

استخدام الألعاب الرقمية في تنمية مهارات التهجئة لدي تلاميذ المرحلة الابتدائية
Using Digital Games for Developing English Spelling Skills
of Primary Students

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Abstract

The present study investigated the effect of using digital games on developing English spelling skills of primary students. The sample consisted of 35 (male and female) students who enrolled in the third year at Mojamaa El Maris Primary School in Luxor. To assess the participants' English spelling skills, an English spelling test was designed. Eleven digital games have been designed to develop English spelling skills of the students. To analyze the collected data, descriptive statistics were used such as Paired samples t- test, Standard deviations, Means, and Spearman rank order coefficient of correlation. Eta squared was obtained using the t-value for the differences between the means of scores to calculate the effect size of incorporating digital games (independent variable) on the participants' spelling skills (dependent variable). Findings of the study proved a remarkable improvement in the post English spelling test scores of the participants. The findings also revealed a considerable increase in the test scores on each of English spelling sub-skills, i.e., phonological awareness, visual

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knowledge, and orthographic awareness, favoring the post administration. Results of the present study confirmed that digital games could develop the primary students' English spelling skills. It was recommended that digital games should be used in English classrooms, especially in teaching spelling. In addition, learning through fun should be included in the educational curricula of the primary stage.

Key words: Digital games, Spelling skills

المخلص:

هدفت الدراسة إلى التعرف علي أثر استخدام الألعاب الرقمية في تنمية مهارات التهجئة لدى تلاميذ الصف الثالث الابتدائي، واشتملت عينة الدراسة علي (35) طالبًا وطالبةً من الملتحقين بالصف الثالث الابتدائي بمدرسة مجمع المريس للتعليم الأساسي بالأقصر، وتم بناء اختبار التهجئة باللغة الإنجليزية لقياس مهارات التهجئة لدي التلاميذ، كما تم تصميم إحدى عشرة لعبةً رقميةً لتنمية مهارات التهجئة باللغة الإنجليزية ، ولتحليل البيانات التي جُمعت تم استخدام الإحصاء الوصفي (المتوسط، الانحراف المعياري، العينات المرتبطة، ومعامل ارتباط سبيرمان لتحليل البيانات) ، بالإضافة إلى الاستعانة بمربع إيتا للاختلافات من أجل قياس حجم تأثير استخدام الألعاب الرقمية (متغير مستقل) على مهارات التهجئة (متغير تابع)، وذلك باستخدام قيمة (ت) بين متوسطات الدرجات، وقد أوضحت نتائج الدراسة وجود تحسُّن ملحوظ في التهجئة باللغة الإنجليزية في التطبيق البعدي للاختبار لدي عينة الدراسة، إلى جانب وجود فروق ذات دلالة إحصائية في كل من المهارات الفرعية للتهجئة : الوعي الصوتي، والمعرفة البصرية، والوعي الإملائي لصالح التطبيق البعدي، و بذلك يمكن استخدام الألعاب الرقمية تنمية مهارات التهجئة لدى تلاميذ المرحلة الابتدائية، وقد أوصت الدراسة باستخدام الألعاب الرقمية في الصفوف الدراسية لتعلم اللغة الإنجليزية -خاصة في تدريس التهجئة- بالإضافة إلي أن يكون التعلم من خلال المرح مدرجًا في المناهج التعليمية للمرحلة الابتدائية.

مفاتيح البحث: الألعاب الرقمية، مهارات التهجئة

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Background of the Problem

Our major means of communication is language. It is a means by which to communicate our ideas and thoughts among people. Speaking, listening, reading, and writing are the four essential skills required for English language. These fundamental skills are separated into sub-skills. Spelling is a difficult written linguistic skill that is gained through using and practicing the language. According to the quality of English spelling skills, the difficulties of the students' English language written work can be reduced. In fact, good spelling in a written message facilitates communication among people. It makes a good impression of the writer as well as the ability to spell words easily can make a good reader.

Spelling is one of the main sub-skills of the written communication so it is not limited to the weekly spelling test of students. According to Santoro, Coyne and Simmons (2006) spelling was defined as "recognizing or reproducing a correct sequence of letter in an oral or written form, the actual process of spelling involves the critical integration of phonological and alphabetic skills of beginning reading" (p.122). While Department for Education and Employment (2001) defined spelling as "it's a letter by letter process which involves a set of conscious choices not required in reading" (p.12). Also, Al Otaiba and Hosp (2010) mentioned that spelling is "a linguistic skill that involves encoding linguistic form into written forms" (p.3). Spelling instruction should not only be limited to memorizing words but also

learning about the developmental skills to represent written words correctly. Many teachers realized that spelling is being more than a memorizing task to be a subject of instruction and an important sub-skill for reading and writing (Templeton & Morris, 2001).

There are numerous English spelling sub-skills as Elkoumy (2002) mentioned some spelling sub-skills as “letter naming, phonics and word structure” (p.39). Also, Staden (2010) emphasized that mastering spelling requires learners to possess certain language abilities such as phonological, morphological, visual memory skills, spelling rules as well as semantic relationships. Similarly, learning to spell requires the combination of several skills that include phonological representation, grammatical and semantic knowledge, in addition to the ability to formulate words on the basis of visual memory and the knowledge of the orthographic rules (lennox & Siegel, 1994 ; Mpiti, 2012).

To make students like learning English spelling, teachers can use digital games for educational purposes specifically in teaching English spelling skills for children. Particularly, Gros (2007) mentioned that digital games can be more useful in the case of building them on instructional purposes. Supporting this view, Alsharafat, Alrashdan, and Younes (2017) added that children should learn through play. In addition, Al Ghamidi (2018) recommended paying attention to Educational electronic games in curriculum and seeking for being an instructional strategy in the educational process (translated).

Recently, digital games have a clear effect on the process of teaching and learning. Many studies as (Castillo-Cuesta, 2020; Rasti-Behbahani, 2021; Kottacheruvu, 2023; Winaldo & Oktaviani, 2022) confirmed the benefits of digital games in the educational process in different areas. Digital games can help learners to be more motivated and interactive as well as they can reduce any understanding problems by providing them with beneficial therapy (Granic, Lobel & Engels, 2014; Mouaheb, Fahli, Moussetad & Eljamali, 2012). Using digital games as a new technique may make the students become the core of the learning process. Students can be responsible for their learning. Students can acquire not only the educational content, but also, they can interact, communicate with each other and solve problems. Precisely, learning through digital games develops students' self-learning skill. In fact, many researchers asserted that a good game provides deep learning as well as problem-solving as (Pound, 2005; Gee, 2003). In contrast, Egenfeldt Nielsen (2006) reported that there was a lack of knowledge about the implications of using games in educational contexts as this particular area had unique problems in terms of methods.

Based on the previous discussion, one of the objectives of teaching English as a foreign language in the primary school is to lay solid foundations for the development of literacy skills in English. Spelling is considered one aspect of literacy. Unfortunately, this claim is not fulfilled. The digital game has a long history as a technique; however, it is almost new in the field of research.

One of the main reasons for selecting digital games is the need to reactivate the role of primary students and re-engage them in the learning process as a result of using traditional methods. Accordingly, the study is an attempt to investigate the impact of using digital games on developing English spelling skills of third year primary students.

Statement of the Problem

Throughout the researcher's experience, it is noticed that primary students have problems with English spelling. Again, this is consistent with the results of some studies reported by Ghareeb (1989), Abdul Shaffy (2016), and Maroof (2017). Accordingly, the problem of the study can be stated as follows: The majority of primary students who enrolled in the third year at Mojamaa El Maris Primary School in Luxor are unable to spell English correctly. They lack certain spelling skills; phonological awareness, visual knowledge, and orthographic awareness.

Questions of the Study

The study attempted to answer the following questions:

- 1.3.1 What is the effect of digital games on developing English spelling skills of third year primary students?
- 1.3.2 How effective is the use of digital games in developing the students' English spelling sub-skills; phonological awareness, visual knowledge, and orthographic awareness?

Purposes of the Study

The study has a two-fold purpose:

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- To investigate the impact of using digital games on developing English spelling skills of third year primary students
- To find out if digital games are feasible to be used in teaching English spelling.

Significance of the Study

The significance of the study can be presented as follows:

1.5.1 The English spelling test might be useful for teachers and researchers.

1.5.2 To the researcher's knowledge, the scarcity of research addressing the use of digital games in teaching English spelling in Egypt enhanced the significance of the study.

1.5.3 Successful application of digital games might change the way spelling is taught.

1.5.4 Findings of the study might encourage teachers in schools to think of incorporating online digital games in teaching and learning English spelling.

1.5.5 Digital games might offer a solution to overcome pronunciation problems.

1.5.6 Curriculum developers might include digital games in the textbook prescribed to the primary stage students.

Delimitations of the Study

This study was delimited to the following:

1.6.1 Desktop (Computer) device.

1.6.2 Online educational digital games.

1.6.3 Third year primary students who enrolled at Mojamaa El Maris Primary School in Luxor, where the researcher works.

1.6.4 Some English spelling skills, namely, phonological awareness, visual knowledge, and orthographic awareness.

1.6.5 Digital games are based on the student's textbook (Connect, second term 2021\ 2022).

Methodology of the Study

Design of the Study

The present study adopted one of the experimental designs, namely, "the one group pretest posttest design".

Variables of the Study

The variables of the study were:

- Digital games as an independent variable
- Spelling skills as a dependent variable.

Participants of the Study

Participants of the study were chosen from the students who enrolled in the third year at Mojamaa El Maris Primary School in Luxor. A pilot study was conducted to determine the participants (poor spellers). A diagnostic spelling test was used. The total number of the participants was (n= 35). The participants included males and females. The average age of

the participants is between eight and nine. They have a similar linguistic background as they have studied English for two years.

Instrument of the Study

To carry out the study experiment, English spelling test was constructed by the researcher.

English Spelling Test (EST)

The English spelling test was designed to assess the participants' spelling skills. The test is divided into five parts. The total score of the English spelling test is 50.

Validity of the English Spelling Test

The English spelling test was submitted to a jury of experts to determine its face and content validity. Intrinsic validity of the English spelling test was computed using the following formula (Sayed, 1978, p.402) translated:

$$\text{Intrinsic validity} = \sqrt{\text{Reliability item}}$$

$$\text{Intrinsic validity of the test} = \sqrt{0.751} = 0.9$$

Reliability of the English Spelling Test

To establish the reliability of the test, the test- retest method was used. The coefficient of correlation between the test- retest scores was computed using Spearman's Formula. Results are reported in table 3.4 below.

Table 3.4 The Coefficient of Correlation between the Test- Retest Scores of EST

EST	M	S D	Spearman's Correlation
Test	21.80	10.09	0.878**
Retest	14.65	7.30	

** Correlation is significant at (0.01) level (2 tailed)

To determine the Internal Consistency of the five parts of the test, the correlation coefficient for each part with the whole test was computed through using Spearman's correlation coefficient.

Table 3.4.1 The Coefficient of Correlation Between the Five Parts of EST with the Overall Test

EST / Part	Spearman's Correlation "rs"
One	0.622**
Two	0.592**
Three	0.612**
Four	0.656**
Five	0.584**

** Correlation is significant at (0.01) level (2 tailed)

Based on these results, the English spelling test is valid and reliable.

Item Difficulty of the English Spelling Test

The difficulty index of the items was assessed to spot items that are too easy or too difficult. To measure the item difficulty index, the following formula of Mitra, Nagaraja, Ponnudurai, & Judson (2009). According to the formula, when the difficulty index value is lower than 30%, the item is too difficult, and when it is higher than 80%, the item is considered too easy. On this basis, too easy and too difficult items were eliminated and, or revised. Results indicated that item difficulty index of the test (EST) ranged between 30% and 70%.

Discrimination Index of the English Spelling Test

The item discrimination index was computed through using the formula of Al Kinani and Jaber (1995, pp.145-146, translated) : $D = \sqrt{F \times P}$, where “D” refers to the item

discrimination Index, “F” is the item facility index , “P” is the item difficulty index. Results indicated that the item discrimination index was between (.46) and (.5).

On this basis, the item discrimination index is excellent. The discrimination index of the test items is presented in Appendix (C).

Time Allotted for the English Spelling Test

To determine the proper time for the English spelling test, the average time required for

the students to answer the test was calculated. The total time of the test was divided by the number of the students. Each part of the test had a limited time. For part one, the examiner scheduled each student individually, then calculated the average time needed for it. Time allowed for the whole test was (50) minutes: 7 minutes for part one, 10 minutes for part two, 12 minutes for part three, 9 minutes for part four, 12 minutes for part five. The time required for given the test directions was not taken into consideration.

Development of the Digital Games

Digital games are developed to improve the students English spelling skills; phonological awareness, visual knowledge, and orthographic awareness. These digital games are based on the third year student textbook (Connect student's book, Second term, year 2022-2023). Five units of the textbook are modified to be suitable for ten digital games, in addition, to one more game (Alphabets and Sounds). Each unit is divided into two lessons. Each game includes the sound and an image of each word. These digital games are designed through using a website called (Nearpod). Native speakers voices are used through using a website called (Kukarella).

To pay the students' attention, the researcher selected colorful and realistic pictures for each word that could be suitable for children. Pictures and slides were adopted and adapted from the internet. Also, digital games are supported with sound effects and positive feedback. Each game consists

of two parts. The first part involves studying the written word supported with some attractive and colorful pictures accompanied with its pronunciation. The second part encompasses practicing what is taken in part one. Each game requires some information such as the student's name, and year to be able to join the game. Teacher's guidelines and students' instructions are provided.

Validity of the Digital Games

To determine the feasibility and the relevance of the digital games, they were submitted to a number of TEFL specialists. They expressed their opinions, comments and suggestions regarding the content clarity, the organization of the pictures, the slides layout and design as well as the clarity of the words pronunciation. Generally, it was revealed that these games are simple and clear. Games objectives are comprehensible and measurable. Pictures are clear and suitable for the children's age. Slides are varied and attractive. The words pronunciations are understandable. The games questions are simple and relevant to the instructional materials. Moreover, specialists added some suggestions which were taken into consideration in the final version. Appendix (G) shows digital games pictures and slides.

Piloting the Digital Games

Digital games were piloted on ten students, not included in the sample of the study. Those students were taken to the computer lab to deal with the game separately under the supervision of the researcher. When completing the games, the difficulties were discussed and the students'

impressions towards digital games were noted. Accordingly, the researcher made some modifications.

Procedures of the Study

The researcher prepared the English spelling test and the digital games. The English spelling test and digital games were sent to the jury members to measure its validity. The researcher piloted the English spelling test to determine its reliability. The researcher administered the English spelling test to the participants before the treatment as a pre-test. The experiment was carried out during the second semester of the academic year 2021/2022. It took place from March to May 2022. The experiment lasted for 8 weeks. The researcher held a meeting with the participants introducing the digital games using the data show. Some guidelines were provided on how to deal with these digital games. There are three phases for completing the experiment; taking the necessary measures as having the Ministry of Education permission to implement the experiment, preparing the computer devices, connecting them with the internet, and modifying the timetable of the computer lab to be able to conduct the experiment.

The participants attended classes twice a week. Each class covered one game that lasted between 8 to 15 minutes. Extra chances were provided for the participants to re-practice the same game. At the end of the experiment, the researcher administered the posttest to the participants.

Results of the Data Analysis

Results of the Pre-post Test for the Participants

Results Concerning the Overall English Spelling of the Participants in the Pre-post -administration of the EST

A paired samples t-test was conducted to compare the mean scores of the participants in the pre and post administration of the EST. The mean scores, standard deviations, t-values, and t-significance of English spelling of the participants in the pre and post administration of the EST are presented in table 4.1.1.1 below.

Table 4.1.1.1

t - value for the Overall English Spelling of the Participants in the Pre- post Administration (EST)

Variable	Administration	Mean	Std. Deviation	t-value	Df	Sig (2-tailed)
English Spelling	Pre	6.97	5.63	22.76	34	0.000**
	Post	36.66	5.26			

**P < 0.01

The above table indicates that there is a noticeable increase in the mean scores of the participants' English spelling in the post test. Means differences between the pre and post scores of the participants were computed. As reported in table 4.1.1.1, the participants' means scores were (6.97 and 36.66, respectively). This means that the mean scores of the participants was high in the posttest of English spelling. The computed t-value (22.76) revealed that statistically significant differences at $p < 0.01$ between the participants'

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mean scores in the pre and post administration of the EST, favoring the post administration. Based on these results, the first hypothesis: "There is a statistically significant difference at 0.01 level between the mean scores of the participants in the pre and post English spelling test, in favor of the post-administration" was accepted. These findings provided an answer for the first question of the study: What is the effect of using digital games on developing English spelling skills of third year primary students?.

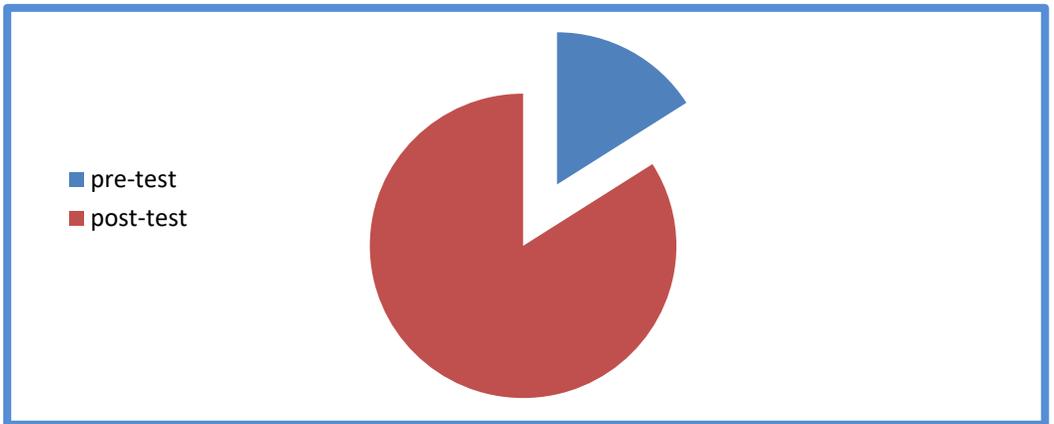


Figure 4.1.1.1 Comparison between Scores of the Participants in the Overall English Spelling Test (Pre- post-administration)

Results Concerning the Three English Spelling Sub-skills of the Participants in the Pre- post-administration (EST)

To compare the mean scores of the participants in the pre-post administration on each sub-skill, a paired samples t-test was conducted. Table 4.1.1.2 below demonstrates the mean scores, standard deviations, t-values and t- significance of the three English spelling sub-skills in the pre – post administration(EST).

Table 4.1.1.2

t- value for each of the Three English Spelling Sub-skills of the Participants in the Pre- post Administration (EST)

Sub-skill	Test	Number Of Cases	Mean	Std. Deviation	t-value	DF	Sig.(2 tailed)
Phonological Awareness	Pre	35	3.09	1.54	16.82	34	0.000**
	Post	35	8.83	1.31			
Visual Knowledge	Pre	35	2	2.55	17.24	34	0.000**
	Post	35	13.71	3.58			
Orthographic Awareness	Pre	35	1.89	3.84	13.86		
	Post	35	14.11	3.21			

**P< 0.01

Table 4.1.1.2 showed a remarkable increase in the mean scores of the participants' English spelling sub-skills in the post test. Data showed that the participants' performance was much better in the post test than in the pre-test. Means

differences between the pre and post scores of the participants in the phonological awareness, visual knowledge and orthographic awareness were computed (3.09 and 8.83 ; 2 and 13.71 ; 1.89 and 14.11, respectively). The computed t-values (16.82, 17.24, and 13.86) revealed that statistically significant differences at $p < 0.01$ were found between the participants' mean scores in the pre and post administration on each of the three English spelling sub-skills, favoring the post administration. Depending on these results, the second hypothesis: "There are statistically significant differences at 0.01 level between the mean scores of the participants in the pre and post English spelling test on each of spelling sub-skills; phonological awareness, visual knowledge, and orthographic awareness, favoring the post-administration" was confirmed. These findings present an answer for the second question: How effective is the use of digital games in developing the students' English spelling sub-skills; phonological awareness, visual knowledge, and orthographic awareness?. Figure 4.1.1.2 illustrates results shown in table 4.1.1.2

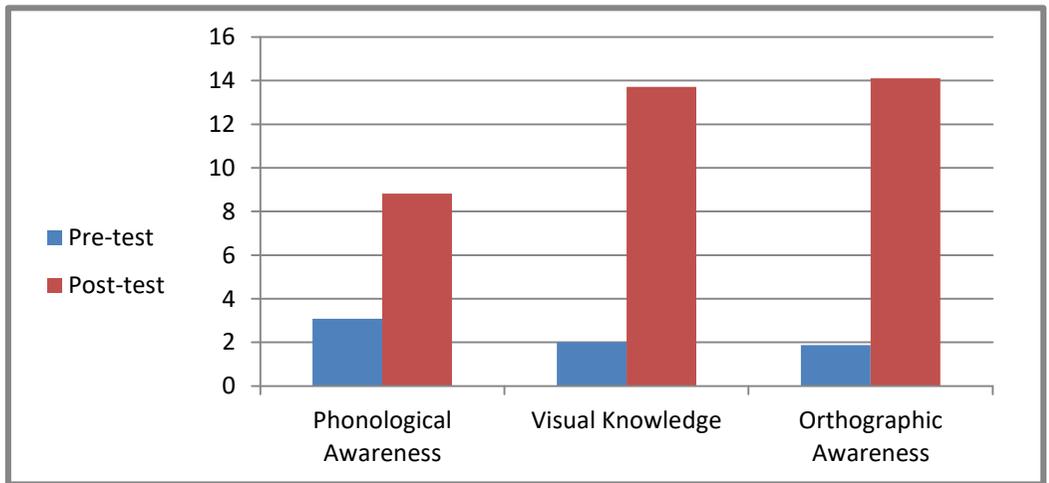


Figure 4.1.1.2 Comparison between Scores of the Participants on the Three Sub- skills of English Spelling Test (Pre- post administration)

The Effect Size of Digital Games on the Overall English Spelling

To measure the effect size "d" of digital games (independent variable) on English spelling skills (dependent variable) of the participants, Eta squared (η^2) was computed using the statistical formula of Al- Dardier (2006, p.77, translated) as followed:

$$\eta^2 = \frac{t^2}{t^2 + df}$$

Therefore, " η^2 " = 0.93

Table 4.1.3 below shows "t" value, DF, η^2 value, "d", and, the effect size.

Table 4.1.3

The Effect Size of Digital Games on the Overall English Spelling of the Participants

Independent Variable	Dependent Variable	T	DF	η^2	D	Effect Size
Digital Games	Overall English Spelling	22.76	34	0.93	7.29	Large

Data displayed in the above table showed that the independent variable (digital games) had a large effect (7.29) on the dependent variable (overall English spelling). In this regard, these findings provided an answer for the first question of the study.

4.1.4 The Effect Size of Digital Games on the Three English Spelling Sub-skills

Table 4.1.4 below presents “t” value, DF, “d” η^2 , and, the effect size.

Table 4.1.4

The Effect Size of Digital Games on the Three English Spelling Sub-skills of EST of the Participants

Independent Variable	Dependent Variable	T	DF	η^2	D	Effect Size
Digital Games	Phonological Awareness	16.82	34	0.89	5.77	Large
	Visual Knowledge	17.24		0.89	5.91	Large
	Orthographic Awareness	13.86		0.84	4.71	Large

Data represented in the above table revealed that the effect size of using digital games on phonological awareness, visual knowledge, and orthographic awareness were (5.77, 5.91, and 4.71, respectively). This finding indicated that the digital games had a large effect size on English spelling sub-skills, namely, the phonological awareness, visual knowledge and orthographic awareness. Meanwhile the effect size score in visual knowledge was (5.91) higher than the effect size score in orthographic awareness (4.71) and phonological awareness (5.77). These findings provided an answer for the second question of the study.

Findings of the Study

The following results were derived from data analysis:

- 5.1.5.1 Digital games had a large effect on the overall English spelling of the participants ($d=7.29$).
- 5.1.5.2 Digital games had a large effect on the three English spelling sub-skills; phonological awareness, visual knowledge, and orthographic awareness (d -values were 5.77, 5.91, and 4.71, respectively).
- 5.1.5.3 Statistically significant differences were found between the mean scores of the participants in the pre and posttest of English spelling skills, favoring the latter (t - value was 22.76). Based on this finding, the first hypothesis was confirmed.
- 5.1.5.4 Statistically significant differences were noticed between the mean scores of the participants in the pre and posttest of English spelling regarding phonological awareness, visual knowledge, and orthographic awareness, in favor of the post administration (t -values were 16.82, 17.24, and 13.86, respectively). Hence, the second hypothesis was accepted.

Conclusions

In light of the findings of the present study, the following conclusions could be drawn:

- 5.2.1 Digital games proved effectiveness in teaching and learning English spelling.
- 5.2.2 Digital games had a large effect on developing English spelling skills of the primary students.

- 5.2.3 Students could enjoy learning English spelling as digital games provided them with motivation and fun.
- 5.2.5 Digital games could be a good treatment for the poor spellers.
- 5.2.6 Digital games activities and surroundings (colorful pictures, attractive slides, soft music, and cartoon characters) encouraged the students to learn spelling skills easily.

5.3 Recommendations

Based on the findings and conclusions of the present study, several recommendations are offered:

- 5.3.1 It is recommended for teachers to take advantage of digital spelling games in English classes.
- 5.3.2 Technology should be more involved in the educational process.
- 5.3.3 Training courses should be presented to teachers on designing and using digital games in teaching and learning English spelling.
- 5.3.4 It is recommended to support teachers who look forward to integrating teaching through fun, especially with children.
- 5.3.5 Curriculum designers are recommended to pay much attention to spelling activities in EFL contexts.
- 5.3.6 More spelling digital games should be designed to improve students' spelling skills.
- 5.3.7 Teachers should take care of poor spellers.

Suggestions for Further Research

- 5.4.1 More research is suggested to determine the effect of digital games on other languages areas.
- 5.4.2 Replication of the present study perhaps with integrated children.
- 5.4.3 Further research is needed to implement mobile digital games in developing English spelling skills.
- 5.4.4 Conducting other studies to use offline digital games in developing other spelling skills.
- 5.4.5 A study can be undertaken to conduct digital games cooperatively.
- 5.4.6 More research can be conducted to investigate using digital games as evaluation tool.
- 5.4.7 Digital games can be a choice for emergency situations.
- 5.4.8 A follow up study is required to explore the students' perceptions towards learning spelling through digital games.
- 5.4.9 Investigating the effect of different types of online digital games in developing spelling skills.
- 5.4.10A study examining the relationship between digital games and gender is needed.
- 5.4.11A descriptive study investigating reasons behind the effectiveness of digital games on spelling.

References

- Abdul Shaffy, A. (2016). *A Suggested Program Based on Multiple Intelligences Theory for Visually Impaired Students in the Primary Stage and Its Effect on Developing Their Spelling* (Master's thesis). University of Ain Shams, Cairo, Egypt.
- Al Otaiba, S., & Hosp, J. (2010). Spell it out: The need for detailed spelling assessment to inform instruction. *Assessment for Effective Intervention*, 36 (1), 3-6.
- Alsharafat, W., Alrashdan, W., & Younes, M. (2017). The Effect of Using an Electronic Instructional Game in Improving English Language Vocabulary for Third Graders in Irbid City. *International Journal of Interactive Mobile Technologies*, 11(6), 123-135.
- Castillo-Cuesta, L. (2020). Using digital games for enhancing EFL grammar and vocabulary in higher education. *International Journal of Emerging Technologies in Learning*, 15(20), 116-129.
- Department for Education and Employment. (2001). *Key Stage 3 National Strategy Literacy Progress Unit Spelling*. London: Department for Education and Employment.
- Egenfeldt-Nielsen, S. (2006). Overview of research on the educational use of video games. *Nordic Journal of Digital Literacy*, 1(3), 184-214.
- El-Koumy, A. (2002). *Teaching and learning as a foreign language: A Comprehensive*

- Gee, J. (2003). *What video games have to teach us about learning and literacy*. USA: Palgrave Macmillan.
- Ghareeb, W. (1989). *The Effect of Using Instructional Activities on Developing Spelling English for Basic Education Pupils* (Master's thesis). Banha University, Banha, Egypt.
- Granic, I., Lobel, A., & Engels, R. (2014). The benefits of playing video games. *The American Psychologist*, 69(1), 66–78.
- Kottacheruvu, N. (2023). Enrichment of English Vocabulary through Digital Games: An Empirical Study. *JETT*, 14(3), 376-380.
- Lennox, C., & Siegel, L. (1994). The role of phonological and orthographic processes in learning to spell. *Handbook of spelling: Theory, process and intervention*, 93-109.
- Maroof, S. (2017). *The Effectiveness of Using Multimedia-Based Program in Developing EFL Primary Stage Pupils' Spelling Skills* (Master's thesis). Banha University, Banha, Egypt.
- Mitra, N., Nagaraja, H., Ponnudurai, G., & Judson, J. (2009). The levels of difficulty and discrimination indices in type a multiple choice questions of pre-clinical semester 1 multidisciplinary summative tests. *IeJSME*, 3(1), 2-7.
- Mouaheb, H., Fahli, A., Moussetad, M., & Eljamali, S. (2012). The serious game: what educational benefits?.

- Procedia-Social and Behavioral Sciences*, 46, 5502-5508.
- Mpiti, T. (2012). *The nature of spelling errors of grade three isiXhosa background students in English first additional language* (Unpublished master thesis), University of Fort Hare, South Africa.
- Pound, L. (2005). *How children learn*. London: Step Forward Publishing, Ltd.
- Rasti-Behbahani, A. (2021). Why digital games can be advantageous in vocabulary learning. *Theory and Practice in Language Studies*, 11(2).
- Santoro, L., Coyne, M., & Simmons, D. (2006). The reading–spelling connection: Developing and evaluating a beginning spelling intervention for children at risk of reading disability. *Learning Disabilities Research & Practice*, 21(2), 122-133.
- Staden, A. (2010). Improving the Spelling Ability of Grade 3 Learners through Visual Imaging Teaching Strategies. *A Journal for Language Learning, Per linguam*, 26(1), 13-28.
- Templeton, S., & Morris, D. (2001, October). Reconceptualizing spelling development and instruction. *Reading Online*, 5(3). Retrieved from http://www.readingonline.org/articles/art_index.asp?HREF=/articles/handbook/templeton/index.html.
- Winaldo, M., & Oktaviani, L. (2022). Influence of video games on the acquisition of the English

language. *Journal of English Language Teaching and Learning*, 3(2), 21-26.

- الدريد، عبد المنعم أحمد. (٢٠٠٦). الإحصاء البارامتري واللابارامتري في اختبار البحوث النفسية والتربوية والاجتماعية (الطبعة الاولى). القاهرة: عالم الكتب، ص ٧٧.
- السيد، فؤاد البهى. (١٩٧٨). علم النفس الإحصائي وقياس العقل البشري. القاهرة: دار الفكر العربي .
- الغامدى، رحاب جمعان عبدالله. (٢٠١٨). فعالية الألعاب التعليمية الإلكترونية فى تحسين التحصيل والتفكير الإبداعى فى مادة الحاسب الآلى لدى طالبات المرحلة المتوسطة، المجلة الدولية للآداب والعلوم الانسانية والاجتماعية ، ع ٥، ١٣٦ - ٢٠٠.
- الكنانى، ممدوح وجابر عيسى. (١٩٩٥). القياس و التقييم النفسى والتربوي. الكويت: مكتبة الفلاح للنشر والتوزيع.

(استخدام الألعاب الرقمية في تنمية مهارات التهجئة لدي تلاميذ المرحلة الابتدائية..). د. فردوس صابر