

The effect of instructional multimedia on communicational skills learning of autism students

Azar khazai¹, Rahim Moradi^{1,2}, Soraya Khazai², Mojghan Moradi³
¹Department of Educational Technology, Faculty of Education & Psychology Allameh Tabataba'i University, Tehran, Iran
²Department of Information Technology Higher Education, Faculty of Education & Psychology Shahid Beheshti University, Tehran, Iran
³Department of Curriculum, Faculty of Education & Psychology, Allameh Tabataba'i University, Tehran, Iran

*Faculty of Education & Psychology
 Olympic Village Boulevard
 Intersection of Shahid Hemmat Highway
 Tehran, 1489684511, Iran.
 Tel: +989372408016
 Fax: +989372408016
 Email:
 Rahimnor08@gmail.com

Background: This research aimed to estimate the effect of instructional multimedia on communicational skills learning of autism students at 3rd grade elementary school in Tehran.

Methods: The method of this research was quasi-experimental and population was all the autism students at 3rd grade elementary school in Tehran. 16 students were chosen by accessible sampling and they were randomly divided into control and experimental groups. The communicational skills questionnaires was made by researcher which had 5 components. Experimental group was trained with researcher-made multimedia software and control group was kept away from independent variable. In order to estimate the changes, at first a pre-test was performed on both groups. After pre-test, the experimental group was exposed at independent variable (Instructional multimedia) and post-test was performed on both groups. For analyzing the data, the statistical methods at two levels of descriptive (central and scattering) and inferential (multivariate analysis of covariance) were used.

Results: In this study, the analysis of covariance was used to evaluate assumptions and since there were established homogeneity of slope of regression and homogeneity of error variances, the results of the test of univariate and multivariate covariance analysis showed that enriched learning in multimedia environment effected on enhancing student's communicative skills that have. autism disorders ($p \geq 0/001$).

Conclusion: in line with other studies, the results of this study showed positive function of using electronic content of interaction-based and Multimedia Education system on learning communication skills of students with autism disorders'.

Keywords: Autism Spectrum Disorders, Communication skills, Instructional Multimedia.

تأثیر چند رسانه ای آموزشی بر میزان یادگیری مهارت های ارتباطی دانش آموزان اوتیسم

مقدمه: پژوهش حاضر با هدف بررسی تأثیر چند رسانه ای آموزشی بر میزان یادگیری مهارت های ارتباطی دانش آموزان اوتیسم پایه سوم ابتدایی شهر تهران صورت پذیرفته است.

روش: روش تحقیق از نوع شبه آزمایشی و جامعه آماری شامل کلیه دانش آموزان اوتیسم پایه سوم ابتدایی شهر تهران بود که با استفاده از روش نمونه گیری در دسترس ۱۶ نفر از دانش آموزان انتخاب و به صورت تصادفی به دو گروه کنترل و آزمایش تقسیم شدند. ابزار جمع آوری داده ها، پرسشنامه یادگیری مهارت های ارتباطی بود که در پنج مولفه طراحی شده است. گروه آزمایش طی هشت جلسه با استفاده از نرم افزار چند رسانه ای محقق ساخته آموزش دیدند و گروه کنترل به دور از متغیر مستقل نگاه داشته شد. به منظور بررسی تغییرات حاصله، ابتدا یک پیش آزمون بر روی هر دو گروه اجرا شد. پس از اجرای پیش آزمون، گروه آزمایش در معرض متغیر مستقل که همان آموزش چند رسانه ای بود، قرار گرفت و از هر دو گروه پس آزمون به عمل آمد. برای تجزیه و تحلیل داده های پژوهش از روش های آماری در دو سطح توصیفی (شاخص های مرکزی و پراکندگی) و استنباطی (تحلیل کوواریانس چند متغیری) استفاده شده است.

نتایج: در این پژوهش ابتدا به بررسی مفروضه های تحلیل کوواریانس پرداخته شد و سپس از آنجایی که این مفروضه ها (همگنی شیب خط رگرسیون) و (همگنی واریانس های خطا) برقرار بودند، نتایج با استفاده از آزمون تحلیل کوواریانس چند متغیری و تک متغیری نشان داد که آموزش غنی شده در محیط چند رسانه ای بر افزایش مهارت های ارتباطی دانش آموزان دارای اختلال اوتیسم در تمام مولفه ها موثر بوده است ($p \geq 0/001$).

نتیجه گیری: بنابراین، نتایج این پژوهش در راستای سایر پژوهش های انجام شده، بیانگر نقش مثبت استفاده از محتوای الکترونیکی تعامل محور و چند رسانه های آموزشی در یادگیری مهارت های ارتباطی دانش آموزان دارای اختلال اوتیسم بود.

واژگان کلیدی: چند رسانه ای آموزشی، اختلال طیف اوتیسم، مهارت های ارتباطی

دراسة مستوی تأثیر الوسائط المتعددة التعليمية على مستوى تعلم المهارات التواصلية عند الطلاب المصابين بالتوحد

المقدمة: إن الدراسة الحالية تمت بهدف توضيح مستوى تأثير الوسائط المتعددة التعليمية على مستوى تعلم المهارات التواصلية عند الطلاب المصابين بالتوحد في مستوى المرحلة الثالثة الابتدائية في مدينة طهران.

الإلموب: إن أسلوب هذه الدراسة من النوع السببية الإختبارية تمت على جميع الطلاب المصابين بالتوحد في المرحلة الثالثة الابتدائية في مدينة طهران. تم اختيار ١٦ طالبا و تم تقسيمهم بشكل عشوائي إلى فريقين الشاهد والإختبار تم استخدام استمارات لجمع المعلومات التي كانت مؤلفة من خمسة نقاط متعلقة بتعلم المهارات التواصلية. تم تعليم فريق الإختبار من خلال ثمانية حصص تم استخدام برامج الوسائط المتعددة و تم ابعاد فريق الشاهد عن أي متغير. ولأجل متابعة التغيرات الحاصلة بدوا تم تعيين إختبار مسبق لكلا الفريقين. بعد إجراء هذا الإختبار تم عرض المتغير على فريق الإختبار وهذا المتغير كان استخدام الوسائط المتعددة. و بعد ذلك تم إختبار الفريقين. و تم تحليل المعلومات بالأصناف الإحصائية في المستوي التوصيفي "الشاخص المركزي و المتناثر" و الأستنباطي " إختبار كواريانس".

الاستنتاج: في بداية هذه الدراسة تم توضيح تحليل كواريانس و بعد ذلك تم تحليل النتائج عبرالقواعد الإحصائية التي اشرت الى أن اغناء التعليم عبرالوسائط المتعددة يرفع مستوى مهارات التواصل عند الطلاب المصابين بالتوحد ($p \geq 0/001$)

الإستنتاج: بناء على هذه الدراسة و الدراسات الموازية في هذا المجال نستطيع استنتاج مستوى التأثير الإيجابي للإستخدام المحتوى الإلكتروني و استخدام الوسائط المتعددة في تعلم مهارات التواصل عند الطلاب المصابين بالتوحد.

آئیزم میں مبتلا طلباء کے رابطہ کرنے کی مہارتوں پر ملٹی میڈیا کی تاثیر

پیک گراؤنڈ: یہ تحقیق آئیزم میں مبتلا پرائمری کے بچوں کے رابطہ پیدا کرنے کی صلاحیتوں پر ملٹی میڈیا کے اثر انداز ہونے کا جائزہ لینے کے لئے انجام دی گئی ہے۔

روش: اس تحقیق میں تہران میں پرائمری کے طلباء میں سے سولہ طلباء کا انتخاب کیا گیا اور انہیں ریڈم طریقے سے دو گروہوں میں تقسیم کر دیا گیا۔ بچوں کو سوالنا مہ دیا گیا جس میں دوسروں سے رابطہ کرنے کی صلاحیتوں کے بارے میں سوالات تھے۔ یہ سوالات پانچ کنیگوریز میں بنائے گئے تھے۔ ٹسٹ گروپ کو ماہرین کے بنائے ہوئے ملٹی میڈیا پروگرام کی ٹریننگ دی گئی اور کنٹرول گروہ کو سادہ تعلیم دی گئی، تبدیلیوں کا جائزہ لینے کے لئے دونوں گروہوں سے ٹسٹ لیا گیا، اس کے بعد ایک پوسٹ ٹسٹ بھی لیا گیا۔ ڈیٹا کا تجزیہ کرنے کے لئے ملٹی ڈائی مینشل کو ویرینس ٹول استعمال کیا گیا۔

نتیجے: اس تحقیق سے معلوم ہوتا ہے کہ آئیزم میں مبتلا پرائمری کے طلباء کی تعلیم پر ملٹی میڈیا نے کافی مثبت اثرات چھوڑے ہیں۔

سفارش: ان نتائج کے پیش نظر یہ سفارش کی جاتی ہے کہ آئیزم میں مبتلا بچوں کی تعلیم کے لئے ملٹی میڈیا کا استعمال کیا جائے۔

کلیدی الفاظ: ملٹی میڈیا، آئیزم، رابطہ کرنے کی مہارتیں۔

INTRODUCTION

Autism spectrum disorders expression is domain of growth-nervous disorders which contains dedicated diagnosis of autism, Asperger syndrome and pervasive growth disorders that haven't been identified in other species (1). autism spectrum disorders are part of 5 growth –nervous disorders set that contains primary defects in social skills and interactions, relationships, limited interests, and standard behavior templates. One of the special groups whom have a lot of problems at communicational skills are autism students. In autistic children the growth and formation of communicational skills have many defects and limitations which need instructional and therapeutic intervention (2-3). Without social competence, people experience isolation and depression. Deficits in social reciprocity, emotional expression, and joint attention are seen in very young children with ASD; these deficits impede early learning (4). and continue into adolescence and adulthood without intensive intervention.

Individuals with Autism Spectrum Disorders face extreme challenges in the area of communication (5). Communication skills is a core deficit in persons with Autism Spectrum Disorders (6). Communication skills are important and complex skills that are often taken for granted. Speech allows individuals to communicate their basic needs, share ideas, express rage, and explain their emotional states (5).

Simultaneously with technology development, the necessity of use of present opportunities in improving the disable and special people life has become more important.

The usage of information and communication technology can change appropriate opportunities in order to reach the instruction program goals independently (7). Technology can provide a great deal of support for individuals with Autism Spectrum Disorders. Technology can be a great aid for persons with Autism Spectrum Disorders because it is customizable. It can be configured in a variety of different ways, and used to solve a variety of problems (5).

This technology for students with special needs should be a blended element from educational program which was related to students independently (8). The use of visual artifacts has been shown to reduce cognitive challenges, social disabilities, and assist users with communication and functional life skills (9). The most central items which is discussible is that multimedia is a great development information and communication technology. Technology tools are fascinating, unique, and portable; they support the principles of Universal Design—multiple means of representing information, acting, expressing, and engaging (10).

Multimedia are noticeable because of their great usages and their effect on participants(11). Computer and multimedia is a valuable part of technology for student which simultaneously and uniformly provides different sources of information like text, voice, picture, music, animation and causes experience and is a stimulus for them in order to improve and develop their communicational and verbal skills (12).

Instructional Multimedia can motivate the a learner,

encourage attention, serve as an extrinsic reward, collect data on performance and level of interaction, mediate social interaction between the therapist and the individual with Autism Spectrum Disorders, monitor imitation and learning, and serve as an assistant in therapy (13,14)

The most important advantage of multimedia in comparison to other educational forms is flexibility at providing information and quick access at providing feedback. The most important usage of multimedia is contribution to student learning and their literacy (15).

The improvement of instructional program for special people should Be part of main efforts of every society in order to provide them life beside other normal people (16). For this purpose, such people need special instruction. Special instruction provides facilities and equipment's for disable, and special people. One of the important goals of special education, beside the education improvement and achievement, is increasing their skills. At not for future these students should work at society and this requires that they has learned necessary communicational skills and reach an acceptable social growth.

In addition, Different researches has showed that defect at communicational skills is main characteristic of autism children and about soy of these children never research the ability of applied use of language and communicational skills (17) and many of behavioral traits a with autism such as aggression, self-stimulatory and self-damage are the secondary result of communicational insufficiency. Many of autism children can't understand the bilateral nature of communication which contains the communication between speaker and listener and will not reach whatever they want (18). On the other hand, present research shows that instruction of appropriate ways for communication establishment to these children decrease such behavioral problem (19) and in the future, They will show better performance at independent life and communication and this issue improve social and academic performance of them (20). Innovation at instructional methods is one of the new ages features. And use of computer at contexts, especially, autism instruction is an inevitable effect. Instructional program with Computer may never substitute book and blackboard but these program for children which learn better with pictures and voice are more understandable and correct use of appropriate programs may cause noticeable changes in their learning (21).

According to national research advisory, many of autism children have better visual processing and they can use pictorial symbols as a way for establishing applied communication. So, instruction of communicational skills with multimedia is one of the useful program which helps all the students at social and personal adequacy, growth at job skills, life skills and social adjustment (18).

Many studies show that autism people are able to use virtual environment (20). Parsons & Mitchel (2003) study showed that autism people can learn simple Social skills with helping of virtual environment .Moor et al (2000) has shown that computers provide appropriate opportunities for learners and with increasing learning motivation make them able to act at challenging learning situation, and engage in solving problems(22).

Moradi (2013) performed a research with the title of effect of multimedia instruction on autism student social skills learning at first grade of elementary school in Tehran. The population were all the students of first grade of elementary and with accessible sampling, 16 autism students were selected and appointed into experimental and control group. The result showed that multimedia software had positive and significant effect on social skill growth of autism (21).

Zarei zavaraki et al (2012) performed a research with the title of "instructional effect of multimedia on math learning and retention of girl student with mental retardation "with quasi-experimental method. The population were students of fourth grade with mental retardation in Arak in 2009. The sample were 16 people and were appointed into experimental and control group randomly. The experimental group was trained by researcher made software. The result showed that multimedia instruction affected on increasing of math learning at fourth grade students with mental retardation (23).

Gharibi (2009) performed a research with the title of "effect of instructional multimedia on math concepts learning and retention of fourth grade educable students with mental retardation .with quasi-experimental method. The software was made by the researcher and the concept which was trained by the software was the concept of multiplication. In that research, the population was all the girl student with mental retardation at fourth grade in Arak. Whom were appointed into experimental and control groups randomly. The result showed that the students whom were trained by multimedia and common instruction had better learning and retention (24).

Bahmani zadeghan Jahromi et al (2010) performed a research with the title of "the survey of social skills instruction effectiveness on autistics behaviors and autism children social growth", with quasi – experimental method. The experimental group was exposed at social skills instruction with the social stories method for 4 months at 56 section. The results showed that social skills instruction with social stories decreased autistic behaviors and social growth improvement at participants(25).

Nouroozi and et al (2011) have done a study as" the effect of multimedia education on learning and reminding math lesson of elementary fifth grade depressed students' " with using quasi-experimental design method. The researcher test and researcher's multimedia software have been used based on multimedia designing principle for collecting data. The achieved results of this study showed that applying multimedia software in teaching math concepts in autistic students was more efficient than classic approaches (26).

Cheng way (2010) performed a study on "virtual learning environmental for helping autism social competition " , the sample was 3 autisms, it took 17 days and the result showed that virtual learning environment increase the autism social interaction and competition, in other word virtual learning environment had a positive significant effect on social interaction and competition(27).

wainer and Ingersoll (2010) accomplished a research as "the effect of computer technology for social teaching skills to

mental disable people. They showed in this research that using computer technology like cooperated computer programs (multimedia) and virtual environment can be effective in improving and developing student's communicative and social skills (28).

Khan (2010) performed a research about "effect of multimedia on learning of students with different needs" the sample were 14 students under 11 with autism or down syndrome. The result showed that multimedia system whose special objectives is on definite disability has a positive effect on learning and increases learning (29).

Raise a et al (2010) has done a study as "using information technology based on multimedia in teaching mathematics to brain cripple and mental disable students in elementary school. In this research two students were examined. They used series of multimedia of solve and exercise for one of these two students in order to improve math skills. One of these students was Mental Disable and other brain paralysis .this solving and exercising multimedia was inside a system based on a web in order to protect learning. Using multimedia instead of note book for solving math problems led to have positive view for learning math lesson of students who used multimedia. Moreover researches observed that these students were more independent , interested and endeavor and they could learn mathematic concept by exercise solving multimedia and showed more interest in themselves to continue work(30).

With this description and regarding to mention research and its consequences the importance and necessity of computer role and especially instructional multimedia in teaching and learning process for special students especially autism students become obvious. With regarding to this research purpose that is survey of instructional multimedia effect on communicational skills learning of third grade autism student in Tehran, the following hypothesis is developed: Instructional multimedia is effective on communicational skills learning of third grade autism student in Tehran.

METHODS

This research is an applied research in which the quasi-experimental pattern is used. The statistical population is all the autism girl student who are at elementary school in academic year 2013-2014 in special institutes in Tehran. Failure to recognize this type of disorder and refusing or rejecting parents to enroll their students in special centers is an important factor which shows their participants are low. Therefore, based on teacher's ideas and based on Delava (2009) Research Methods in Psychology and Educational science, available sampling was used to measure the communicative skills of autistic students. Considering the small size of the participants, the sample of this study involved 16 Elementary school students from Payke Honar selected randomly and they were divided into one experimental group (8) and one control group(8). In order to observe research ethics and the subject rights and based on volunteering participation, the present study shows that information included were related to research purposes. Inclusion criteria of the research involve students who have intellectual average or higher (90 or higher) and they have _____

one type of autism spectrum disorders. Exclusion criteria include students with multiple disabilities and students who are below IQ average.

The research instrument is a research-made questionnaire that is related to measure communicative skills. This test involves 5 dimensions (Respect to others, sociability, empathy and understanding the motivation of others and our behaviors, finding a good friend and responsibility) and it has 40 items that measure 5 scales of communication skills. Every item ranges from yes, no and sometimes and the scale was graded numerical point or value 5/0, zero and 25/0 respectively. (Table 1).

For calculating the validity of this questionnaire ,the content

validity and the specialists idea was used and for defang the reliability , the cronbach reliability coefficient method and with Spss software ,the .83 correlation coefficient for the data was shown . It's important to mention that the research made questionnaire was used as both pre-test and post-test.

The purpose of communicational skills instructional program in multimedia form were: Respect for others and collaborative interaction with them, sociality and social present, Empathy and behavior motivation understanding self and others, making friend, responsibility .the instructional program(Table 2) was performed at 8 section for 45 minute in experimental group at special institutes in Tehran.

Table 1. Characteristics of Questionnaire		
Component	number of Question	Question
Respect to others	5	24-25-26-27-28
Sociability	11	13-14-15-16-17-18-19-20-21-22-23
empathy and understanding the motivation of others and our behaviors	12	1-2-3-4-5-6-7-8-9-10-11-12
finding a good friend	7	34-35-36-37-38-39-40
Responsibility	5	29-30-31-32-33

Table 2. Multimedia instructional program	
section	Purpose
First section	Introduction and acquaintance with group member and provide explanation about multimedia software.
Second section	make students acquainted with how to communicate with other and become friend with them(in this section, our purpose was training student with multimedia, how to communicate with other, play with each other at playtime, not be aloof, share their properties with with their friends.
Third section	make students acquainted with respect styles to others and collaborative interaction with them (in this section, the purpose was training students with multimedia to say hello to parents and friends, counsel with them, not hurt their friends and help each other at their homework.
Fourth section	make students acquainted with collaboration at social activities and integration with other (in this section, the purpose was training students with multimedia to be self-confident and be interested in cultural activities and courage to be assertive, for example, help others, do homework with each other in school, discuss about lesson with teacher and other students at class and be able to express an opinion when others are present.
Fifth section	Make students acquainted with sympathy and openness to other (in this section, our purpose was training students with multimedia to understand and feel other's inner experience. And be in others shoes, whatever they like for themselves, like it for others, if their friend is sad, speak with him, ask about its reason and try to eliminate it.
Sixth section	make students acquainted with responsibility for their works and be accountable and dutiful and if they are appointed to do something, they do it correctly and regularly (in this section, the purpose was training students with multimedia specially animation how to go get dressed, wash their face and hands before and after eating, if their parents ask them to do something, they do it, do their homework.
Seven section	Make students acquainted with social and norms and acceptance and partiality of them. (in this section, our purpose was training students with multimedia about norms which are at society in order to have better communication with other for example, while crossing the street, pay attention to traffic lights, observe other's turn, avoid absurd works which cause rejection from others.
Eighth section	When learning and performance improve that user can interact with content significantly (in this section ,the purpose was giving interaction test from experimental group about trained items which is one of the features of this multimedia ,so curriculum items and material multimedia ,and at last , learner responses are received and feedback is given.

RESULTS

Two method were used in analyzing data: A .descriptive statistic , which involves average and standard deviation in pre-test and post-test separation ,is in two groups ,experimental and control and total sample .B .deductive statistic : in order to compare two control and experimental group from the viewpoint of getting regarded grade average after survey hypothesis used from method Multivariate and univariate analysis of covariance a. Data were analyzed using SPSS version 20.

Statistical description of variable and indexes in groups

In this section at first, the description of indexes and variables is provided and then probability of group differences is estimated. The mean and standard deviation of communicational skills dimensions grade at pre-test and post-test in experimental and control group is reported.

As it is observed the experimental group mean at post – test in comparison to pre-test increase at all components.(Table 3) According to table2, it can be mentioned that instruction with multimedia increases respect skill to others and collaborative interaction with them , sociality and social presence, empathy and behavior motivation understanding self and other, making friend , accountability in autism student.

Study defaults multivariate analysis of covariance

In applying parametric statistic methods first, the hypothesis

of the test must be confirmed in order to use regarded test. so, first the hypothesis of variance analytic method " observation independence, being normal the distributing dependent variable, homogeneousness variance, being linear the dependent variable and homogeneousness and covariation of regression slopes in different groups were studied. Being independent means that the grade of each person in companion and dependent variable, is independent from the grades of all other persons who are tested. this condition was conducted because the answer of these people who were tested was not affected by other ones.

This study revealed normal assumption using calmogrov Smirnov test and it showed that significant level of all dependent variables were higher than 0/05. Levine's test was used to evaluate homogeneity of variances and its $f = 0.33$ and significant level 0/25 was approved. The regression slope homogeneity means that the regression coefficient of dependent variable based on covariate variables among groups is the same as each other. ANOVA was used to verify this assumption for each of components and variance test showed $f = 1.22$ and significance level (0/09). In order to research the equality of variance covariance matrices, Embox was used and its significant level was 0/78.

With regarding to presented pre-hypothesis sum, it was observed that the data of this investigation can enter to covariance analysis and the differences of these two groups in depended variable were surveyed.

Table 4 shows that after pre-test effect elimination with

Table 3. mean and standard deviation of student communicational skills dimension grade at pre-test and post-test in experimental and control group.

scale	group	Number	Mean	Standard deviation	
Respect for others and collaborative interaction with them	Experimental group	Pre-test	8	16/9	2/45
		Post-test	8	19/60	2/85
	Control group	Pre-test	8	15/45	1/60
		Post-test	8	16/00	1/85
Sociality and social present	Experimental group	Pre-test	8	6/25	0/90
		Post-test	8	9/90	1/80
	Control group	Pre-test	8	3/90	0/85
		Post-test	8	4/60	0/75
Empathy and behavior motivation understand self and others	Experimental group	Pre-test	8	9/25	0/80
		Post-test	8	13	1/60
	Control group	Pre-test	8	8/5	1/06
		Post-test	8	8/75	1/25
Making Friend	Experimental group	Pre-test	8	8/00	1/00
		Post-test	8	8/75	2/08
	Control group	Pre-test	8	7/5	2/85
		Post-test	8	8/00	1/90
Responsibility	Experimental group	Pre-test	8	13/25	0/90
		Post-test	8	17/50	1/50
	Control group	Pre-test	8	13/85	0/90
		Post-test	8	14/00	1/85

Multivariate covariance analysis method, there is a significant effect for "independent variable" multimedia instruction method factor. This effect shows that there is significant difference at least between one of communicational skill component at students whom were trained by multimedia method in comparison to control group student (Wilks lambda 0/25, $P < 0.05$).

It shows that multimedia education has significant effect on experimental group to increase the linear combination of communicative skills. To determine the differences between two groups regarding to the components of communication skills, table 4 presented the results of univariate covariance analysis in the context of multivariate analysis of covariance. Table 5 shows that with pretest variable effect elimination, the research hypothesis, the effect of multimedia instruction on communicable skills learning of 3rd grade autism student in Tehran is confirmed. As, it is observed in table 5, the significance level of all the components is smaller than 0/01 significance level which obtained from Reform Bonferroni (0/05 significance level division to five components of communicational component). So, with regarding to obtained means, it can be mentioned that with 99 percent confidence, experimental group communicational skills had increase (at components of respect to others and collaborative interaction, sociality and social presence, empathy and behavior motivation understanding self and others, making friend, Responsibility) in comparison to control group. In addition, the research statistical test power shows that with 98 percent probability the zero hypothesis is rejected correctly. The statistical power of communicative skills was 80 percent to 98 percent which showed that the null hypothesis is rejected at high power. The researcher can express that this hypothesis is confirmed 99%.

DISCUSSION

This study aimed to investigate the effect of educational multimedia on the learning communicative skills of students who have autism spectrum disorder in Tehran. The results of the present study showed that multimedia training or education has effected on learning communicative skills of student and its components, including respect to others and participant interaction to them sociability, empathy, understanding the motivation of others and our behaviors, finding a good friend and responsibility.

The history of the field of Educational Technology involves a very careful study of more than 50 years of applying technology to educational problems, and it supports the following conclusions about the use of technology: no technology can fix an educational problem or supply a universal solution; the use of technology must match an identified need within the curriculum; teachers will always be more important than technology; and just because you can use technology, does not mean that you should use it (31).

The impact of virtual environments on individuals with Autism Spectrum Disorders indicates that transfer, enjoyment, understanding emotions and social interactions is possible (32, 33, 34). More studies were conducted on the use of different forms of technology with learners with Autism Spectrum Disorders. The studies provided support for the use of computers as a promising tool for motivating and improving the attention of autistic learners, reducing problem behaviors, increasing speech, and helping learners gain competence in other areas (35).

Overall, the results of this study consistent with the results of researchers such as Wainer & Ingersoll (28), Khan (29),

Table 4. communicational skill dimension post-test grade multivariate analysis of covariance in both group

Statistical Indicators effect	test	value	F	Hypothesis Df	Error Df	Sig
Deferent two groups with control effect pre-test	Pillai's trace	0/90	5/85	5	5	0/04
	Wilks lambda	0/25	5/85	5	5	
	Hoteling's	5/85	5/85	5	5	
	Roy's largest root	5/85	5/85	5	5	

Table 5. the result of communicational skill components grade analysis of covariance on mean.

Statistical Indicators variables	source	ss	Df	F	Sig	Observed power
Respect for other and collaborative interaction	Group	30/10	1	20/80	0/001	0/98
Sociality and social present	Group	22/84	1	16/20	0/004	0/94
Empathy and behavior motivation understanding self and other	Group	15/50	1	59/60	0/001	0/98
Making friend	Group	5/80	1	10/49	0/009	0/80
Responsibility	Group	35/05	1	19/84	0/003	0/95

pointed out educational technology, especially multimedia education and visual supports can be beneficial and effective to teach students who have specific educational needs, such as students with autism spectrum disorders. Autism students can follow learning hierarchy multimedia and without tiring, review the previous information. Pictures and charts can be real and interesting with computer and photos and voices look well. So when multimedia enter at autism children education, it has many advantages which shows the multimedia importance (37). Video Modeling is emerging as a promising intervention for teaching social skills, demonstrating performance, and helping learners with Autism Spectrum Disorders learn appropriate behaviors and language in group settings (34).

Based on Costa et al (14) view, educational technologies can be used to motivate learners, show self-esteem, strengthen attentions as external rewards and reinforcement, increasing performance and social interaction, mediating interaction between therapist and students with special needs, developing imitation and learning and act as an assistant. Also McCoy and Hermansen (38), Ayres and Langone (39) and Rayner (40) stated that in order to learn something, people who have autism disorders have relative consideration to visual stimuli and they can process this kind of stimuli better than other stimuli. Feil-Seifer and Mataric (41) define socially assistive robots as a hybrid between assistive robotics and socially interactive robotics (SIR). The goal in SIR is effective interaction with a human being which allows the robot to provide assistance in rehabilitation, education, and convalescence.

The researches in Autism Research Institute indicate that watching cartoon and animation lay important role to improve children has autism. Therefore, using new method of teaching children can create beneficial view in the educational process.

On the other hand, computer-based assistive technologies and multimedia training or education and visual supporters decrease confusion, frustration and academic failure, show stability and predictability and increase student's ability to become independent to do homework (36). Information and interaction technology can play important role to form

based on features such as individual education and consisting education or training with needs and learner's features (42). Visual scripts are recited by a learner in a natural setting and faded (43) over time Visual support reduces confusion and frustration, provides consistency and predictability, and increases a learner's productivity and independence completing tasks (36).

Using visual artifacts decreased cognitive challenges and social disabilities and it helped users to learn how to use practical and social skills in life (9).

According to available researchers, it can be concluded that multimedia as a new method of education or training can have specific effects on self-esteem and communicative skills of students, because it has different abilities such as applying several senses in the learning process, involving learners, making flexible learning environment and considering specific needs of children.

Limitations of the present study include time-consuming process of scenario planning and multimedia design based on Meyer's multimedia principles and characteristics of students with autism spectrum disorders. Researchers have to use personal computers to carry out the research.

Some evidences suggest that there are many schools which pay more attention to educational programs. So, this type of schools has more emphasize on educational skills and they spend low time and money on teaching or training communicative skills to students who have specific needs. Consequently, these students have lack of communicative skills and qualifications. Accordingly, it is proposed that teaching communicative skills through multimedia software is a part of educational programs and they teach students using the expert and teacher experiences in special schools and educational technologists. Based on findings of the present study, the Exceptional Education Department also will highlight designing and producing different lessons or books as multimedia and it will provide necessary conditions. As a last point, we can say that teachers use educational multimedia with existing traditional methods of teaching and learning for students who have special educational needs and apply them together. Therefore, it can be suggested that teachers and education officials use this new method to enhance student's communicative skills and self-esteem.

REFERENCES

- Mulloy A, Lang R, Reilly M, Sigafoos L. Gluten-Free and casein-free diets in treatment of autism spectrum disorders systematic review. *Res Autism Spectr Disord* 2010; 4: 328-339.
- Gray DE. Ten years on: A longitudinal study of families of children with autism. *Intellect Dev Disabil* 2002; 27(3): 215-22.
- Ingersoll B, Schreibman L. Teaching reciprocal imitation skills to young children with autism using a naturalistic behavioral approach: Effects on language, pretend play, and joint attention. *J Autism Dev Disord* 2006; 36: 487-505.
- Scott J, Baldwin W. Definitions and characteristics of the spectrum. In: Zager D. (editor). *Autism spectrum disorders identification, education, and treatment*. 3rd ed. Mahwah, NJ: Lawrence Erlbaum Associates; 2005: 173-228.
- Ennis-Cole DE. *Educational communications and technology: Issues and innovations: Technology for learners with autism spectrum disorders*. New York: Springer; 2015.
- Beals K, Hurewitz F. Language software for teaching semantics, grammar, and pragmatics to students with Autism. In: Boser K, Goodwin M, Wayland S. (editors). *Technology tools for students with autism*. Baltimore, MD: Paul H. Brookes; 2014: 107-23.
- Flourine L, Hégaret J. *Information and communication technology and special educational needs*. Zavaraki Zarei E, Jfrkhany F. (translators). Tehran: Avaye Noor; 2012. [In Persian].
- Asparvhak A, Hilde Y. *Information and communication technology and special educational needs*. Zavaraki Zarei E, Velayati E. (translators). Tehran; 2013. [In Persian].
- Hayes G, Hirano S, Marcu G, Monibi M, Nguyen D, Yeganyan M. *Interactive visual supports for children with autism*. *Personal and ubiquitous computing* 2010; 14: 663-83.

10. Domingos Y, Crevecoeur Y, Ralabate P. Universal design for learning: Meeting the needs of learners with autism spectrum disorders. In: Boser K, Goodwin M, Wayland S. (editors). *Technology tools for students with autism*. Baltimore, MD: Paul H. Brookes Publishing; 2014.
11. Shirmohammadi MM, Chaharduly M, Zargari H. Introduction to multimedia. Hamadan: Daneshjo; 2011. [In Persian].
12. Gharekhani A, Afrooze Gh, Masoumian M. The use of computer technology to rehabilitation and educate children depress. *J Special Educ* 2010; 105: 47-53. [In Persian].
13. Boser K, Lathan C, Safos C, Shewbridge R, Samango-Sprouse C, Michalowski M. Using therapeutic robots to teach students with autism in the classroom. In: Boser K, Goodwin M, Wayland S. (editors). *Technology tools for students with autism*. Baltimore, MD: Paul H. Brookes Publishing; 2010.
14. Costa S, Resende J, Soares F, Ferreira M, Santos C, Moreira F. Applications of simple robots to encourage social receptiveness of adolescents with autism. *Conference Proceedings of Annual International Conference of the IEEE on Engineering in Medicine and Biology Society*; 2009: 5072-5.
15. Gharibi F. The effect of multimedia instructional, learning and retention of math concepts educable mentally retarded fourth grade students in Arak. MS. Dissertation. Tehran: Tabatabai University; 2009. [In Persian].
16. Huerta NE. The promise and practice of the individuals with disabilities education act. In: Jimenez TC, Graf VL. (editors). *Education for all: Critical issues in the education of children and youth with disabilities*. California, CA: Jossey-Bass; 2008.
17. Scarbro-McLaug J. The effects of sign language on the vocal responses of a child with autism. MS. Dissertation. University of North Texas; 2004.
18. Acheson M. The effect of natural aided language stimulation on requesting desired objects or actions in children with autism spectrum disorder. Ph.D. Dissertation. Education and Research of University of Cincinnati; 2006.
19. FreaW, Koegle R, Koegel L. Understanding why problem behaviors occur: A guide for assisting parents in assessing causes of behavior and designing treatment plans. Santa Barbara: university of California at Santa Barbara; 1993.
- communication for students with autism: manual signs, graphic symbols, and voice output communication aids. *Language, speech, and hearing services in schools* 2003; 34: 203-16.
21. Moradi R. The impact training through multimedia on social skills development autism first-grade students in Tehran. MA. Dissertation. Faculty of Psychology and Educational Sciences, Allameh Tabatabai University; 2013. [In Persian].
22. Moor M, Calvert S. Brief report: vocabulary acquisition for children with autism: teacher or computer instction. *J Autism Dev Disord* 2000; 39: 357-62.
23. Zavaraki Zarei E, Gharibi F. The impact multimedia teaching, learning and retention of learning Mathematics mentally retarded fourth grade female students in Arak. *Journal of exceptional psychology* 2011; 5(2): 1-19. [In Persian].
24. Gharibi F. The impact of multimedia training on retention of learning math concepts educable mentally retarded student's city arak fourth grade. MA. Dissertation. Tabatabai University; 2009. [In Persian].
25. Bahman Zadegan Jahromi M, Yarmohammadian A, Mousavi H. Evaluation of the effectiveness of social skills training on behavior autistic and social development of children with disorders autism. *The journal of new findings in of psychology* 2010; 23(12): 132-6. [In Persian].
26. Nouroozi D, Ahmadzade B, Qabraty N. The impact multimedia on learning and training Notes math lessons autistic students. *Journal of Psychology* 2010; 4(15): 432-9. [In Persian].
27. Cheng Y. Exploring the social competence of student with autism spectrum conditions in a collaborative virtual learning environment-the pilot study. *Comput Educ* 2010; 54: 1068-77.
28. Wainer A, Ingersoll B. The use of innovative computer technology for teaching social communication to individuals with autism spectrum disorders. *Res Autism Spectr Disord* 2012; 5(1): 96-107.
29. Khan TM. The effects of multimedia learning on children with different special education needs. *Soc Behav Sci* 2010; 2(2): 4341-5.
30. Raise MGAD, Cabral L, Peres E, Bessa A, Valente A, Morais R, et al. Using information technology based exercise in primary mathematics technology of children with cerebral palsy and mental retardation: A case study. *Turkish Online J Educ Tech* 2010; 9: 106-18.
- educational technology into teaching. 5th ed. Boston, MA: Allyn and Bacon; 2010.
32. Parsons S, Leonard A, Mitchell P. Virtual environments for social skills training: Comments from two adolescents with autistic spectrum disorder. *Comput Educ* 2006; 47(2): 186-206.
33. Moore D, Cheng Y, McGrath P, Powell N. Collaborative virtual environment technology for people with autism. *Focus Autism Other Dev Disabil* 2005; 20(4): 231-43.
34. Tartaro A, Ratz C. Incorporating technology into peer social group programs. In: K. Boser K, Goodwin M, Wayland S. (editors). *Technology tools for students with autism*. Baltimore, MD: Paul H. Brookes Publishing Co; 2014: 185-200.
35. Hetzroni E, Tannous J. Effects of a computer-based intervention program on the communicative functions of children with Autism. *J Autism Dev Disord* 2004; 34(2): 95-113.
36. Newton D, Eren R, Ben-Avie M. Visual supports for individuals with autism spectrum disorders. *J Special Educ Tech* 2013; 28(2): 53-8.
37. Naseh H. With autism from diagnosis to treatment. Tehran: Danzh; 2009. [In Persian].
38. McCoy K, Hermansen E. Video modeling for individuals with autism: A review of model types and effects. *Educ Treat Children* 2007; 30(4): 183-213.
39. Kevin MA. Intervention and instruction with video for students with autism: A review of the literature. *Educ Train Dev Disabil* 2005; 40(2): 183-96.
40. Rayner G. Meeting the educational needs of the student with Asperger Syndrome through assessment, advocacy, and accommodations. In: Stoddart KP. (editors). *Children, youth and adults with Asperger syndrome: Integrating multiple perspectives*. Philadelphia, PA: Jessica Kingsley Publishers; 2005: 184-96.
41. Feil-Seifer D, Matarie M. Defining socially assistive robotics. *Proceeding of Annual International Conference of the IEEE on Rehabilitation Robotics*; 2005: 465-8.
42. Adam T, Tatnall A. Use of ICT to assist students with learning difficulties: An Actor-Network Analysis. In: Reynolds N, Turcsányi-Szabó M. (editors). *Key Competencies in the Knowledge Society*. IFIP Advances in Information and Communication Technology, Springer, Berlin, Heidelberg; 2010: 324.
43. Ganz J, Boles M, Goodwyn F, Flores M. Efficacy of handheld electronic visual supports to enhance vocabulary in children with ASD. *Focus Autism Other Dev Disabil* 2014; 29(1): 3-12.