

Identification of the optimal method of teaching learners with Attention Deficit Hyperactivity Disorder (ADHD)

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Abstract: Attention deficit hyperactivity disorder is a kind of disorders that in recent decade, has had high prevalence and growing, this disorder can affect different aspects of performance of individuals, and the one of the most important of this aspects is academic performance and learning. Despite numerous studies on this disorder, yet about effective educational interventions that can lead to improve academic performance of Patients, there is little cognition. So, this quasi-experimental study aimed at identifying the optimal method of training for patients with attention deficit hyperactivity disorder in the autumn of 2014 on a total of 45 samples that with targeted manner with taking into account factors of research and obtaining consent for study in the 3 groups of 15 individuals relatively homological (group of traditional education, e-learning and the combinatorial instruction) were placed, was conducted. Participants in each group based on the designed content (7 units of lesson, each one based on one of the instructional design models) were trained during 7 weeks. The data gathering tool included questionnaire of Inventory of School Motivation (ISM) in the two stage of pre-test and post-test, for all 3 groups were performed; questionnaire of academic achievement for all 3 groups and all 7 units in form of the post-test were performed. Validity and reliability of tools was confirmed. Data by using method of descriptive statistics, correlated t-test, one way ANOVA, test of variance equality and LSD test and by SPSS software (version 18) analyzed. The results showed that training to electronic method leads to increase academic motivation and training based on the educational design model Gagné and Briggs in the electronic form leads to academic achievement of learners with ADHD.

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1. Introduction

ADHD disorder sometimes is written AD / HD, be considered as an umbrella, which can include 3 subsets which include: 1- ADHD-I: where dominant meaning is attention deficit and in some cases in form of attention Deficit Disorder (ADD) is discussed and usually the affected person has no symptoms of impulsivity and hyperactivity. 2- ADHD-HI: that the attention deficit has less appearance in it and is dominant meaning of impulsivity hyperactivity, and 3- ADHD-C: or combinatorial type in which the symptoms from all three properties, inattention, hyperactivity and impulsivity be observed. (Khushabi et al., 7: 2006).

Process of ADHD is highly variable. Specified symptoms, in approximately 50% of cases continue until adolescence and adulthood. In 50 percent of the remaining, symptoms subside during puberty or early adulthood. In some cases, hyperactivity goes away, but the decline in attention and remains impulse control problems. (Kaplan and *Sadock*, 470: 2009), this disorder is too sustainable and inclusive.

(Kangaroo et al., 216: 2012) The extent and pervasiveness of disorder adds the importance of further investigation. (Behrouz, et al., 1039: 2012) in the students with ADHD, possibility of drop out of school, academic failure and problems in the social adaptation is more than the other students. (Safavi et al., 105: 2014) In fact, ADHD is associated with academic failure. (*Jeremy Lyon* and Martel, 2012) Educational progress in patients is lower from other individuals. (Kaplan and *Sadock*, 470: 2007), ADHD is associated with poor academic performance, but there is no precise understanding about the factors of this subject. Results show that the status of Education and training is one of the important and fundamental factors in the decline of students with ADHD. (Bassing et al., 2012) Also, many people with ADHD in response to the persistent failure, in the case of learning disabilities and low self-esteem obtained from it are involved despondency and in some cases secondary depression. (Kaplan and *Sadock*, 470: 2009). So, according to what was said and the high prevalence and of course growing of this disorder, is

essential until non-drug treatment programs be considered to removal educational problems in patients with ADHD (Nejati et al., 69: 2013) because the failure in education will lead to next failures of individuals in various aspects of life and consequently society. According to the researches, the reform of class environment can prevent many of the problems individuals with ADHD. (Sarrami Foroushani and Hashemi, 28: 2004) One of the most important aspects of education, teaching methods and model and pattern is that teacher from it uses, for creating learning in learner whether consciously or unconsciously, so research aimed to identify the optimal approach of training of ADHD patients deals to compare the effect of three methods of traditional teaching (traditional), electronic and combinatorial and the impact of 7 models of instructional design models on enhancing learning and academic motivation of ADHD patients.

Method

Present study is type of quantitative studies, quasi-experiment that with the applied aim of identifying optimal method of training for patients with attention deficit hyperactivity disorder was conducted in autumn 2014. Statistical population of research included all patients with ADHD disorder that in Ravan Research Institute of Tehran University were under treatment. Inclusion criterion was satisfaction, being student, average age of 14 to 18 years and lack of physical and mental other diseases that create disorders in learning. Sampling was performed with targeted method and 45 people for the study were placed into 3 groups of 15 people relatively homological (maximum homological was carried between the groups in terms of age, gender, education, history of learning English and catching the sub-form ADHD). Educational content with the help of experts (1 person instructional designer, 1 person distance education Planner, 1 person teaching English

and 1 person electronic content designer) in 7 units that were the same in terms of level of difficulty and scope of goals (each unit according to one of 7 model of instructional design, specified in this study were prepared) was codified and in 3 form of printed content (book) and electronic (in two forms, need to attend of educator and self study) were prepared. Tool of this research is a Inventory of School Motivation (ISM) that in the two stage pre-test and post-test for all 3 groups were performed, questionnaire of academic achievement that for the all 3 groups and in any 7 unit was performed in form of the post-test.

Face and content validity of school motivation test and school achievement test was confirmed by experts and reliability of school achievement test by using Cronbach's method and school achievement by two half method calculated and verified.

Data by using descriptive statistics correlated T test, ANOVA, test of variance equality and LSD test and by SPSS software (version 18) analyzed.

Findings

In this study, 45 subjects studying in the academic year 2014-2015 due to having ADHD in Ravan Research Institute of Tehran University were treated, participated In the 3 groups of 15 people which was 31 boys and 14 girls. In terms of having ADHD sub-form, 34 number patients with the diagnosis of combined ADHD, 6 patients hyperactive and 5 persons inattentive were treated. A total of 24 people in the first high school and 21 in second high schools (high school, conservatory and work and knowledge) were studying. The study took place during the 7-week and pre-test of school motivation for all 3 groups participating in the first training session held and before the start of training held and posttest at the end of the last session held in the seventh week.

The described results in Table 1 are visible.

Table 1. Marks of pretests and post-test of Inventory of School Motivation (ISM) to distinguish three groups of participants

Dimensions of Inventory of School Motivation	Group	Average	Standard deviation	Number
Pre-test of tends to work	Traditional training	2.9500	42741.	15
	e- training	38332.	19851.	15
	<i>combinatorial</i> training	55002.	25071.	15
post-test tends to work	Traditional training	05003.	40541.	15
	e- training	40002.	19071.	15
	combinatorial training	51672.	27991.	15
Pre- test tends to progress	Traditional training	24933.	82610.	15
	e- training	74802.	87450.	15
	combinatorial training	08733.	68520.	15
Post- test tends to progress	Traditional training	15073.	81710.	15
	e- training	76332.	89820.	15
	combinatorial training	00803.	78380.	15

Dimensions of Inventory of School Motivation	Group	Average	Standard deviation	Number
Pre- test competitiveness	Traditional training	10803.	04121.	15
	e- training	66272.	81190.	15
	combinatorial training	86272.	10470.	15
post- test competitiveness	Traditional training	20733.	01151.	15
	e- training	89732.	79110.	15
	combinatorial training	70602.	00291.	15
Pre- test social power	Traditional training	14073.	29121.	15
	e- training	70372.	23571.	15
	combinatorial training	75202.	26261.	15
Post- test social power	Traditional training	41873.	06401.	15
	e- training	74002.	18411.	15
	combinatorial training	71732.	42741.	15
Pretest social dependency	Traditional training	28403.	21421.	15
	e- training	74802.	02291.	15
	combinatorial training	75132.	08501.	15
Post-test social dependency	Traditional training	55272.	13041.	15
	e- training	82932.	88900.	15
	combinatorial training	84132.	05891.	15
Pretest altruism	Traditional training	25333.	17261.	15
	e- training	86672.	90230.	15
	combinatorial training	02673.	958170.	15
Post-test altruism	Traditional training	64003.	94680.	15
	e- training	88002.	63340.	15
	combinatorial training	97332.	89060.	15
Pretest fame-seeking	Traditional training	46673.	94680.	15
	e- training	92002.	915480.	15
	combinatorial training	97332.	880910.	15
Post-test fame-seeking	Traditional training	58673.	88760.	15
	e- training	96002.	83660.	15
	combinatorial training	06673.	91400.	15
Pre-test material reward	Traditional training	15733.	85750.	15
	e- training	78932.	86100.	15
	combinatorial training	98872.	725310.	
Post-test material reward	Traditional training	19473.	06551.	15
	e- training	75002.	03961.	15
	combinatorial training	97332.	70340.	15
Pretest in general academic motivation	Traditional training	20123.	14741.	15
	combinatorial training	72822.	97400.	15
	e- training	87402.	912090.	15
Post-test in general academic motivation	Traditional training	35013.	99050.	15
	e- training	77752.	87460.	15
	combinatorial training	85032.	0.8809	15

For evaluate the effect of teaching in 3 methods of traditional, electronic and combinatorial on academic motivation of learners with ADHD disorder, participated in the study, from method of paired-t or correlated-t by separating each dimension of school motivation test and school motivation in general was

used that for reason of brevity observance from the presentation of tables related to dimensions pass up and results related to school motivation in general, by separating each 3 group in Tables 2,3 and 4 is considerable.

Table 2. Result of correlated t-test in Traditional training

	paired Disputes					T statistic	Degrees of freedom df	Decision criteria (Sig.2-tailed)
	The average	Standard deviation pair	The standard error of average	Confidence interval of 95 percent				
				Lower bound	upper bound			
Pretest in general school motivation Post-test in general school motivation	148920.	26461.	32650.	55140.-	84920.	4560.	14	6550.

Table 3. Result of paired t-test in e-training group

	paired Disputes					T statistic	Degrees of freedom df	Decision criteria (Sig.2-tailed)
	The average paired	Standard deviation paired	The standard error of average	Confidence interval of 95 percent				
				Lower bound	upper bound			
Pretest in general academic motivation Post-test in general academic motivation	049330.	08790.	02270.	0006/0	09800.	1732.	14	0470.

Table 4. Result of paired T test in the combinational training group

	paired Disputes					T statistic	Degrees of freedom df	Decision criteria (Sig.2-tailed)
	The average paired	Standard deviation paired	The standard error of average	Confidence interval of 95 percent				
				Lower bound	upper bound			
Pretest in general academic motivation Post-test in general academic motivation	023670.-	65991.	42860.	9429.0-	8956.0	055.0-	14	957.0

Training in all 3 groups Traditional, electronic and combinational over 7 weeks, each week a meeting took place based on the 7 models of selected Educational design. In the second session of each week school achievement test was held based course objectives and data by using one-way variance analysis

analyzed and the if meaningful results, the test post hoc LSD (least significant difference) was conducted, should be noted in the any 3 groups, did equality of variance and equality was confirmed. The results in the Tables 5 to 11 are visible.

Table 5. Descriptive Results of school achievement test in the of traditional method group based on 7 Educational design models

Educational model	Number	Average	The standard deviation	Confidence interval of 95 percent		Maximum	Minimum
				Lower bound	upper bound		
Gagné and Briggs	15	768.16	68242.	.38115	352.18	20	11
Sheryl and Schiffman	15	53315.	25393.	731.13	33517.	.519	9
Li Shin, Pollack and Rigolth	15	067.16	8715.2	47714.	657/17.	5.19	10
Gerlach Wally	15	033.16	0675.3	33514.	73217.	19	5.9
Kirk and Gustafson	15	033.16	0965.3	319.14	74817.	5.19	10
Dick and Carey	15	000.15	1339.3	265.13	736.16	.517	5.9
Kamp	15	567.15	88392.	97013.	16417.	5.18	10

Table 6. The results of ANOVA, test of school achievement in the of traditional training group based on 7 Educational design models

	The sum of squares	Degrees of freedom df	average of squares	F statistic	Decision criteria (Sig)
Intergroup	30.714	6	5.119	0.576	0.755
Intergroup	300.884	98	9.023		
Sum total	91.014	104			

Table 7. Descriptive results of school achievement test in the group's combinatorial training based on the 7 model Educational design

Educational model	Number	Average	The standard deviation	Confidence interval of 95 percent		Minimum	Maximum
				Lower bounds	upper bound		
Gagné and Briggs	15	15.933	2.6177	14.484	17.383	10	18.5
Sheryl and Schiffman	15	14.633	2.4746	13.26	16.004	9.5	18
Li Shin, Pollack and Rigolth	15	14.567	2.4775	13.195	15.99	9.5	18
Gerlach Wally	15	14.833	2.4689	13.466	16.201	10	18
Kirk and Gustafson	15	14.700	2.4986	13.316	16.048	10	17.5
Dick and Carey	15	14.933	2.5972	1.495	16.372	9.5	17.5
Kamp	15	14.833	2.3521	13.532	16.139	10	17.5

Table 8. The results of ANOVA of test school achievement in the combinational education group based on 7 Educational design Model

	The sum of squares	Degrees of freedom df	average of squares	F statistic	Decision criteria (Sig)
Intergroup	19.462	6	3.244	0.519	0.792
Intergroup	612.100	98	26.246		
Sum total	631.562	104			

Table 9. descriptive results of school achievement test in the electronic education group based on 7 designs Educational Model

Educational pattern	Number	Average	The standard deviation	Confidence interval of 95 percent		Minimum	Maximum
				Lower bounds	upper bound		
Gagné and Briggs	15	17.367	2.5176	15.973	18.761	5.12	20
Sheryl and Schiffman	15	14.500	3.0822	12.793	16.207	5.9	519.
Li Shin, Pollack and Rigolth	15	14.333	2.8263	12.868	15.899	9	18
Gerlach Wally	15	14.833	3.0511	13.144	16.523	10	19
Kirk and Gustafson	15	14.867	2.8690	13.278	16.455	10	19
Dick and Carey	15	14.633	2.5944	1.197	16.070	9	18.5
	15	14.167	2.6163	12.718	15.616	9	18

Table 10. The results of ANOVA of school achievement test in the electronic education group based on 7 Educational design Model

	The sum of squares	Degrees of freedom df	average of squares	F statistic	Decision criteria (Sig)
Intergroup	107.357	6	17.893	2.280	0.280
Intergroup	769.200	98	7.849		
Sum total	876.557	104			

Discussion and conclusion

ADHD in childhood is associated with school failure and disorder in school performance. The results show, the diagnosis of ADHD lifetime, regardless of its continuation, is associated with a disorder in educational performance; timely intervention can compensate disorder in school performance. (Waugh and Gao, 2013) this disorder in addition to pharmacological interventions, require non-pharmacological interventions to solve the educational problems of the patients. Research results Advak and colleagues (2011) showed that pharmacological treatments are not problem solvers of school achievement student with ADHD. Therefore, it is essential that non-drug treatment programs be considered to meet the educational problems of patients with ADHD. (Nejati et al., 69: 2013), despite the high prevalence and research about this disorder that in recent decades has occurred, ADHD as a controversial subject among some of those involved in education is raised. Ignorance ratio ADHD, prevents effective interventions and cause failure of educational opportunities in schools. (Cooper, 2008)

Research findings show that training based on instructional design model Gagné and Briggs in the electronic form, leading to increased school achievement of learners with ADHD participated in the study. In this field it can be said that the unique features of Gagné and Briggs pattern has been led to widespread apply of this pattern in the design of educational various models including distance training in its present form or the same e-learning. This model of educational design with lessons web-based, especially ones that take advantage from capabilities of individual and group of Internet connection is compatible. Most of the web-based lesson plans is designed based on the model of educational events Gagné and Briggs. (Hanin et al., 2002: 1) in the same field, Al Shelby et al. (2012) based on a design pattern was designed Gagné and Briggs e-training model for students at the University of Jordan, According to them 9 steps Gagné and Briggs pattern for the implementation of distance education in electronic form is compatible. Based on their research, e-training designed based on Gagné and Briggs pattern has necessary effectiveness. In addition to pattern-matching Gagné and Briggs, this pattern is consistent with the needs of learners with ADHD. Gagné and Briggs pattern is a systemic pattern. In the systemic patterns disciples encounter with works that gradually their complexity is added. . At first these works are offered in the simplest form possible, and finally arrive to the intended complexity in purposes of Training and apprentice with his step by step learning achieve the desired complex skills.

(Fardanesh, 2: 1392) In addition to the benefits of pattern Gagné and Briggs, the use of computer capabilities in e-learning can be a utility factor of this form of Training in learning learners with ADHD. In this field, Milton (2010) in their research entitled "effects of computer program of working memory Training on attention" showed that computer programs can be cause significant improvement in cognitive flexibility and working memory. And also, Rebecca et al (2005) in own research titled "Inhibition performance of children with attention deficit hyperactivity disorder in homework and computer games" showed that children with ADHD in computer assignments compared to computer games act better and cognitive inhibition affected by this program have been improved significantly. Defects in the Attention system of Patients with ADHD disorder in fact is most fundamental problem in the field of learning that should be considered in designing and implementing training and in fact same issue justify necessity of specific planning for training these people same. Depending on the shape and nature the considered educational model, strategies will be different. About distance education in an electronic form, there are ways to integrate tools focus include the use of letters in bold; color: white space, focus, scene of the dichotomous; shadows; interpretation. (Li Shin et al., 305: 2013) According to the research, creation and development of individualized education plans for students with special educational needs (eg, students ADHD) is appropriate and such plans should be considered as an essential intervention. (Bentham, 83: 2010) E-learning due to own nature the possibility of creating individual training makes possible. In this type learning do not requires to the presence of learners in a certain time and place, and the learner can at any time and in any place that is ready to learn deal to it. The strongest shortcoming of executive functions in patients with attention deficit disorder hyperactivity is in the amount of response inhibition, working memory and vigilance and planning. (Bakhshipoor, et al., 162: 2013) based on results Andrews recherches (1999), educational interventions, such as, immediate and frequent feedbacks, divide of tasks into smaller units and application intended activities is helpful to reinforce appropriate behavior patients with ADHD. E- Learning doing this affairs make easier. One of the problems learners ADHD is reluctance for learn due to the lack of previous success. The same applies in many cases led to these people exit from the educational system. Many people with ADHD in response to the persistent failure, in the case of learning disabilities and low self-esteem obtained from it, experience despondency and in some cases secondary depression. (Kaplan and soduck, 470: 2009)

In the field the results of Hashemi and Mashinchi Abbasi (2013) with title "Comparison of executive functions in subsets of attention deficit hyperactivity disorder based on the Berkeley models" showed that students with ADHD in behavioral inhibition and regulation of emotion and motivation are defective. And research and *Clearance Ruble* (2011) showed that students with ADHD disorder compared to common students have more negative emotions. Also, study of Strand et al (1193: 2012) calls attention to the role of motivation in cognitive disorders with ADHD. As has been observed, training in a way of motivating learners with ADHD disorder, participated in the research had effect. This result may be due to the success of this group of learners in achieving educational goals, as well as compliance this method with their needs, in this educational method, learners deal to learning at own desired time and place, and this could lead to an increase in their willingness to learning and consequently increase in the motivation. E-learning is a learner-centered model that help to learners until find information in optimal time and with the personal speed ,electronic learning, is not only the use of electronic devices and new technologies and have to note specially in devise and design of these courses, educational theory , educational purposes and features and learner's requests. (Ali Nejad, 25: 2012).

Finally, it can be said, persons with attention deficit hyperactivity disorder -their number are not low, too) require conditions of special training, training that according to their needs and them characteristics design and be provided. Inform of the audience feature helps to training designer that design assignments, activities and projects commensurate with them and adjust training program commensurate with the learning styles and them job goals. (Seraji and Attaran, 2007) the results of Bassing et al research (2012) showed that situation of education acts as a major factor in the school decline of student with ADHD. We require designing for any training. Useful and effective training can not be done by trial and error, but needs a plan. (Barzegar and Ali Abadi, 24: 2013) if instructional design not done correctly; can not be expected the desired goal be realized in the best way. Instructional design with the providing precise design of training is including factors affecting education that guarantees the learning process. (Norouzi and Razavi, 27: 2013) Each instructional design models according to your own emphasized principles has different effects on learning and retention of students. The purpose of learning is actually process relatively stable change in behavior in result of experience. People that we know and communicate to them by learning to what are have achieved. (Barzegar and Ali Abadi, 24: 1392)

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