ ). The results indicated that Iranian EFL learners in the flipped group were able to improve their reading comprehension skills through OFPDA. Additionally, significant differences existed between the experimental group's immediate and delayed post-test ( $MD = 1.222, p = 0.00$ ), implying that the flipped group's reading comprehension skills improved through OFPDA and could be applied to more challenging contexts (See Table 9).

### Qualitative results

The third research question concentrated on the attitudes of Iranian EFL learners regarding their experiences with OFPDA reading comprehension skills. Twelve EFL students from the flipped group willingly took part in a focus group interview. The content analysis indicated five recurring themes, as illustrated in Table 10.

**Table 10.** Themes Addressing EFL Learners' Attitudes Towards OFPDA

Themes	Examples
Reducing learners' level of anxiety	<i>L9: I could ask my peer to guide me more and more in reaching the correct answer without receiving a sense of anxiety from other classmates or the teacher.</i>
Boosting learners' autonomy	<i>L3: Watching videos by myself and exchanging mediations with my peer during OFPDA assisted me in facing the in-class activities autonomously. I should mention that exchanging mediations with my peer encouraged me to be more responsible for my learning.</i>
Peer availability as a guidance	<i>L4: Compared to my previous conventional classes, during this mode of classroom, I could receive graduated mediation from my peer and ask her to guide me in reaching my goal.</i>
Increasing learners' motivation	<i>L1: This mode of instruction motivated me to practice various reading comprehension texts in my free time.</i>
Issues with Internet connection	<i>L7: At times, we encountered internet connectivity issues that are out of our control, like slow internet speed, preventing us from having a clear video call. Thus, we should repeat ourselves several times. Also, I sometimes couldn't download the videos.</i>

The analysis of the focus group interviews highlighted the participants' positive attitudes toward OFPDA as an aid to boost their reading comprehension skills in general. The learners believed that exchanging graduated and contingent mediations with their peers is more comfortable than with their teacher.

They claimed that OFPDA helped them become independent by encouraging them to analyze their peers' work and providing dialogic, gradual, and contingent assistance to overcome challenges in reading comprehension skills. The learners maintained that the availability of peers in OFPDA assisted them in exchanging mediation and reaching the course goals. They believed that pre-class activities such as watching videos and conducting OFPDA in a digital-based context assisted them in transferring their understanding via dialogic, graduated, and contingent to their peers.

The learners believed OFPDA motivated them to work on their reading comprehension issues in their free time. The learners mentioned that the reading comprehension section of IUEE has been neglected due to its challenging nature. They claimed that this way of evaluation helped them develop a positive attitude towards



improving their reading comprehension skills. Ultimately, the learners' only concern was related to the Internet connection. They noted challenges in accessing high-speed Internet.

## Discussion

The present study examined the impacts of OFPDA on Iranian female EFL learners' reading comprehension skills. A sequential explanatory mixed-methods design was applied to collect and assess the data. The quantitative results demonstrated a significant difference in the enhancement of reading comprehension skills of the flipped group.

The results of the study are consistent with previous research (e.g., Karimi & Hamzavi, 2017; Wang, 2023), revealing that applying the flipped method positively improved the learners' reading comprehension skills. Furthermore, the study's results are consistent with the main principles of Vygotskian SCT, highlighting the social nature of learning. This signifies that learners' interactions help them acquire, internalize, and self-regulate language elements (Lantolf & Poehner, 2014).

The study's findings confirm Dornyei's (2005) discussion that the online learning context manipulates how learners perceive themselves, mainly by narrowing the lacuna between their "real self" and "ideal self." In line with Dornyei's claim, this research supports the idea that digitally mediated flipped instruction and assessment are designed to foster learning abilities and critical thinking skills (Law et al., 2020). Furthermore, the current study aligns with Ebadi and Saeedian (2016) in transferring reading comprehension skills to a more challenging context through flipped dynamic digital-based assessment. Therefore, it can be argued that the Online Flipped Peer Dynamic Assessment (OFPDA) has potentially overcome the limitations of traditional assessment by offering learners valuable opportunities to recognize and reflect on their language difficulties (Poehner & Lantolf, 2005). Hence, this procedure has resulted in an enhancement of their reading comprehension skills.

The results of the focus group interview showed that EFL learners generally held favorable attitudes toward OFPDA. This aspect of the study is consistent with the findings of Poehner and Infante (2016), who found that peer-provided dialogic, contingent, and graduated mediations could help EFL learners develop the skills needed to master linguistic structures, as these mediations are tailored to their individual needs and preferences. In alignment with this line of the study, the dialogic graduated, and contingent mediations in OFPDA sessions helped the learners transform regulated activities into self-regulated ones.

In their discussion of the disadvantages of flipped instruction, Aghaei et al. (2019) stated that the teacher's unavailability in a flipped methodology is the learners' concern when watching the videos before attending the class since the learners need to be guided and encouraged by the teacher while working on educational issues. This line of the study's findings disagrees with Aghaei et al. (2019), as applying peer dynamic assessment in the flipped online context assists the learners in receiving graduated, contingent, and

dialogic feedback from their peers. Besides, this position aligns with Vygotsky's (1999) argument that graduated feedback within one's ZPD may serve as an influential tool to divulge the fully formed capabilities and those still in progress.

Another possible discussion of the study evidenced that the learners' level of anxiety was reduced through implementing online flipped digitally mediated assessment. This line of the current study corroborates Ebadi and Bashir (2020), who argued that digital-based dynamic assessment can alleviate learners' level of anxiety. Namely, offering graduated, contingent, and ZPD-based support through technological tools like mobile phones can decrease social pressure on the learners.

The current study also delves into the discussion of enhancing EFL learners' motivation and autonomy through FOPDA. This aspect of the study aligns with the findings of Rezai et al. (2022), who asserted that offering suitable ZPD-based support through OPDA helped learners improve their motivation and autonomy. They highlighted that the dialogic, graduated, and contingent support provided by peers in OPDA assisted learners in practicing their writing skills in their spare time, allowing them to become more autonomous in their writing practice without relying solely on the teacher's guidance.

The research findings provide several educational implications for L2 educators and students. According to the skill acquisition theory (SAT), receiving feedback from peers significantly impacts proceduralization and automatization more than practicing without feedback (Sato & Lyster, 2012). Besides, Yoshida (2008) recommended that interactions between teachers and learners may not always be practical for learning purposes. In light of this, L2 learners can utilize digital tools to convert peer-regulated activities into self-regulated ones in their self-paced, stress-free interactions.

The present study has limitations that could indicate potential avenues for future research. Since this study exclusively utilized spoken mediation, future researchers are encouraged to incorporate written mediation to gather more comprehensive data regarding learners' development. Furthermore, as the current study focused solely on Iranian female EFL learners, it is essential to conduct additional research involving male participants to improve the generalizability of the results. Besides, L2 researchers may investigate the efficiency of OFPDA on other skills and sub-skills.

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