

Original Article

The Effectiveness of Using Multimedia in Smart Classes on Improving Reading Disorders, Word Chain, and Word Comprehension in Late Learning Students

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Abstract

The present research scrutinized the effectiveness of using technology and multimedia in smart classrooms on improving reading disorders, word chain, and word comprehension in late learning students. For this purpose, 34 male students with reading disorders (dyslexia) were selected as a sample based on the Wechsler IQ test, and Koromi Nouri and Moradi's dyslexia test. The participants were selected from primary schools in Marand city in the academic year 2019-2020. This study is quasi-experimental research with pretest and posttest. The experimental and control groups included 17 participants, which were randomly assigned to each group. Both groups were evaluated by a diagnostic reading test as a pretest. The experimental group was taught in smart classes for 12 sessions for a year and each session was 90 minutes, yet the control attended in normal classes without using any technology and multimedia. At the end of the year, both groups were re-evaluated using the posttest. The data were analyzed by ANOVA test. The results showed that teaching based on multimedia in smart classrooms improved reading disorders, word chain, and word comprehension in retarded children. The findings can be of great importance for teachers and parents.

Keywords: Late Learning Students, Reading Disorders, Smart Classes, Word chain, Word Comprehension

1. Introduction

Among all learning disorders, reading disorders have a more clinical and experimental history (Tabrizi, 2019). This group has the highest number of children with learning disabilities. Reading is a skill that children encounter from the beginning of primary school. That is why reading disorders appear in children from that time. Undoubtedly, the ability to read is one of the most complexes and at the same time the most essential human abilities and it forms the basis of acquiring knowledge. Reading is one of the cognitive abilities and includes decoding, recognizing, and understanding word chain, and word comprehension. Paying attention to different aspects of reading, especially at the age of growth and early years of learning, is inevitable and should be considered by experts, especially in educational centers (Tabrizi, 2019). Students with special learning disabilities are one of the groups with special needs who need special education and related services (Hallahan, Kaufman & Pollen, 2015). Students with special learning disorders or learning disabilities are divided into three subgroups: reading disorders, writing disorders, and arithmetic disorders (Tannock, 2016).

In the present age, which is called the information age, information is mostly exchanged in a form of writing; therefore, reading skills are one of the most important learning needs in society today. As it can be understood from the principles and frameworks of reading literacy, the ability to read focuses on the word chain and word comprehension, in that the reader extracts and shapes meaning by interacting and accounting a written language simultaneously (Snowling, Hulme & Mercer, 2002). The ultimate goal of reading is to comprehend what has been read. Yet, the basis and the main principle of reading comprehension is having efficacy in reading a word. To understand a text properly, at first, the words in a text must be decoded and recognized quickly (Snowling, 2012). Reading skill is one of the most important ways to acquire information. Every person in a society has to read many written texts, so in most societies, literacy is a key to educational success. Students with poor reading skills are considered as a very sensitive group in learning different subjects during their education (Maughan, 2016).

Reading, word chain, and word comprehension can be regarded as fundamental and useful means to make students interested in reading. If the learner cannot read and understand a text, he or she will not enjoy it and will not be able to answer and solve problems. Literacy means focusing on verbal fluency and receiving the meanings of words,

phrases, sentences, receiving knowledge and recognizing what is hidden in the text, and finally getting the message that the author tries to state using verbal signs and symbols. Reading, word chain, and word comprehension are among the most important learning needs of learners. Unless the learner understands the material, he will neither be interested nor progress in it. This can only be done by providing solutions that are out of classroom traditions and it can be carried out by combining reading with playing. The reading syllabus and the teaching of reading fluency have two main purposes: at first, they help students to understand the content of a lesson; and then they develop their ability to become self-regulators in using fluid verbal strategies.

Reading disorders are the most common group of learning disorders including 80 to 85% of children with learning disabilities (Ashuri&Abkenar, 2016). The ability to read, word chain, and word comprehension are key skills for academic success. However, many students are not equipped with the basic skills to read and recognize important points in the text. These students lack their ability to read, have verbal fluency, and recall information presented in the text (Williams, Etkinnes, Mc Farland& Wechsler, 2016). Students with reading disorders have major problems in word recognition, spelling, handwriting, reading comprehension, word comprehension, and reading ability (Petrto&Masala, 2017).

Furthermore, in most cases, the origin of the disorder in other subjects goes back to dyslexia. Although reading performance requires extensive skills to decode, understand, and learn from the text, its ultimate goal is verbal fluency (Williams et al., 2016). Reading performance is related to reading disorders, and children with poor reading performance have deficiencies in visual perception, spatial visualization, coding, extraction of various phonemes, and meaningful units. Even such shortcomings are associated with certain behavioral problems (Tannock, 2016). Sometimes, children's educational and behavioral problems affect the mental health of family members, especially the mother (Hamidi&MohammadiKhorasani, 2017). Reading has two main components called decoding and verbal fluency. Decoding refers to the conversion of written letters into spoken language, word chain, and word comprehension refer to the understanding of meanings or an aspect of higher reading (Petretto& Masala, 2017). Verbal fluency is the naming images, category signs, and letter signs and understanding the meaning of words and sentences before, during, or after reading. In other words, it is a process of extracting the meaning, purpose, or main message of the text (Bulut, 2017).

In the present study, the researcher is a teacher for slow learning students. She observed that late learning students have more difficulties in reading, understanding the meaning, reading comprehension, and they face problems in reading and verbal reading fluency. She tried different solutions and methods to tackle this problem, improve this situation, and solve their difficulties. Thus, based on the above-mentioned points the major problem of this study is the lack of a proper syllabus and methodology to provide late learning students with adequate and interesting instruction. This study gains significance as the findings can help the administrators and teachers dealing with students with certain disabilities and low IQ to instruct them with qualified methods similar to normal children and arrange for the most suitable learning environment. Here, the use of technology can be of great importance; accordingly, the current study aims to fill the gap in the related literature by examining the effectiveness of technology in improving late learning students' reading disabilities. To this end, Koromi Nouri and Moradi's Reading Test and Weschsler's IQ test are administered. However, to the best of the researcher's knowledge, no research has been done on the relationship between the use of smart classrooms on improving reading disorders, word chain, and word comprehension in late learning students.

2. Literature Review

Virtual learning environments are commonly used in educational settings. Today, technology is such that teaching and learning are constantly evolving. Computer and network facilities have been considered as one of the most important educational facilities (ZareiZavaraki, 2008). It is no longer possible to help people have big changes in their lives by resorting to and employing traditional methods. Nowadays, school activities and education constitute a large part of human life (Shabani, 2019). One of the means of using information technology in smart classrooms is computer training, which is an attractive educational tool, accompanied by entertainment, and can be used to teach various topics such as motor skills, education, and improving creativity (Raisi, 2017). Since utilizing computers in smart classrooms and new teaching methods are very attractive for children, such classes need to be designed according to the needs of children with learning disabilities, especially reading disorders. Therefore, recognizing various educational technologies and using them in smart classrooms as an educational tool to improve reading disorders in late learning students seems necessary and can be employed by educational

policymakers, educational planners, medical centers and educational clinics, families, and Instructors help to develop appropriate strategies in education to improve learning disabilities, especially reading disorders and students' verbal fluency. Additionally, the use of information technology and computer reduce the need for the presence of a teacher and make the education by parents to be interesting at home for children since the effect of continued education and practice is greater than the education provided by a teacher or a therapist in medical centers (Raisi, 2017).

Of course, many related empirical studies have been carried out in this case. In reviewing the backgrounds, one can find cases that indicate the effectiveness of this method on children's reading, word chain, and disorders. For example, ZareiZavaraki(2008) concluded that information technology can make learning more interesting, appropriate, and correct. EsmaeeliGojarand Rajabian(2019) concluded that educational technology can improve education learning and regulate mind awareness in children. Kakabraei and Amiri (2019) in a study considered the effect of Davis's educational method in improving the reading performance of dyslexic children and confirmed it. Rezaei and Kermanizadeh (2015) have concluded that the use of modern and advanced educational methods is a useful and effective method that its application leads to an increase in the verbal fluency of dyslexic female children and improves their reading skills. Estes (1974, as cited in Karami Nouri et al., 2008) suggested that tests of the frequency of words (with semantic or phonetic cues) provide the best means to understand how children organize their thinking.

2.1. Learning and Reading Disorders

Providing a proper educational system for students with learning disabilities has been and continues to be a center of attention in educational modification. Kemp, Segal, and Cutter (2009) stated that children who have learning disabilities must gain support since they are not able to apply effort, pay great attention, or expand enthusiasm for school. However, their learning disability, or learning disorder, is not a problematic point connected to intelligence. Kemp et al. (2009) added that learning disorders appear to be triggered by a transformation in the brain that disturbs how information is received, processed, or transferred. Children and even adults with learning disabilities have suffered in handling sensory information since they see, hear, and understand things inversely.

One of the reading disorders is dyslexia. According to Snowling and Hulme (2012), Dyslexia is primarily allied with language difficulties such as reading, writing, and spelling through people with dyslexia might also have trouble with vision, memory, and/or orientation. They mentioned that dyslexic children have trouble learning to read correctly and with satisfactory speed. The literature described that the dyslexics can compensate for reading complications and can be high-functioning students with dyslexia; based on the documents collected from samples of postsecondary or adult samples, the reading comprehension scores attained by the compensated readers were reported as compared to those achieved by the same age peers (Birch & Chase, 2004; Deacon, Parrila & Kirby, 2006). This evidence showed that numerous individuals with dyslexia can and do achieve reading comprehension and academic achievement outcomes that are similar to their peers once the suitable intervention response is exploited (Corkett, Parrila, & Hein, 2006; Deacon, et al. 2006).

2.2. The Role of Technology in Reading Improvement

The use of technological tools in learning contexts such as computers, animations, the internet, and projectors can create an interesting environment for the learners and motivate them. This can ultimately lead to improved learning performance and academic achievement, especially for students with certain learning disabilities. McEneaney (2003) asserted that there are numerous noteworthy profits of technologies. Initially, they provide a foundation for quicker integration of the content and the process than print tools and media. Second, Web-based resources can direct the learning process via direct management of the reading situation founded either on prearranged agendas and strategies or because of data collection. Third, Web content can be manipulated by using script-based linking and the means of delivery. Bierwisch (1983) stated that using the computer to assist reading is an operative approach to help learners read better for the reason that reading on a computer is a real-time language activity including all kinds of available linguistic information.

Yet, as far as the researcher knows, no research has been done on the effect of smart classrooms on improving reading disorders, word chain, and word comprehension in late learning students. Thus, to fill this gap, the present study aims to examine the role of

technology and smart classes in developing male late learning students' reading ability and reading comprehension. This study tries to answer the following questions:

1. Does teaching in smart classes affect the improvement of word comprehension disorders?
2. Does teaching in smart classes affect the improvement of word reading disorders?
3. Does teaching in smart classes affect the improvement of word chain disorders?

3. Methodology

In this section, we discuss the design of the study, characteristics of the participants, data collection instruments, and the conducted procedures. The reliability and validity of the instruments are presented in the related sections.

3.1. Design and Context of the Study

The method of the present study was a quasi-experimental pretest-posttest with a control group. The data was collected at primary schools in Marand city in the academic year 2019-2020.

3.2. Participants

The statistical population included all primary school children with reading disorders in Marand city in the academic year 2019-2020 who had an IQ of 70-85 and received training and medical services in centers for learning disabilities. The statistical sample was selected based on the minimum number of children required for experimental designs of 34 children who were selected by the purposive sampling method. Thus, among all the children who were introduced to the Learning Disabilities Centers of Marand city and had an IQ of 70-85 according to the Wechsler test were ready to receive services, all of them were Azerbaijani-Persian Turkish bilinguals. (The mother tongue of all participants and the language they speak at home is Azerbaijani Turkish and they study in Persian at school). Among all of them, 34 children were purposefully selected and randomly divided into two groups of experimental and control groups including 17 students in each group. All students selected for the control and experimental groups were male and they were selected from the second and third grades (8 students, 23.5%), and the fourth and fifth grades (9 students, 26.5%). Inclusion criteria include having learning disabilities and IQ of 70-85, elementary

school education, consent of the child and parents to attend educational interventions and exclusion criteria include hearing and vision problems, simultaneous use of similar psychological or educational programs with the present study and the absence of more than two sessions in training sessions.

Table 1

Participants of the Study

Number	34
Gender	Male
Academic Year	2019
Native Language	Azerbaijani Turkish

3.3. Instruments

The following section discusses the instruments of the present study.

Table 2

Instruments of the Study

Item	Number of Questions
Koroma Nouri and Moradi Reading and Dyslexia Reading Test	10
Wechsler Test	100

3.3.1. Koromi Nouri and Moradi Reading and Dyslexia Reading Test

One of the tools used in this research is the standard reading and dyslexia test (Nema) which has been made by Koromi Nouri and Moradi (2017). This test includes 10 subtests to measure the different dimensions of reading for students in grades one through five. The reliability of this test by calculating Cronbach's alpha 0.8 and using the reduction method 0.77 has been reported. In the present study, word comprehension, word chain subtest, and word reading subtest were used. The total validity of the test by internal consistency method (Cronbach's alpha) was 80% (Koromi Nouri & Moradi, 2017).

The word comprehension test consists of two parallel cards. Each card has 20 images and runs separately. The time of this test is one minute, start with the name of the first image and end after one minute. The Cronbach's alpha obtained in this subtest is 0.75 and the subtest of the word reading consists of three letters of the Persian alphabet (M-A-N) which are written separately. The time required to produce the words for each letter is one minute and the total time of this subtest is three minutes. The Cronbach's alpha obtained in

this subtest is 0.66. Another subtest is the word chain subtest. This subtest consists of six categories: girl name, boy name, body name, fruits, colors, and Kitchen appliances. The duration of this subtest is one minute for each category and the total time of this subtest is six minutes. The Cronbach's alpha obtained in this subtest is 0.81%.

3.3.2. Wechsler Test

Another tool used in this research is the Wechsler IQ test, which was used to obtain the IQ of children to identify children with an IQ of 70-85 and participate in this study. Wechsler's IQ scales have high standards, validity, and reliability. According to the estimates made in the field of reliability and validity of sub-tests, Wechsler IQ scales, the reliability coefficient of these scales in verbal tests are from 0.77% to 0.87% and in practical tests are between 0.69% to 0.89%. Also, the reliability coefficient of the retest in the 23-day interval for verbal and practical scales varies from 0.87% to 0.94%.

3.3.3. Smart Class

Smart Classes use digital technology to develop the learning process. By using different audio and visual tools, learning can be more interesting. In this study, the teacher used a computer and projector to play interesting cartoons and their scripts. With the help of their teacher, the students search the internet for unknown words. The teacher used computers, the internet, and different technological aids to make reading and reading comprehension more fascinating for the students.

3.4. Data Collection Procedure

During the research, the teaching method was performed for the experimental group in each class separately for 12 sessions of 90 minutes. Since the implementation of the educational program by the teacher is more effective, teachers used smart teaching aids in the presence of the researcher, trained students, and worked on reading skills and word comprehension of these students. The teacher and the students read a part of the text silently to themselves. Then the teacher shows the text through the projector and the text is read to them at the same time. The teacher tries to involve the students in the teaching by asking questions. They searched for a text that was incomprehensible to them on the Internet and displayed it in class. By playing cartoons, the teacher taught the students new

strategies for summarizing, questioning, explaining, and predicting the content of the texts. The students then read another part of the text, and this time the teacher used the students as assistants in the classroom to perform the text dramatically in the classroom, again using the computer, the internet, and various educational technology tools, reading the text and verbal fluency. It was interesting for the students. At the end of the training sessions, all members of the sample group (experimental and control groups) underwent a post-test. The control group received regular training only in their classrooms at schools and did not receive special training in any of the learning disability centers.

3.4.1. Summary of Teaching Sessions in Smart Classrooms

Summary of teaching sessions in the smart classroom, which included twelve 90-minute sessions once a week is presented here. The instructional items were stated in the order (Kakabraei&Amiri, 2019).

Session 1: Introducing students, introducing work in smart classrooms, and doing exercises at home.

Session 2: (clarifying the concept of mental imagery): In this session, different words were played through the computer and he was asked to close his eyes and visualize the image of the pronounced words in his mind.

Session 3: (Positioning counseling and orientation practice): To practice orientation, the student was asked to imagine the words spoken in a specific situation, such as in a park.

Session 4: (Release Method): In this session, the student was told to punch his hand, mentally assume an imaginary open hand, and then tighten his fist instead of opening it. All of these exercises were done in class with a recorded voice. The purpose of these exercises was to relieve students' stress and anxiety while reading the text.

Session 5: (Positioning Review Method): By giving different images and showing them through the projector, the student was asked to place his finger in the place where the positioning point was, and the purpose of this section was to maintain focus and attention.

Session 6: (Accuracy level): A scene is shown to the child. The teacher set a point and asked the child to focus his mind on that point and keep his eyes balanced, and at the same time an audio file was played to him and the child was asked to maintain his visual and auditory balance at the same time.

Session 7: (Coordination): In the form of a software game, words came out of a package and moved in different directions, and the child had to tick them with the mouse. The practical purpose of this exercise was to eliminate confusion in recognizing the right and left sides as a recreational activity.

Session 8: (Mastery of words): In this way, texts were given to the student in software such as Word and he was asked to find the desired words in the text and underline them.

Session 9: (Mastery of symbols): The student was given texts and asked to find symbols such as question marks, colon, commas, and the like in the texts and to identify them by changing the color.

Session 10: (spelling and reading): The student was told that his eyes should view the whole word. If he did not say the word correctly, he had to overturn the word again, and if he could not, he spelled it out, and then the correct pronunciation was played to the student, and he had to repeat it.

Session 11: (image in marking): In this session, the purpose of reading, understanding and, comprehending the text was read. In this way, the student reads the text played on the slide and is asked the meaning of a few words. If he did not know the meaning of the word, he would find it in the dictionary or on the Internet (Davis & Brown, 2002).

Session 12: Performing the test of calling images, word chain, and word reading of Koromi-Nouri and Moradi test in two experimental and control groups (Koromi Nouri & Moradi, 2017).

3.5. Data Analysis Procedure

The present study attempted to investigate the effect of using multimedia in smart classes on the improvement of three notions among late learning students. They included reading ability, word chain, and word comprehension. Accordingly, descriptive and inferential statistics have been used to analyze the data obtained from this study. The Descriptive statistics included mean, standard deviation, etc. At the level of inferential statistics, the ANOVA test was utilized.

4. Results

The data obtained from the pretest and posttest scores were analyzed by SPSS based on ANOVA test. The statistical analysis of the available data and the obtained results can

be seen in the following section. Initially, the scores of word comprehension, word reading, and word chain in the control and experimental group are displayed.

Table 3
Scores of Word Comprehension and Word Chain and Word Reading of the Control and Experimental Group

Total	Without Trouble	Troubled	Word Comprehension Subtest				
17	0	17	Frequency	81.6	Average	control group	pretest
100%	0	100%	Percent	11.5	Standard deviation		
17	2	15	frequency	84.2	Average	Experimental group	
100%	11.8%	88.2%	percent	9.6	Standard deviation		
17	1	16	frequency	86.2	Average	control group	Post-test
100%	5.9%	94.1%	percent	10.7	Standard deviation		
17	4	13	frequency	102.8	Average	Experimental group	
100%	23.5%	76.5%	percent	11.3	Standard deviation		
total	Without trouble	troubled	Word reading subtest				
17	0	17	frequency	85.2	Average	control group	pretest
100%	0	100%	percent	7.5	Standard deviation		
17	3	14	frequency	87.7	Average	Experimental group	
100%	17.6%	82.4%	percent	9.1	Standard deviation		
17	0	17	frequency	90.2	Average	control group	Post-test
100%	0	100%	percent	10.1	Standard deviation		
17	5	12	frequency	103.8	Average	Experimental group	
100%	29.4%	70.6%	percent	9.3	Standard deviation		
total	Without trouble	troubled	Word chain subtest				
17	2	15	frequency	79.8	Average	control group	pretest
100%	11.8%	88.2%	percent	10.5	Standard deviation		
17	2	15	frequency	82.1	Average	Experimental group	
100%	11.8%	88.2%	percent	10.6	Standard deviation		
17	2	15	frequency	84.2	Average	control group	Post-test
100%	11.8%	88.2%	percent	10.9	Standard deviation		
17	4	13	frequency	110.9	Average	Experimental group	
100%	23.5%	76.5%	percent	10.3	Standard deviation		

As shown in Table 3, in post-tests, the average post-test scores for word comprehension in the control group are 86.2 and in the experimental group with class and smart teaching are 102.8. Additionally, the average score of word reading in the control group is 90.2 and in the experimental group with class and smart teaching is 103.8. Furthermore, the average score of word chain in the control group is 84.2 and in the experimental group with class and smart teaching is 110.9. Therefore, it seems that the use of therapeutic methods by using information technology and smart classes is effective in solving the problem of subtest word comprehension, word reading, and category symptom.

Teaching in smart classrooms is effective in improving word comprehension disorders. In this first hypothesis, due to the normality of the obtained data and the comparison of the scores of word comprehension between the four groups, the analysis of variance test was used, and the result is shown in Table 4.

Table 4

One-Way Analysis of Variance Means Score of Word Comprehension by Type of Test and Group of Test

Level of significance	F	average of squares	DF	sum of squares	Source of changes
0/00001	16.34	4692.99	3	14078.9	Intragroup
		287.24	64	18383.6	Intergroup
		-	67	32462.5	total

As can be seen in Table 4, the scores for word comprehension differ between two groups (control group post-test, control group pre-test, experimental group post-test, experimental group pre-test). Because the significance level of the ANOVA test is less than 0.05. The significance of the F test or analysis of variance does not tell us which pair of means is significant. Tukey test was used to prioritize the groups. Table 3 shows the results of the Tukey test and significant details of the difference in the mean scores of word comprehension according to the type of test and the group.

Table 5

Tukey Test Results Score of Word Comprehension by Type of Test and Group of Test

The significance level	The difference between the means	Compare groups
0.93	-2.6	Comparison of pre-test score of the control group (81.6) with pre-test score of experimental
0.266	-4.6	Comparison of control group pre-test score (81.6) with control group post-test score (86.2)
0.00001	-21.2	Comparison of pre-test score of the control group (81.6) with a post-test score of the experimental group (102.8)
0.598	2	Comparison of pre-test score of the experimental group (84.2) with a post-test score of control
0.0001	18.6	Comparison of pre-test score of the experimental group (84.2) with a post-test score of the experimental group (102/8)
0.0001	16.6	Comparison of control group post-test score (86.2) with experimental group post-test score (102.8)

According to the results obtained from Table 5, the significance level of the Tukey test is less than 0.05. Therefore, the use of smart classes (post-test of the experimental group) is effective in improving word comprehension disorders.

Teaching in smart classrooms is effective in improving word reading disorders. In the second hypothesis, due to the normality of the obtained data and the comparison of the scores of the word reading between the four groups, the analysis of variance test was used; the result of it is shown in Table 6.

Table 6

One-Way Analysis of Variance Means Word Reading Scores by Type of Test and Group of Test

Level of Significance	F	Average of Squares	DF	Sum of Squares	Source of Changes
0/00001	89.12	3928.52	3	11785.5	intragroup
		44.08	64	2821.2	intergroup
		-	67	14606.7	total

As can be seen in Table 6, the scores of the word reading differ between the four groups (control group post-test, control group pre-test, experimental group post-test, experimental group pre-test). Because the significance level of the ANOVA test is less than 0.05. The significance of the F test or analysis of variance does not tell us which pair of means is meaningful. Tukey test was used to prioritize the groups. Table 5 shows the

results of the Tukey test and significant details of the difference between the mean scores of word reading according to the type of test and group of tests.

Table 7

Tukey Test Results from the Amount of Word Reading Pictures by Type of Test and Group of Test

Significance Level	Difference between the	Compare Groups
0.838	-2.5	Comparison of pre-test score of the control group (85.2) with pre-test score of the experimental group (87.7)
0/344	-5	Comparison of control group pre-test score (85.2) with control group post-test score (90.2)
0.00001	-18/6	Comparison of pre-test score of the control group (2/85) with a post-test score of the experimental group (103/8)
0/711	-2.5	Comparison of experimental group pre-test score (87.7) with control group post-test score (90.2)
0/00001	-16/1	Comparison of pre-test score of the experimental group (87.7) with a post-test score of the experimental group (103.8)
0.0001	-13/6	Comparison of post-test score in the control group (90.2) with the post-test score in the experimental group (103.8)

According to the results obtained from Table 7, the significance level of the Tukey test is less than 0.05. Therefore, the use of smart classes is effective in improving word reading disorders.

Teaching in smart classrooms is effective in improving word chain disorders. In the third hypothesis, due to the normality of the obtained data and comparison of the scores of the word chain between the four groups, the analysis of variance test was used; the result of it is shown in Table 8.

Table 8

One-Way Analysis of Variance Means Score of Word Chain by Type of Test and Group of Test Category

Level of significance	F	average of squares	DF	sum of squares	Source of changes
0/00001	12.05	3393.42	3	10180.27	intragroup
		281.64	64	18025.42	intergroup
		-	67	28205.69	total

As can be seen in Table 8, the scores of the word chain differ between the four groups (control group post-test, control group pre-test, experimental group post-test, experimental group pre-test). Because the significance level of the ANOVA test is less

than 0.05. The significance of the F test or analysis of variance does not tell us which pair of means is meaningful. Tukey test was used to prioritize the groups. Table 7 shows the results of the Tukey test and significant details of the difference between the mean scores of the word chain according to the type of test and group.

Table 9

Tukey Test Results Score of Word Chain by Type of Test and Group of Test

The significance level	The difference between the means	Compare groups
0/88	-2/3	Comparison of pre-test score of the control group (79.8) with pre-test score of the experimental group (82.1)
0/343	-4/4	Comparison of control group pre-test score (79.8) with control group post-test score (84.2)
0.0001	-11	Comparison of control group pre-test score (79.8) with experimental group post-test score (110.9)
0/723	-2/1	Comparison of experimental group pre-test score (82/82) with control group post-test score (84/2)
0/00001	-28/8	Comparison of pre-test score of the experimental group (82.1) with a post-test score of the experimental group (110.9)
0/00001	-20/7	Comparison of control group post-test score (90.2) with experimental group post-test score (110.9)

According to the results obtained from Table 9, the significance level of the Tukey test is less than 0.05. Therefore, the use of smart classes is effective in improving word chains.

5. Discussion

The major aim of this study was to explore the effect of using technology and multimedia in smart classes on improving reading ability disorders, word chain, and word comprehension of students with low IQ and learning disabilities. These students are regarded as late learning students. The obtained findings revealed that using multimedia including computers, the internet, and animations have a significant and desirable effect on improving reading disorders, word chain, and word comprehension of the participants. Generally, it can be argued that the use of certain e-based instruments such as animations and the internet can increase the motivation and interest of the students since they focus more on the funny aspects of learning and the serious aspect, which usually causes anxiety and stress, is diminished. The use of technology is also beneficial for the teachers, that is to say, they would have no difficulty in explaining the meaning of complex words to the students; they can use authentic materials from the internet including audio files, pictures,

and animations. Therefore, smart classes can develop the linguistic and communicative dimensions of the reading skill of the students. Since reading does not just mean pronouncing correctly, and reading comprehension is a major part of cultivating the ability to read. Students are expected to involve in an interaction with the text and not only understand the meaning of the single words but also get the general intention of the writer.

Regarding the first research question, the result illustrated that using smart classrooms is effective in improving word comprehension disorders. According to the results, the significance level of the Tukey test is less than 0.05. Therefore, the use of smart classes (post-test of the experimental group) is effective in improving word comprehension disorders.

Regarding the second research question, the result illustrated that using smart classrooms is effective in improving word reading disorders. According to the results, the significance level of the Tukey test is less than 0.05. Therefore, the use of smart classes is effective in improving word reading disorders.

Regarding the third research question, the result illustrated that using smart classrooms is effective in improving word chain disorders. According to the results, the significance level of the Tukey test is less than 0.05. Therefore, the use of smart classes is effective in improving word chain disorder. The consideration of the mean table revealed that reading skills, word chain, and word comprehension in the post-test were significantly increased in the experimental group compared to the control group. In this way, the use of smart classrooms has led to the improvement of reading, word chain, and word comprehension disorders of late learning students.

In general, students with learning disabilities in various areas such as processing speed, auditory processing, phonological awareness, visual processing, and deficits and dysfunctions in verbal and abstract comprehension and reasoning, suffer from dysfunction (Kroll et al. 2018). According to the linguistic approach, the problems encountered in reading disorders are rooted in phonological awareness, recognition of syllables and letters, how sounds are combined, grammar, semantics, word chain, and word comprehension (Hallahan, Kaufman & Pollen, 2015). The increasing mastery of educational scientists and educational specialists over the shortcomings of students with reading disabilities will help them to design smart classrooms in a multi-sensory and stimulating context to enhance visual, auditory, and memory abilities. Although teaching in smart and technology-

equipped classes is more important today, but for students with learning disabilities and reading disorders in the country, special attention and many studies are needed.

The results of this research are in line with Zavaraki(2008) which exposed that information technology can make learning lessons more interesting, appropriate, and correct. Similarly, Esmaeeli Gojarand Rajabian (2019) revealed that educational technology can improve education and regulate mindfulness in students. Moreover, Kakabraei and Amiri(2019) showed the positive effect of Davis's educational method on improving the reading performance of dyslexic students. The results of the Rezaei and Kermanizadeh study(2015) confirmed the positive effect of using modern and advanced educational methods on the verbal fluency of dyslexic female students. It is based on increasing metacognitive awareness and presenting a systematic strategy on the barriers to reading and aligning readers' mental comprehension. In explaining the theoretical and experimental findings, it can be said that there is a lot of evidence that educational programs and the use of classrooms equipped with educational and intelligent technology are effective in improving the learning of late learning students. Davis has also emphasized the mental image role in educating and rehabilitating people with learning disabilities. He stated that whenever a dyslexic person can identify his/her state of loss and create a position and consciousness, he/she will be able to improve (Davis, 2002).

6. Conclusion

The findings of the present study revealed that using technology-enhanced materials through smart classes can be influential in developing late learning students' reading ability and improving their understanding of word chains and word comprehension. Based on the findings it can be concluded that the use of multimedia and technological materials in educational settings can facilitate delivery of the content, explanation of the problematic areas, and providing the students with suitable feedback. This can be also applicable in classes special for disabling learners. Students, who have a reading disability as studied in this research, have a low level of IQ and thus they are not able to comprehend the words and the entire text, also they are not regarded as fluent and fast readers. As the findings showed smart classes are found to be effective in solving these issues. Consequently, we can make use of multimedia in dealing with different linguistic problems of the students and equally improve their comprehension level.

The results of the current study can be of great help for teachers at different levels including elementary, high school, and even EFL teachers. The teacher can use technological material to motivate learners and boost their energy in the class and simultaneously they can improve the quality of their instruction. Moreover, the students and their parents can use the findings to develop their learning disabilities in class and at home. Material developers, especially the ones dealing with learning disabilities can make use of the findings to develop new materials for normal learners and disabled students.

Finally, further studies can shed more light on the effectiveness of smart classes. This study lasted for one year, so it is suggested that in future research, multiple follow-up tests at different time intervals be used to reveal the stability of the training effect. Due to the effectiveness of the results of this study, it is suggested that educational technology and smart classes are expected to be used as much as possible in the education of disabled learners so that the learning program will be more effective for them. Based on the findings, it is recommended to use this method in psychology clinics and educational centers and to introduce it to teachers during in-service or workshop courses. It would be useful to investigate the relationship between different aspects of language learning and the role of smart classes in improving language learning and teaching.

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