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# Perceptual Learning Style Preferences and Computer-Assisted Writing Achievement within the Activity Theory Framework

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## Abstract

Learning styles are considered among the significant factors that aid instructors in deciding how well their students learn a second or foreign language (Oxford, 2003). Although this issue has been accepted broadly in educational psychology,further research is required to examine the relationship between learning styles and language learning skills. Thus, the present study was carried out to investigate the relationship between the perceptual learning style preferences and the participants writing achievement after receiving instruction based on computer-assisted language learning within the activity theory framework. For this purpose, 67 students majoring in English translation at a university in Iran were selected as the participants of the study based on their performance on a version of The Oxford Placement Test. A correlational research design was employed using a writing pretest and posttest and a style preference questionnaire. The writing instruction was based on an e-learning platform designed according to the activity theory framework. The results indicated lack of significant relationship between the participants learning style preferences and theirwriting achievement. It was also found that there was no significant difference in the writing achievement of the participants across different learning style preferences.

***Keywords***: activity theory, computer-assistedlanguage learning, learning style preferences, writing achievement

## Introduction

One of the crucial factors in the efficacy of any instructional methods is the consideration of learners learning style preferences. Learning styles refer to . n individual s natural, habitual, and preferred way(s) of absorbing, processing, and retaining new information and skills (Reid, 1998, p. viii).According to Reid (1987), learning style preferences are categorized into auditory, visual, kinesthetic, tactile, group, and individual. Although it is difficult to to adjust a second language (L2) curriculum to learners preferred learning styles, taking into account how students learn can help teachers to develop and adapt their teaching methods and materials to their students various learning styles (Nel, 2008). In this regard, teachers can boost learners le rning opportunities and improve their language skills.

Among language macro-skills, the development of writing has recently obtained prime importance in L2 education, especially in modern communities (Richards, 2002). L2 writing involves combinations of social, linguistic, and cognitive processes (Kern, 2000). Therefore, teachers should provide various writing tasks and activities in accordance with students diverse learning styles to assist them in enhancing their writing skill. According to Hyland (2003), in L2 writing classes, students perceptual learning style preferences can be adjusted differently. For example, students with a dominant auditory style perform better on listening and interactive tasks as resources for writing while students with a visual preference work better on reading source texts, textual, and video materials as writing resources. On the other hand, while kinesthetic students enjoy role-plays, site visits, and projects as writing prompts, tactile students perform better on written reports and jigsaw tasks. Moreover, whereas learners with an individual learning style prefer individual writing tasks, learners with a group learning style perform better on collaborative and peer writing tasks. Hence, it seems beneficial to attempt to gear L2 writing instruction to learners various learning style preferences.

Despite the fact that the importance of language learning style preferences has been theoretically established, there is a need to conduct further research to investigate the significance of language learning styles in writing achievement (Cano-Garcia & Hughes, 2000; Romanelli, Bird, & Ryan, 2009). Previous research has shown that practical application of learning styles theory in instructional practice needs further investigation (Romanelli et al., 2009). The literature review also reveals that although the majority of studies related to learning styles explored the relationship between learning styles and academic achievement (e.g., Gohar & Sadeghi, 2015; Renou, 2008), scant research is available with regard to the

relationship between language learning styles and writing achievement (e.g., Inal, Büyükyavuz, &Tekin, 2015; Sahragard & Mallahi, 2014). Moreover, only limited studies were found investigating the differences in students writing achievement in terms of learning style preferences (e.g., Ahmed, 2012; Srijongjai, 2011;Umar & Rathakrishnan, 2012). Therefore, this study is an attempt to hopefully fill this gap by employing computer-assisted language learning (CALL) within the activity theory framework to identify the extend to which learning styles affect the students writing achievement.

Activity theory has been developed from Vygotsky stheory of mediation (Lantolf & Pavlenko, 2001; Thorne, 2003) and is analysed based on the activity system (see Figure 1) which consists of six elements: subject, tools/mediating artifacts, goals, division of labor, community, and rules (Engeström, 1987). In the activity system, the subject denotes the individual or group whose motivation and aims are considered in the analysis of the activity. The object refers to the purpose of the activity system which generates the outcome. Mediational tools are the mediating instruments which assist in achieving the outcome of the activity. The community is composed of people who have the same object with the subject. Rules in the activity system adjust and control actions and interactions within the system. Finally, the division of labor means how tasks are divided up among the members of the community (Engeström, 1987, 1999).

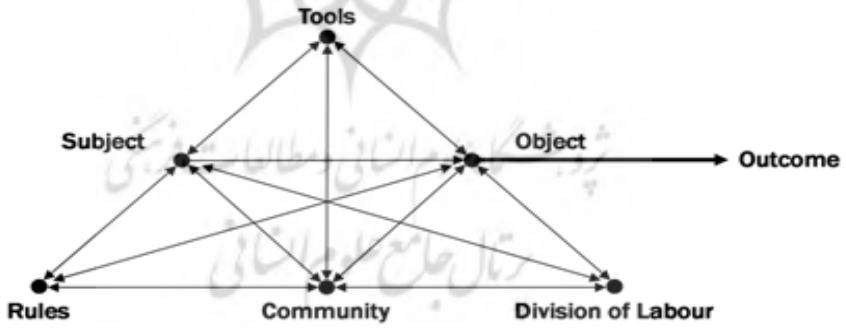


*Figure 1.* Activity theory system (Adopted from Engeström, 1987, p. 78)

In an activity system, CALLcan be considered as an artifact or a mediating tool that stands between subject (usually the student) and object (usually the content to be learned) and thus facilitates learning. Therefore, the present researchers, to the best of their knowledge and personal teaching experience, tend to claim that CALL with the activity theory framework can

be suggested as a promising framework for learners with different learning style preferences in an L2 writing context because this framework involves various social, personal, mental, and cultural activities, considers both individual and social factors, and focuses on collaboration and interaction among learners (Engeström, 2009). However, it is necessary to experimentally investigate whether this assumption is correct or not.

Consequently, the purpose of this study is to explore the relationship between the learning style preferences and the writing achievement of Iranian EFL learners and to find out any difference in the learners writing achievement across the six types of perceptual learning style preferences after receiving instruction based on CALL with the activity theory framework.

To fulfill the purpose of this study, the following research questions were formulated:

RQ1: Is there any statistically significant relationship between the perceptual learning style preferences (auditory, visual, kinesthetic, tactile, individual, and group) and the computer-assisted writing achievement of Iranian EFL learners within the activity theory framework?

RQ2: Is there any statistically significant difference in Iranian EFL learners computer assisted writing achievement across the six types of perceptual learning style preferences (auditory, visual, kinesthetic, tactile, individual, and group) within the activity theory framework?

## Method

### Participants

The participants of this study consisted of 67out of a pool of 75 male and femaleundergraduate students, majoring in English translation, at Islamic Azad university in Tehran, Iran. They were selected based on their scores on a version of the Oxford Placement Test in order to make sure that the participants were homogenous in terms of their general English proficiency level. The age range of the participants was 19-26.

### Instrumentation

In order to achieve the goal of this study, the researchers used the followingmajor instruments:

**Writing scale**. The writing scale used in this study was the one developed by Jacobs, Zinkgraf, Wormuth, Hartfiel, and Hughey (1981, p. 30). Jacobs et al. sESL Composition Profile (see Appendix 1)is an analytical scaling grid which, according to Weigle (2002), is more reliable and informative than holistic ones. In analytic scoring, scripts are rated on several aspects of writing or criteria rather than given a single score. In Jacobs et al. **s**cale,

scripts are rated on five aspects of writing: content, organization, vocabulary, language use, and mechanics. This scale is based on 100-point scheme, allotting 30 points to the content, 20 points to the organization, 20 points to vocabulary use, 25 points to language use, and 5 points to mechanics.

**Perceptual learning style preference questionnaire (PLSPQ).** PLSPQ, developed by Reid(1987), was used in this study(see Appendix 2). The questionnaire assesses preferredlearning styles ofstudents based on how they learn best using their perceptions: visual, auditory,kinesthetic, and tactile preferences, and two social aspects of learning: group and individual preferences. PLSPQ is a five-point Likert scale and consists of 30 self-report statements. Respondents must indicate how much they agree with each item on a scale from 1 to 5 when they learn English. Each number notes certain measurement such as: (5) strongly agree, (4) agree, (3) undecided, (2) disagree, and (1) strongly disagree. There are five questions for each category, grouped in the following way: visual: 6, 10, 12, 24, 29, auditory: 1,7, 9, 17, 20, kinesthetic: 2, 8, 15, 19, 26, tactile: 11, 14, 16, 22, 25, group: 3, 4, 5, 21, 23, and individual: 13, 18, 27, 28, 30. The score for each category is calculated by multiplying the score by 2. Therefore, results can be understood as major learning style preference if the score is between 38-50, minor learning style preference if the score is between 25-37, and negligible if the score is between 0-24.

**Procedure**

To attain the purpose of this study, the following steps were taken during the research process. Prior to the beginning of the study, an online course called Advanced Writing was created on an e-learning platform based on the six elements of activity theory appropriate for EFL writing classes. Both the instructor, who was the first author of the present paper, and the students could post announcements and assignments through this online course. The students could get help from all the elements of the course via mediating tools, objects, rules, community, and division of labors to develop a well-written academic English paragraph.

In the first session of the class, a writing pretest topicwas run, and all the participants were asked to write a paragraph (100-150 words) on the topic assigned by the instructor. The students writings wereevaluated and scored based on Jacobset et al. (1981) rating scale. The next two sessions were devoted to the course and e-learning platformintroduction. The participants were informed clearly aboutthe course requirements and

objectives, the procedure of the class, and how to work and post on the platform.

From the fourth session on, the instructor started to teach different developmental patterns of expository mode of writing. The students were instructed how to write paragraphs by utilizing the e-learning platform.For this purpose, after teaching a developmental pattern based on the course book, *Paragraph Development* by Arnaudet and Barrett (1990), the instructor posted two topics as weekly assignments on the platform. In addition to the topics, some other helpful tools wereposted. Furthermore, another file labeled Assigned Labors was posted to divide responsibilities amongst the participants, thus the participants had to provide and share some written helpful materials (e.g., related vocabulary, transition signals, etc.) for the assigned topics. In doing so, the participants could get assistance from both the platform contents and other sources. After that, the participants had to write a paragraph on one of the assigned topics and email it to the instructor in due time. Finally, the instructor scoredthe students paragraphs, provided some unfocused metalinguistic corrective feedback using error codes, and then posted some of those scored paragraphs anonymously on the platform. On the whole, it took 14 sessions to teach all the six patterns of the course book.

After the treatment was completed, the participants had to take a writing posttest on a topic similar to the pretest topic. The posttest was evaluated and scored based on the same rating scale used in the pretest.At the end of the course, the students filled out the PLSPQ in order to enable the researchers to investigate the relationship between EFL learners perceptual learning style preferences and their writing achievement, as well as to assist the investigators inlocating any differences in the writing achievement of the students across different learning style preferences after the intervention.

**Design**

The design of this study was correlational because it aimed to determine whether a significant relationship existed between the variables. In the present study, writing achievement was the dependent variable, and learning style preferences were the independent variables. The independent variables were also considered as organismic or attribute variables since they could not be manipulated(Best & Kahn, 2006, p.168). Besides, gender was considered as the moderator variable, and students nationality was regarded as the control variable because all the participants of this study were Iranian EFL students.

## Results

The research questionsof this study were probed through a series of Pearson correlation coefficient and Kruskal-Wallis test. Prior to answering the research questions, the reliability of the PLSPQ and its components were calculated through Cronbach s Alpha and KR-21 formulas after administration. The reliability indices obtained reassured the reliability of the instrument (see Table 1).

Table 1
*Reliability Statistics of the PLSPQ*

| Reliability Statistics | | |
|---|---|---|
| No. of Participants | No. of Items | Cronbach Alpha |
| 67 | 30 | 0.81 |

Furthermore, the mean scores (see Table 2) indicate that the most representative perceptual learning style preference was auditory (M=38.04); therefore, auditory was considered as the major learning style preference of the participants since the mean score obtained was between 38-50. Other preferred learning styles of the participants were visual (M=37.70), kinesthetic (M=36.90), and tactical (M=36.30), respectively. Regarding the sociological learning style preferences, the highest mean score belonged to individual (M=35.40), and then group (M=33.40). These preferences were considered minor learning style preferences as a result of being within the range of 25-37. No negligible (0-24) learning style preferences were found in this study.

Table 2
*Descriptive Statistics and Reliability Indices for the Components of the PLSPQ*

| | N | Minimum | Maximum | Mean | Std. Deviation | Variance | KR-21 |
|---|---|---|---|---|---|---|---|
| Visual | 67 | 22 | 50 | 37.70 | 5.541 | 30.697 | 0.71 |
| Auditory | 67 | 22 | 50 | 38.04 | 6.086 | 37.043 | 0.77 |
| Kinesthetic | 67 | 18 | 50 | 36.90 | 7.380 | 54.459 | 0.84 |
| Tactile | 67 | 20 | 50 | 36.30 | 7.550 | 57.000 | 0.84 |
| Group | 67 | 16 | 50 | 33.40 | 8.648 | 74.790 | 0.87 |
| Individual | 67 | 10 | 50 | 35.40 | 9.458 | 89.456 | 0.90 |

**Answering the first research question.** In order to answer the firstresearch question, investigating whether there is any statistically significant relationship between the perceptual learning style preferences

and the writing achievement of Iranian EFL learners using CALL within the activity theory framework, Pearsonproduct-momentcorrelation coefficient was used. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. The results (see Table 3) show that there was not any significant relationship between any of the visual, auditory, kinesthetic, or tactile style preferences and the students writing achievement.

Table 3
*Correlations between Six Style Preferences and Writing Achievement*

| | | Posttest |
|---|---|---|
| Visual | Pearson Correlation | .077 |
| | Sig. (2-tailed) | .538 |
| | N | 67 |
| Auditory | Pearson Correlation | -.111 |
| | Sig. (2-tailed) | .371 |
| | N | 67 |
| Kinesthetic | Pearson Correlation | .109 |
| | Sig. (2-tailed) | .379 |
| | N | 67 |
| Tactile | Pearson Correlation | .202 |
| | Sig. (2-tailed) | .101 |
| | N | 67 |
| Group | Pearson Correlation | **-.280*** |
| | Sig. (2-tailed) | **.022** |
| | N | 67 |
| Individual | Pearson Correlation | **.271*** |
| | Sig. (2-tailed) | **.027** |
| | N | 67 |

*. Correlation is significant at the 0.05 level (2-tailed).

Although small significant relationships were found between the individual ($r = -.28$, $p < .05$) and group ($r = .27$, $p < .05$) styles and writing achievement of the students, the answer to the firstresearch question was negative because the significance levels were very small or almost negligible (Pallant, 2013).

**Answering the second research question.** Kruskal-Wallis test was used to answer the second research question, examining whether there is any statistically significant difference in Iranian EFL learners writing achievement across the six types of perceptual learning style preferences

using CALL within the activity theory framework. Table 4 and Figure 1 display the frequencies and percentages of the learning style preferences.

Table 4
*Frequencies and Percentages of Learning Style Preferences*

| | | Frequency | Percent |
|---|---|---|---|
| Learning Styles | Visual | 7 | 10.4 |
| | Auditory | 10 | 14.9 |
| | Kinesthetic | 9 | 13.4 |
| | Tactile | 6 | 9.0 |
| | group | 10 | 14.9 |
| | Individual | 17 | 25.4 |
| | Mixed | 8 | 11.9 |
| | Total | 67 | 100.0 |

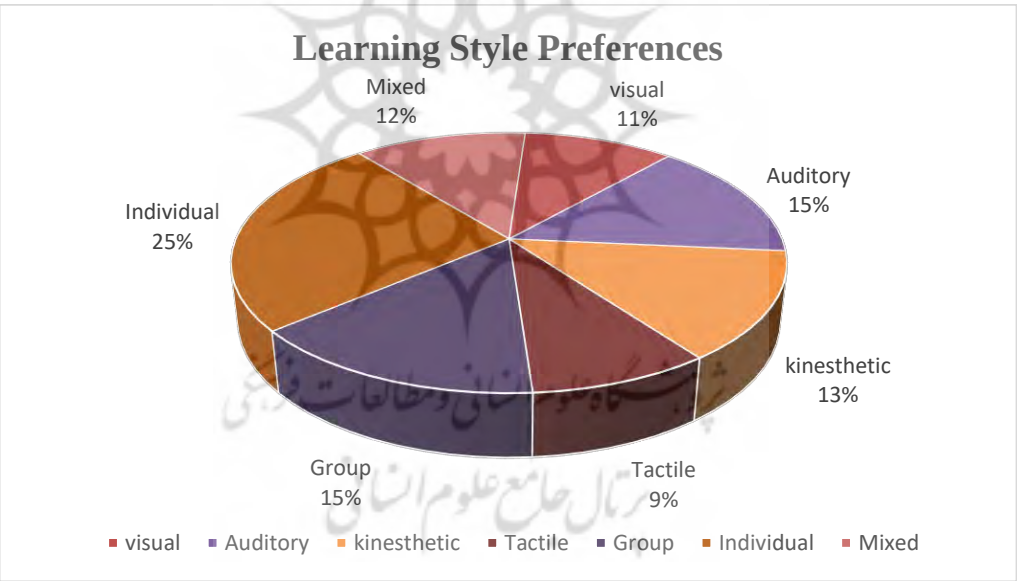


*Figure 1.* Percentages of learning style preferences

Since the frequencies of the learning styles were mostly lower than 10, the research question was probed through the Kruskal-Wallis test which is the non-parametric equivalent for one-way ANOVA.

The Kruskal-Wallis test was first run to compare the six learning style groups mean ranks on the pretest of writing (see Table 5) in order to determine whetherthe students enjoyed the same level of writing proficiency prior to the treatment.

Table 5
*Mean Ranks; Pretest of Writing by Learning Style Preferences*

| | Styles | N | Mean Rank |
|---|---|---|---|
| Pretest | Visual | 7 | 32.07 |
| | Auditory | 10 | 28.85 |
| | Kinesthetic | 9 | 26.39 |
| | Tactile | 6 | 29.25 |
| | group | 10 | 29.20 |
| | Individual | 17 | 32.47 |
| | Total | 59 | |

The results of the Kruskal-Wallis test in Table 6 indicated that there was not any significant difference between the six learning style groups on the pretest of writing, $^{2}$ (5) = .930, p = .968. Thus, it can be concluded that the participants were homogenous in terms of their writing proficiency during the pretesting phase of the study.

Table 6
*Kruskal-Wallis Test; Pretest of Writing byLearning Style Preferences*

| | Pretest |
|---|---|
| Chi-Square | .930 |
| df | 5 |
| Asymp. Sig. | .968 |

Figure 2 illustrates the results vividly.

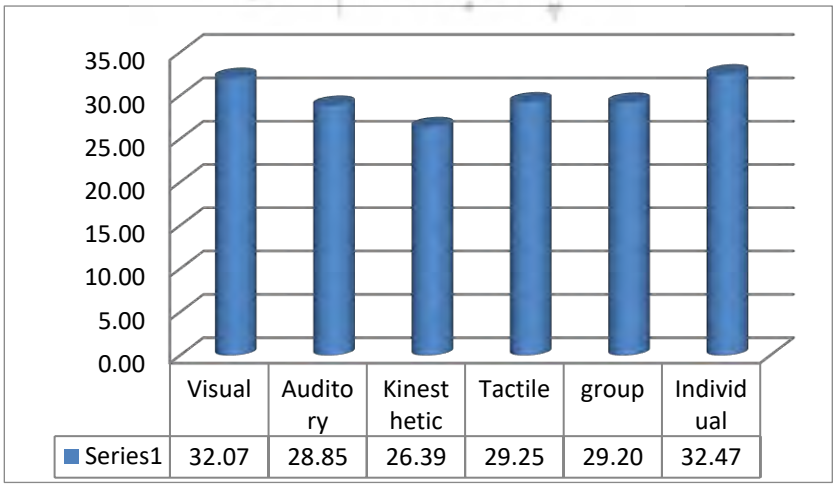


*Figure 2.* Pretest of writing across learning style preferences

Furthermore, another Kruskal-Wallis test was run to compare the six learning style groups mean ranks on the posttest of writing (see Table 7) in order to answer the second research question.

Table 7
*Mean Ranks; Posttest of Writing by Learning Style Preferences*

| | Styles | N | Mean Rank |
|---|---|---|---|
| Pretest | Visual | 7 | 35.86 |
| | Auditory | 10 | 21.00 |
| | Kinesthetic | 9 | 31.72 |
| | Tactile | 6 | 31.08 |
| | Group | 10 | 23.30 |
| | Individual | 17 | 35.53 |
| | Total | 59 | |

The results of the Kruskal-Wallis test in Table 8 indicated that there was not any statistically significant difference in the posttest of writing across the six learning style groups, $^{2}$ (5) = 6.967, p = .223. Thus, the answer to the second research question was negative.

Table 8
*Kruskal-Wallis Test; Posttest of Writing by Learning Style Preferences*

| | Posttest |
|---|---|
| Chi-Square | 6.967 |
| Df | 5 |
| Asymp. Sig. | .223 |

Figure 3 represents the participants posttest scores across learning style preferences more clearly.

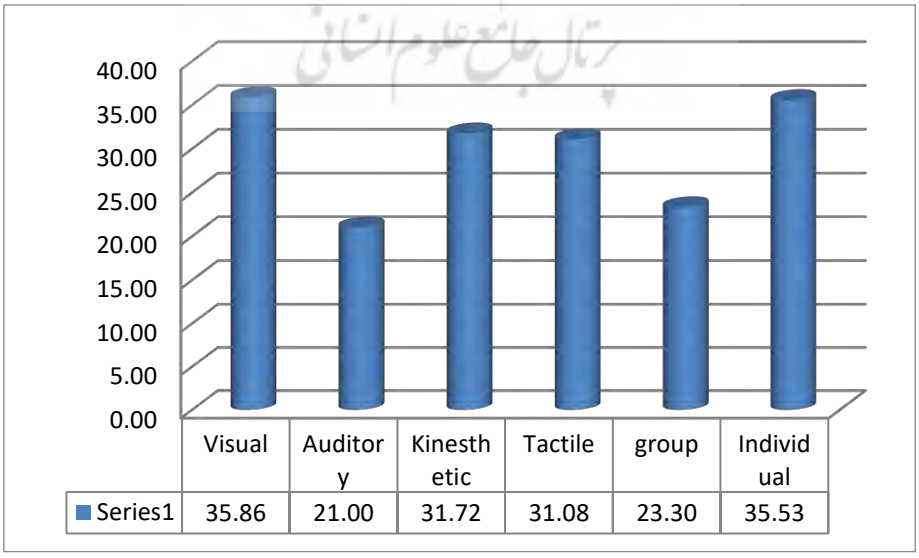


*Figure 3.* Posttest of writing across learning style preferences

## Discussion

The results of the study show that based on Reid (1987) classification of learning styles into major, minor, and negligible, the auditory and individual learning styles were the major learning styles of the participants of this study. The findings of this study are in accordance with Riazi and Mansoorian (2008) study who investigated the preferred learning styles of 300 Iranian male and female EFL students. Similar results were found in what Sabeh, Bahous, Bacha, and Nabhani (2011) reported. However, the obtained results are not consistent with those found by Yaseri Moghadam, Razavi, and Jayervand (2013) study indicating that the most preferred learning style was the kinesthetic and the least preferred one was the individual. Consequently, it can be interpreted that students have different learning style preferences in different contexts. According to Fu (2009), in all academic contexts, there are students with multiple learning styles, and it can be difficult to generalize the most preferred learning styles of students. Indeed, the findings of this study regarding the most prevalent learning style preferences are not generalizable.

Moreover, this study tried to address the relationship between the learning style preferences and the students computer-assisted writing achievement. The results of the PLSPQ and the writing posttest scores revealed that there was not any statistically significant relationship between the six learning style preferences and the computer-assisted writing achievement of Iranian EFL learners within the activity theory framework instruction. These results are in line with the findings of a study done by Inal et al. (2015). The results of their study revealed that no significant relationship was found between learning style preferences and writing achievement. Such results are also in agreement with the findings of Al-Hebaishi (2012) study asserting that learning style preferences had no significant relationship with academic performance. Furthermore, the same findings were captured in a study by Wilson (2011) who tried to identify the extent to which learning style preferences influence the educational outcome of 200 students in terms of academic achievement. The results demonstrated a lack of significant correlation between the variables. Moreover, the results of the present study are in line with many of previous studies investigating the relationship between learning style preferences and academic achievement (e.g., Almigbal, 2015; Gappi, 2013; Yildirim, Acar, Bull, & Sevinc, 2008). They all reported no significant relationship between the learning styles and academic achievement. On the other hand, a review of literature indicates that some studies (e.g., Brown, 2000; Reid, 1987) found that there existed a significant relationship between learning styles and

academic achievement. Consequently, it is asserted that the relationship between learning styles and academic achievement is controversial and needs further investigation due to the incompatibility of the different research results on this issue. However, it can be claimed that this incompatibility can be ascribed to various factors such as instructional methodology, learning environment in the respective context of studies, cultural aspects, number of students, etc.

Furthermore, this study sought to investigate any significant difference in the students writing posttest scores in terms of the six learning style preferences, namely auditory, visual, kinesthetic, tactile, individual, and group, after receiving the treatment. Based on the results, sufficient statistical information was provided to decide that there existed no statistically significant difference in the mean scores of the students posttest across the six different learning style preferences. As a result, it can be proposed that learning style preferences were not strong predictors of writing achievement.

In reviewing the literature to find out similar results concerning the effect of learning style preferences on writing achievement, a study by Srijongjai (2011) was found investigating whether there were differences in the participants writing achievement across different learning styles. The results of his study revealed that there were no significant differences. Same results were highlighted in Inal et al. s(2015) study. Besides, similar findings were reported in Umar and Rathakrishnan s(2012) research. They asserted that the differences in learning styles did not influence the students essay writing performance in a wiki environment. However, the findings of the present study were not in agreement with Ahmed s(2012) study reporting that learning styles have significant effect on developing writing skills.

Other studies in this area worked on the effect of learning styles on academic achievement in general, and many of them found similar results. The findings of the present study are in agreement with Gohar and Sadeghi s(2015) study concerning the impact of learning style preferences on Iranian EFL learners language achievement. The results of their study showed no statistically significant difference in students achievement in terms of different learning style preferences. The same results were found in Renou s(2008) study investigating the effect of perceptual learning styles on academic achievement. The results showed no significant differences between predominant learning-style groups and course achievement. The results of this study also seem to share views with Chaudhary et al. s(2015)

study. They found no significant difference in academic performance among the students with different learning styles. The results of the present study are also consistent with what Ehrman and Oxford (1995) found regarding learning styles and personality variables. They claimed that learning styles and personality variables were only weakly or indirectly related to foreign language achievement.

Taking into account the research results, the present study implies that although it may not be plausible to ascertain a unique learning style for each student, directly dealing with this issue can be worthwhile for both teachers and learners. By obtaining information concerning students learning styles and their writing experiences, teachers can design writing instruction and activities based on students variations in a way to reinforce their strengths and compensate for their weaknesses (Hyland, 2003).

To conclude, the findings of this study yielded that L2 writing instruction based on CALL within the activity theory framework could be effective for students with different learning style preferences since there were no differences in their writing achievement after the treatment. However, since differences do exist in learning styles among students, such differences should be taken into account in L2 teaching and learning.

This study maintains significant implications for EFL teachers, syllabus designers, and curriculum planners. EFL teachers should be acquainted with their students diverse learning style preferences in order to effectively match their instruction to those styles. In other words, teachers can capitalize on such information to monitor their instruction, to employ a variety of teaching strategies and techniques, to select the most appropriate materials, and to apply it in language testing. In the same vein, syllabus designers and curriculum planners should consider it necessary to design L2 teaching syllabi and programs compatible with students various learning style preferences.

To conclude, the purpose of this study was not to indicate the dominance of any learning style preferences but to reveal whether there was any significant relationship between the learning style preferences and the writing achievement of the students after receiving instruction based on CALL within the activity theory framework. Although the present study showed lack of significant relationship between the two variables, it did not refute the possibility of such relationship. The researchers believe that these two variables require further studies with larger and more diverse samples. Therefore, the present study can be a trigger for more extensive research and deeper investigation into the relationship between learning styles and writing achievement.

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