The Effects of Using Digital Game Based Learning in Primary Classes with Inclusive Education

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Abstract

This study investigates the effectiveness of digital games designed specifically for the formation of correct reading skills in the learning of the Latin alphabet by learners with special educational needs in primary school. Learners participating in the study (N = 36) were randomly selected from primary school with inclusive education. During an 8-week intervention for the training group in addition to school provided support were used digital game-based learning to teach correct reading the Latin alphabet, and the control group continued receiving only school-provided support. These activities were conducted under the supervision of their parents and teachers, both at school and at home. The results showed that the level of reading skills of learners in the training group, which used digital game, based learning to teach reading in Latin, developed significantly faster compared with the level of learners in the control group. In addition, in comparison with the results of training learners in the school curriculum before the study, during the digital game based learning intervention, it was found that their reading development was significantly faster. During the study, there was an increase in interest of learning learners in the training group, and there was observed no change in the motivation of learners in the control group. However, the increased interest of learners is mainly because parents allow them to extend the time of using digital devices for education. The results of the 8-week study showed that the exercise of letters, sounds, syllables, words with digital game based learning contributes to improving the learning skills of learners, especially those in need of special education. The results of research on the use of digital game based learning in order to respond the needs of learners with special educational needs can be used for further development of learners.

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1. Introduction

In Kazakhstan, there are 39 special kindergartens and 315 special groups, involving more than 15,000 preschool children, as well as 106 special schools and 1,219 special classes in general education schools, involving 25,000 learners with special educational needs. Currently, 17 rehabilitation centers, 133 psychological and pedagogical correction offices and 558 speech therapy school centers provide correction-pedagogical support to children with special educational needs (Kenesbayev et al., 2017).

Among the technologies being developed for use in education, a special place is occupied by digital technologies to support learners with special educational needs (**Tombak, Ateşkan, 2019**). Digital technologies, in particular, special training programs and mobile applications can become an auxiliary tool in all conditions of life (Salgarayeva et al., 2020). One of the important tools of the technology product that is used to increase learners' interest in learning when teaching the alphabet to primary school learners is digital game-based learning (Prensky, 2001; Gee, 2007). Digital game-based learning is used as a convenient, interactive advanced learning method for learners (Chu, Chang, 2014; Prensky 2003). In addition, digital games can be considered as an independent form of educational technology, these games aim to increase the interest of learners in learning by including in the content of training game elements such as idea, special rules, achievement of goals, privacy, control to achieve educational goals (Garris et al., 2002; Hwang et al., 2012; Hwang et al., 2013).

According to researchers and practitioners in the educational sector, this approach of learning involves solving individual problems (Hwang et al., 2014), forming and developing reading skills (Hwang et al., 2017, Yang et al., 2013) of learners with special educational needs.

Digital games have a special interest in teaching children through tasks that are presented and designed at a high level, in accordance with the age characteristics of learners. A meta-analysis of the impact of digital game-based learning (Wouters et al., 2013) showed that their effect is higher than simple instructions that are provided in terms of teaching. However, the analysis of Girard et al. (2012) indicated that more research, comparable to other forms of learning, is needed to better generalize about the effects of digital games. Additional research is also needed to determine the impact and effectiveness of digital games should be conducted specifically for a group of learners with special educational needs (Ke, Abras, 2013). Digital games can provide the formation of certain skills of learners with special educational needs through individual adaptive learning, which is not fully implemented during simultaneous training with all learners in an inclusive educational environment. It is worth taking into account the fact that children with special educational needs have a problem of inhibition of motivation (Chapman et al., 2000; Morgan, Fuchs, 2007; Mol, Bus, 2011), which is another reason for using digital games to effectively increase their interest in receiving new knowledge (Ke, Abras, 2013; Rosas et al., 2003). The game has a special place in building reading skills for students with special educational needs (Van de Ven et al., 2017; Van Gorp et al., 2016).

Since digital games in mobile devices are very popular among children aged 6-8 years, researchers believe that the process of developing and planning the further distribution of educational digital games is an important objective.

Although digital games on mobile devices are very popular among children aged 6-8 years (Fromme, 2013), researchers believe that developing digital games for educational purposes and developing their distribution requires careful planning. Learning strategies need to be effectively integrated into game content, otherwise the impact of digital game-based learning can have a negative impact on learning and motivating learners.

In our study, we consider the issue of training with the digital game-based learning for the teaching of children with special needs, which is still insufficiently studied. This study was aimed at raising the level of knowledge about the effectiveness of digital games designed to prevent and eliminate speech impairment in students with general underdevelopment of speech, especially to support children with special educational impairments.

To develop the design and content of educational digital games, a consultation was held with narrow specialists, such as a Speech therapist, Psychologist, and Children's doctors. These

specialists shared their many years of experience working with children with impaired language, reading and speech from an early age. Digital games designed to teach the Latin alphabet not only teach children the printed and written forms of the alphabet, but also help to restore the overall development of colloquial speech of students. Performing tasks set in digital games, students learn to pronounce individual sounds correctly, master the phonetic structure of words.In this study, we determined the effectiveness of games in education and assessed the degree of involvement of students with special needs in the educational process.

2. Discussion

Today, the presence of developmental delay in learners with special educational needs in reading and speaking is one of the most common problems in learning (Chapman et al., 2000; Morgan, Fuchs, 2007; Mol, Bus, 2011). Reading instruction depends on the language we are learning. Therefore, there is a definite connection between teaching, learning, and overcoming difficulties encountered in the learning process.

Children with general speech underdevelopment are students aged 4-8 years with speech defects, but with normal hearing and intelligence. Speech disorders are diverse, they can be manifested in a violation of pronunciation, grammatical structure of speech, poverty of the vocabulary, as well as in violation of the pace and smoothness of speech (Vakulenko, 2018).

It is noted that many primary school learners who had problems with spoken language at the stage of preschool childhood, despite overcoming them in the process of correctional work, experienced certain difficulties in mastering writing and reading (Grushevskaya, 1989; Kornev, 1997).

In this regard, increasing a number of studies in the sector of digital technologies in the educational process of preschool and elementary grades. The analyze of literature on the research topic, the impact of digital learning games on the learner's reading skills was examined in detail. For instance, Li and Tsai (2013) found that these games are **designed to develop a learner's reading** skills. Cheng et al. (2015) indicated that researchers focused on the role of digital game-based applications for learning in improving the formation of student's learning skills.

The level of reading skills in primary school students is observed in the first month of the educational process (Eklund et al., 2015). One of the most common problems is the difficulties in reading comprehension (Juel et al., 1986), which in the future leads to low academic achievements of the child, when choosing a career that does not require an extended education (Savolainen et al., 2008).

Children with poor reading and speaking skills also face a number of difficulties in memorizing, pronouncing, dividing words into syllables and reading them again (Ramus et al., 2003; Lyytinen et al., 2008). Children with special educational needs also have problems with attention (Willcutt, Pennington, 2000) and language impairment (Pennington, Bishop, 2009), **which in turn suppress the child's** emotional reaction and motivation to learn (Chapman et al., 2000). **Children with general speech underdevelopment are characterized by «motivational»** intellectual passivity, due to insufficient personal readiness for schooling (Troshin et al., 2005, Spirova et al., 1985).

Researchers emphasize that prevention of these complications should be carried out from an early age (Torgesen, 2004). In solving this problem, it is becoming increasingly important to use educational technologies designed specifically for children with special needs.

In addition, conducted an analysis of scientific research articles that provide empirical information (Young et al., 2012). Analysis shows that digital games are often used to support learners' knowledge and improve their cognitive abilities. Hwang and Chen (2017) put into practice the use of game elements in the learning process and considered them as the main factor in increasing the learning skills of students to determine their effectiveness. Developed a method of game approach to study the effectiveness of this learning mechanism. The results of the study showed that the use of additional digital games for the formation of educational skills taught is useful to compare with the implementation of traditional training.

Cheng et al. (2015) examined the effect of design and ease of use of digital games for educational purposes on the formation of students' reading skills. The results of the study showed that researchers focused on the role of educational applications based on digital games in improving the formation of children's learning skills. Qian and Clark (2016) showed that the use of

digital games in learning has led to increased student interest in learning. Young (Young et al., 2012) believe that a lot of research is needed to determine whether digital game-based learning is a viable method of learning. Thus, there is no doubt that the work to increase the attractiveness and popularity of digital games created for educational purposes still needs to be continued.

3. Materials and methods

In the course of the study were used, methods of analysis and synthesis, deduction and induction. As well as compare the level of the experimental groups was used the method of comparative analysis. Conducted a number of studies and meta-analyses about the impact of educational technologies on learning (Cheung, Slavin, 2013). However, less is known of the specific effects of digital games adapted for children with special educational needs.The main advantage of digital game-based learning is that the content of the training will be adapted to the individual characteristics of the child. Adaptation plays an important role in creating a game, with taking into account the individual characteristics of the player and focusing on the level of complexity (Ke, Abras, 2013). In addition, to automate the acquisition of initial training skills, you need to repeat the same task several times. Digital game-based learning can provide multiple repetitions of exercises, keeping each child's interest in accordance with their needs.

For instance, M. Ronimus et al. (2019) reviewed the impact of the game GraphoLearn on second grade students with difficulty learning the correct reading skills. In this study, which lasted 6 weeks, participated 37 students. This game is aimed at improving the child's reading skills by repeatedly completing tasks, such as determining whether letters match, composing words, and combining sounds. According to the results of the study, observed in students development of learning skills.

Although some studies have shown that game elements increase the interest of players and positively influence the learning process, experimental results in some studies deny this (Abdul Jabbar et al., 2015; Kim et al., 2017; Ronimus et al., 2014). This is due to shortcomings in the game design, due to the distraction of students' attention to the features of game entertainment (Zheng, Spires, 2014) or the complexity of the training content (Kim et al., 2017). To focus students only on learning, in our case, on the study of letters, sounds, syllables and words, it is necessary to carefully consider the design of the game. Games, being attractive, should not bother the player in mastering the content (Wrzesien, Raya, 2010). Another important condition for the productive existence of a digital game-based learning is that in order to encourage the child to correctly perform educational tasks, it is necessary to add a reward element to the structure of the game (Abdul Jabbar, 2015).

4. Results
4.1. Game description

The digital game "Qazaqsha logoped" used in the study is aimed at developing students' reading skills, such as word reading, spelling, reading fluency and reading comprehension. In development stages of **the game, we were guided by the concept of "learning reading" by** Svetlovskaya (2001), where 5 methods are used in the formation of educational skills: 1) letter-by-letter; 2) abrupt syllable; 3) smooth syllable; 4) smooth syllable with a holistic reading of individual words; 5) reading in whole words and groups of words.

According to this concept, the tasks given in the game consist of several stages.At the first stage, the student is given articulation exercises for individual groups of sounds.At the second stage were proposed tasks for abrupt syllable reading, at the third stage — tasks for training smooth syllable reading, at the fourth stage — tasks for reading sounds with difficult pronunciations aloud, at the fifth stage — songs and tongue twisters for practicing these sounds (Figure 1).
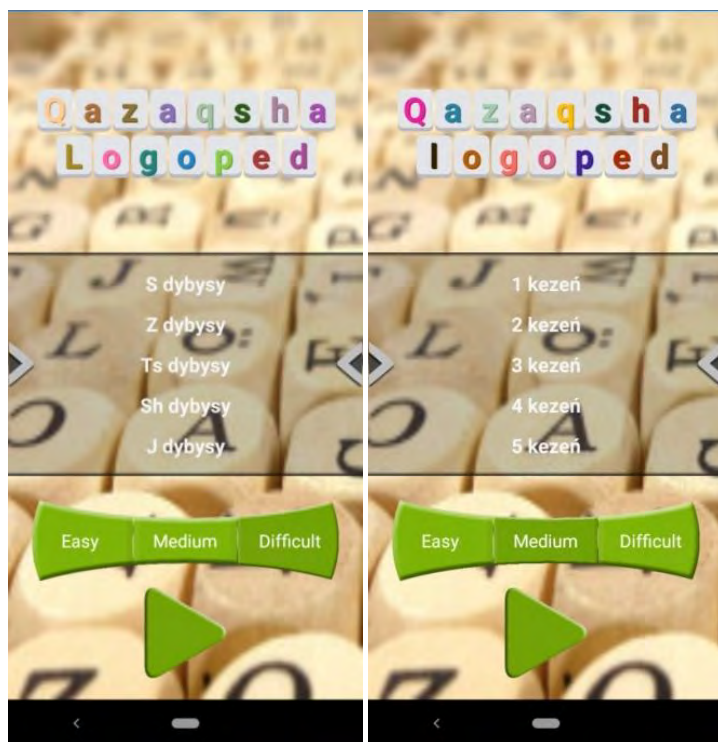
Fig. 1. Digital Game Qazaqsha Logoped

1) Spell reading. At the first stage of the "Qazaqsha logoped" digital game, a student performs letter recognition exercises. During the game, the letter sounds, and the letter corresponding to its pronunciation is selected from four possible answers.

2) Syllable reading. In the second phase of the "Qazaqsha logoped" digital game, a student learns to read open and closed syllables.

3) Smooth syllabic reading. At the third stage of the "Qazaqsha logoped" digital game, the student learns to smoothly combine syllables of these words. During the task, learner practices reading syllables together, starting with stretching the first consonant, adding the next consonant and continuing, gradually reducing the pronunciation of the consonant. The syllable table was used to represent the words in the tasks for joint reading of syllables. These exercises help students with general speech underdevelopment overcome the difficulties of joint integration. In particular, from the number of familiar syllables are formed the skills of reading joint syllables.

4) Reading aloud by connecting syllables. In the fourth stage of the digital game, "Qazaqsha logoped" combines syllables with difficult sounds and reads it aloud. Correct syllabic reading of words is pre-voiced. The learner listens to the correct reading for self-control and repeats.

5) Reading full words and groups of words. At the fifth stage of the digital game "Qazaqsha logoped", were distributed tongue twisters and poems dedicated to the formation of the student's reading skills.

The tasks were organized according to the method proposed by Krasilnikova (2003). In the task, syllables or letters of some words of the poem are missing; the student finds this syllable or letter and fills the words. Full tongue twisters and poems are pre-voiced. The student listens to the correct reading, then repeats and rehearses for a self-test.

The user interface of the game is very simple and all instructions sounded, so student does not need to have any reading skills when using the game. The difficulty level of the game is adjusted according to the level of the student's game. The game begins with the acquisition of letters and sounds, and since then the game is complicated in accordance with the educational achievement of the learner. This game is effective for children with difficulty in learning skills, such as exercises presented in the game, offer exercises, such as correctional tasks.

The knowledge of students in the training group was tested before and after using digital games in the educational process. In the course of the study, the influence of the game "Qazaqsha

logoped" on improving the learning speed of students was taken under control. As a result, it was noticed that the students developed skills in recognizing letters, correct pronunciation, reading syllables, and reading words independently. The use of digital game-based learning showed that students have acquired some skills (writing, drawing) that are not included in the game. Digital game-based learning have shown that they as forming learning skills, including letter-sound communication, lead to positive changes in the learning process.

4.2. Experimental design

To study the pedagogical advantages of using digital game-based learning for educational purposes and determine the effectiveness of motivation to learning the field of education, an experiment was conducted in elementary school students with inclusive education.

A. Participants

The experiment involved three large districts such as Almaly (9 schools), Zhetysu (12 schools), Medeu (7 schools) of Almaty city that provide inclusive education. The participants were selected from the primary school group according to the study plan. They are difficult to recognize and read the letter, need special support, and need to overcome their difficulties. After the written consent of parents, the first screening test was received from children of primary school.

The test was used to determine the level of literacy of students and their level of development. At the average level, it was found that children only know 10-15 letters (there are N = 32 letters in the alphabet based on Latin graphics). Thus, N = 36 children from 28 schools (21 boys, 15 girls) took part in the experiment. The number of children in the training group was 18 (7 girls, 38.89 %) and in the control group 18 (8 girls, 44.44 %). All children were native speakers of Kazakh. The mean age of the participants at the beginning of the second grade was 8.17 years (SD = 0.38).

The results of a survey of parents showed that before for children with special educational needs were held corrective training classes by necessity. It was also confirmed that all students have difficulties in learning and speaking.

B. Research tools

The main goal of our short 8-week study was to determine the impact of using digital games on the development of reading skills for students with special educational needs.

We divided students into 2 groups as a control and training group to evaluate the effectiveness of the proposed games. We were interested in the results of the training group.

In particular, according to the results of the experiment, we had to answer the following question: How much does the use of digital game-based learning affect the development of reading and spelling skills of students with special educational needs?

C. Experimental procedure

The procedure of the study is represented in Figure 2. Each school was randomly assigned either to the GL intervention or control group. We asked teachers to help divide the children into groups. The number of children participating in the study was 18 in the training group (11 boys, 7 girls, 14 schools) and 18 (10 boys, 8 girls, 14 schools) in the control group. The groups did not differ from each other in gender distribution $\chi^2(1, N = 36) = 0.11, p = .74 > .05$.

The 8-week intervention took place at school (6 children), at home (5 children), or at both places (7 children), depending on the preferences of the teachers and parents. Among the students, there were also children who did not have the skills to use a digital game-based learning (3 children). However, this did not cause significant difficulties for students, since the user interface of the digital game is designed so that students can easily use the game.

The selection process of the participants and procedure are:
1. Permission from educational organizations to conduct research;
2. Information letters sent to the schools in the area;
3. Volunteering teachers contact the researchers;
4. Parental consent forms and background questionnaires;
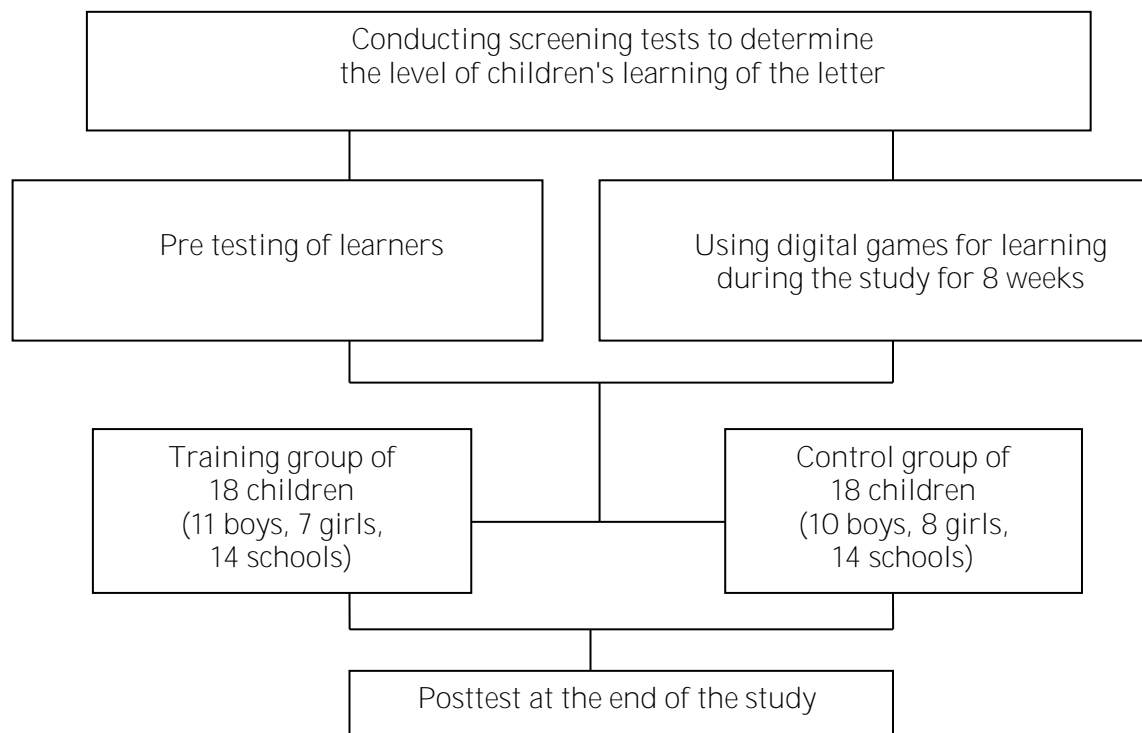5. The consent forms and questionnaires filled in and sent by parents.

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┌─────────────────────────────────────────────────────┐
│         Conducting screening tests to determine       │
│      the level of children's learning of the letter   │
└─────────────────────────────────────────────────────┘

┌──────────────────────────┐    ┌──────────────────────────┐
│   Pre testing of learners │    │ Using digital games for   │
│                           │    │ learning                  │
│                           │    │ during the study for 8    │
│                           │    │ weeks                     │
└──────────────────────────┘    └──────────────────────────┘

┌──────────────────────────┐    ┌──────────────────────────┐
│     Training group of     │    │     Control group of      │
│       18 children         │    │       18 children         │
│     (11 boys, 7 girls,    │    │    (10 boys, 8 girls,     │
│        14 schools)        │    │       14 schools)         │
└──────────────────────────┘    └──────────────────────────┘

          ┌─────────────────────────────────────┐
          │     Posttest at the end of the study │
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Fig. 2. Procedure of the study

The parents and teachers of the training group were sent instructions by email for installing and using digital game "Qazaqsha logoped". Technical help was also provided via email or phone, social network, when needed. Control over the time of use of the game was transferred to parents and teachers. In accordance with the age characteristics of children in the preparatory group, it is recommended no more than 1 hour per week, that is, 8-10 minutes per day. Short sessions were recommended because of the high amount of repetition in the game, which could lead to boredom if continued for too long. Teachers were encouraged to use the games as a complement to the traditional lesson, and not completely replace it with the digital game "Qazaqsha logoped".

Measures

The study assesses four groups of reading skills of students: word reading, spelling, reading fluency, reading comprehension. The screening was conducted in May 2019 (final month of first grade). The pretest was conducted in early September 2020 and the posttest in December 2020.

Word reading

Tasks for assessing reading skills among students were developed in accordance with the **instructional and methodical letter "About the peculiarities of the organization of the educational** process in secondary education organizations of the Republi**c of Kazakhstan" (2019).**

Students complete the assignment on a separate sheet. The assignments were translated into Latin. Students are given 45 words to evaluate recognition of words that contain letters that are difficult to pronounce. The student reads the proposed words aloud for 1 minute. Each correctly read word is assigned 1 point. The maximum score is 45. **Cronbach's alpha** reliabilities for this task were .80, .81 and .82 at the pre-, post and follow-up tests, respectively.

Spelling

Students were asked to write the names of the pictures in order to assess their ability to write correctly. In accordance with the assignment, students write an image dictation. Students write the names of 15 figures on a sheet in the appropriate place on the sheet.

If the name of the picture is spelled correctly, 2 points are given, if there are minor errors, 1 point if the answer is incorrect, and 0 points. The maximum number of points scored is 30. **Cronbach's alpha reliability of this task were .**83, .84and .85 at the pre-, post and follow-up tests, respectively.

Reading fluency

On the instructions of students to determine educational skills, students are given 50 obviously true (for example, "round ball") or obviously false (for example, "strawberry blue") statements. For each opinion, the student chooses one of the answers "Yes" or "No". The task takes 2 minutes to complete. The correct answer is 1 point, if the answer is not chosen or the answer is incorrect, then 0 points. Maximum 50 points. Cronbach's alpha reliability of this task were .84, .85 and .87 at the pre-, post and follow-up tests, respectively.

Reading comprehension

Students receive four texts to complete reading comprehension tasks. After each text, given five questions with three possible answers. Students read the text and choose one of the suggested answers. If the answer is correct, 1 point is given, if not – 0 points. The maximum score is 20. Cronbach's alpha reliability of this task were .80, .82and .83 at the pre-, post and follow-up tests, respectively.

A. Data analysis

The main goal of this study was to evaluate the effectiveness of improving children's reading skills using digital game-based learning to learn Latin alphabet.

During the study of learning Latin alphabet, to evaluate indicators of the development of recognition skills, syllables and combined learning, letter recognition, reading fluency and reading comprehension was used point system.

The results of an 8-week experiment gave an answer to the question of whether the use of digital game-based learning improved reading skills in students.

The Shapiro-Wilks test was used as normality test. The assumption of normality for pretest and post-test score in skills of word reading, spelling, reading fluency and reading comprehension is significant, $p > .05$ and normal distribution was observed in both groups.

Pre-assessment of participants' skills in reading and spelling skills

No differences were found between the two groups in initial reading and spelling skills before the intervention ($\alpha = 0.05$). One-way ANOVA was used to evaluate learners' assignment submitted for checking learners' homogeneity in the pre-test. All participants were homogeneous and had equivalent abilities in skills of word reading, spelling, reading fluency and reading comprehension skills before being exposed to the experiment (see Table 1).

Table 1. ANOVA

		Sum of Squares	Df	Mean Square	F	Sig.
Word reading	Between Groups	4,000	1	4,000	1,248	,272
	Within Groups	109,000	34	3,206		
	Total	113,000	35			
Spelling	Between Groups	4,000	1	4,000	,958	,335
	Within Groups	142,000	34	4,176		
	Total	146,000	35			
Reading fluency	Between Groups	,444	1	,444	,118	,733
	Within Groups	128,111	34	3,768		
	Total	128,556	35			
Reading_comprehension	Between Groups	,694	1	,694	,312	,580
	Within Groups	75,611	34	2,224		
	Total	76,306	35			

Post-assessment of participants' skills in reading and spelling skills

To show participant learners' performance in both groups regarding the skills of word reading spelling, reading fluency and reading comprehension mixed design ANOVA was used for all domains. The results showed that in the mixed design ANOVA for the word reading, the main effect of time and time×group interaction were significant, $F(1,34) = 71.944,\ p < 0.001, \eta^2 = 0.679$ and $F(1,34) = 6.664, p < 0.014, \eta^2 = 0.164$ respectively. Paired samples t test separately by group, $t(17) = -9.220, p < 0.001$ and $t(17) = 3.688, p = 0.002 < 0.05$ for the training and the control group, respectively showed that in both groups, the mean level of the word reading level increased during the intervention period. An independent samples t test showed that the training group developed faster than the control group $t(34) = 2.581, p = 0.014 < 0.05$).

Then, to see if the progress in trained word reading had a transfer effect to children's' performance regarding the skills of spelling, reading fluency and reading comprehension skills mixed design ANOVA was used for all domains. In the mixed design ANOVA for spelling the main effect of time was significant, $F(1,34) = 19.814, p < 0.001, \eta^2 = 0.368$. But the time × group interaction was not, $F(1,34) = 1.055, p = 0.312, \eta^2 = 0.030$. Then we had exactly the same results in the mixed design ANOVA for reading fluency and reading comprehension skills. The main effects of time for reading fluency and reading comprehension skills were significant, $F(1,34) = 30.516, p < 0.001, \eta^2 = 0.473$ and $F(1,34) = 34.425, p < 0.001, \eta^2 = 0.503$ respectively, whereas the time group interactions were not, $F(1,34) = 0.105, p = 0.747, \eta^2 = 0.003$ and $F(1,34) = 0.425,\ p = 0.519, \eta^2 = 0.012$ respectively. Both the training and control groups improved their performance in spelling, reading fluency and reading comprehension skills, but there were no differences in the rate of improvement between the groups.

The Kruskal-Wallis test was used to rule out the potential confounding effect of the training place on the learning outcomes in training group (at home, at school, or at both places) in post-test. The test found no significant differences in the four scores between these three groups trained at different places: word reading (H = 3.011, df = 2, p = .222), spelling (H = 0.753, df = 2, p = .686), reading fluency (H = 0.324, df = 2, p = .851), and reading comprehension (H = 4.924, df = 2, p = .085).

In conclusion, the goal of the current study was to examine the effectiveness of digital game-based learning in teaching the Latin alphabet to children with special educational needs. The results of an 8-week study conducted with the help of teachers and parents showed that it had a significant positive effect on students' reading skills. These results complement previous studies (Van de Ven et al., 2017; Van Gory et al., 2016). At the same time, the research work expands the scope of previous research, demonstrating the effectiveness of the use of digital games by students with special educational needs.

During the control period, the positive effect on reading fluency and reading comprehension was slow. To speed it up, we can say that the use of digital game-based learning for a long time gives positive results. This will be considered in our future research. Full, effective use of the time allocated for the game, in turn, contributes to improving the educational skills of students with special educational needs. Digital games are effective in developing the skills of word reading, spelling, reading fluency and reading comprehension. In general, the results of the study are consistent with the results of previous studies (Fredricks et al., 2004; Guthrie et al., 2012). Similar studies, exactly studies on digital game-based learning, have also produced comparable results to our result (Zheng, Spires, 2014; Ronimus et al., 2019).

5. Conclusion

The results of the research work are very effective in providing support to students with special educational needs, using digital games in the formation and development of educational skills. This result shows that the use of digital game-based learning as a new teaching method for traditional teaching methods offered by the school has a positive effect on the development of students' reading skills. The effectiveness of digital games in accordance with the goals of the game is measured by improving literacy skills with reading words letter-by-letter; abrupt syllable, smooth syllable, smooth syllable with a holistic reading of individual, reading in whole words and groups of words. The results of the study indicate the importance of using additional training methods, along with traditional methods of developing other skills. We hope that the results

obtained in this study will help teachers evaluate the effectiveness of digital game-based learning to children with special educational needs and developing their reading skills.

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