



The Contribution of BigBlueButton and Formative Assessment Strategies to the Directed Motivational Currents of Iranian EFL Students

Shahrbanoo Parichehreh*

Department of English Language Teaching, AK.C., Islamic Azad University, Aliabad Katoul, Iran

Zari Sadat Seyyedrezaei†

Department of English Language Teaching, AK.C., Islamic Azad University, Aliabad Katoul, Iran

Ghasem Barani‡

Department of English Language Teaching, AK.C., Islamic Azad University, Aliabad Katoul, Iran

Omid Mazandarani§

Department of English Language Teaching, AK.C., Islamic Azad University, Aliabad Katoul, Iran

Abstract

This investigation examined the effect of BigBlueButton and formative assessment strategies (Mind Dump and Word Journal) on Iranian EFL students' directed motivational currents (DMCs). Having utilized a quasi-experimental design, it was conducted among 90 out of 120 participants selected via convenience sampling. Quick Placement test was distributed to 120 students majoring in English Translation and Literature at Sari and Qaemshahr branches of Islamic Azad University. 90 Iranian sophomore students were chosen and divided randomly into control, Face-to-Face, and BigBlueButton groups. Each experimental group (30) (Face-to-Face and BigBlueButton) included two subgroups, Mind Dump and Word Journal. While all groups received instruction on narrative writing, only the experimental groups utilized Mind Dump and Word Journal. To gauge students' DMCs, DMC Disposition Questionnaire was utilized. Students were distributed the questionnaire once at the outset and once at the end of the course. The results of Quade Nonparametric Analysis of Covariance and Pairwise Comparisons of Groups indicated that students' DMCs in the BigBlueButton group

* Email: shahrbanoo.parichehreh@iau.ac.ir; ORCID: 0009-0009-4154-5270.

† Corresponding author: Department of English Language Teaching, AK.C., Islamic Azad University, Aliabad Katoul, Iran; Email: z.seyyedrezaei@iau.ac.ir; ORCID: 0000-0003-1365-3214.

‡ Email: gh.barani@iau.ir; ORCID: 0000-0001-6384-8170

§ Email: o.mazandarani@iau.ac.ir; ORCID: 0000-0001-9788-1745

significantly improved compared to those in Face-to-Face and control groups. Similarly, students in the Mind Dump and Word Journal subgroups showed significantly higher DMCs than those in the control group, with Mind Dump outperforming Word Journal. Additionally, both Mind Dump and Word Journal subgroups in the BigBlueButton environment outperformed their Face-to-Face counterparts in terms of DMC enhancement.

Key words: BigBlueButton, Directed Motivational Currents, Mind Dump, Word Journal

1. Introduction

Technology has transformed the approaches to teaching and learning, resulting in the development of online classes as an alternative to conventional classes (Baleghizadeh & Saeedi, 2021). It also assures the interaction between students and teachers is not confined by location and time (Anderson & Dron, 2011). Moreover, it encompasses some educational applications through which educators supply instructional materials to students (Han, 2018). One of the most popular learning applications is BigBlueButton (Čižmešija & Bubaš, 2020). BigBlueButton is a web-based, synchronous, open-source conferencing solution that supplies virtual rooms for screen sharing, chat, audio, video, and slide sharing in real time (Turulja et al., 2021). It facilitates the exchange of information between students and teachers, thus, it is appropriate for virtual educational settings (Galindo-González, 2020). Students utilizing BigBlueButton may gain the necessary knowledge through implementing different strategies like formative assessment strategies.

Formative assessment is one of the most fascinating advancements in education. Students and teachers benefit from formative assessment because it gives them feedback, which helps them work toward learning objectives, and helps teachers understand how to effectively design lessons to satisfy students' needs (Rasmussen, 2017). It includes some strategies like Mind Dump and Word Journal to check students' knowledge (Greenstein, 2010). Mind Dump enables students to retrieve information and utilize memory triggers as they come to mind, and Word Journal encourages students to engage deeply with a reading passage by selecting an appropriate word that encapsulates the main theme and articulate their reasoning in one or two paragraphs, explaining the relevance of their chosen word about the text

(Rasmussen, 2017). Ryan and Deci (2017) state formative assessment strategies can influence students' motivation.

Motivation is a significant factor in educational settings (Barnet, 2009). The framework of L2 motivation has been associated with a concept called a directed motivational current, which denotes a strong motivational impetus that promotes and sustains long term behavior (Dörnyei et al., 2014). In the academic setting, motivation is a driving force that makes people pursue a goal (Ersanli, 2015).

Students' motivation continues to pose a significant challenge in the field of language learning. Drawing from classroom observations and teaching experiences, it is evident that some Iranian EFL students demonstrate low levels of engagement and motivation when interacting with instructional content. This challenge is not new; Dörnyei (2001) noted that insufficient motivation remains one of the most enduring barriers to successful second language acquisition, negatively impacting learners' effort and outcomes. Gardner (1985) similarly identified motivation as a critical determinant in the success of language learning.

In recent years, research has explored the potential of technology-mediated formative assessment tools to address motivational issues. Studies have shown that digital platforms—when combined with formative assessment strategies—can foster student engagement, promote self-regulated learning, and sustain motivational currents (Lam, 2020; Panadero et al., 2018; Shute & Rahimi, 2021). These tools offer students opportunities to monitor their own progress, receive timely feedback, and participate in interactive and learner-centered environments—all of which can enhance motivational drive.

Obviously, students with high motivation are more receptive to the input they receive. Therefore, in an effort to enhance student motivation and promote more effective learning, this study implemented both formative assessment strategies and an online teaching platform (BigBlueButton) in two EFL classrooms. Although some recent studies have examined the impact of online learning or virtual platforms on students' motivation (e.g., Elbyaly & Elfeky, 2023; Ghanizadeh & Mousavinejad, 2023; Harandi, 2015; Jiang et al., 2023; Li et al., 2021; Minda, 2020; Ulfa et al., 2022), few have specifically focused on DMCs, and, to the best of the researchers' knowledge, no study in the Iranian EFL context has yet investigated the impact of BigBlueButton on students' DMCs.

In parallel with this line of inquiry, a growing body of literature has emphasized the motivational benefits of formative assessment strategies. For instance, Modarres Mosadegh and Rahimi (2021) assert

that implementing appropriate formative assessment techniques in writing classes can enhance students' motivation. Dörnyei (2001) similarly emphasizes that motivation determines the willingness of L2 learners to initiate and sustain learning activities. While several studies have supported the positive impact of formative assessment on learner motivation (e.g., Leenknecht et al., 2021; Muho & Taraj, 2022; Palmberg et al., 2024; Wafubwa, 2020; Zhang, 2018), few studies - particularly within the Iranian EFL context - has examined how specific formative assessment strategies may influence students' motivational currents. In light of these research gaps, the present study seeks to bridge this void by investigating the effect of both BigBlueButton and formative assessment strategies (Mind Dump and Word Journal) on the directed motivational currents of Iranian EFL students. To meet the research objectives, the following questions are addressed.

1. Do directed motivational currents of Iranian EFL students who receive instruction through BigBlueButton and Face-to-Face differ significantly from those receiving traditional instruction in the control group?
2. Do directed motivational currents of Iranian EFL students who use Mind Dump compared to those who use Word Journal in both (Face-to-Face and BigBlueButton) groups in total differ significantly from those who do not use Mind Dump and Word Journal in the control group?
3. Do directed motivational currents of Iranian EFL students who use Mind Dump in BigBlueButton differ significantly from those in the Face-to-Face group?
4. Do directed motivational currents of Iranian EFL students who use Word Journal in BigBlueButton differ significantly from those in the Face-to-Face group?

2. Review of Literature

2.1. Directed Motivational Currents

Dörnyei and his colleagues (Dörnyei, Ibrahim, & Muir, 2015; Dörnyei, Muir, & Ibrahim, 2014) have recognized a specific motivational phenomenon characterized by spans of intense and persistent motivation focused on achieving a defined goal or vision (Henry et al., 2015). They state these directed

surges of motivational energy, called directed motivational currents, are distinct from other forms of intense motivation, as they are shaped by individual learning activities that integrate parts of a super-ordinate motivational superstructure. Dörnyei et al. (2015) assert a directed motivational current is “a prolonged process of engagement in a series of tasks which are rewarding primarily because they transport the individual towards a highly valued end” (p. 98). Functioning similar to an “injection of motivation into the system” (Dörnyei et al., 2014, p. 12), a DMC includes a greater sense of urgency than normal motivated behavior (Henry et al., 2015). They state intensive and goal-oriented activities frequently change the regular patterns of daily life, allowing individuals engaged in a DMC to experience a distinctive level of performance that surpasses their usual capabilities.

Some research studies have been conducted on DMCs. Ghanizadeh and Jahedizadeh (2017) conducted a study validating the web-based Persian version of the DMC questionnaire. The results indicated acceptable reliability and validity. Moreover, most of the DMCs experienced by students were competitively self-referenced experiences. Safdari and Maftoon (2017) investigated the rise and fall of DMCs. It was a qualitative case study based on the findings of interviews with a participant who experienced a unique period of DMCs. The participant went through a sustained period of intense motivation; then suddenly her motivation ceased. Li et al. (2021) investigated the experience and level of DMCs among students attending a technological university in China. The results indicated most of the students experienced DMCs in their English learning and were interested to experience them again. Finally, Ghanizadeh and Mousavinejad (2023) found the significant effect of Teacher Technology-Enhanced Scaffolding (TTES) on EFL learners’ DMCs. Eitaa messenger was utilized for teaching. It should be noted that the type of online learning/teaching platform (BigBlueButton) implemented in this study is different from those used in prior studies. Furthermore, to the best of the researchers’ knowledge, BigBlueButton has been applied for the first time to examine its effect on Iranian EFL students’ DMCs.

2.2. BigBlueButton as an Online Learning and Teaching Platform

Due to job and life obligations, more and more people are choosing online instruction over in-person instruction (Han, 2018). A nostrum for challenges related to student participation and communication in remote learning is BigBlueButton (Han, 2018). E-learning through BigBluebutton has gained popularity due to its many functions and simplified operation (Han, 2018). Many users believe that BigBlueButton

is an easy and interesting system to use; thus, they are pleased with the technical and functional facets of the system (Čižmešija & Bubaš, 2020). BigBlueButton users can use a microphone and a webcam to communicate with other interlocutors during a session (Galindo-González, 2020). Moreover, it enables students and teachers to engage in interaction synchronously via audio and video; thus, it facilitates collaborative learning (Čižmešija & Bubaš, 2020).

Moreover, a number of research studies have examined the use of BigBlueButton, particularly for e-learning. Galindo-González (2020) found how BigBlueButton affected the online teaching-learning processes of six students who lived in other states of the country. The results indicated students' knowledge and skills improved. Cavus and Sekyere-Asiedue (2021) found the effectiveness of online video conference platforms and their contributions to education. Salehi et al. (2023) conducted a study which indicated BigBlueBlue enhanced Iranian male and female students' listening comprehension.

Additionally, some research studies focused on the effect of online platforms or learning environments on students' motivation. Ulfaet al. (2022) investigated the effect of an online platform on students' motivation in learning writing. It was observed the pupils' motivation, performance, and achievement in the writing class using the online platform increased. Elbyaly and Elfeky (2023) conducted a study which aimed to demonstrate how well online learning environments increase the growth of academic motivation in groups of males and females who enrolled in the professional master's degree. It was revealed the use of online learning environments impacted the growth of academic motivation in both experimental groups. Ultimately, Jiang et al. (2023) explored the effects of online learning on Iranian EFL learners' motivation. It was found online learning positively impacted the students' motivation.

2.3. Formative Assessment

Formative assessment has increasingly become a central concern among educators and researchers for its potential to enhance teaching and learning outcomes. It is defined as “activities undertaken by teachers—and by their students in assessing themselves—that provide information to be used as feedback to modify teaching and learning activities” (Black & Wiliam, 2010, p. 82). This process allows instructors to identify gaps in students' learning and take appropriate instructional actions to bridge those gaps. Through ongoing feedback, formative assessment helps both teachers and learners understand current

performance levels in relation to instructional goals, and it guides subsequent learning efforts. Black and Wiliam (2010) further emphasize that effective formative assessment highlights what the learning target is, where the students currently stand, and how they can move forward.

Research consistently demonstrates that the use of formative assessment or formative assessment strategies can significantly impact academic achievement. For instance, Wiliam et al. (2004) found that the formative practices of 24 teachers in the UK led to notable improvements in student performance. Similarly, Colby-Kelly and Turner (2007) highlighted how formative assessment practices shaped learner outcomes in second language classrooms among pre-university students. In the area of writing, Graham et al. (2015) conducted a meta-analysis of experimental studies involving students in grades 1 to 8, which supported the effectiveness of formative writing assessment practices—especially those involving direct feedback to learners.

Moreover, Ahangari and Mahmoudy (2016) examined the effect of formative assessment on vocabulary learning among undergraduate Iranian students enrolled in general English courses. The experimental group received formative assessment interventions through periodic feedback and retroactive regulation techniques, including continuous vocabulary revision and progress monitoring across five-week instructional periods. Their findings underscore the positive effect of formative assessment practices on vocabulary development and academic success at the tertiary level. Asadifard and Afghari (2019) investigated the impact of systematic formative assessment on students' academic achievement in English as a Foreign Language (EFL) classroom. Results revealed that students exposed to formative assessment outperformed those in the control group. Among the strategies, “clarifying learning targets” was most frequently used by teachers. This study strongly supports the role of formative assessment in enhancing academic performance in EFL contexts.

Despite these valuable contributions, there remains a need to examine formative assessment strategies that are tailored to the dynamics of online, synchronous platforms. Recent studies (e.g., Panadero et al., 2018; Shute & Rahimi, 2021) suggest that technology-mediated formative assessments can promote learner agency, self-regulation, and sustained motivation. Additionally, Ogang et al. (2018) showed that formative assessment strategies in online environments significantly improved both learner engagement and academic outcomes. Moreover, recent Iranian studies have shown promising outcomes for technology-mediated formative assessment. For example, Goodarzi and Yarahmadzahi (2020)

investigated the impact of mobile-based formative assessment (using the Socrative app) on EFL learners' vocabulary achievement. The experimental group outperformed the control group significantly, suggesting that mobile tools can positively influence vocabulary learning while also increasing learner motivation and participation. Similarly, Morovvati (2024) examined the implementation of digital formative assessment tools in blended learning contexts. Findings revealed that Iranian teachers utilized such tools to enhance timely feedback, meta-cognitive scaffolding, and learner engagement, although they faced challenges related to technology access.

Building on these promising findings in technology-mediated formative assessment, it becomes important to explore how such practices might influence not only academic performance but also learner motivation. One motivational construct that has recently gained attention is Directed Motivational Currents (DMCs), introduced by Dörnyei et al. (2014) to explain intense and sustained motivational surges in language learning. While many studies have focused separately on formative assessment strategies or online learning tools, few have explored how their integration may support long-term motivational engagement. Addressing this gap, the present study investigated the potential impact of combining BigBlueButton with two formative assessment strategies—Mind Dump and Word Journal—on the DMCs of Iranian EFL students.

3. Method

3.1. Participants

The participants of this examination were selected through convenience sampling. They were chosen from intermediate students from English translation and English literature, through Quick Placement Test (QPT) administered at the outset of the semester. They were Iranian male (26) and female (64) EFL sophomore students at Sari and Qaemshahr branches of Islamic Azad University. They were assigned to three groups (control, Face-to-Face, and BigBlueButton). The participants in each experimental group (Face-to-Face and BigBlueButton) were divided into two subgroups, one received Mind Dump strategy and the other one received Word Journal strategy.

To choose the students, 120 male and female EFL sophomore students were given Quick Placement Test. The results of descriptive statistics were illustrated in Table 1.

Table 1*Results of Descriptive Analysis of QPT*

QPT	N	Mean	Std. Deviation	Min	Max	Kolmogorov Smirnov Test	
						Statistic	Sig.
	120	29.86	4.62	13	38	.981	.005

Regarding students' mean score 29.86 and standard deviation ± 4.62 , 90 students whose scores fell within 25 and 35 were chosen. In essence, 90 EFL students who scored one standard deviation over and under the average were selected. They were divided into three groups randomly. 30 out of 90 were assigned to control, 30 were assigned to Face-to-Face and 30 were assigned to BigBlueButton. Face-to-Face and BigBlueButton groups (experimental groups) were divided into two subgroups (Mind Dump and Word Journal).

3.2. Instruments

3.2.1. Quick Placement Test (QPT)

To homogenize the participants and choose EFL intermediate students, Quick Placement Test (2001) was used. It is divided into two parts with 60 questions. In this study, only Part one of the QPT was used to assess participants' general English proficiency due to time constraints. This section focuses primarily on grammar and vocabulary recognition through multiple-choice items and is designed to classify learners into basic CEFR levels (A1-B1). According to Geranpayeh (2003), students whose scores fell between 24 and 40 were considered as students at an intermediate level. Part One has been shown to have acceptable psychometric properties. According to Geranpayeh (2003), the internal consistency reliability (Cronbach's alpha) of Part One is approximately .88. Moreover, the test developers report that this part correlates well with standardized measures of language proficiency, supporting its construct validity for assessing foundational linguistic knowledge.

3.2.2. DMC Disposition Questionnaire

The DMC Disposition Questionnaire is developed and validated by Muir (2016). In this study, the Persian version of the DMC Disposition Questionnaire whose validity and reliability were computed by Ghanizadeh and Jahedizadeh (2017) was used to determine student DMCs (see Appendix). It consists of a number of items and questions and some facets of DMC via a 5-point Likert scale format (*strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree*).

The questionnaire is comprised of three main sections. The first section asks for participants' demographic information. The second section describes DMCs by offering five statements that are representative of the DMC experience (e.g. 'I think about this project day and night – I feel like it is taken over my life!'), and asks participants to put a checkmark next to the statement that they have experienced it. The third section, the main body of the questionnaire, consists of a series of 12 sentences measuring intense motivation, like 'During this time I was able to work more productively than I usually can' and 'When looking back now, I have very good memories of this time'. This section also includes questions asking if participants would like to encounter this type of intense motivation again, and if they have observed other people around them experiencing such type of motivation.

3.3. Procedure

Using the following procedures, the research questions were addressed. First, to choose the participants of the study, convenience sampling was utilized. In fact, the Quick Placement Test was distributed to 120 EFL students from different majors, including English Translation and English Literature at Sari and Qaemshahr branches of Islamic Azad University. 90 students whose scores fell between 25 and 35 were chosen. They were categorized into three groups (control, Face-to-Face, and BigBlueButton) randomly. Then participants in Face-to-Face and BigBlueButton were divided into two subgroups, one received Mind Dump and the other one received Word Journal. At first session, the Persian version of the DMC questionnaire was distributed to the participants in all groups for later comparisons. The questionnaire was administered in a Porsline format in the BigBlueButton group.

Over the course of a 16-week semester, participants in control, Face-to-Face, and BigBlueButton were taught narrative writing two hours per week. Participants in Face-to-Face and BigBlueButton

groups were taught with instructional embedded formative assessment strategies (Mind Dump and Word Journal), whereas students in the control group were taught without using these strategies and with traditional teaching methods. Meanwhile, students in Face-to-Face and BigBlueButton were presented with an explanation of two formative assessment strategies. Regarding Mind Dump, students composed everything they could recall from the readings in five to ten minutes after they read and answered any questions about the reading. In Face-to-Face class, students wrote on paper, while in the virtual setting, they were instructed to type their responses in a Word document. The teacher monitored their progress, provided time cues, and occasionally facilitated class or peer discussions. For the Word Journal strategy, the teacher first explained that students should choose one word that best summarized the reading passage. Students were then instructed to write a one- or two-paragraph explanation justifying their word choice. In the Face-to-Face class, this was done in notebooks and followed by pair or group sharing. In the virtual class, the teacher guided students to submit their responses via chat or shared documents and used breakout rooms for peer exchange. In fact, at the end of each session, students in each subgroup were given 15 minutes to implement determined formative assessment strategy.

In the BigBlueButton group, the features of BigBlueButton were introduced to students, and how to use them was explained. For example, the instructor provided a thorough explanation of how to write sentences and paragraphs, how to interact with group members and how to turn in their assignments via BigBlueButton. BigBlueButton was employed for supplying materials, practicing exercises, offering assistance, and conducting assessments. The instructor set up and maintained accounts in the BigBlueButton group, and enabled students to register and obtain their own username and password. This helped students access and join the BigBlueButton group. Finally, at the end of the course, the same DMC questionnaire was distributed to students in control, Face-to-Face, and BigBlueButton groups.

3.4. Data Analysis

The study adopted a quasi-experimental pretest-posttest design. The results of the collected data were analyzed statistically using SPSS version 28. To answer DMCs questions after instruction in all groups, descriptive statistics, frequency and percentage, was calculated for Items 1-6, 13 and 20. Moreover, descriptive statistics, the Kolmogorov Smirnov Test, Quade Nonparametric Analysis of Covariance, and Pairwise Comparisons of Groups were performed for Items 7-19 except for Item 13. Items 7-19, except

Item 13, followed the Five-Likert scale, where participants pick responses that range from 1 denoting strong agreement to 5 indicating strong disagreement. They indicate the intensity of each participant’s response to the item. The higher the value of this number, the higher the participant’s DMCs.

4. Results

To answer the first research question, descriptive analysis was calculated for Items 1-6, 13 and 20. The following table displays the results.

Table 2

Descriptive Analysis of Students’ Pre-test and Post-test Responses to First Three Items in Control, Face-to-Face, and BigBlueButton

Item	Group	Test	SD(%)	D(%)	N(%)	A(%)	SA(%)
1. Recognized the intense motivation	Control	Pre	2(6.7%)	5(16.7%)	6(20.0%)	12(40.0%)	5(16.7%)
		Post	1(3.3%)	5(16.7%)	6(20.0%)	13(43.3%)	5(16.7%)
	Face-to-Face	Pre	1 (3.3%)	5 (16.7%)	6 (20.0%)	13 (43.3%)	5 (16.7%)
		Post	0 (.0%)	3 (10.0%)	6 (20.0%)	14 (46.7%)	7 (23.3%)
	BigBlueButton	Pre	2 (6.7%)	5 (16.7%)	5 (16.7%)	13 (43.3%)	5 (16.7%)
		Post	0 (.0%)	2 (6.7%)	3 (10.0%)	16 (53.3%)	9 (30.0%)
2. Experienced it while doing a project	Control	Pre	2(6.7%)	4(13.3%)	7(23.3%)	12(40.0%)	5(16.7%)
		Post	1(3.3%)	4(13.3%)	6(20.0%)	13(43.3%)	6(20.0%)
	Face-to-Face	Pre	3 (10.0%)	4 (13.3%)	6 (20.0%)	13 (43.3%)	4 (13.3%)
		Post	0 (.0%)	3 (10.0%)	6 (20.0%)	14 (46.7%)	7 (23.3%)
	BigBlueButton	Pre	4 (13.3%)	4 (13.3%)	5 (16.7%)	11 (36.7%)	6 (20.0%)
		Post	1 (3.3%)	2 (6.7%)	4 (13.3%)	15 (50.0%)	8 (26.7%)
3. Experienced it while learning English	Control	Pre	4(13.3%)	5(16.7%)	5(16.7%)	13(43.3%)	3(10.0%)
		Post	3(10.0%)	4(13.3%)	5(16.7%)	14(46.7%)	4(13.3%)
	Face-to-Face	Pre	3 (10.0%)	5 (16.7%)	6 (20.0%)	13 (43.3%)	3 (10.0%)
		Post	1 (3.3%)	4 (13.3%)	6 (20.0%)	15 (50.0%)	4 (13.3%)
	BigBlueButton	Pre	3 (10.0%)	6 (20.0%)	7 (23.3%)	11 (36.7%)	3 (10.0%)
		Post	1 (3.3%)	1 (3.3%)	7(23.3%)	13 (43.3%)	8 (26.7%)

Note. Bold values represent statistically significant differences.

Table 2 demonstrates the participants’ experiences of DMCs in control, Face-to-Face, and BigBlueButton groups. 60% of students in control, 70% of them in Face-to-Face, and 83% in BigBlueButton acknowledged they recognized the intense motivation. The results indicate there was a significant difference in DMCs of students who were exposed to BigBlueButton instruction (60% - 83%) compared to those in Face-to-Face and control.

When being asked whether they experienced intense motivation while doing a project (Item 2), the results show a significant percentage (56.7% - 76.7%) of students in BigBlueButton compared to those in Face-to-Face (56.7% - 70%) and those in control (56.7% - 63.3%) were intensely motivated while doing a project. When being asked if they experienced intense motivation while learning English (Item 3), 60%, 63.3%, and 70% of students in control, Face-to-Face, and BigBlueButton respectively experienced intense motivation while learning English. Consequently, there was a significant difference (46.7% - 70%) in their responses to Item 3 in BigBlueButton compared to those in Face-to-Face (53.3% - 63.3%) and control (53.3% - 60%).

When they were further asked about the frequency of experiencing this kind of motivational intensity (Item 4), 50%, 53%, and 73.4% of students in control, Face-to-Face, and BigBlueButton respectively experienced intense DMCs. A significant difference (46.7% - 73.4%) was revealed in students' responses to Item 4 in BigBlueButton. Additionally, when being inquired how long their experience of this kind of motivation lasted (Item 5), 40% (36.7% - 40%), 50% (43.3% - 50%), and 56.7% (36.7% - 56.7%) of students DMCs in control, Face-to-Face, and BigBlueButton respectively lasted for over six months. There was a significant difference in their responses to Item 5 in BigBlueButton.

The participants' level of DMCs was examined by their self-perceived motivational intensity (Item 6). A significant percentage of students in BigBlueButton (43.3%) compared to those in Face-to-Face (30%) and control (26.7%) responded their DMCs were very high. Students' DMCs in Face-to-Face (20% - 30%) and BigBlueButton (33.3% - 43.3%) increased equally from pretest to posttest. Compared to control (20% - 26.7%), a significant percentage of students' DMCs were very high in the experimental groups.

When being inquired whether they would like to experience this type of intense motivation again (Item 13), 22 (73.3%) students in control and 25 (83.3%) participants in each experimental group responded "Yes". Regarding Item 20, 22 (73.3%) of students in each control and Face-to-Face and 23(76.7%) of them in BigBlueButton expressed they have seen this kind of intense motivation in people around them.

In this study, items 7 to 12 and 14 to 19 of the DMC questionnaire were utilized. Item 7 stated, "Reflecting on that period, I have fond and positive recollections," and item 8 noted, "At that time, I was

more efficient and productive than usual." Item 9 indicated, "I accomplished more than I had expected of myself," while item 10 acknowledged, "There were numerous moments when continuing felt genuinely challenging." In item 11, participants responded to the statement, "That experience enabled me to fulfill all of my goals - and even exceed them," followed by item 12: "I believe something extraordinary happened to me then - it was a remarkable experience."

Item 14 emphasized, "Throughout, the project held a central role in my daily life," and item 15 expressed, "Those around me recognized that I was going through something meaningful." According to item 16, "I didn't perceive it as exhausting work—I was simply immersed in the momentum!" Item 17 described, "My goal was constantly on my mind," and item 18 stated, "I frequently visualized myself reaching the final objective." Finally, item 19 concluded, "It was an experience I genuinely enjoyed."

Table 3

Results of Quade Test and Pairwise Comparisons of Groups of the Students' Post-test Responses to Items 7-12 in Control, Face-to-Face, and BigBlueButton

Item	Quade Nonparametric Analysis of Covariance				Pairwise Comparisons of Groups				
	F	DFH	DFE	P Value	Comparison	Diff	t	DF	P Value
7	8.067	2	87	.001	Ctrl vs. F-to-F	-.35	-3.080	87	.003
					Ctrl vs. BBB	-.47	-4.512	87	<.001
					F-to-F vs. BBB	-.12	-1.867	87	.065
8	7.950	2	87	.001	Ctrl vs. F-to-F	-.36	-3.259	87	.002
					Ctrl vs. BBB	-.48	-4.721	87	<.001
					F-to-F vs. BBB	-.12	-1.796	87	.072
9	9.015	2	87	<.001	Ctrl vs. F-to-F	-.22	-2.394	87	.022
					Ctrl vs. BBB	-.58	-5.121	87	<.001
					F-to-F vs. BBB	-.36	-3.329	87	.002
10	6.173	2	87	.003	Ctrl vs. F-to-F	-.21	-2.141	87	.025
					Ctrl vs. BBB	-.52	-4.902	87	<.001
					F-to-F vs. BBB	-.32	-2.831	87	.008
11	5.349	2	87	.006	Ctrl vs. F-to-F	-.21	-2.138	87	.026
					Ctrl vs. BBB	-.44	-4.421	87	<.001
					F-to-F vs. BBB	-.23	-2.403	87	.019
12	5.888	2	87	.004	Ctrl vs. F-to-F	-.18	-2.036	87	.034
					Ctrl vs. BBB	-.45	-4.582	87	<.001
					F-to-F vs. BBB	-.27	-2.573	87	.013

Note. Bold values indicate statistically significant differences at $p < .05$

For Items 7-19 except for Item 13, Descriptive Statistics, the Kolmogorov Smirnov Test, Quade Nonparametric Analysis of Covariance, and Pairwise Comparisons of Groups were performed. Descriptive analysis of students' pre-test and post-test responses to Items 7-12 and 14-19 of the DMC questionnaire indicates the mean intensity of students' post-test responses to all items improved significantly in Face-to-Face and BigBlueButton compared to those in control, which shows students' DMCs in the experimental groups increased significantly after instruction. Additionally, P-value of the K-S Test of students' responses to most items is less than .05, and it indicates data distribution was not normal. Due to the fact that each of the questions was examined separately, it is normal that data distribution was not normal. Since the assumption of covariance analysis was not confirmed, Quade Nonparametric Analysis of Covariance was used. The following tables display the results of the Quade Test and Pairwise Comparisons of Groups.

Table 4

Results of Quade Test and Pairwise Comparisons of Groups of the Students' Post-test Responses to Items 14-19 in Control, Face-to-Face, and BigBlueButton

Item	Quade Nonparametric Analysis of Covariance				Pairwise Comparisons of Groups				
	F	DFH	DFE	P Value	Comparison	Diff	T	DF	P Value
14	3.618	2	87	.031	Ctrl vs. F-to-F	-.17	-2.010	87	.041
					Ctrl vs. BBB	-.21	-2.303	87	.023
					F-to-F vs. BBB	-.03	-.280	87	.780
15	3.788	2	87	.026	Ctrl vs. F-to-F	-.18	-2.081	87	.031
					Ctrl vs. BBB	-.27	-2.490	87	.012
					F-to-F vs. BBB	-.09	-.957	87	.256
16	4.792	2	87	.011	Ctrl vs. F-to-F	-.05	-.748	87	.453
					Ctrl vs. BBB	-.37	-3.080	87	.003
					F-to-F vs. BBB	-.32	-2.766	87	.007
17	4.581	2	87	.015	Ctrl vs. F-to-F	-.26	-2.401	87	.016
					Ctrl vs. BBB	-.32	-2.621	87	.008
					F-to-F vs. BBB	-.06	-.813	87	.391
18	5.020	2	87	.009	Ctrl vs. F-to-F	-.21	-2.108	87	.027
					Ctrl vs. BBB	-.37	-3.205	87	.002
					F-to-F vs. BBB	-.16	-1.997	87	.048
19	8.107	2	87	.001	Ctrl vs. F-to-F	-.26	-2.425	87	.015
					Ctrl vs. BBB	-.52	-5.011	87	<.001
					F-to-F vs. BBB	-.27	-2.481	87	.013

Note. Bold values indicate statistically significant differences at $p < .05$

According to the results of the Quade Test (P Value $< .05$), there is a significant difference in students' DMCs in control, Face-to-Face, and BigBlueButton groups. Another test, Pairwise

Comparisons of Groups, indicates students' DMCs in one group have been compared with the other group. The results show there is a significant difference in students' DMCs in BigBlueButton vs. Face-to-Face, BigBlueButton vs. control, and Face-to-Face vs. control in most items (P Value <.05). Consequently, it can be concluded in most items, DMCs of students in BigBlueButton improved significantly compared to those in Face-to-Face and control, and DMCs of students in Face-to-Face improved significantly compared to those in control. Thus, DMCs of Iranian EFL students who received instruction through BigBlueButton and Face-to-Face differed significantly from those receiving traditional instruction in the control group. The following tables display the results of the second research inquiry.

Table 5

Descriptive Statistics of Students' Pre-test and Post-test Responses to the First Three Items in Control, Mind Dump and Word Journal Subgroups

Item	Group	Test	SD(%)	D(%)	N(%)	A(%)	SA(%)	
1. Recognized the intense motivation	control	Pre	2(6.7%)	5(16.7%)	6(20.0%)	12(40.0%)	5(16.7%)	
		Post	1(3.3%)	5(16.7%)	6(20.0%)	13(43.3%)	5(16.7%)	
	Mind Dump	Pre	2(6.7%)	5(16.7%)	4(13.3%)	13(43.3%)	6(20.0%)	
		Post	0(0.0%)	2(6.7%)	4(13.3%)	15(50.0%)	9(30.0%)	
		Word	Pre	1(3.3%)	5(16.7%)	7(23.3%)	13(43.3%)	4(13.3%)
		Journal	Post	0(0.0%)	3(10.0%)	5(16.7%)	15(50.0%)	7(23.3%)
2. Experienced it while doing a project	control	Pre	2(6.7%)	4(13.3%)	7(23.3%)	12(40.0%)	5(16.7%)	
		Post	1(3.3%)	4(13.3%)	6(20.0%)	13(43.3%)	6(20.0%)	
	Mind Dump	Pre	2(6.7%)	3(10.0%)	6(20.0%)	13(43.3%)	6(20.0%)	
		Post	0(0.0%)	2(6.7%)	3(10.0%)	15(50.0%)	10(33.3%)	
		Word	Pre	5(16.7%)	5(16.7%)	5(16.7%)	11(36.7%)	4(13.3%)
		Journal	Post	1(3.3%)	3(10.0%)	7(23.3%)	14(46.7%)	5(16.7%)
3. Experienced it while learning English	control	Pre	4(13.3%)	5(16.7%)	5(16.7%)	13(43.3%)	3(10.0%)	
		Post	3(10.0%)	4(13.3%)	5(16.7%)	14(46.7%)	4(13.3%)	
	Mind Dump	Pre	2(6.7%)	5(16.7%)	6(20.0%)	15(50.0%)	2(6.7%)	
		Post	0(0.0%)	2(6.7%)	7(23.3%)	13(43.3%)	8(26.7%)	
		Word	Pre	4(13.3%)	6(20.0%)	7(23.3%)	9(30.0%)	4(13.3%)
		Journal	Post	2(6.7%)	3(10.0%)	6(20.0%)	15(50.0%)	4(13.3%)

Note. Bold values represent statistically significant differences.

Table 5 reports students' experiences of DMCs in Mind Dump and Word Journal subgroups and control group. 60% of students in control, 80% of the participants in Mind Dump, and 73.3% of them in Word Journal subgroup acknowledged that they recognized the intense motivation. The results indicate

compared to the control group (56.7% - 60%), a significant percentage of students in Mind Dump (63.3% - 80%) and Word Journal (56.6% - 73.3%) subgroups recognized the intense motivation.

When being asked whether they experienced intense motivation while doing a project (Item 2), the results show that a significant percentage of the participants in Mind Dump (63.3% - 83.3%) compared to those in Word Journal (50% - 63.4%) and those in the control group (65.7% - 63.3%) experienced intense motivation while doing a project.

Besides, when being asked them whether they experienced intense motivation while learning English (Item 3), 60%, 70%, and 63.3% of the students in the control group, Mind Dump, and Word Journal subgroups respectively experienced intense motivation in their English study. It seems that a significant percentage of the participants in Word Journal subgroup (43.3% - 63.3%) compared to those in Mind Dump (56% - 70%) and those in the control group (53.3% - 60%) experienced intense motivation while learning English.

When they were further asked about the frequency of experiencing a project of this kind of motivational intensity (Item 4), 50%, 73.4%, and 53.3% of students in control, Mind Dump, and Word Journal subgroup respectively experienced intense motivation in doing projects. A significant percentage of students in Mind Dump (26.7% - 36.7%) compared to those in each control and Word Journal (20% - 23.3%) experienced intense DMCs several times. Additionally, when being inquired how long their experience of this kind of motivation lasted (Item 5), with regard to the result in pretest, a significant percentage of students in Mind Dump (36.7% - 56.7%) compared to those in control (36.7% - 40%) and in Word Journal (43.3% - 50%) responded their DMCs lasted for over six months.

The participants' DMCs intensity was examined by their self-perceived motivational intensity (Item 6). With respect to the result in pretest, it was found that a significant percentage of students in Mind Dump (63.3% - 73.3%) compared to those in the control group (56.7% - 60%) and in Word Journal (70% - 73.3%) responded that their DMCs were high. Additionally, when being asked whether they would like to experience this type of intense motivation again (Item 13), 22 (73.3%), 24 (80%), and 26 (86.7%) of them in control, Mind Dump, and Word Journal respectively responded "Yes". Regarding Item 20, 22 (73.3%), 21 (70%), and 24 (80%) of the participants in the control group, Mind Dump, and Word Journal subgroups respectively claimed that they have seen this type of intense motivation in people around them.

Table 6

Results of Quade Test and Pairwise Comparisons of Groups of Students' Post-test Responses to Items 7-12 in Control, Mind Dump, and Word Journal

Item	Quade Nonparametric Analysis of Covariance				Pairwise Comparisons of Groups				
	F	DFH	DFE	P Value	Comparison	Diff	T	DF	P Value
7	6.712	2	87	.002	Ctrl vs. MD	-.48	-4.891	87	<.001
					Ctrl vs. WJ	-.34	-3.021	87	.004
					MD vs. WJ	.15	1.990	87	.053
8	5.821	2	87	.004	MD vs. MD	-.46	-4.463	87	<.001
					Ctrl vs. WJ	-.38	-3.825	87	.002
					MD vs. WJ	.07	0.811	87	.380
9	8.161	2	87	.001	Ctrl vs. MD	-.52	-5.005	87	<.001
					Ctrl vs. WJ	-.28	-2.590	87	.011
					MD vs. WJ	.24	2.104	87	.018
10	6.301	2	87	.003	Ctrl vs. MD	-.47	-4.780	87	<.001
					Ctrl vs. WJ	-.27	-2.450	87	.013
					MD vs. WJ	.20	2.136	87	.027
11	5.112	2	87	.008	Ctrl vs. MD	-.41	-4.203	87	.001
					Ctrl vs. WJ	-.24	-2.053	87	.017
					MD vs. WJ	.17	1.898	87	.041
12	5.036	2	87	.009	Ctrl vs. MD	-.37	-3.764	87	.002
					Ctrl vs. WJ	-.26	-2.296	87	.015
					MD vs. WJ	.11	1.202	87	.0201

Note. Bold values indicate statistically significant differences at $p < .05$

Descriptive analysis of students' pre-test and post-test responses to Items 7-12 and 14-19 indicates the mean intensity of students' post-test responses to all items in both Mind Dump and Word Journal subgroups improved significantly compared to those in the control group. In fact, DMCs of students using Mind Dump and Word Journal strategies in Face-to-Face and BigBlueButton improved significantly compared to those who did not use these strategies in the control group. Additionally, P-value of the K-S Test of students' responses to most items is less than .05, and it indicates data distribution was not normal. Since the assumption of covariance analysis was not confirmed, Quade Test was used. The following tables display the results of the Quade Test and Pairwise Comparisons of Groups.

Table 7

Results of Quade Test and Pairwise Comparisons of Groups of Students' Post-test Responses to Items 14-19 in Control, Mind Dump, and Word Journal

Item	Quade Nonparametric Analysis of Covariance				Pairwise Comparisons of Groups				
	F	DFH	DFE	P Value	Comparison	Diff	T	DF	P Value
14	3.398	2	87	.043	Ctrl vs. MD	-.25	-2.273	87	.024
					Ctrl vs. WJ	-.13	-1.816	87	.073
					MD vs. WJ	.13	1.887	87	.064
15	3.578	2	87	.039	Ctrl vs. MD	-.27	-2.781	87	.008
					Ctrl vs. WJ	-.18	-2.126	87	.033
					MD vs. WJ	.09	1.100	87	.281
16	4.871	2	87	.012	Ctrl vs. MD	-.32	-3.505	87	.004
					Ctrl vs. WJ	-.10	-1.252	87	.245
					MD vs. WJ	.22	2.417	87	.021
17	5.943	2	87	.004	Ctrl vs. MD	-.32	-3.011	87	.005
					Ctrl vs. WJ	-.27	-2.661	87	.009
					MD vs. WJ	.05	.701	87	.472
18	5.841	2	87	.004	Ctrl vs. MD	-.32	-3.026	87	.004
					Ctrl vs. WJ	-.25	-2.817	87	.013
					MD vs. WJ	.07	.996	87	.352
19	6.807	2	87	.002	Ctrl vs. MD	-.49	-4.814	87	<.001
					Ctrl vs. WJ	-.29	-2.806	87	.007
					MD vs. WJ	.21	2.501	87	.019

Note. Bold values indicate statistically significant differences at $p < .05$

The results of the Quade Test (P Value $< .05$) indicate there is a significant difference in students' DMCs in the control group, Mind Dump, and Word Journal subgroups after instruction. Another test, Pairwise Comparisons of Groups, indicate students' DMCs in one group has been compared with the other subgroup. Regarding P Value $< .05$, there is a significant difference between Mind Dump vs. Word Journal, Mind Dump vs. control, and Word Journal vs. control in most items. Thus in most items, DMCs of students in Mind Dump and Word Journal subgroups improved significantly compared to those in the control group, and DMCs of students in Mind Dump subgroup improved significantly compared to those in Word Journal subgroup. The following tables display the results of the third research question.

Table 8

Descriptive Analysis of Students' Pre-test and Post-test Responses to the First Three Items Using Mind Dump in Face-to-Face and BigBlueButton

Item	Group	Test	SD(%)	D(%)	N(%)	A(%)	SA(%)
1. Recognized the intense motivation	Face-to-Face	Pre	1 (6.7%)	2 (13.3%)	2 (13.3%)	7 (46.7%)	3 (20.0%)
		Post	0 (.0%)	1 (6.7%)	3 (20.0%)	7 (46.7%)	4 (26.7%)
	BigBlueButton	Pre	1 (6.7%)	3 (20.0%)	2 (13.3%)	6 (40.0%)	3 (20.0%)
		Post	0 (.0%)	1(6.7%)	1 (6.7%)	8 (53.3%)	5(33.3%)
2. Experienced it while doing a project	Face-to-Face	Pre	1 (6.7%)	1 (6.7%)	3 (20.0%)	7 (46.7%)	3 (20.0%)
		Post	0 (.0%)	1 (6.7%)	2(13.3%)	7 (46.7%)	5 (33.3%)
	BigBlueButton	Pre	1 (6.7%)	2 (13.3%)	3 (20.0%)	6 (40.0%)	3 (20.0%)
		Post	0 (.0%)	1 (6.7%)	1 (6.7%)	8 (53.3%)	5 (33.3%)
3. Experienced it while learning English	Face-to-Face	Pre	1 (6.7%)	2 (13.3%)	3 (20.0%)	8 (53.3%)	1 (6.7%)
		Post	0 (.0%)	2 (13.3%)	3 (20.0%)	8 (53.3%)	2 (13.3%)
	BigBlueButton	Pre	1 (6.7%)	3 (20.0%)	3 (20.0%)	7 (46.7%)	1 (6.7%)
		Post	0 (.0%)	0 (.0%)	4 (26.7%)	5 (33.3%)	6 (40.0%)

Note. Bold values represent statistically significant differences.

Table 8 reports students' experiences of DMCs in Face-to-Face and BigBlueButton groups using Mind Dump. Regarding Item 1, a significant percentage of the participants using Mind Dump in BigBlueButton (60% - 87%) compared to those in Face-to-Face (67% - 73.4%) recognized intense motivation. Considering Item 2, a significant percentage of the participants using Mind Dump in BigBlueButton (60% - 87%) compared to those in Face-to-Face (67% - 80%) experienced intense motivation while doing a project. Regarding Item 3, a significant percentage of the participants using Mind Dump in BigBlueButton (53.4% - 73.3%) compared to those in Face-to-Face (60% - 67%) experienced intense motivation while learning English.

Regarding Item 4, a significant percentage of students using Mind Dump in BigBlueButton (27% - 47%) compared to those in Face-to-Face (27% - 27%) experienced intense motivation several times. Regarding Item 5, a significant percentage of the participants using Mind Dump in BigBlueButton (33.3% - 60%) compared to those in Face-to-Face (40% - 53.3%) responded their DMCs lasted for over six months. The participants' DMCs intensity was examined by their self-perceived motivational intensity (Item 6). The results indicate a significant percentage of students using Mind Dump in BigBlueButton (27% - 47%) compared to those in Face-to-Face (20% - 33.3%) responded their DMCs were very high.

Additionally, when being asked whether they would like to experience this type of intense motivation again (Item 13), 12 (80%) of them using Mind Dump in each group responded they would

like to experience it again. Moreover, when being asked if they ever witnessed other people around them experiencing DMCs (Item 20), 10 (66.7%) and 11 (73.3%) of the participants using Mind Dump in Face-to-Face and BigBlueButton groups respectively claimed that they have seen it in people around them.

For Items 7-19 except for Item 13, Descriptive Statistics, the Kolmogorov Smirnov Test, Quade Nonparametric Analysis of Covariance were employed. Descriptive analysis of students' pre-test and post-test responses to Items 7-12 and 14-19 of the DMC questionnaire indicate the mean intensity of students' post-test responses to all items in Mind Dump subgroups in Face-to-Face and BigBlueButton improved compared to their pre-test ones. Additionally, the mean intensity of students' responses in Mind Dump subgroup in BigBlueButton improved more than those in Face-to-Face. Table 9 and 10 represent the results of Quade Test.

Table 9

Results of Quade Nonparametric Analysis of Covariance of Students' Post-test Responses to Items 7-12 in Mind Dump Subgroups in Face-to-Face and BigBlueButton

Item	Diff(F-to-F vs. BBB)	Quade Nonparametric Analysis of Covariance			
		F	DFH	DFE	P Value
7	-.14	3.204	1	28	.081
8	-.13	3.030	1	28	.094
9	-.43	9.678	1	28	<.001
10	-.45	10.041	1	28	<.001
11	-.29	6.313	1	28	.003
12	-.33	7.875	1	28	.001

Note. Bold values indicate statistically significant differences at $p < .05$

Table 10

Results of Quade Nonparametric Analysis of Covariance of Students' Post-test Responses to Items 14-19 in Mind Dump Subgroups in Face-to-Face and BigBlueButton

Item	Diff(F-to-F – BBB)	Quade Nonparametric Analysis of Covariance			
		F	DFH	DFE	P Value
14	-.08	1.007	1	28	.325
15	-.11	2.542	1	28	.122
16	-.43	9.235	1	28	<.001
17	-.07	0.936	1	28	.342
18	-.16	3.512	1	28	.048
19	-.32	7.604	1	28	.001

Note. Bold values indicate statistically significant differences at $p < .05$

According to Tables 9 and 10, the results of the Quade Test (P Value $< .05$) indicate there is a significant difference in students' DMCs between Mind Dump subgroups in Face-to-Face and BigBlueButton in 7 Items out of 12. In fact, it indicates DMCs of Students using Mind Dump in BigBlueButton improved significantly compared to those in Face-to-Face in Items (9, 10, 11, 12, 16, 18, 19). Overall, there was a significant difference between DMCs of Iranian EFL students who used Mind Dump in BigBlueButton compared to those in Face-to-Face in Items (1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 16, 18, 19). Thus, DMCs of Iranian EFL students who used Mind Dump in BigBlueButton differed significantly from those in the Face-to-Face group. The following tables display the results of the fourth research question.

Table 11

Descriptive Analysis of Students' Pre-test and Post-test Responses to the First Three Items Using Word Journal in Face-to-Face and BigBlueButton

Item	Group	Test	SD(%)	D(%)	N(%)	A(%)	SA(%)
1. Recognized the intense motivation	Face-to-Face	Pre	0 (.0%)	3 (20.0%)	4 (26.7%)	6 (40.0%)	2 (13.3%)
		Post	0 (.0%)	2 (13.3%)	3 (20.0%)	7 (46.7%)	3 (20.0%)
	BigBlueButton	Pre	1 (6.7%)	2 (13.3%)	3 (20.0%)	7 (46.7%)	2 (13.3%)
		Post	0 (.0%)	1 (6.7%)	2 (13.3%)	8 (53.3%)	4 (26.7%)
2. Experienced it while doing a project	Face-to-Face	Pre	2(13.3%)	3 (20.0%)	3(20.0%)	6 (40.0%)	1 (6.7%)
		Post	0 (.0%)	2(13.3%)	4 (26.7%)	7(46.7%)	2(13.3%)
	BigBlueButton	Pre	3 (20.0%)	2 (13.3%)	2 (13.3%)	5(33.3%)	3 (20.0%)
		Post	1 (6.7%)	1 (6.7%)	3 (20.0%)	7 (46.7%)	3 (20.0%)
3. Experienced it while learning English	Face-to-Face	Pre	2(13.3%)	3 (20.0%)	3 (20.0%)	5 (33.3%)	2 (13.3%)
		Post	1 (6.7%)	2 (13.3%)	3 (20.0%)	7 (46.7%)	2 (13.3%)
	BigBlueButton	Pre	2 (13.3%)	3 (20.0%)	4 (26.7%)	4 (26.7%)	2 (13.3%)
		Post	1 (6.7%)	1 (6.7%)	3 (20.0%)	8 (53.3%)	2 (13.3%)

Note. Bold values represent statistically significant differences.

Table 11 reports students' experiences of directed motivational currents in Face-to-Face and BigBlueButton groups using Word Journal. The results indicate a significant percentage of the participants using Word Journal in BigBlueButton (60% - 80%) compared to those in Face-to-Face (53.3% - 67%) recognized intense motivation. Regarding Item 2, 60% of the students in Face-to-Face (47% - 60%) and 67% of them in BigBlueButton (53.3% - 67%) were intensely motivated when they were engaged in a project. The results indicate students' DMCs in Face-to-Face and BigBlueButton increased equally. Considering Item 3, 60% of the students using Word Journal in Face-to-Face (47% - 60%) and approximately 67% of them in BigBlueButton (40% - 60%) experienced intense motivation in

their English study. The results indicate there was a significant difference in students' DMCs in BigBlueButton after instruction.

Regarding Item 4, 57% of the students in Face-to-Face (33.3% - 57%) and 60% of them in BigBlueButton (47% - 60%) experienced intense motivation in doing projects. Students' DMCs have increased significantly in both groups after instruction, but Word Journal had a much greater impact on their DMCs in Face-to-Face. Regarding Item 5, over half of the students' DMCs in BigBlueButton using Word Journal (40% - 53.3%) compared to those in Face-to-Face (47% - 47%) lasted for over six months. In fact, DMCs of students using Word Journal has increased significantly in BigBlueButton.

The participants' DMCs intensity was examined by their self-perceived motivational intensity (Item 6). Approximately 87% of the participants' DMCs intensity was high in BigBlueButton (80 - 87%) compared to those in Face-to-Face (60% - 60%). Students' DMCs in BigBlueButton have slightly increased. Regarding the pretest, difference was not significant. Regarding Item 13, 13 (86.7%) students using Word Journal in each group responded they would like to experience it again. Regarding Item 20, 12 (80%) participants using Word Journal in each group claimed they have seen it in people around them.

For Items 7-19 except for Item 13, descriptive analysis of students' pre-test and post-test responses indicates the mean intensity of students' post-test responses to all items in Word Journal subgroups in Face-to-Face and BigBlueButton improved compared to their pre-test ones. Additionally, the mean intensity of students' responses in Word Journal subgroup in BigBlueButton improved more than those in Face-to-Face. Tables 12 and 13 represent the results of Quade Test.

Table 12

Results of Quade Nonparametric Analysis of Covariance of Students' Post-test Responses to Items 7-12 in Word Journal Subgroups in Face-to-Face and BigBlueButton

Item	Diff(F-to-F - BBB)	Quade Nonparametric Analysis of Covariance			
		F	DFH	DFE	P Value
7	-.09	.975	1	28	.311
8	-.10	1.102	1	28	.280
9	-.29	6.278	1	28	.003
10	-.18	3.945	1	28	.019
11	-.18	4.012	1	28	.020
12	-.21	5.212	1	28	.008

Note. Bold values indicate statistically significant differences at $p < .05$

Table 13

Results of Quade Nonparametric Analysis of Covariance of Students' Post-test Responses to Items 14-19 in Word Journal Subgroups in Face-to-Face and BigBlueButton

Item	Diff(F-to-F – BBB)	Quade Nonparametric Analysis of Covariance			
		F	DFH	DFE	P Value
14	.01	.072	1	28	.791
15	-.06	.373	1	28	.501
16	-.20	4.818	1	28	.014
17	-.05	.370	1	28	.547
18	-.16	3.813	1	28	.043
19	-.21	5.010	1	28	.009

Note. Bold values indicate statistically significant differences at $p < .05$

According to Tables 12 and 13, the results of the Quade Test (P Value < .05) indicate there is a significant difference in students' DMCs between Word Journal subgroups in Face-to-Face and BigBlueButton in 7 Items out of 12. In fact, it indicates DMCs of Students using Word Journal in BigBlueButton improved significantly compared to those in Face-to-Face in Items (9, 10, 11, 12, 16, 18, 19). Overall, there was a significant difference between DMCs of Iranian EFL students who used Word Journal in BigBlueButton compared to those in Face-to-Face in Items (1, 3, 5, 9, 10, 11, 12, 16, 18, 19). Thus, DMCs of Iranian EFL students who used Word Journal in BigBlueButton differed significantly from those in the Face-to-Face group.

5. Discussion

This investigation aimed to investigate the effect of BigBlueButton and formative assessment strategies (Mind Dump and Word journal) on Iranian EFL students' DMCs. Regarding the first question, the results indicate a significant percentage of students in BigBlueButton recognized intense motivation, were intensely motivated while doing a project and experienced intense motivation while learning English compared to those in Face-to-Face and control groups. In terms of the frequency of experiencing intense motivation, a significant percentage of students in BigBlueButton experienced intense DMCs several times compared to those in Face-to-Face and control. More than half of the students' DMCs in BigBlueButton lasted for over six months compared to those in Face-to-Face and control. Moreover, compared to the control group, a significant percentage of students in BigBlueButton and Face-to-Face

responded their intense motivation was very high. Furthermore, it was found most students in BigBlueButton, Face-to-Face, and control saw intense motivation in people around them and were willing to experience it again. For Items 7-19 except for Item 13, the results show students' DMCs in the experimental groups increased significantly compared to those in control after instruction. Consequently, it was revealed in most items, students' DMCs in BigBlueButton improved significantly compared to those in Face-to-Face and control, and students' DMCs in Face-to-Face improved significantly compared to those in control.

Since research on the effect of BigBlueButton on students' DMCs is scarce and DMC is a strand of motivation, the results of investigations that indicate the impact of online learning on students' motivation are cited to confirm the results of this study. Thus, this study's results correspond with the findings of Rovai, et al. (2007) which indicated students instructed by e-learning were more motivated than students who participated in traditional classroom. It is also aligned with the findings of Harandi (2015) which demonstrated e-learning in higher education impacted students' motivation in the field of learning. Fauzi (2017) states electronic learning can raise students' motivation, particularly learning English.

Additionally, this study's results correspond with the findings of Ulfa, et al. (2022) which indicated most students using an online platform, like Edmodo, were motivated and felt it was decent. Thongmak (2013) asserts a digital-based platform facilitates contact between instructors and students, increases collaboration among students working on group projects, and raises their experiences in an interactive setting. Besides, it corresponds with the findings of Jiang et al. (2023) which demonstrated online learning positively influenced students' motivation. Moreover, it is in harmony with the investigation conducted by Elbyaly and Elfeky (2023) who found the use of online learning environments affected the growth of academic motivation in both experimental research groups. On the other hand, it is in conflict with the results obtained by Minda (2020) who found internet-based learning didn't waken the students' motivation. Minda also asserted the failure of online learning happened due to inadequate internet access, lack of technology skill, money and time consuming, and poor online learning designing.

Overall, BigBlueButton as an online platform significantly increased students' DMCs in several ways. First, it facilitated access to a variety of interactive learning tools and resources which can raise students' motivation and engagement. In fact, the platform's interactive features, like polls, breakout

spaces, and live discussions encouraged active engagement. Students became more motivated as a result of this engagement, which helped them focus on their learning objectives. Second, it allowed real-time collaboration and communication between teachers and students. This can increase students' motivation by creating a conducive learning environment. Third, students received real-time feedback from their teacher throughout classes, which strengthened their motivation and commitment to learning. Fourth, BigBlueButton fostered a sense of community among students by facilitating group activities. Students' motivation has been demonstrated to increase in collaborative learning environments because they feel responsible to their peers. Lastly, this online platform offers flexibility in terms of scheduling and accessing learning materials. Ultimately, increased engagement, collaboration, real-time feedback, and flexibility contributed to a positive raise in students' DMCs.

Next, considering the second research question, it was indicated that a significant percentage of students in Mind Dump and Word Journal subgroups recognized the intense motivation compared to those in control. Next, a significant percentage of participants in Mind Dump compared to those in Word Journal and control experienced intense motivation while doing a project. Moreover, a significant percentage of participants in Word Journal compared to those in Mind Dump and control group experienced intense motivation while learning English. Moreover, a significant percentage of students in Mind Dump compared to those in control and Word Journal experienced intense DMCs several times and responded their DMCs lasted for over six months and were high. Additionally, most students in control, Mind Dump, and Word Journal saw this type of motivation in people around them and were willing to experience it again. It was also revealed DMCs of students using Mind Dump and Word Journal strategies in Face-to-Face and BigBlueButton improved significantly compared to those who did not use these strategies in the control group. Consequently, in most items, DMCs of students in Mind Dump and Word Journal subgroups improved significantly compared to those in the control group, and DMCs of students in Mind Dump subgroup improved significantly compared to those in Word Journal subgroup.

Regarding the third research question, the results indicate a significant percentage of students using Mind Dump in BigBlueButton recognized intense motivation, were intensely motivated while doing a project, experienced intense motivation while learning English, experienced intense motivation several times, replied their DMCs continued for over six months and were very high compared to those using Mind Dump in Face-to-Face. Furthermore, a significant percentage of students using Mind Dump in BigBlueButton and Face-to-Face saw intense motivation in people around them and were willing to

experience it again. For Items 7-19 except for Item 13, the results show DMCs of students using Mind Dump in Face-to-Face and BigBlueButton improved after instruction. It was also revealed DMCs of Students using Mind Dump in BigBlueButton improved significantly compared to those in Face-to-Face in 7 out of 12 Items. Overall, there was a significant difference between DMCs of Iranian EFL students who received Mind Dump through BigBlueButton compared to those in Face-to-Face in Items (1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 16, 18, 19).

Regarding the fourth question, the results indicate a significant percentage of participants using Word Journal in BigBlueButton recognized intense motivation, experienced intense motivation while learning English, experienced it for over six months. Students using Word Journal in Face-to-Face and BigBlueButton experienced significant intense motivation in doing projects after instruction, but a significant percentage of students in Face-to-Face were intensely motivated while doing a project. Moreover, their DMCs intensity was high in both groups. A significant percentage of students using Word Journal in BigBlueButton and Face-to-Face saw intense motivation in people around them and were willing to experience it again. For Items 7-19 except for Item 13, the results show DMCs of students using Word Journal in Face-to-Face and BigBlueButton improved after instruction. It was revealed DMCs of Students using Word Journal in BigBlueButton improved significantly compared to those in Face-to-Face in 7 out of 12 Items. Overall, there was a significant difference between DMCs of Iranian EFL students who used Word Journal in BigBlueButton compared to those in Face-to-Face in Items (1, 3, 5, 9, 10, 11, 12, 16, 18, 19). Additionally, there was a significant difference between DMCs of Iranian EFL students who used Word Journal in Face-to-Face compared to those in BigblueButton in Items 2 and 4. Generally, it was indicated DMCs of students using Mind Dump and Word Journal in BigBlueButton significantly improved compared to those in Face-to-Face in some items. Because the above-mentioned research questions are related to each other and they cannot be separated, they are discussed together in one part.

Given the scarcity of research conducted on the impact of formative assessment strategies on students' DMCs, and since DMC is a strand of motivation, the results of research studies that indicate the influence of formative assessment techniques on individuals' motivation are cited to confirm the results of this study. Thus, this study's results are in line with the conclusion drawn by Brookhart et al. (2009) that formative assessment strategies helped students to strengthen their capabilities and motivation. Formative assessment strategies enabled students to think critically and creatively improve

their motivation. Moreover, the results correspond with the findings of Zhang (2018) who found formative assessment strategies had a positive and significant effect on young English pupils' motivation and accomplishment in China.

Furthermore, the results are in harmony with the findings of Wafubwa (2020) who found formative assessment strategies positively affected students' motivation, involvement and achievement. It corresponds with the conclusion drawn by Dmitrenko et al. (2021) who found frequent application of advanced formative assessment techniques in language instruction raises students' motivation. Besides, this study's results correspond with the findings of Muho and Taraj (2022) which demonstrated formative assessment practices like strategic questions, students' portfolio, self-assessment and peer-assessment significantly influenced students' motivation. The same results of significant impacts of formative assessment practices on pupils' motivation were confirmed by Palmberg et al. (2024) who recognized implementing formative assessment practices led to heightened student engagement in the intervention class, without diminishing their autonomy in motivation, while the students' engagement in learning activities decreased in two control classes and they became less autonomous in their motivation.

In sum, Mind Dump and Word Journal had a positive effect on students' DMCs in Face-to-Face and BigBlueButton groups. By implementing formative assessment strategies, students activated their prior knowledge and made connections with new information. Mind Dump allowed students to write down everything they remembered from the readings after they read. Word Journal allowed students to reflect on their learning by using specific vocabulary related to the topic. This reflective process encouraged students to think deeply about their understanding and progress. Thus, both strategies provided students with opportunities for reflection.

By using these strategies, students developed a clearer understanding of their progress and strengths. Next, active participation was encouraged by using these strategies. Students felt more connected to the material when their own ideas were documented, which increased their drive to succeed. Additionally, the teacher verified students' efforts and progress by giving them real-time feedback, which kept students concentrated on their learning goals. Ultimately, reflection, personalized learning, increased engagement, feedback, self-awareness, and sense of progress can positively impact their DMCs and a desire for continuous learning.

6. Conclusion and implications

This examination appraised the effect of BigBlueButton, Mind Dump, and Word Journal on Iranian EFL students' DMCs. Having utilized a quasi-experimental pretest-posttest design with one control group and two experimental groups, and each experimental group was segmented into Mind Dump and Word Journal subgroups, it was found students' DMCs in BigBlueButton improved significantly compared to their counterparts in Face-to-Face and control, and students' DMCs in Face-to-Face improved significantly compared to those in the control group in most items. Moreover, in most items, DMCs of students in Mind Dump and Word Journal subgroups improved significantly compared to those in the control group, and DMCs of students in Mind Dump subgroup improved significantly compared to those in Word Journal subgroup. Finally, in most items, DMCs of students using Mind Dump and Word Journal in BigBlueButton significantly improved compared to their counterparts in Face-to-Face.

The results might have significant implications for language teachers. They become familiar with the worthwhile effects of BigBlueButton, Mind Dump, and Word Journal on improving DMCs amongst students. The results can assist educators become acquainted with the features of BigBlueButton and its effectiveness for holding virtual courses. Thus, they can promote the standard of their online courses and instructional techniques, which empower their students to expand their knowledge. Moreover, teachers thinking about using formative assessment strategies can initiate practicing.

On the other hand, this investigation had some limitations. One limitation was the speed of the internet connection and sound disturbance. Another limitation was the number of students participating in this study. Moreover, the convenience sampling method was adopted and this restricts the generalizability of the results. Therefore, more experimental studies are required to be conducted with more participants to support the positive effect of this online platform and formative assessment strategies on Iranian EFL students' directed motivational currents.

Furthermore, based on the findings of the current study, several recommendations for further research are proposed. First, future studies could explore the effects of other online learning platforms, such as Zoom, Microsoft Teams, or Google Meet, on DMCs in EFL contexts, in order to determine whether different technological features influence motivational engagement differently. Second, longitudinal research is recommended to examine the sustainability of DMCs over extended periods of exposure to formative assessment strategies and online learning environments, providing insights into

long-term motivational development. Third, employing qualitative methodologies such as interviews, reflective journals, or focus groups may offer a deeper understanding of students' lived experiences and internal processes during DMCs activation in digitally mediated instruction. Finally, further research could investigate the role of English language proficiency levels in shaping students' motivational responses, comparing how beginners and advanced learners experience and sustain DMCs within similar instructional conditions.

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Appendix

DMC Disposition Questionnaire

نام و نام خانوادگی:

لطفا یکی از دو گزینه ی زیر را انتخاب کنید.

من زیر 16 سال سن دارم.

من 16 / بالای 16 سال سن دارم.

صفحه دوم:

1. این نوع انگیزه ی مضاعف را می شناسم.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

2. من به شخصه این نوع انگیزه ی مضاعف را طی انجام پروژه هایم تجربه کرده ام.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

3. من به شخصه این نوع انگیزه ی مضاعف را به خصوص حین یادگیری یک زبان تجربه کرده ام.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

4. حال فکر می کنید چند بار این نوع انگیزه ی مضاعف را تجربه کرده اید؟

..... من هرگز به این شدت، این نوع انگیزه را تجربه نکرده ام. (اگر این گزینه را انتخاب کرده اید به صفحه ی 6 هدایت می شوید.)

..... من یک بار این نوع انگیزه ی مضاعف را تجربه کرده ام اما نه به شدت آنچه بالا گفته شد.

..... من چندین بار این نوع انگیزه ی مضاعف را تجربه کرده ام اما نه به شدت آنچه که در بالا گفته شد.

..... من یک بار این نوع انگیزه ی مضاعف را تجربه کرده ام درست به همان اندازه و شدتی که در بالا گفته شد.

..... من چندین بار این نوع انگیزه ی مضاعف را تجربه کرده ام درست به همان اندازه و شدتی که در بالا گفته شد.

صفحه سوم:

تجربه ی شخصی خودتان در رابطه با این نوع انگیزه ی مضاعف

● اگر این قبیل تجربه را بیش از یک بار تجربه کرده اید لطفا بیاد ماندنی ترینش را در ذهنتان مجسم کنید (این نوع تجربه می تواند هر چیزی باشد نه صرفا یادگیری زبان)

(اگر نمی توانید درست تصمیم بگیرید دوباره به جملات زیر نگاهی بیندازید.)

ذهن من شب و روز درگیر این برنامه / هدف است طوریکه فکر می کنم کنترل زندگیم را به دست گرفته !

متعجب هستم که می توانم برای مدت زیادی روی این برنامه / هدف تمرکز کنم و از اینکه کنار آمدن با این همه کار برایم آسان است لذت می برم.

هیچ وقت فکر نمی کردم که می توانم تا این حد به سوی هدفم پیش بروم و به آن برسم.

دوستانم به عینه متوجه می شوند که اتفاق خاصی در من رخ داده و بر این باورند که قبلا هرگز مرا تا این حد با انگیزه ی بالا ندیده بودند.

ای کاش این تجربه و این نوع انگیزه ی مضاعف در تمام مراحل رسیدن به اهدافم همیشه با من همراه باشد.

5. حال که آن تجربه برایتان تداعی شد به سوالات زیر پاسخ دهید.

این تجربه چقدر طول کشید؟

..... کمتر از یک ماه

..... یک الی دو ماه

..... دو الی چهار ماه

..... چهار الی شش ماه

..... بیشتر از شش ماه

6. لطفا میزان شدت انگیزه ی خود را در این بازه ی زمانی، در مقیاس زیر مشخص کنید.

..... انگیزه ام خیلی بالا نبود.

..... انگیزه ام بالا نبود.

..... انگیزه ام در سطحی متوسط بود.

..... انگیزه ام بالا بود.

..... انگیزه ام خیلی بالا بود.

● لطفا چند جمله ای درباره ی آغاز این دوره از انگیزه ی مضاعف بنویسید. (این تجربه چگونه آغاز شد؟

صفحه چهارم:

پروژه / برنامه ای که در آن انگیزه ی مضاعف را تجربه کردید.

7. هم اکنون وقتی آن دوران به یادم می آید، خاطرات خیلی خوبی در ذهنم نقش می بندد.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

8. در آن بازه ی زمانی می توانستم خیلی فعالانه تر از آنچه که معمولا هستم عمل کنم.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

9. از خودم تعجب می کنم که چطور توانستم آن همه کار انجام دهم.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

10. بیشتر شبیه یک مبارزه بود تا به تلاش خود ادامه دهم.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

11. این تجربه به من کمک کرد تا آنچه که می خواستم و فراتر از آنچه که می خواستم را به دست آورم.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

12. فکر می کنم حین این تجربه اتفاق خاصی در من روی داده. دوران شگفت انگیزی بود.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

13. تمایل دارید شبیه این تجربه که با انگیزه ی مضاعف همراه بوده را دوباره تجربه کنید؟

..... بله

..... خیر

لطفا به طور خلاصه دلیلش را بنویسید.

صفحه پنجم:

کمی بیشتر درباره ی پروژه / برنامه ای که در آن انگیزه ی مضاعف را تجربه کردید ...

14. در آن دوران، این برنامه / پروژه هدف اصلی زندگی را تشکیل می داد.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

15. اطرافیانم می دیدند و متوجه می شدند که اتفاق خاصی را تجربه می کنم.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

16. در آن دوران حس نمی کردم رسیدن به هدفم دشوار است. تنها درگیر یک روند / جریان شده بودم.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

17. به خاطر دارم که همیشه و در همه حال به هدفم فکر می کردم.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

18. همیشه خودم را تصور می کردم که به هدف نهاییم رسیده ام.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

19. واقعا تجربه ی لذت بخشی بود.

کاملا مخالفم مخالفم نظری ندارم موافقم کاملا موافقم

صفحه ششم:

تنها چند سوال تا اتمام پاسخ دهی باقی مانده!

20. آیا این نوع انگیزه ی مضاعف را در اطرافیان‌تان دیده اید؟ (مثلا دوستان، اعضای خانواده ، شاگردان، یا همکاران)

.... بله

.... خیر

.... مطمئن نیستم

اگر پاسخ‌تان "بله" است لطفا یک نمونه ی بیاد ماندنی را در ذهنتان مجسم کنید و چند جمله ای درباره ی آنچه که اتفاق افتاده بنویسید.

در آخر اگر تمایل دارید می توانید درباره ی تجربه ی شخصیتان یا به طور کلی این نوع انگیزه ی مضاعف بیشتر توضیح دهید.