Moodle Implementation for L2 Vocabulary Development and Retention: The Effects on Extroverted vs. Introverted Iranian Intermediate EFL Learners

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Abstract

Despite all the studies conducted on second/foreign language (L2) vocabulary, most L2 learners suffer from deficiency in their vocabulary development and retention. One of the probable reasons behind this specifically in Iranian EFL context is that less implementation of new technologies such as CALL and Virtual Learning Environments (VLEs). Because the use of new language learning technologies is likely related to learner variables and personality differences, the present study attempted to examine the use of Moodle as an effective type of VLE on 90 introverted vs. extroverted EFL learners' vocabulary development and retention. Myers Briggs Type Indicator (MBTI), researcher-made and validated vocabulary tests used as pretest, posttest, and delayed posttest were employed for data collection. The application of two-way ANOVA indicated that Moodle had a significant positive effect on L2 vocabulary development and retention. However, introversion/extroversion personality factor could not moderate the effect of Moodle on vocabulary learning and retention. The interaction effect of the two independent variables on vocabulary development and retention was not significant as well. Study findings suggest that EFL practitioners and learners can employ Moodle as an effective VLE for L2 vocabulary achievement and retention.

Keywords: Vocabulary Development, Vocabulary Retention, Moodle, Virtual Learning Environments (VLEs), Introversionism, Extroversionism

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1. Introduction

Vocabulary plays a pivotal role in the process of learning a foreign language (FL). One of the major concerns among all L2 teachers and researchers is how to efficiently improve learners' vocabulary. In this regard, Zimmerman (2013) points out that vocabulary learning has been the headache of the second language learners and is central to language acquisition, whether the language is first, second, or foreign. In Nation's (2001) opinion, the most frustrating experience in using another language is the inability to use the words that we need to express ourselves. Learning vocabulary is one of the most challenging learning tasks facing L2 learners. According to the latest research, this challenge comes from two important reasons: one reason is that there are a large number of words to be learnt, and the other is that little attention has been paid to the problems of students in this regard (Hill, 1998; Nation, 2006; Sonbul & Schmitt, 2013; Schmitt, 2014). Such being the case, conducting more research on novel ways to facilitate vocabulary learning seems highly warranted.

The other consideration of this study is vocabulary retention. The question of how vocabulary can be taught efficiently in a way that engages the learner and promotes long-term retention for easy retrieval for future communication needs to be addressed. Indeed, the question of what types of input the teacher can deliver in the class so as to transfer vocabulary from input to intake has remained widely unanswered (Schmitt & Schmitt, 2014). As Nation (2006) commented, L2 learners need to internalize the new words and store them in long-term memory in order to easily use them in oral and written communication.

Likewise, in Iran's EFL context, how long a learned word remains actively in mind has been among the primary concerns of Iranian English teachers. More often than not, many Iranian learners complain about forgetting the words they have learned previously, which can be arguably

attributed to lack of lexical retention among them. That is why devising some novel ways to help English learners gain better retention of words is highly essential.

On the other hand, recent years have shown a boom of interest in using computers for foreign language teaching and learning (Ayres, 2002; Barker & Gossman, 2013; Burston, 2013; Dudeney & Hockly, 2007; Gunduz, 2005; Murphy, 2009; Walker & White, 2013). A decade ago, the use of computers in the language classroom was of concern only to a small number of specialists in western countries. However, with the advent of multimedia computing and the Internet, the role of computers in language instruction has now become an important issue confronting large numbers of language teachers throughout the world. However, as Dudeney and Hockly (2007) pointed out, L2 instructors need to understand how CALL can best be used to offer effective instruction to language learners.

It has already been hypothesized (Brown, 2014) that extraversion and introversion, among other personality variables, may have some influence on second language achievement. It should be recalled that extraversion is generally viewed as a continuum ranging from introversion to extraversion. In language learning, extraversion has been thought of as a continuum, which is more likely to be operative in a second language than a foreign language situation (Ellis, 2008). Despite this, no study is available to show the effect of using VLE's, in this study Moodle, on introverted and extroverted learners. Similarly, to the best of the researcher's knowledge, very few studies about the application of Moodle in Iranian context are found in the literature. This, therefore, entails that further research be conducted to fill this gap.

2. Literature Review
2.1 CALL and VLEs for Language Learning

There is no doubt that technology has perfectly gained a unique position in the realm of language teaching and learning. Indeed, these days it is hardly

ever possible to envisage L2 instruction and learning happening divorced from technology interventions. In this regard, the first example that conjures up in mind is the Internet. At present, many EFL teachers are constantly integrating Internet English lessons into their class programs simply because they have witnessed the numerous advantages offered by this learning medium (Walker & White, 2013). The Internet opens an endless supply of academic sources and teaching material for EFL teachers interested in incorporating them into their current programs as many advocates recommend them. Among them, Warschauer, Shetzer, and Meloni (2001) stated that "authenticity, literacy, interaction, vitality and learners' empowerment" (p. 7) are the main reasons for using the Internet for English teaching.

Computer-Assisted Language Learning (CALL) is seen as an approach to teaching and learning language in which the computer is employed as an assistant to the presentation and assessment of material, which includes a substantial interactive element (Burston, 2013). As a pioneer in CALL research domain, Levy (1997) defines CALL as "the search for and study of applications of the computer in language teaching and learning". This term emerged as researchers in CALL tried to incorporate concepts from SLA into the development of CALL. As Tower (2000) pointed out, instructional designers were looking for some premises to help them make some of the many decisions they are faced with in designing software for instructional purposes. Moreover, teachers need some theoretical foundations to help them assess their learners through CALL.

In the late 1990s, CALL pedagogy was being framed in terms of perspectives from SLA (Tower, 2000). Chapelle (2001) proposed some ways in which CALL tasks can engage learners in interaction, thereby fostering meaningful acquisition. She then described different aspects of instructional

design that can be incorporated into CALL tasks. More recently, Wu, et. al (2011) listed some methodological principles of language teaching which can be operationalized through CALL pedagogy including numerous learning tasks (e.g., use tasks, not texts, as the unit of analysis), input (e.g., elaborate input), learning processes (e.g., provide negative feedback), and learners (e.g., individualize learning).

CALL has undergone quite a large number of advancements, among which Virtual Learning Environments (called VLE hereafter) stands out. The main point about a VLE is that it can be described an institution-wide system which is used by many educators to present a variety of courses; it is not limited to one course only (Dudeney & Hockly, 2007; Weller, 2007). VLE's are of tremendous help to those educators who want to take advantage of the benefits offered by the Internet to support their L2 teaching activities, but end up with realizing that creating Internet resources that are stimulating, appealing, easy to use and educationally sound is painfully time consuming and requires considerable expertise. In fact, VLEs allow educators to create resources quickly and without the need to develop technical skills (Weller, 2007). More specifically, VLEs provide an integrated set of Internet tools, which enable easy upload of materials and offer a consistent look and feel that can be customized by the user. Some popular commercial VLEs currently being used around the world include Blackboard, WebCT1, and Moodle, the latter of which will be explained in more depth, as it was chosen for the purposes of the study.

2.2 Moodle

Modular Object Oriented Dynamic Learning Environment (MOODLE) is considered is a very prominent and free software in western world educational systems (Beaty, & Ulasewicz, 2006). Moodle, which is a well-known VLE, is a powerful network simulation program that allows students

to take up their education virtually. Moodle provides simulation, visualization, authoring, assessment, and collaboration capabilities and facilitates the teaching and learning of all the fields including L2 teaching and learning (Murphy, 2009). This software, moreover, includes various pieces of equipment in its virtual classroom, thus allowing students to create a network with an almost unlimited number of devices, encouraging practice, discovery, and troubleshooting. The simulation-based learning environment of Moodle helps students develop many essential skills such as problem solving and critical thinking as two major concepts in an L2 setting. Additionally, Moodle allows teachers to easily teach and demonstrate complex concepts and even evaluate their students at the end of the virtual semester (Beatty & Ulasewicz, 2006).

Regarding the mechanism of this software, it should be said this software is downloadable without any pay needed and can be readily used on the computer. Moodle's main structure is arranged according to the requirements of the course. These are some pages in Moodle which teachers can deliver their resources and activities to their students (Stanford, 2009). These pages might include various layouts but they normally have some central sections in which materials are shown along with some side blocks which offer extra features or comments. Having registered and obtained a username and password, students and teachers can have instructional sessions. A logged-in user can access areas of Moodle such as their courses or profile from the Navigation block and Settings block. What a user sees in these blocks depends on their role and any privileges granted them by the administrator. In addition, depending on the syllabus defined by the teacher, the teaching materials and methods can be determined and thereafter the whole course will be initiated. In fact, courses can contain content for a year's studies, a single

session or any other variants depending on the teacher or institute. They can be used by one teacher or shared by a group of teachers.

2.3 Introversion vs. Extroversion Personality Type

People possess various characteristics which have an effect on their life; even the way they learn is affected by these features. One reason for possessing these different characteristics is associated with personality types of people. Among all the personality types ever investigated, introversion and extraversion have attracted considerable attention on the side of the researchers of this field (Brown, 2014; Ellis, 2008).

According to Brown (2014), extroverts talk more, louder and more over and over again, with much less pauses and hesitations, they have higher speech rates, smaller silences, a greater verbal output, a lower type/token ratio and a less formal language, while introverts use a wider vocabulary. Extraverts also use more positive emotion words, and show more agreements and words of flattery than introverts (Ellis, 2008).

As far as the relationship between L2 vocabulary is concerned, more studies have supported a stronger relationship between being extrovert and learning more L2 words (e.g., Carrell, Prince, & Astika, 1996; Dewaele & Furnham, 1999; Golaghaei & Sadighi, 2013). Golaghaei and Sadighi (2013), for example, reported that extroverted EFL learners were better that the introvert counterparts in acquiring both passive and active words. However, no study has so far examined the effect of these two personality types on vocabulary development and retention when it is taught via the implementation of Moodle. Thus, the purpose of this study was to examine the effect of implementing Moodle as one of the main VLE's on the development and retention of vocabulary among introverted and extraverted learners.

3. Research Questions

To fulfill the purposes of the present study, the following research questions were formulated:

1. How does implementing Moodle affect L2 vocabulary development among Iranian EFL learners?
2. How does implementing Moodle affect L2 vocabulary development among introverted vs. extroverted Iranian EFL learners?
3. How does implementing Moodle affect L2 vocabulary retention among Iranian EFL learners?
4. How does implementing Moodle affect L2 vocabulary development among introverted (vs. extroverted) Iranian EFL learners?

4. Method

4.1 Participants

The study sample included 90 intermediate EFL learners at *Shokouh English Language Institute* in Tehran. To guarantee the representativeness of the sample, the learners were randomly selected based on their performance on a Nelson proficiency test. The participants in this study were all female and within the age range of 20 to 28. They were then randomly divided into an experimental and a control group each including 45 learners. Another group of the participants, including 20 EFL students from the same institute, took part in the pilot phase, as will be further explained later. It is worth mentioning that their English proficiency level and characteristics were similar to the main target sample. However, due care was practiced not to include any of them in the main sample to avoid test practice effect.

4.2 Design

Participants of the study were both randomly selected and then assigned into experimental and control groups. Additionally, the independent variables here were the implementation of Moodle as one of the VLE's, as well as two personality types of introversion and extroversion. The experimental group received vocabulary learning treatment using Moodle; however, the control

group was taught vocabulary without using VLE's. The dependent variables included L2 vocabulary development and retention which were gauged through administering a vocabulary pretest and a posttest. Before the main study, a vocabulary pretest was also given to the learners. Accordingly, based on Mackey and Gass (2012), this study had all the features of a true-experimental design.

4.3 Instruments

This study utilized five instruments: *a Nelson test*, a researcher-made vocabulary pretest, a vocabulary posttest, a delayed posttest, and Myers Briggs Type Indicator (MBTI) Questionnaire.

4.3.1 Nelson test

The first instrument was a Nelson Language test (Flower & Coe, 1988). To ensure the homogeneity of the participants, this proficiency test was employed. There are two parts in the original exam: vocabulary, and reading comprehension. The vocabulary section has 80 multiple-choice questions, and test takers will choose from five possible answers on each one. For the reading comprehension section, the test taker reads five brief passages taken from college textbooks, and then answers 38 multiple choice questions testing both direct comprehension skills, and the ability to make inferences based on what they have read. The entire test takes about 45 minutes. However, due to some limitations concerning managerial considerations in the institute where this test was conducted, the test was shortened into 25 vocabulary questions and three reading passages. Accordingly, the time allowed for the test was also reduced. The reason why Nelson test was selected as the proficiency test here is that this test has a wide coverage of vocabulary, which is the primary variable in this study. It should be added that, because Nelson test is an already tried and trusted test by a considerable number of researchers, demonstrating it high reliability and validity.

4.3.2 Vocabulary pretest

It was a researcher-made multiple-choice test comprising 40 items, and it was checked for its validity and reliability prior to its main administration. This test was administered at the beginning of the semester to examine the participants' vocabulary knowledge before the treatment. The content was developed based on the wordlist taught in the course. To establish the reliability of this test, it was piloted and checked prior to its actual administration. It was administered to 20 learners who were similar to the targeted group. Cronbach's Alpha was calculated and the reliability was found to be .82, indicating high reliability of the vocabulary pretest. All the needed modifications were made after the pilot study. Beside the reliability of the whole test, other indices involving item reliability, item discrimination (ID), item facility (IF), and choice distribution were shown to be acceptable.

4.3.3 Vocabulary posttest

The vocabulary posttest was also an equivalent vocabulary test to the pretest. It was developed prior to the main study by the same procedure and was validated by the same group. Its reliability was .80 based on the pilot study. This test was given to learners at the end of the treatment to compare the amount of vocabulary learning between experimental and control groups across personality types.

4.3.4 Delayed vocabulary posttest

It was the same as the posttest but with rearranged and scrambled items. It was administered a month after the administration of the posttest the purpose of which was to check learners' vocabulary retention.

4.3.5 Myers Briggs Type Indicator (MBTI) Questionnaire

The fourth instrument was a questionnaire through which introversion and extroversion were measured. Myers Briggs Type Indicator (MBTI) is a self-report questionnaire developed first by Myers (1962) and later revised after many studies. MBTI provides information about human character by dividing people into 16 types through combining the following four two-sided points;

extroversion and Introversion, perceiving and judging, sensing and Intuition, and thinking and feeling. Though learners filled in the whole questionnaire, only the extroversion/introversion section scores were used in this study.

4.4 Materials

A list of vocabulary words suitable for the intermediate level learners were used for instruction. These words were taught via Moodle but only for the experimental group and the control group received conventional instruction on vocabulary. These words all came from the course book taught at one level higher than the current level of the participants in *Shokouh Language Institute*, where this study was hosted. Also, to ensure the validity, the words were checked and commented by some ELT professionals.

4.5 Procedure

As the first step, 90 intermediate EFL learners from *Shokouh Language Institute* were chosen based on their scores on a Nelson proficiency test, and then they were randomly divided into two groups with equal sizes. Afterwards, the vocabulary pretest was conducted to make sure that the participants did not considerably differ in their knowledge regarding the target words which were the focus of the study at the outset.

What came next was vocabulary instruction as the distinctive treatment of the study, with the experimental group receiving it via Moodle (Version 1.9), while the control group received conventional teaching, by which it mainly means in-class teaching of vocabulary including dictionary checking for new words, use of definitions, synonyms, and antonyms, or bilingual translations. In the experimental group, the words chosen were taught via Moodle. Here, after creating an account under their real names, the participants were assembled in an online group defined by the teacher, who was one of the researchers. All the participants were required to go online at a pre-arranged time. Then, they received ten words per online session, just as the same

happened in the in-class instruction for the control group. Here, the instruction was conducted with the contribution of the features available in the Moodle. Moreover, a classroom check was considered by the teacher to ensure their grasp of the new words, thus the consolidation of the treatment. The course took 16 sessions held in two months. Accordingly, about 160 target words were covered in the course.

At one of the sessions during the course, all the participants were asked to fill out the Myers Briggs Type Indicator (MBTI). This was for the purpose of determining whether they were introverted or extroverted. Once the course was finished, a vocabulary posttest was completed in both experimental and control groups. After a month, the delayed posttest was given. The aim of the first posttest was to measure vocabulary development, while the second posttest, called delayed posttest, measured vocabulary retention.

4.6 Data Analysis

To analyze the collected data, SPSS software (version 22) was employed. Descriptive statistics were employed to analyze learners' scores on the study measures. More specifically, the parametric assumptions such as normality, linearity, and homogeneity of regression lines were statistically checked. The scores on the pretest were compared across the two independent variables levels using a two-way ANOVA to check if the experimental and control groups enjoyed the same level of the vocabulary before the treatment was given. The most appropriate statistical test to answer the four research questions together was a two-way MANOVA that compared the effect of two independent variables (personality type & treatment type) each including two levels on two related dependent variables (posttest & delayed posttest scores); however, because the correlation between the two dependent variables was higher than acceptable level of .9 (i.e., r = .93), two separate two-way ANOVAs were applied to answer the four research questions of the study.

5. Results
5.1 Descriptive Statistics
Two-way ANOVA has three assumptions; normality of the data, reliability, and homogeneity of variances of the groups. The normality and reliability assumptions are reported in this section; however, the assumption of homogeneity of variances is checked when reporting the main results. The normality of the data was probed by calculating the ratios of skewness and kurtosis indices over their standard errors. Since the absolute values of these ratios were lower than 1.96, it could be claimed that the assumption of normality was retained.

Table 1
Descriptive Statistics for Testing Normality Assumption of the Three Measures

Group	Personality		N	Skewness			Kurtosis		
			Statistic	Statistic	Std. Error	Ratio	Statistic	Std. Error	Ratio
Moodle	Introvert	Pretest	25	.875	.464	1.89	-.286	.902	-0.32
		Posttest	25	-.476	.464	-1.03	.221	.902	0.25
		Delayed	25	-.089	.464	-0.19	-.816	.902	-0.90
	Extrovert	Pretest	20	.911	.512	1.78	.652	.992	0.66
		Posttest	20	-.819	.512	-1.60	-.180	.992	-0.18
		Delayed	20	-.825	.512	-1.61	.349	.992	0.35
Control	Introvert	Pretest	20	.924	.512	1.80	-.328	.992	-0.33
		Posttest	20	.324	.512	0.63	-1.250	.992	-1.26
		Delayed	20	.452	.512	0.88	-1.301	.992	-1.31
	Extrovert	Pretest	25	.860	.464	1.85	.221	.902	0.25
		Posttest	25	.538	.464	1.16	.066	.902	0.07
		Delayed	25	.275	.464	0.59	-.686	.902	-0.76

Table 2 displays the KR-21 reliability indices for the pretest, posttest, and delayed posttest of vocabulary. The reliability indices were .79, .86 and .83 for the three tests, respectively.

Table 2
KR-21 Reliability Indices of Pretest, Posttest, and Delayed Posttest of Vocabulary

	N	Min	Max	Mean	Std. Deviation	Variance	KR-21
Pretest	90	9	35	17.94	6.53	42.72	.79
Posttest	90	12	39	26.41	7.48	55.97	.86
Delayed Posttest	90	13	37	25.51	7.04	49.60	.83

A two-way ANOVA was run to compare extrovert and introvert groups'

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means on the pretest of vocabulary in the Moodle and control groups to check their homogeneity in terms of their vocabulary knowledge prior to the treatment. The assumption of homogeneity of variances was met by employing Levene's test (p>.05), demonstrating that there was not any significant difference between the two groups' variances on pretest.

Table 2
Descriptive Statistics for Learners' Scores on the Vocabulary Pretest

Group	Personality	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
						Lower Bound	Upper Bound
Moodle	Introvert	22	18.280	6.77	1.316	15.665	20.895
	Extrovert	23	16.200	5.38	1.471	13.276	19.124
	Total	45	17.24	6.22	.98	15.278	19.202
Control	Introvert	20	18.300	7.20	1.471	15.376	21.224
	Extrovert	25	18.720	6.71	1.316	16.105	21.335
	Total	45	18.51	6.58	.98	16.548	20.472
Total	Introvert	42	18.29	6.89	.98	16.328	20.252
	Extrovert	48	17.46	6.22	.98	15.498	19.422
	Total	90	17.94	6.53	.68	16.58	19.36

Table 2 displays the descriptive statistics for the Moodle and control group leaners across personality type factor on the pretest of vocabulary. The results showed the Moodle (M = 17.24) and the control (M = 18.51) groups had close means on the pretest of vocabulary. The introvert (M = 18.29) and the extrovert (M = 17.46) groups had also close means. Figure 1 can show the pretest scores by study groups and their subdivisions in a vivid way:

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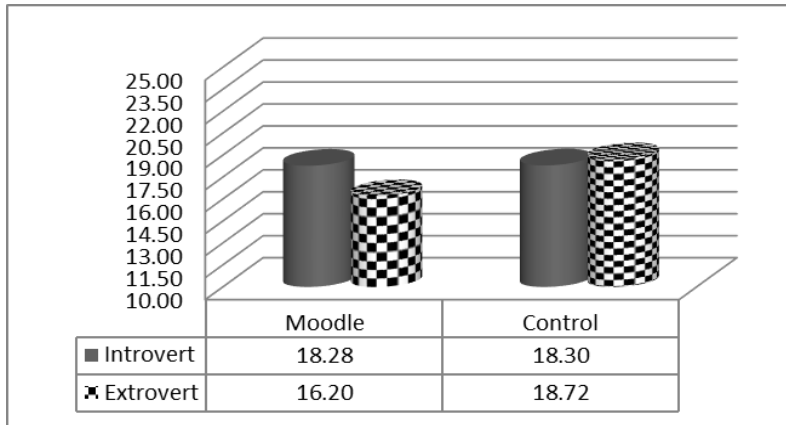|	Moodle	Control
■ Introvert	18.28	18.30
✖ Extrovert	16.20	18.72

Figure 1. Means on pretest of vocabulary by groups and personality types

In order to check the significance of such a difference, a two-way ANOVA was utilized the results of which are presented in Table 3.

Table 3
Tests of Between-Subjects Effects for Pretest Scores by Experimental and Control Groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Group	35.842	1	35.842	.828	.365	.010
Personality	15.309	1	15.309	.354	.554	.004
Group * Personality	34.722	1	34.722	.802	.373	.009
Error	3721.480	86	43.273			
Total	32783.000	90				

As seen in Table 5, the results of two-way ANOVA [$F_{(1, 86)}$ = .828, p = .365, Partial η^2 = .010 representing a weak effect size] indicated that there was not any significant difference between the two study groups on the pretest of vocabulary. Thus it was concluded that the two groups were homogenous in terms of their vocabulary knowledge before the treatment began. The results of the applied two-way ANOVA [$F_{(1, 86)}$ = .354, p = .554, Partial η^2 = .004 representing a weak effect size] also showed that there was not any significant difference between the extrovert and introvert groups vocabulary knowledge. Finally, there was not any significant interaction between groups and personality types on the pretest of vocabulary [$F_{(1, 86)}$ = .802, p = .373, Partial η^2 = .009 representing a weak effect size].

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5.2 First and Second Research Questions

A two-way ANOVA was run to compare the extrovert and introvert learners' mean scores on the posttest of vocabulary in the Moodle and control groups to probe if types of treatments (Moodle vs. tradition) and personality types (extrovert vs. introvert) had any significant effect on the development of vocabulary knowledge among Iranian EFL learners. The assumption of homogeneity of variances was checked in advance of the analysis (p>.05). Table 4 displays the descriptive statistics for the Moodle and control groups on the posttest of vocabulary across two personality types.

Table 4
Descriptive Statistics for the Vocabulary Posttest for Groups by Personality Types

Group	Personality	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
						Lower Bound	Upper Bound
Moodle	Introvert	22	32.28	4.23	1.13	30.03	34.52
	Extrovert	23	30.15	5.95	1.26	27.63	32.66
	Total	45	31.21	5.16	.84	29.53	32.89
Control	Introvert	20	21.05	6.41	1.26	18.53	23.56
	Extrovert	25	21.84	6.47	1.13	19.59	24.08
	Total	45	21.44	6.39	.84	19.76	23.12
Total	Introvert	42	26.66	7.70	.84	24.98	28.34
	Extrovert	48	25.99	7.36	.84	24.98	28.34
	Total	90	26.33	7.70	.77	24.72	27.85

Based on the results, it was found that Moodle group (M = 31.21) had a higher mean than the control group (M = 21.44); also the introvert (M = 26.66) and the extrovert (M = 25.99) groups had rather similar means on the vocabulary posttest. Generally, both extrovert and introvert participants in Moodle group had higher means than the control group (see Table 4 & Figure 2).
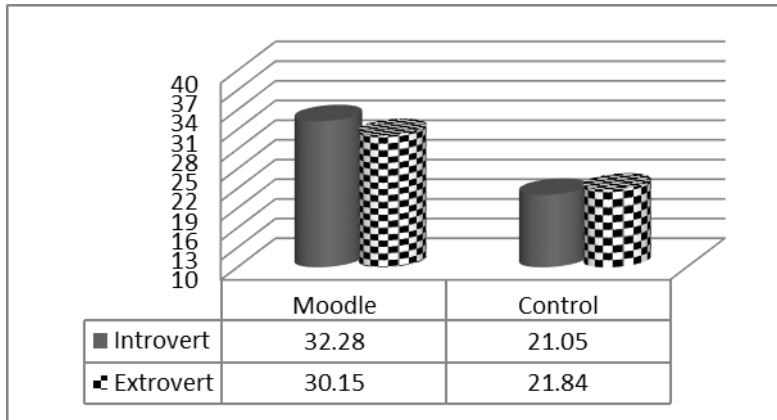
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Figure 2. Means on vocabulary posttest for groups across personality types

The results of two-way ANOVA (Table 10) [F (1, 86) = 66.48, p = .000, Partial η^2 = .436 representing a large effect size] indicated that the Moodle group significantly outperformed the control group on vocabulary posttest.

Table 5
Tests of Between-Subjects Effects for Vocabulary Posttest by Groups Across Personality Types

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Group	2121.176	1	2121.176	66.482	.000	.436
Personality	9.976	1	9.976	.313	.578	.004
Group * Personality	47.369	1	47.369	1.485	.226	.017
Error	2743.900	86	31.906			
Total	67761.000	90				

Two-way ANOVA also demonstrated that there was not any significant difference between the extrovert and introvert groups on the posttest of vocabulary. [F (1, 86) = .313, p = .578, Partial η^2 = .004 representing a weak effect size]. In addition, no significant interaction was observed between groups and personality types the vocabulary posttest [F (1, 86) = 1.48, p = .226, Partial η^2 = .017 representing a weak effect size].

5.3 Third and Fourth Research Questions

A two-way ANOVA was run to compare the Moodle and control extrovert

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and introvert groups' means on the delayed posttest to probe any significant difference in the retention of vocabulary among study groups. The assumption of homogeneity of variances was met. Table 6 displays the descriptive statistics for the Moodle and control groups on the delayed posttest of vocabulary.

Table 6
Descriptive Statistics for the Delayed Posttest by Groups and their Subdivisions

Group	Personality	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
						Lower Bound	Upper Bound
Moodle	Introvert	22	31.12	3.91	1.05	29.01	33.22
	Extrovert	23	29.00	5.90	1.18	26.65	31.35
	Total	45	30.06	7.01	.79	28.48	31.63
Control	Introvert	20	20.75	7.11	1.18	18.40	23.10
	Extrovert	25	20.92	7.05	1.05	18.81	23.02
	Total	45	20.83	4.99	.79	19.25	22.41
Total	Introvert	42	25.93	7.70	.79	24.35	27.51
	Extrovert	48	24.96	7.63	.79	23.38	26.53
	Total	90	25.20	7.84	.80	23.55	26.76

The results illustrated that the Moodle group (M = 30.06) had a higher mean than the control group (M = 20.83) on the delayed posttest; moreover, the introvert (M = 25.93) and the extrovert (M = 24.96) groups had roughly same means on this test. As shown in Table 6 and Figure 3, both extrovert and introvert participants in Moodle group had outperformed the control group on the delayed posttest.
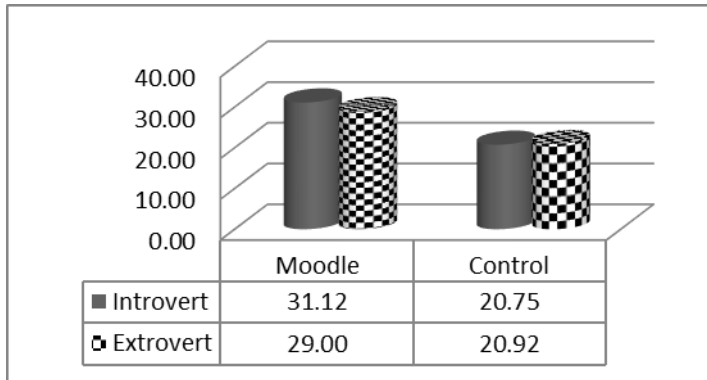
Figure 3. Means on delayed posttest of vocabulary by groups and personality types

Running a two-way ANOVA (Table 7) discovered that the Moodle group significantly outperformed the control group on the delayed posttest of vocabulary [F (1, 86) = 67.64, p = .000, Partial η^2 = .440 representing a large effect size].

Table 7
Tests of Between-Subjects Effects for Delayed Vocabulary Posttest by Groups Across Personality Types

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Group	1891.125	1	1891.125	67.646	.000	.440
Personality	21.125	1	21.125	.756	.387	.009
Group * Personality	29.134	1	29.134	1.042	.310	.012
Error	2404.230	86	27.956			
Total	62988.000	90				

Based on two-way ANOVA results (Table 7), no significant difference between the extrovert and introvert groups on the delayed posttest of vocabulary was detected [F (1, 86) = .756, p = .387, Partial η^2 = .009 representing a weak effect size]. Furthermore, the interaction between groups and personality types on this test was not significant [F (1, 86) = 1.04, p = .310, Partial η^2 = .015 representing a weak effect size].

6. Discussion

The purpose of the study was to examine the effect of implementing Moodle

on vocabulary improvement and retention. Included here also was the introversion and extroversion of the participants as one of the personality traits.

As just mentioned, this study was an attempt to investigate the effect of applying a virtual learning environment, called Moodle, on vocabulary improvement and retention. Of interest here was also examining the effect of introversion and extroversion. Having amassed the results of the research, the following findings were obtained.

In the first place, comparing the results of vocabulary posttests between the experimental and vocabulary group clearly indicated that applying Moodle as a virtual learning environment can have a significant effect on improving vocabulary learning among Iranian EFL learners. This finding is in line with a number of other studies among which the one conducted by Laufer (2000) can be mentioned. With the minor difference that he added an online dictionary to the treatment, he went through the same procedure as the one in the present study, having finally reported that learners' vocabulary skills were significantly improved compared to those sitting for conventional classes. Another seminal, more recent, study the findings of which is in harmony with the ones in this study is Tozcu and Coady's (2004). They investigated the effect of direct vocabulary learning through CALL on vocabulary knowledge. They found that students who used CALL to learn high frequency words mastered a much larger number of words than those in a control group.

Through this study, it was statistically proved that Moodle-mediated instruction has significant impact on Iranian EFL learners' vocabulary knowledge. This is corroborated by Kilickaya and Krajka (2010) who studied the impact of online learning on English vocabulary knowledge of Turkish learners. The learners of online class were compared to learners of traditional

classes. The results showed that the learners who received online teaching performed better than the other group in the test of the vocabulary. Working on other variables, Kirkgoz (2011) investigated the speaking ability of student teachers of English using face-to-face instruction as well as technology (i.e., video). At the end of the experiments, students' oral communication skills changed significantly.

As just said, the results showed that the experimental group showed a better performance than the control group in English vocabulary knowledge. This result agreed with that of some previous studies such as Soltani, Tehrani, and Tabatabaie (2012). They carried out a study on the effect of blended on-line and face-to-face instruction on Iranian EFL learners' vocabulary achievement using on-line environment of Nicenet. The results showed the efficiency of the used VLE compared with the traditional paper-and-pencil approaches.

Moreover, the results of the present study indicated that using Moodle not only helped EFL learner enhance their vocabulary knowledge, but it also helped them with vocabulary retention. In other words, experimental group outperformed the control group concerning how they retained the words taught. This finding is corroborated by a number of other studies including Shafaei (2011) and Soleimani, Rahimi, and Sadeghi (2015). Soleimani, Rahimi, and Sadeghi (2015), investigated the effect of online language learning on some Iranian female intermediate EFL learners' reading ability as well as their vocabulary size improvement in short term, and long term vocabulary retention. The analysis of the collected data through out of this study confirmed that, the online group's progress in all measured scopes were statistically significant. It was revealed that using virtual learning environment positively affected the learners' reading ability and accelerated their vocabulary retention.

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Another study which corroborates the findings of the present is the one carried out by Shafaei (2011) which examined the effect of online learning on vocabulary retention. This research included an empirical case study of a project conducted for vocabulary learning of elementary EFL learners in Iran. According to the analysis and discussion of the outcomes of her study, there was a significant relationship between using online teaching techniques in foreign language teaching and the learners' performance on standard vocabulary tests, even in delayed posttests. She concluded that using virtual learning environment accelerated vocabulary learning and improved vocabulary retention.

The other variable investigated in this study was introversion and extroversion. As the results indicated, this personality trait had no effect on vocabulary development and retention when it is taught via applying Moodle. This is in contrast with what Carrell et al. (1996) reported. They reviewed a research they did in Indonesia. The participants were some Indonesian students, who were given the MBTI. Measures of academic performance included English reading comprehension, vocabulary, grammar, and writing assessed on a monthly basis and end-of-semester grades. In relation to results, introversion, in particular, only correlated substantially and positively with vocabulary. It appears that introversion may be a positive predictor of performance on the vocabulary test. Also, in a further analysis of the data, Carrell et al., found that "on the vocabulary tests, students classified as introverts performed better than extraverts" (p. 91). As can be noted, the findings seem to support the idea that introverts perform better than extraverts at academic level. The reason why this contrast has happened can be attributed to a number of factors. First of all, the specifications of these studies and the present one are different (i.e., the methodology, the level of participants, and the instruments). Thus, further research is required to settle

this difference.

7. Conclusion and Implications

The main conclusion is that CALL-mediated teaching, here Moodle, had a significant effect on developing vocabulary, both in knowledge and retention. This implies that CALL and VLE's can be considered as effective tools in manipulating L2 skills and subskills. On the other side, introversion and extroversion was not found effective, meaning this personality trait can readily embrace both groups, which is a favorable development in any educational system.

As revealed in the present study as well as other studies (Beatty, 2003; Roed, 2003; Vinther, 2011; Wiebe & Kabata, 2010), CALL has advantages over traditional classroom teaching and learning which can be attributed to many factors including motivation and autonomy for learners, flexible learning, immediate and detailed feedback, reducing anxiety, and enhancing learners' involvement and participation. Like other empirical research, the findings of the present study are not definitive. In other words, the findings do not suggest that virtual learning described in this study is the only best way to improve vocabulary learning and retention, but rather they represent a useful construct to be employed by teachers as a basis for enhancing learners' performance in vocabulary.

Nowadays, it is generally acknowledged that classroom teachers are often held accountable for utilizing more novel methods to enhance the quality of their instruction delivery. Such being the case, incorporating the findings of the latest research, including the present study, seems highly warranted. However, a word of caution should be added here. The use of VLE-mediated learning itself cannot guarantee vocabulary learning. There should be a *teacher* to organize the materials, motivate, guide and give feedback to students. The outcomes of this study facilitated the EFL teachers' job to

design and adapt language learning materials for improving vocabulary knowledge and retention of participants.

The current vocabulary learning activities can be criticized because they take much of the class time and the teacher's energy. If vocabulary learning integrates to other language skills and components like presenting through Moodle instruction framework, it would help to save teachers' time and energy. More specifically, VLE's should be introduced into EFL teachers' curriculum. In addition to this, material developers can consider VLE intervention while producing EFL lessons related to vocabulary instruction. Here, the inclusion of some tasks and exercises to be done virtually can be seen appropriate.

Clearly, no research effort is exhaustive in itself; thus further research is needed to confirm, validate, and expand upon the results of it. That is why replication of the current study should be mentioned as the main suggestion. This aside, the participants of this study were intermediate learners; replications should be made with participants of other groups and proficiency levels to examine the effect of VLE's in those situations. The same basic design could also be employed for learners of other languages. In the same vein, the effect of implementing VLE's can be gauged within other EFL skills as well as subskills like grammar, speaking, listening, and so on. Moreover, the method used in this study can be accompanied with questionnaires to find out about the attitudes and motivations of the learners and instructors towards Moodle.

The significant effect of implementing Moodle as a VLE which was verified by the study calls for more thorough investigation of the '*reasons*' behind it. It is needless to reemphasize that discovering the reasons behind such matters can provide a wider insight to them. In addition, as the present study did not find any significant difference between introverted and extroverted participants either in vocabulary development or retention, future studies should investigate affective or emotional factors with more attention.

Affective factors such as motivation, introversion and extroversion, or attitude towards implementing VLE's have not been given due attention in previous studies, but have begun to be recognized as crucial for more effective use of them. As Schumann (1998) has stated, "success in second language acquisition is emotionally driven" (p. 323). Learning through VLE's should not be an exception. Any attempt to examine the affect component will definitely widen teachers' and learners' horizons about the virtual world.

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