The Effect of Educational Computerized Games on Learning English Spelling among Iranian Children

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ABSTRACT

The present study investigated the effects of educational computerized games on learning English spelling among Iranian children. In doing so, 66 young Iranian English learners with the average age of 9.5, attending the children's branch of Iran Language Institute (ILI), the most well-established state-run language teaching institute in Iran, participated in this study. These students attended two intact classes. One of the classes was randomly assigned to the experimental group, in which the students were exposed to an educational computerized game called "Fun Spelling". The other class was assigned to the control group, where the learners did their homework in the conventional way throughout the whole term. Three instruments were used to collect the data: a pre-and-post English spelling test for the experimental group, a pre-and-post English spelling test for the control group, a pre-and-post dictation test of homophones and a pre-and-post dictation test of English words with silent letters. Paired and independent samples T-tests were used to compare the students' scores on all the pre-and-post tests. The results of data analysis showed that using the educational computerized game had a great impact on the language learners in the experimental group. Also, the results indicated that the use of the game by the learners in the experimental group, compared to the learners in the control group, had a significant effect on learning English spelling in general and on learning the spelling of English homophones and English words with silent letters, in particular.

INTRODUCTION

Among all the languages in the world, English is the most popular; meaning that many different individuals speak and write in English and English is either their mother tongue or they have learned it as a second or foreign language. English is being used broadly in business, academic and other aspects of life (Naraghizadeh & Barimani, 2013). Considering the importance of English and its different varieties, Kachru (1997) used the term 'world Englishes' to refer to the range of different varieties that have developed since the nineteenth century. Classifying the world countries into three circles (i.e. inner circle, outer circle, and expanding circle countries) where English is used in one way or another, he has tried to stress the overarching role it plays nowadays in different arenas such as politics, education, economy, etc. Similarly, Crystal (2003) provides facts and figures to refer to the status of English as a 'global language'. Considering the large population (1500 million speakers of the

language worldwide), he has acknowledged the current and future potential of English as the international language of communication and the most successful language ever. Such being the case, in recent years, English has become a prerequisite for communication in different ways between human beings all around the world. This is exactly the reason why most Iranian parents insist on sending their children to English classes at a young age.

Learning English as a second language is usually a difficult task for young Iranian children. For Iranian children who have recently started elementary school and have been learning Persian alphabet and orthography, it is extremely hard to learn another language simultaneously. By analyzing the dictation errors of Iranian children, it has generally been recognized that the problems that Iranian learners of English face while learning English as a second language are due to four major differences in English and Persian, as follows:

1. English and Persian phonemes are different. For example in Persian there is not a phoneme for the letter w.
2. The orthography of English is completely different from that of Persian.
3. English homophones (i.e., words that have the same pronunciation but are different in spelling and meaning, e.g. to, two, too.) make learning English spelling difficult for Iranian language learners.
4. English words containing unpronounced or silent letters, like the word "climb" with a silent "b", also make learning English spelling a difficult task for Iranian English learners.

Due to the reasons mentioned above, young Iranian English learners often face difficulties while learning English spelling and they are usually weak in mastering this aspect of knowledge of English. It is worth mentioning that when learners of English have difficulty mastering the spelling system of the language, they usually have problems with reading aloud at the beginning stages of learning and reading comprehension at later stages. In order to overcome the spelling problem, English teachers force their students to copy the new and difficult words many times in order for them to master the correct spelling of the words. What English teachers do not usually notice is that children are not fond of learning everything through repetition, (though it might prove useful for learning some aspects of language such as word pronunciation) and they often feel tired of writing a word many times and eventually they put their homework aside and start playing games. Therefore, English teachers are encouraged to make learning interesting and fun for their students in order to attract them to the materials being taught.

Living in the era of technology, many people of different age groups and backgrounds feel more comfortable using electronic devices at home or at work and children have been attracted to the amusing and entertaining computer games.

Although computers have been used since the 20th century, they were not utilized as an educational device until the 1960s. In the 1970s, Computer Assisted Language Learning (CALL) evolved as a result of the development in research regarding the use of computers for linguistic purposes and for creating suitable language learning conditions (Naraghizadeh & Barimani, 2013).

Since 1980s, the application of electronic devices has been an essential tool in the language classrooms as well (Cunningham, 1998). Additionally, technology and pedagogical developments help to combine computer technology with the language learning process (Barani, 2013). As a result, educational games and educational computerized games play an important role in growing a young child's ability in learning a second language. As Klimova (2015) has said, by playing games children understand the world around them; therefore it should be part of their learning as well, including learning a foreign language. The problem lies in the fact that the employment of educational games has not yet developed to its full potential

and they may not be available for all learning purposes but if educational games are implemented in the educational system, learners will be more willing to learn (Shahriarpour & Kafi, 2014). Considering the points mention above, this study, through introducing a new educational computerized game named 'Fun Spelling' designed by the researchers, has tried to help Iranian children learn English spelling in an easier and better way.

LITERATURE REVIEW

English Spelling

As Kenworthy (1990, p. 97) states, "the English spelling system is rich in both regularities and irregularities which present problems to non-native learners". In fact, mastering rules of spelling in English has always been a major challenge for language learners, especially those whose first language has a non-Roman alphabet. In an attempt to help Iranian learners of English have a better understanding of probable areas of problem in English speaking, Solati, Saealie & Che Lah (2008) studied the English spelling errors of Iranian English learners. In this research spelling errors are divided into five categories:

1. Written yet unpronounced letters in English orthography. e.g. **k**now
2. Homophone confusion. e.g. it-eat, write-right, here-hear
3. Letters in English conveying different sound(s). e.g. across-**akros**,   pick-**pik**
4. Sounds present in L2, but absent in L1. e.g. /w/ way-**vay**
5. Sound distinctions present in L1, but not in L1. e.g. /I/-/I:/   fit-feet

What can be implied form the classification of the spelling errors made by Iranian learners of English is that steps are needed to be taken to make mastering such a complicated spelling system as simple as possible for language learners, especially children.

Games

In General, use of games provokes motivation and engagement and the engagement that these games produce is not comparable to any other training methods. Serious games are useful for training students and they offer an environment where users learn by playing and making mistakes in a controlled environment (Juzeleine, Mikelioniene, Escudeiro & Carvalho, 2014). Franciosi (2011, p.11) also contends that "a gaming approach to language instruction is more intrinsically motivating than non-gaming approaches."

In the same vein, Uberman (1998) believes that games are not just for fun, games can also be used for teaching and learning. Students can learn each lesson by playing games, without conscious analysis or awareness of every step in learning. Games are not designed just to fill a child's spare time; they, in fact, encompass a high value in education.

Considering the educational value of games, Harmer (1983) got to the conclusion that educational games should correspond with the student's level of education; otherwise they will not have a positive effect on student's learning. If the game is too easy, the player/student shows interest at first, but as time goes by, the player gets bored. If the game is too hard and the player/student cannot progress in it, he/she gets frustrated and will not be attracted to it. Similarly, Prensky (2003) recommended digital game-based learning for the material that is dry, technical and boring, subject matter that is difficult and audience that are hard to reach.

Regarding the multifaceted nature of games, Mcfarlane, sparrowhawk & Heald (2005) state that games develop players' interest and motivation, help them maintain attention and concentration and teach them to work as part of a group and learn to share. The language and literacy skills that games enhance in the players encourage children to explain what is

happening, pursue attentive listening and respond to what they have heard by relevant comments, questions or actions. As a result, this process of learning helps them to be organized and have sequenced daily thinking, ideas, and feelings.

Broadly speaking, in developing creativity in children, games facilitate the recognition and exploration of sound changes, recognition of repeated sound patterns and matching the movement to music. As a result of playing games, players utilize a verity of ways to respond to what they see, hear, smell, touch and feel. They use their imagination in art and design, music, dance, imaginative role play and storytelling and singing simple songs from memory

With respect to the overall effect of playing games on students' performance, Azami & Jafari (2007) compared the effect of educational games on girls versus boys. They found that girls and boys who played the game had higher scores compared to the girls and boys who didn't play the game. However, there was no statistically significant difference between the average scores of the girls and the boys who played the game.

Having a close look at what is offered in this section, one can easily notice the importance of playing games for children, its effects on them and the necessity of conducting research on games, especially the educational ones.

Computer-Assisted Language Learning (CALL)

Expanding the scope of using computers for educational purposes, in general, and language education, in particular, a relatively large number of studies have been conducted on the effect of using CALL for language learning/teaching purposes. In what follows, a brief mention is made of some of these studies.

Investigating the effect of CALL on grammar learning, Iravani & Tajik (2012), and Ghorbani & Marzban (2013), employing experimental designs, observed the effect of CALL on learning grammar among Iranian EFL learners. The results implied that using CALL in teaching grammar has a great impact on the learners' learning.

Exploring the impact of CALL on Iranian EFL learners' vocabulary learning, Naraghizadeh & Barinami (2013), and Barani (2013) studied the effect of CALL on vocabulary learning among Iranian EFL learners and concluded that using CALL had a great impact on their vocabulary learning.

Still in another study, Baradaran & Davari (2010), using an experimental design, studied the impact of utilizing CALL on EFL learners' foreign accent reduction. The results of the research illustrated that the experimental group performed better due to the employment of CALL application.

Finally, Mehrpour, Alavi Shoushtari & Haghighat Nezhad Shirazi (2016), employing an experimental design, aimed to examine the effect of CAPT (Computer Assisted Pronunciation Training) program on learners' English pronunciation proficiency. The results of the study verified that CAPT provides an enhancement in pronunciation for learners, especially in EFL contexts where exposure to target language pronunciation is insufficient.

The studies reported above, very clearly show the positive effect of using computers on different aspects of knowledge of English, such as grammar, vocabulary, accent, and pronunciation. However, it seems there are some under-research areas such as English spelling which require further investigation.

The Effect of Computerized Games on Language Learning

Broadly speaking, computer games are nowadays a very popular form of entertainment through which language learners can receive extensive exposure to English (Suparp, Watson Todd & Darasawang (2006). Considering the fact that learning English vocabulary simply by memorizing them may not be effective for all learners and that educational games tend to increase the level of learning, promote imagination in learners, increase interaction and

motivation for learners and make learning meaningful, Shahriarpour & Kafi (2014) conducted a study, the results of which showed that the students who played the vocabulary digital game were more active and successful while doing some related tasks. Also the students who played the game at home were able to use the new words of the digital game in class.

In a similar way, Ashraf, Ghanei Motlagh, & Salami (2014) conducted a study and compared two groups of students. The experimental group learned new words via online computer games during a 15 week period. The control group learned the new words through the traditional method of pen and paper during the same period. After analyzing the pre and posttests of both groups, it was revealed that the experimental group outperformed the control group. Therefore, online games proved to be more effective in learning English vocabulary.

Being interested in investigating the importance of mastering sound-symbol correspondence in learning a language such as English, Kam, Agarwal, Kumar, La;, matjir, Tewari & Canny (2008) designed a game called "Parrot" through which Indian children learned the English alphabet and phonemes. The effect of playing this game on Indian children was that they learned English alphabet and phonemes more rapidly. They learned faster because they admired the use of a technology in and out of the classroom. Also, being able to learn English alphabet and phonemes by playing a game where they could see the picture of their teacher as an instructor throughout the game was amusing and served as a source of motivation for them to play the game and learn the educational material in a fun setting.

The studies reported above very clearly show the positive effects of playing computerized games on different aspects of language such as vocabulary, orthography and pronunciation.

The Impact of Computerized Games on Learning English Spelling

Focusing specifically on the educational aspects of computerized games, Crespo Garcia, Kloos & Casrtro Gil (2008) studied the effects of an educational computerized game on learning and memorizing the spelling of words. The results of this research revealed that only 2 out of the 24 students who played the game got a lower score on the post-test compared to the pre-test. This indicates that the other 22 students had learned more words and their spelling had improved after playing the game.

Considering the importance of spelling in learning English as a foreign language, Shokri and Abdolmanafi-Rokni (2014) conducted an experimental study to investigate the effect of video computer games on Persian EFL students learning the spelling of English words. The results proved that the students in the experimental group were motivated to learn the spelling of English words through playing different computer games such as Hang Man and Spelling Bee and they had higher scores in their dictations compared to the control group. The researchers also indicated that games improve students' ability to memorize the spelling of words and the repetitions that are programmed in the games continuously expose students to the target language. Also, with the sense of winning that students gain by playing these games, students become motivated to play the game more and learn more about the spelling of words in order to achieve a better score in the game.

In another relatively similar study, Shokri (2014) studied the long term effects of video computer games on students' learning the spelling of English words and the effect it has on recall and retention of the spelling of English words. This study proved that games give students chances to examine the words closely and similarly they motivate students to learn and practice the words, thus they have a better chance in memorizing and remembering the correct spelling of words.

Going through the studies reported in the above review of literature, one can reach the conclusion that, due to the paucity of research, the area of English spelling and the impact of educational computerized games on its mastery calls for further investigation, especially when

it comes to learning the complicated system by Iranian children learning English as a foreign language. Consequently, the present study was an attempt to address some novel aspects of the issue in question.

Objectives of the Study

As previously mentioned, an educational computerized game was designed to facilitate learning English spelling among Iranian children. In this study, the effect of the Fun Spelling game on learning the spelling of English words, English homophones and English words with unpronounced or silent letters were investigated.

Research Questions

Based on the objectives of the study just mentioned, the present study addressed the following research questions:

1. Is there a significant difference in learning English spelling between the students who play educational computerized spelling games and those who do their homework in the conventional way?

2. Is there a significant difference in learning the spelling of English homophones between the students who play educational computerized spelling games and those who do their homework in the conventional way?

3. Is there a significant difference in learning the spelling of English words with silent letters between the students who play educational computerized spelling games and those who do their homework in the conventional way?

METHOD

Design of the Study

Based on the research questions of the study, since conducting the research required providing some of the participants who were chosen non-randomly with instruction and practice on using the computerized educational game (i.e., Fun Spelling) and comparing their performance with other participants not receiving the instruction and practice, the proper type of research design, according to Ary, Jacobs, & Sorensen (2010), is quasi-experimental.

Participants

Two intact English classes at Iran Language Institute (ILI) took part in this study. The number of students in each class was 33 (66 students in total). This type of sampling was based on the following considerations: 1) The participants had nearly the same level of proficiency learning English for two years, and 2) They had been taught through the same teaching materials and teaching procedures with teachers having nearly the same level of proficiency and efficiency.

Materials

In this research an educational computerized game was designed and implemented to help children learn English spelling. The name of the game, that is, "Fun Spelling" implies that this game makes learning entertaining and interesting. Fun Spelling, as the name implies, helps players learn and memorize the spelling of new words while having fun. The words used in this game were taken from the textbooks taught in the kids' branch of Iran Language Institute. Fun Spelling is designed with bright colors, amusing sounds and fun graphics in order for the game to appeal to the children.

At the children's branch of the ILI, there are twelve levels that must be completed if language learners wish to improve their knowledge of the language and move on to higher levels of English proficiency. Based on the mentioned twelve educational levels, twelve stages were designed in the Fun Spelling game. Thus in each stage of the game, the words taught in the corresponding educational level were used. As a result, players could easily choose the stage that corresponded to their level of knowledge. Each stage of the game was divided into three categories: easy, medium and hard. The first category included two or three letter words. The second category contained four or five letter words and the third category contained words with more than six letters.

Description of the Game

The player starts the game by clicking on its icon, a window opens and the player chooses the stage according to the instructional level he/she is studying. Then the player chooses the difficulty level of the game. Then the main window of the game opens and on the right corner of the screen, as seen in the screen shot provided below, a cartoon picture of a word to be learned by the player during that particular instructional level is shown.

Figure 1. The Main Screen, before Spelling the Word

By looking at the picture, the player should have the vocabulary in mind and using the letters of the alphabet seen at the bottom of the screen, he/she should try to type the correct spelling of the word in the blank space.

Figure 2. The Main Screen, after Spelling the Word

If the spelling is correct, the player will achieve the full score, but if the word is misspelled, each incorrect letter will cause one bar of chocolate to be removed from the box placed in the middle of the screen. The number of the chocolate bars in the box depends on the number of the letters in that particular word. If all the chocolate bars are removed from the box, it means that the player has not been able to fill in the blanks with correct letters of the word. In this case, the correct spelling of the word appears on the screen and the player does not obtain a score. Afterwards, the picture of the next word appears on the right corner of the screen and the game continues this way.

Instruments

To collect the data, three tests of dictation of English words, English homophones and English words with silent letters (each consisting of 30 items) were constructed by the researchers. The reliability indexes of the three tests estimated through Alpha Chronbach turned out to be 0.87, 0.81, and 0.84, respectively which are considered relatively high reliability indexes.

Data Collection Procedure

As previously mentioned, 66 young Iranian English learners participated in this study. These students belonged to two intact classes. One of the classes served as the control group, in which the students did their homework in the conventional way throughout the term and the other class served as the experimental group in which students did their homework in the conventional way during the first ten sessions of the term. On the tenth session of the term,

three tests of dictation of English words, English homophones and English words with silent letters were given to the students of both groups as pre-tests. This was done to verify that at the time when students of both groups did their homework in the conventional way they had an equal knowledge of spelling in English.

From the tenth session on, students of the experimental group were exposed to the educational computerized Fun Spelling game. For the next ten sessions of the term, students in the experimental group played the game instead of doing homework in the conventional way. The control group continued doing their homework in the conventional way. At the end of the twentieth session, the same three tests of dictation of English words, English homophones and English words with silent letters used as pre-tests were again given to the students of both groups as post-tests in order to determine the difference between the mean scores of the experimental group and those of the control group. The results were compared to observe the effect of the game on learning spelling between students in the two groups.

RESULTS

In order to make sure that at the beginning of the study the control and the experimental groups were equal regarding their dictation abilities, an independent samples t-test was conducted on their scores of the pre-test of dictation. The results of the t-test (t=0.737,   sig= 0.692) revealed that both groups had a similar performance on the dictation test (See table 1 below).

Table 1. Independent Samples T-tests on the Pre-test of Dictation of the Control and the Experimental Group

Groups	Mean	Std. deviation	t	df	Sig.
Experimental	15.05	2.56			
Control	14.58	2.67	0.737	64	0.692

In order to show that the game had a positive effect on learning English spelling, the results of the pre- and post- tests of dictation of English words, English homophones and English words with silent letters of the control group were compared with those of the experimental group using a set of independent samples T-tests which appears below.

Table 2. Independent Samples T-test on the English Words in the Post-test of Dictation of the Experimental Group and the Control Group

Groups	Mean	Std. deviation	t	df	Sig.
Experimental	18.80	1.09			
Control	16.22	2.22	5.973	64	0.001

A seen, the mean score of the post-test of dictation of English words of the control group was 16.22 and that of the experimental group was 18.80. The results of the t-test showed that the experimental group had significantly outperformed the control group.

In order to see if the students had improved in their spelling based on the conventional method, the results of the pre- and post-tests of dictation of English words of the control group were analyzed using a paired samples T-test. Their mean score in the pre-test of dictation was 14.57 and that of the post-test was 16.22. As it can be seen, the difference between the two mean scores is statistically significant showing that the conventional method had also improved the students' spelling ability.

Table 3. Paired Samples T-test on the Pre- and Post-test of Dictation of the Control Group

Pre-test=1 Posttest= 2	Mean	Std. deviation	t	df	Sig.
English spelling (1)	14.58	2.67			
English spelling (2)	16.22	2.22	-2.99	33	0.005

To see if the students of the experimental group had also advanced in their spelling and if the game had a positive effect on their learning, the results of their pre- and post-tests of dictation of English words were analyzed using a paired samples T-test. The experimental group's mean score in the pre-test of dictation was 15.05 and that of the post-test was 18.80. As it can be seen, the difference between the two mean scores is 3.75 points which is more than the difference between the mean scores of the control group (1.64) which reveals that the students in the experimental group had improved their spelling ability much more than the control group due to the application of the spelling game.

Table 4. Paired Samples T-test on Pre-and Post-test of Dictation of the Experimental Group

Pre-test= 1 Post- test= 2	Mean	Std. deviation	t	df	Sig.
English spelling (1)	15.05	2.56			
			-10.03	31	0.000
English spelling (2)	18.80	1.09			

In the pre-test of dictation of English homophones, the mean score of the control group was 13.40 and that of the experimental group was 14.02 and the results of an independent samples t-test conducted on the scores revealed that the difference between the mean scores was not statistically significant.

Table 5. Independent Samples T-test on English Homophones in the Pre-test of Dictation of the Control and the Experimental Group

Experimental= 1 Control= 2	Mean	Std. deviation	t	df	Sig.
Spelling of homophones (1)	14.02	2.65			
			0.949	64	0.829
Spelling of homophones (2)	13.40	2.72			

In the post-test of dictation of English homophones, the mean score of the control group was 14.94 and that of the experimental group was 18.32. The results of another t-test run on the mean scores showed that the difference was statistically significant which indicates the positive effect of the treatment on the experimental group.

Table 6. Independent Samples T-test of English Homophones in Post-test of Dictation of the Control and the Experimental Group

Experimental= 1 Control= 2	Mean	Std. deviation	t	df	Sig.
Spelling of homophones (1)	18.32	1.20			
			7.173	64	0.002
Spelling of homophones (2)	14.94	2.42			

The mean score of the pre-test of dictation of English words with silent letters of the control group was 14.18 and that of the experimental group was 14.76 and the results of a t-

test showed that at the beginning of the study the two groups were equal regarding their performance on the pre-test.

Table 7. Independent Samples T-test of English Words with Silent Letters in Pre-test of Dictation of the Control and the Experimental Group

Experimental = 1 Control = 2	Mean	Std. deviation	t	df	Sig.
Spelling of words with silent letters (1)	14.76	2.89	0.827	64	0.976
Spelling of words with silent letters (2)	14.18	2.80			

The mean score of the post-test of dictation of English words with silent letters of the control group was 15.20 and that of the experimental group was 19.09 after the treatment. The results of another t-test conducted on the scores obtained from the post-test on English words with silent letters revealed that the experimental group had significantly outperformed the control group.

Table 8. Independent Samples T-test of English Words with Silent Letters in Post-test of Dictation of the Control and the Experimental Group

Experimental= 1 Control= 2	Mean	Std. deviation	t	df	Sig.
Spelling of words with silent letters (1)	19.09	0.93	7.592	64	0.000
Spelling of words with silent letters (2)	15.20	2.79			

DISCUSSION

As stated earlier, so far no studies have examined the effects of computerized educational games on learning the spelling of English words, English homophones and English words with silent letters. However, despite the scarcity of literature in the realm of educational computerized games, the results of the present study are in line with the ideas expressed by and the studies conducted by Harmer (1983), Uberman (1998), Prensky (2003), Mcfarlane et al. (2005), Juzeleine et al. (2014) and Escudeiro & Carvalho (2014) who concluded that games are essential instruments in education and teaching and that via games students learn more rapidly and enjoy learning even the most complicated materials.

The results of the present research are also thoroughly supported by the findings of the studies conducted by Shokri & Abdolmanafi-Rokni (2014) and Shokri (2014) who showed the direct effect of playing video computer games on the improvement of English spelling among Iranian EFL learners.

Additionally, based on the results of the current study, it is confirmed that the obtained results are supported by the results of the studies conducted by Azami and Jafari (2007), Crespo Garcia et al. (2008), Kam et al. (2008), Shahriarpour & Kafi (2014), Ashraf et al. (2014), Klimova (2015). These studies proved that playing games results in higher scores in examinations and enhanced comprehension of the instructed lessons.

CONCLUSION

This study aimed to investigate the effect of educational computerized Fun Spelling game, designed by the researchers, on learning the spelling of English words among young Iranian children. The results of the study revealed that playing the educational computerized game had a positive effect on learning English spelling among Iranian children, especially the spelling of words with silent letters and the spelling of English homophones. The results of the study can have implications for English teachers, learners and material developers. English teachers can include spelling games, especially the computerized ones, in their lessons to reduce the burden of mastering spelling rules for their students. Students should also play such games at home to have more exposure to the materials and to learn them faster and better. Material developers can also think of designing interesting computerized spelling games and introduce them to language teachers and learners to improve both the quality of teaching and learning of this important aspect of English language. Since, as stated earlier, the present study is one of the few attempts to explore the effect of educational computerized games on English words, especially in Iran, and homophones and words with silent letters, in particular, more studies are needed to be conducted on the same issue and the obtained results should be approached with caution. Another limitation which should be taken into account is the type of sampling employed. In fact, as mentioned before, due to practicality issues, it was not possible to apply random sampling in selecting the participants of the study. A third limitation of the study is the relatively small number of participants. Including more participants could have improved the generalizability of the research findings to a greater extent. Taking the mentioned limitations into consideration, one can conclude that more similar studies are needed to be carried out in future to verify the results of the present study.

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