The Effect of Synchronous and Asynchronous Computer-Mediated Communication (CMC) On Iranian EFL Learners' Writing Accuracy and Complexity

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Abstract

Rapid development of information and communication technologies has changed learning a second language. Computer-mediated communication (CMC) has removed restriction to traditional face-to-face education. The effect of synchronous/ asynchronous computer-mediated communication (SCMC) on Iranian EFL learners' writing accuracy and complexity was examined in this study. To this end, a quasi-experimental design was used. Forty EFL learners were selected from an institution in Zahedan based on an Oxford Placement test. To evaluate learners' writing, measures of accuracy and complexity were used. The data was analyzed by the help of a series of Multivariate Analysis of Variance. Regarding the writing accuracy, the results of the study showed significant differences among the groups. However, the results didn't show any significant difference among the groups for writing complexity. The results of the study were discussed and suggestions for further studies have been made. The implications of this work can be strengthening of interaction based on the presence of SCMC and encouraging cognitive effort to improve learners' language skills.

Keywords: Asynchronous Computer-mediated, Communication, Synchronous, Writing Accuracy, Writing Complexity

1. Introduction

By supporting the interactional and intelligent highlights of language that are consolidated through CMC, the proper question that should be answered is whether this innovation-based medium expands capacity to improve language. The current examination researches to somewhat reply this inquiry by looking at a specifically coordinated type of CMC and the effects it has on the linguistic discipline of writing accuracy and complexity. The skills of second and foreign language training have gone through profound changes over the most recent decades. Ideas, for example, punctuation or structural practice and remembrance are not focused any longer in language classes. Banks & Graaf (2020) and Brown (1994) indicate that social development and technology have caused a shift in the traditional communication process and instead of the old systematic methodologies, extreme alteration in educating exercise through forceful and perceptive methods, centering on mutual action and familiar communication, has been presented by the Communicative Language Teaching Approach (CLT). CLT, as one of its most significant attributes, not only does not restrict the investigation of language to its semantics depiction, but also considers pragmatics and the characteristics of cultural society. The same as acquiring the first language, considering the social nature of language learning and use and seeing learners as social agents, learning a foreign language can be seen as a social activity achieved through consistent social communication and interaction between the learners and the social, where the language education has been influenced by the advanced communication technology, such as multimedia educational software and distance learning courses, via internet (Warschauer, 1998, Muhamadjonovna, 2020, Jarrah & Alzubi, 2021).

In the CLT access, association is a significant concentration, and what at last desirably prompts language advancement is the thought of students getting involved in a significant talk with their instructor or with peers

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(Brown, 1994). There is an agreement between the idea of communication in language acquiring and a lately famous means to reach L2, the Vygostskian Sociocultural Theory. As it is stated by the sociocultural worldview, social communication establishes a beneficent condition "to learn language, learn about language, and learn through language" (Warschauer, 1997, p. 471). Through Zone of Potential Development (ZPD), learner-teacher and learner-learner cooperation, as demanded by Sociocultural Theory, can act as guidance for the developments of language students. A gap is there, regarding learning, between what students could achieve through collaboration with students who are more knowledgeable and what they are able to obtain by themselves; this space is the ZPD. (Warschauer, 1997). In the same manner, SCT also indicates that mental 'tools', the generally significant of which is language, intercedes human advancement. The 'tools' idea permits the other part of second language learning, CALL, to accompany the research. Azizi & Nemati (2018) in their study mention the superiority of new methods over more traditional ones in improving learners' overall writing expertise as well as fluency and accuracy of their written texts. Zangoei *et.al* (2019, p. 139) also believes that "traditional non-dynamic test loses sight of a big part of learners' abilities through neglecting learners' potentialities and putting emphasis only on their preliminary performance".

Expecting that learning is impacted by interaction, in this investigation it has been tried to realize the function of CMC, a subdivision of CALL, as an interceding device, and examine its adequacy related to language advancement. By way of CALL, analysts are investigating the hypothetical and instructive possibility of computers operating as devices for language learning, and the suggestions for educators and students (Darhower, 2000). The cognitive facets of teach have been concentrated on by most investigations about PCs and language these days (Johnson, 1991). As expressed previously, sociocultural and informative components have anyway penetrated the language teaching sessions, underlining the requirement for communication and social progression. Conquering the cognitive hindrance, Synchronous CMC (SCMC) as a computer program could coordinate the hypothesis with the training exercise.

At first SCMC was used to assist hearing-disabled English learners at Gallaudet University (Baston, 1988) and later was tried as another stage for classroom conversations in writing and literature classes for English native speakers (Bump, 1990). The open-ended entire class conversation composed through PC networks was indicated as computer-assisted classroom conversations (Bump, 1990, p. 51) that were soon brought into English as a Second Language (ESL) classes to help arranging discussions in groups or for the entire class; also, were appeared to have much capability of raising the amount of reciprocal actions and make students' partaking equal (Kelm, 1992, Beauvois, 1992, Kern, 1995, Warschauer, 1996). In another research by Ziegler (2013), results demonstrated that L2 progression gains positive effects from interaction in face-to-face (FTF) as well as in SCMC, accompanied by comparative discoveries revealing that interaction in SCMC showed more, although non-significant, impact on measures of L2 learning results. At the point when the centrality was on the advancement of students' creative and amenable abilities, results indicated a little impact for SCMC on students' creative skills and a little influence for FTF on students' amenable abilities. Furthermore, learners' written and oral aptitudes were researched by examinations, with the outcomes showing not large impact for cooperation in SCMC on composed abilities and a little impact for FTF reciprocal action on oral skills. The other study conducted by Rezai & Zafari (2010). Oral capability tests utilized in their examination demonstrated that online conversation (S-CMC), just as for the individuals who express optimism and positiveness, is more gainful for the linguistically anxious and bashful learners toward discussions through internet. In addition, concerning the number of turns and number of words per learner per meeting, analysis of students' chat logs showed that the rate of students' involvement in dyadic online conversation was not the same.

Regarding hypothesis and investigation, no coordination between adequate consideration and the developing interest of analysts and instructors about SCMC has been seen. Warschauer (1997) remarks that investigation on the way students turned into equipped individuals from a language network, increase social information, and create language and basic reasoning abilities have not been adequately done. Besides; since students have problem in writing in English as a target language, teachers need to devote considerable time and energy to help students to develop and improve their writing skill. Teachers usually use the methods they learnt before in their own teaching experience and they do not like to put away the traditional ways of teaching. Murray (1984, p.7) confirmed this statement by stating that "teachers naturally want students to study what the teachers want them to study and to learn from methods what our teachers learned". Over last twenty years, teachers used the following approaches to teach writing in EFL classes: process–based writing, product-based writing.

Accordingly, cautious examination concentrating on constant sociocollaborative talks must be a theme that has the right to occupy the top position of the research plan on the language learning (Salaberry, 1999). If we consider the relationship between writing ability and SCMC, from the scholar's point of view, SCMC has some benefits and drawbacks on writing ability. The type of text-based communication is actually used in S-CMC and enables the students to see the language of correspondence both at the hour of discussion and thereafter without interruption of the online discussion. Additionally, unlike the conventional classrooms in which the role of teachers is full control, in S-CMC, the position of teachers changes to a less dominant position and chances for self-articulation, self- awareness, self-revision, and self-guided learning are more provided for the learners. This can both decrease the emotive obstacle and nervousness which disturb language acquiring and push the students towards valid and significant interaction (Beauvois, 1992, Chun, 1994). Simultaneous computer-mediated communication (SCMC) has lately turned into new utilization of computer innovation in the language classroom. Possible advantages with probable beneficial outcomes on learners' writing capacity have been found by a few examinations investigating the effect of SCMC in language improvement. So, in this investigation, to solve the inquiry about the influences of the utilization of SCMC on English composing accuracy and complexity, the examination was planned in the accompanying way.

The utilization of synchronous computer-mediated communication (SCMC) and its probable effects on composing complexity and accuracy in the EFL classes are the motivation behind this study. The goal of this study is to investigate whether the use of SCMC / ASCMC has any significant effect on Iranian EFL writing accuracy and complexity. So, the following research hypotheses were formulated:

Research Hypothesis One: Utilization of synchronous/ asynchronous Computer-Mediated Communication (SCMC) does not have any significant effect on writing accuracy.

Research Hypothesis Two: Synchronous/ asynchronous Computer-Mediated Communication (SCMC) does not significantly influence writing complexity of Iranian EFL learners.

2. Method

A quasi-experimental design was used to examine the effect of synchronous and asynchronous CMC on writing accuracy and complexity of Iranian EFL learners. The type of writing was argumentative essays.

2.1. Participants

Forty students from high-intermediate courses participating in three writing classes were used in this study; they were randomly selected from an English Language Institution in Zahedan. Following Ellis (2003), at the beginning of the study to ensure that the three groups belonged to the same level of proficiency, the researcher administered 40 multiple-choice grammar items, as a pre-test, taken from "Oxford Placement Test 2" (Dave, 2004) to 60 participants. Since the test results showed that just 40 students were proficient similarly, the others were dropped from the research. The participants were then classified into three categories, face-to face interaction (FFI), SCMC, and ASCMC randomly;14 participants into FFI, and 26 participants into the two other groups. In addition, a writing assignment of argumentative type was performed to the participants. The results of one-way MANOVA did not show statistically significant differences among the groups in their writings skills.

2.2. Measures

The quality of the participants' written material was assessed using accuracy and complexity criteria. These criteria have already been utilized in research. (e.g., Yuan & Ellis, 2003, Wendel, 1997, Foster & Skehan, 1996).

 2.2.1. Accuracy Measures

a. Error-free clauses: are the number of clauses in which there is no any syntactical and morphological errors

b. Correct verb forms: are the number of verbs which, regarding tense, aspect, modality, and subject-verb agreement are accurately used.

2.2.2. Complexity Measures

a. Syntactic variety: refers to the total number of different grammatical verb forms, including passive voice, tense, e.g., past continuous, present, and modality, e.g., have to, could, used in the task. These are the same measures used by Yuan & Ellis (2003).

b. Syntactic complexity: considering the participants' writing production, the ratio of clauses to T-units (minimal terminal unit, accompanied by any associated dependent clauses) is dealt with.

2.3. Data collection and Analysis

In this study an argumentative writing task was used. The essay prompt was: "Some people think children should have the freedom to make mistakes while other people believe that adults should prevent children from making mistakes. Discuss both sides and give your opinion." Forty-minute time was given to write the essay.

Considering accuracy and complexity measures, all writings materials, before being scored, were segmented and coded. The transcripts were fragmented, coded, and scored by two separate specialists to confirm that the segmentation and scoring of the texts were done properly. The magnitudes of interrater reliability coefficients were then determined. The inter-rater reliability achieved 0.85 after two training sessions, which was an adequate level of reliability for this investigation. The basic assumptions for MANOVA were checked using SPSS software version 26. Finally, a one-way MANOVA was used to examine each element of the dependent variables.

Furthermore, Cohen's (1998) procedure was used to calculate effect sizes. Cohen defined "large" effect sizes as those more than 0.8, "medium" as those between 0.5 and 0.8, "small" as those between 0.2 and 0.5, and "negligible" as those less than 0.2.

3. Results

This study examined the effect of Synchronous/ asynchronous Computer-Mediated Communication (SCMC) writing accuracy and complexity of Iranian EFL learners. The first research hypothesis was formulated as follows: Synchronous/ asynchronous Computer-Mediated Communication (SCMC) does not have any significant effect on writing accuracy. To this end, two aspects of writing accuracy, that is error free clause and correct verb form, shown in Table 1, were investigated.

Table 1: Descriptive Statistics of Accuracy in Argumentative Essay Writing

Conditions	Mean	Standard Deviation
FFI		
Error free clause	28.41	4.18
Correct Verb Forms	47.42	7.1
SCMC		
Error free clause	32.23	5.14
Correct verb form	49.14	7.54
ASCMC		
Error free clause	22.28	5.17
Correct verb form	38.33	8.14

Descriptive statistics (Table 1) indicated that the SCMC group produced more error free clauses (M= 32.23; SD= 5.14) than the FFI (M= 28.41; SD= 4.18) and ASCMS groups (22.28; SD= 5.17). The descriptive statistics also showed that the participants in the SCMC group produced more correct verb forms ($M = 49.14$; SD= 7.54) compared to the FFI (M= 47.42; SD= 7.1) and ASCMC groups (M= 38.33; SD= 8.14) in writing. A one-way MANOVA, followed by a Post-hoc Scheffé, was also performed to verify the hypothesis. The results are shown in Table 2.

Table 2: Summary of MANOVA Test Results on Writing Accuracy

Task	MANOVA				Location of Significance: Scheffé *p*		
Argumentative Essay writing	Wilk's Lambda	ŋ2	F	*P*	PTP – WTP	PTP- NP	WTP – NP
Error Free Clause	.032	.75	12.4	.001	.835	.001	.01
Correct Verb Form	.048	.58	15.65	.001	.041	.048	.001

A one-way MANOVA (Table 2) revealed a significant multivariate main effect for the writing task [Wilks' Lambda=.032, F (2,32) =12.4, p =.001, ŋ2=.78]. Given the significance of the overall test, the univariate main effects were examined for error free clauses, F (2, 36) =12.4, p=.001, ŋ2=.75] and correct verb form [F (2,.42)

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=15.65, p=.001, ɳ2=.58]. Thus, the first hypothesis, stating that there is no statistically significant difference among the groups was rejected.

The second research hypothesis was formulated as follows: Synchronous/ asynchronous Computer-Mediated Communication (SCMC) does not have any significant effect on writing complexity. To this end, two aspects of writing complexity, that is syntactic complexity and syntactic variety, were investigated, shown in Table 3.

Table 3: Descriptive Statistics of Complexity in Argumentative Essay Writing

Conditions	Mean	Standard Deviation
FFI		
Syntactic complexity	5.85	2.12
Syntactice variety	16.08	4.1
SCMC		
Syntactic complexity	5.32	3.24
Syntactice variety	14.82	5.36
ASCMC		
Syntactic complexity	5.63	3.13
Syntactice variety	14.67	6.15

Considering writing complexity, the descriptive statistics (Table 3) indicated that the FFi group produced syntactically more complex sentences (M= 5.85; SD= 2.12) than the SCMS (M= 5.32; SD= 3.24) and ASCMS groups (5.63; SD= 3.13). Based on the descriptive statistics, more various syntactical forms (M = 16.08; SD= 4.1) was also produced by the participants in the FFI group, compared to the SCMS (M= 14.82; SD= 5.36) and ASCMC groups (M= 14.67; SD= 6.15) in their writing. To verify the hypothesis, a one-way MANOVA, followed by a Post-hoc Scheffé, was also performed. The results are shown in Table 4.

Table 4: Summary of MANOVA Test Results on Writing Complexity

Task	MANOVA				Location of Significance: Scheffé *p*		
Argumentative Essay writing	Wilk's Lambda	ɳ2	F	*P*	PTP – WTP	PTP-NP	WTP – NP
Syntactic Variety	.86	.31	24.33	.061	.835	.001	.01
Syntactic Complexity	.12	.58	15.65	.063	.041	.048	.001

What the MANOVA followed by post hoc Scheffe tests (Table 4) resulted in, also show that the combined dependent variables (syntactic complexity and syntactic variety) were significantly affected by the task conditions based on the Wilk's Lambda criterion [Wilks' lambda=0.86, F (2, 74) =24.33, p=061, and ɳ2 =0.31]. Considering different aspects of writing complexity individually, statistically no significant differences were found among the groups with regard to syntactic complexity [F (2, 174) =15.65, p.063, ɳ2 =.58] and syntactic variety [F (2, 126) =24.33, p.061, ɳ2 =.31]. Thus, the second hypothesis, stating that there is no statistically significant difference among the groups related to writing complexity was confirmed.

4. Discussion and Conclusion

As lately, simultaneous computer-mediated communication has gotten an inventive utilization of PC innovation in the language study and L2 learning, a few examinations have investigated the effect of SCMC in language improvement and have discovered less restriction comparing to the traditional face-to-face education; also, they reported possible advantages, among which, to some extent, beneficial outcomes on writing capacity can be seen.

In this study, the writing accuracy and complexity of the Iranian EFL learners and the effect of Synchronous/asynchronous Computer-Mediated Communication (SCMC) on them has been investigated. The first research hypothesis says that utilization of SCMC does not have any significant effect on writing accuracy. However, the results show that, generally, the language education can be influenced by the advanced communication technology via internet, which is in line with the argumentations in Jarrah & Alzubi, 2021, Muhamadjonovna, 2020, Zangoei *et.al*, 2019, and Warschauer, 1998, but not in agreement with the finding in

Kessler, *et. al.* (2020), which studies logographic languages and contradicts the perspectives suggesting that online chat may have more advantages.

More findings of the study related to the first hypothesis, suggest that, as a writing ability, writing accuracy in a language can be increased under the effect of Synchronous/asynchronous Computer-Mediated Communication, which is in agreement with what An & Lee (2021, p. 1272) found, in that "SCMC tasks positively affected the development of L2 writing ability compared to the traditional group". The result shows that in writing accuracy, in terms of correct verb forms and error free clauses, there is statistically significant difference among the groups. Although this result is in line with An & Lee (2021) and also with Dao, *et. al.* (2021, p. 16), measuring the accuracy of the written text by error-free clauses, argued in believing that "when learners attend to and discuss language form, they tend to produce more accurate texts", it is not in agreement with what Ziegler (2013) study demonstrated, in that interaction in SCMC showed non-significant impact on measures of L2 learning results.

The reasons behind the significant difference among the groups in terms of writing accuracy can be the factors of anxiety and shyness, which are reduced in SCMC; this is also mentioned in Rezai & Zafari (2010), Chun (1994), and Beauvois (1992) studies, in which demonstrated that online conversation (S-CMC) is more gainful for the linguistically anxious and bashful learners toward discussions through internet, and that can decrease both the emotive obstacle and nervousness, which disturb language acquiring, and push the students towards valid and significant interaction.

The second research hypotheses says that Synchronous/ asynchronous Computer-Mediated Communication (SCMC) does not significantly influence writing complexity of Iranian EFL learners. The result of the study confirmed this hypothesis, as it did not show any significant difference among the participants regarding writing complexity. The non-significant result is in line with Ziegler (2013), argued that interaction in SCMC, although showed more effective, it did not present any significant impact on measures of L2 learning outcomes. However, the result is not in agreement with studies such as Dao, *et. al.* (2021), which showed the positive effect of SCMC on writing complexity resulting that with complex idea, the learners use more complex sentences to communicate their thoughts and opinions.

The reasons for having the writing complexity not affected by SCMC in our study may come from different sources, such as the participants' level of English language in general, the less progressive place of education and type of teaching method the learners received while building up the bases of their English language. Also, the writing complexity may show more variable results if a larger sample size is analyzed.

The conclusions drawn from the study can be that the SCMC changes the environment of traditional classrooms, where teachers have full authority, to a less dependent situation by causing less dominating position for instructors. So, learners gain independence in terms of input, output, and feedback, resulting in more autonomy and control over the learning process. It implies that SCMC can also lessen the cultural issues associated with classroom engagement.

Moreover, the results suggest that SCMC can assist instructors in providing opportunities for their students to move beyond typical face-to-face interaction in the classroom and incorporate innovative strategies and embrace new technologies to improve their writing skills and abilities. Teaching will be more successful and productive if technology is integrated into the classroom. A significant number of participants are volunteered to face the challenge of incorporating their computer-using experiences into language learning (Warschauer & Kern, 2000).

Given the outcomes of this and those of previous studies, providing learners with opportunity to integrate modern technology in their classrooms appears to be a feasible choice for teachers. This allows students to dedicate more time to their writing preparation. Teachers may need to set up a training session to acquaint their learners with a precise strategic device like idea mapping before implementing it.

This study indicated that SCMC can significantly affect the quality of L2 writing in a way that both writing pedagogy and testing can benefit important implications through this. And that means by changing the work circumstances and task conditions, teachers may be able to modify complexity and accuracy, the components of writing, that L2 writers pay attention to. SCMC practices may successfully increase the quality of written language output in EFL courses. This can be considered as another pedagogical implication of this

study. Although this study contributed to the field of applied linguistics by filling the gaps in the area of task-based writing research, it has two limitations.

First, despite that the researcher attempted to choose distinct and complementary measures, given the current understanding of the CAF triad, measurement of these is still restricted in this study. As a result, future research will need to test accuracy using more nuanced and in-depth methods (see Skehan, 2009). In addition, some learners' characteristics like aptitude, interest level, working memory capacity, and motivation were not fully covered in this research; these factors may have greatly mitigated the impacts of technology on accuracy and complexity.

To examine the way that working memory volume and mental power act reciprocally with CMC environment, further research is needed. Also, our understanding of the best way of using tasks in language classroom, will be deepen by such research.

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