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Virtual reality therapy upon attention span among secondary school students

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Abstract
Education is an essential tool for everyone to get success in life and earn respect and recognition. Education plays great role in everyone's life as it brings positive effects on the human life. It provides ability to think in both aspects positive and negative to get surety about and handle the situation. It is the most easy way to enhance knowledge and expand skills to have clear view over the world. It creates interest within us to enhance our way of life and thus country growth and development. We can learn by watching TV, reading books, discussion and by other various means. A child's attention span is a very important factor in the learning process. This study was conducted to assess the effectiveness of virtual reality therapy upon attention span among secondary school students. Study was conducted using true experimental research design. The sample included 60 students (30 in control group and 30 in experimental group) and were selected using purposive sampling technique. Data was collected by self-administration method using proforma on background characteristics of students', and Mindfulness Attention Awareness Scale. Results revealed that the difference in mean and standard deviation of attention span scores of secondary school students between pre test and post test of control group (M= 55.6, 56.5 & SD= 7.03, 6.9) was not statistically significant ($p>0.05$). In experimental group, mean concentration scores (M=57.1 & SD=7.4) was higher in post test than in the pre test (M= 61.9 & SD= 5.8) which was statistically significant ($P< 0.05$). The study findings revealed that virtual reality therapy is effective in improving attention span among students. Hence virtual reality therapy can be planned and organized by the teachers and concerned others as a routine for secondary school students.

Keywords: secondary school students, attention span, virtual reality therapy

Introduction
Children are the valuable asset of the nation and only hope of the tomorrow. Children are bright of the country. Let children be children, is not only a popular phrase heard in education, but it is also our motto. Yes, it is true, today's children are tomorrow's future but how we choose to raise our children determines the outcome of our future. Many believe academics should be stressed more in schools, taking away from children's playtime. I feel that play is what molds a child. Play allows not only a child's imagination to run freely, but builds and strengthens children's motor, language, cognitive, and social emotional development skills. I believe that play; along with parental involvement forms a child's identity. Play is what makes children: tomorrow's future (charlesworth, 2000) [4].

Most teachers daily confront the reality that student attention wanders in class. They can be seen nodding off, sleeping, gazing distractedly at some point other than the front of the room, texting, or working on something for another class. It's a problem, and one that teachers often find hard not to take personally. Dealing with the emotional reaction engendered by inattention is easier when it's more fully understood (Bunce, 2010) [3].

The attention span of a child or teen who is actively trying to pay attention is 3 to 5 minutes for every year of the child's age. As a result, a 13-year-old has an attention span between 39 and 65 minutes, while a 16-year-old is capable of paying attention for 48 to 80 minutes.

A growing number of books, including the shallows, argue that the internet and digital gadgets are making it harder for us to concentrate. The Pew Research Centre in America recently surveyed almost 2,500 students and found that 77% thought that the internet had a "mostly positive" impact on students' research works while 87% felt modern technologies were creating an "easily distracted generation with short attention spans".

There are many strategies and techniques such as gardening, meditation, yoga, gaming among these virtual reality therapy is one of the impact technique, which can be used to improve the attention span of school students.

Virtual reality treatment is a relaxation technique which refers to immersive, interactive, multisensory, viewer centered, sensored, projector viewed theatre environments which can be explored and interacted with by a person. Thereby the person feels relief from his problems by permanently registering the positive effects in brain. (Webster, 2014) [5].

Virtual reality therapy may be very useful in treating Attention span. As attention span and concentration often requires a multimodal treatment program, virtual reality therapy is easily combined with other therapies to provide the most comprehensive and effective intervention plan. Attentional tests imbedded in the VR world can be given to the child prior

to beginning therapy. This same assessment can be repeated to provide a precise measurement of treatment progress (VRMC, 2015).

However there is paucity of research on virtual reality therapy upon attention of the students. Hence the investigator has undertaken this study to assess the effectiveness of virtual reality therapy on attention span among secondary school students.

Statement of the problem

An Experimental Study to Assess the Effectiveness of Virtual Reality Therapy upon Attention Span among Secondary School Children in Selected Schools, Chennai.

Objectives of the study

1. To assess the level of attention span in experimental and control group of students before and after administration of virtual reality therapy.
2. To evaluate the effectiveness of virtual reality therapy upon attention among secondary school students.
3. To find out the association between selected demographic variables and the level of attention span in control and experimental group pretest and posttest administration of virtual reality therapy.

Null hypotheses

$H_0$1: There will be no significant difference in level of attention span between experimental and control group before and after administration of virtual reality therapy.

$H_0$2: There will be no significant association between selected demographical variables and level of attention span in secondary school students of before and after administration of virtual reality therapy.

Methodology

True experimental pretest and posttest research design was adopted for conducting this study at UCCK matriculation school, Chennai. Sixty students were selected for the study using purposive sampling technique. Selected samples were allotted to control and experimental group randomly using odd-even number method.

Tools used for the data collection were background characteristics of students' consisted of age, gender, grade, number of hours spent for study after school and academic performance. Mindfulness Attention Awareness Scale is an standardized tool which consists of 15 items with 6 options such as (Almost Always, Very Frequently, Somewhat Frequently, Somewhat Infrequently, Very Infrequently, Almost Never) and score ranged from 1 to 6. Scoring varied based on responses of participants. Hence total obtainable scores was 15-90.

After initial introduction the researcher obtained written consent from the selected subjects to participate in the study. An assurance was given regarding confidentiality before the data collection procedure was initiated. The data was collected through interview method in the therapy room by using the predetermined, pretested tools such as background characteristics of students and California university concentration scale.

The investigator used the kinect Adventures", a sports video games released by Microsoft Game Studios. Kinect Adventures uses full body motion to allow the player to engage in a variety of mini games. The investigator used kinect Adventures for the administration of virtual reality therapy in which the "River Rush, Rally Ball, Space Pop, Leak plug" was the selected module. The game type used was 20,000 Leaks, the player's avatar is in a glass cube underwater.

The data collection was done for a period of 4 weeks among selected samples. After pretest, Virtual reality therapy was demonstrated by the researcher and further practiced by the study participants for a period of 2 weeks. The therapy was administered to the all students every day for 2 consecutive weeks, for 5-7 minutes each day for all the participants, which is designed and administered by the investigator for the secondary school students. Post test was conducted after two weeks of the intervention.

Collected data was entered and analyzed in SPSS-18, using appropriate descriptive and inferential statistics based on the objectives of the study.

Results

Table 1: Frequency and Percentage Distribution of Background Characteristics of the Control and Experimental groups of Students (N=60)

Background characteristics	Control group (n=30)		Experimental group (n=30)		χ^2	P value
	n	P	N	p		
Age						
12yrs	0	0	1	3.3	0.3	p>0.05
13yrs	16	53.3	14	46.7		
14yrs	10	33.3	9	30		
15 yrs	2	6.7	5	16.7		
16yrs	2	6.7	1	3.3		
Gender						
					0.05	p>0.05
Male	20	66.7	19	63.3		
Female	10	33.3	11	36.7		
Grade						
8th	18	60	17	56.7	0.06	p>0.05
9th	12	40	13	43.3		
Time spent in studies at home						
1-2hrs	19	63.3	22	73.3	2.66	p>0.05
3-4hrs	11	36.7	7	23.3		
5andabove	0	0	1	3.3		
Attention without any distraction (as reported by students)						
10-20mins	1 2	6.7	8	26.7	0.06	p>0.05
21-30mins	18	60	13	43.3		
31-40mins	7	23.3	8	26.7		
41-50mins	2	6.7	1	3.3		
51-60mins	1	3.3	0	0		

Note: Relevant categories were clubbed for the computation of chi square analysis.

Background of the students data revealed that more than half of students were aged between 12-13 years (53.3 %, 50%) with the mean age of 13 years, majority of school students were males (66.7%, 68.3%), studying 8th class (60%, 56.7%). Most of the school students' spending time to study in home

after school has ranged between 76-90% (63.3%, 73.3%) in control and experimental group. Attention span without any distraction in majority of school students ranges between 21-30 minutes (60%, 43.3%) in control and experimental group respectively.

Findings also revealed that there is no statistically significant difference between control group and experimental group with regard to background characteristics of the students ($p>0.05$) indicating the homogeneity of the groups.

Table 2: Frequency and Percentage Distribution of Level of Attention span before and After Virtual Reality Therapy in Control and Experimental Group of School Students (N=60)

Test	Levels	Control group (n=30)		Experimental group (n=30)	
		N	p	n	P
Pre test	Low	0	-	0	-
	Average	8	60	18	60
	Above average	12	40	11	36.7
	High	0	-	1	3.3
Post test	Low	0	-	0	-
	Average	13	43.3	1	3.3
	Above average	17	56.7	28	93.3
	High	0	-	1	3.3

The data presented in table 2 depicts that 60%, 56.7% of the control group of school students have average level to above average level of attention span before and after virtual reality therapy respectively. Whereas among experimental group of the school students, majority were found to have average level of attention before administration of virtual reality therapy (60%), whereas after virtual reality therapy most of them had above average level attention span (93.3%).

Table 3: Comparison of Mean and Standard Deviation of Attention Span Scores in Pretest and Posttest between Control and Experimental group of School Students (N=60)

	Pre test		Independent t test value	Post test		Independent t test value
	Mean	S D		Mean	S D	
Control group (n=30)	55.6	7.03	0.80 (NS)	56.5	6.9	3.29***
Experimental group (n=30)	57.1	7.4		61.9	5.8	

***P<0.001 NS – not significant

The data presented in the table 3 depicts the difference in mean and standard deviation of attention span scores of school students in pretest (M= 55.6, 57.1, SD= 7.03, 7.4) between control and experimental group which was not statistically significant ($p>0.05$). Whereas after virtual reality therapy the difference in the mean and standard deviation (M= 56.5, 61.9, SD= 6.9, 5.8) between control and experimental group of school students was statistically significant ($P< 0.05$) i.e. In experimental group, mean concentration scores (M=57.1 & SD=7.4) was higher in posttest than in the pretest (M= 61.9 & SD= 5.8) which was statistically significant ($P< 0.05$). It can be attributed to the effectiveness of virtual reality therapy upon attention span. Hence the null hypothesis Ho1 "There will be no significant difference in the level of attention span between control and experimental group of school students in pretest and posttest" is rejected.

Table 4: Association Between the Selected Variables and the Level of Attention Span in School Students Before and After Virtual Reality Therapy in Control group (N=30)

Selected Variables	Before therapy		χ^2	After therapy		χ^2
	Up to mean	Above mean		Up to mean	Above mean	
Age						
Up to 14 years	13	13	0.53#	14	12	0.44#
Above14years	3	9	(df=1)	3	1	(df=1)
Gender						
Male	12	8	1.09	13	7	0.61
Female	4	6	(df=1)	5	5	(df=1)
Grade						
8th	11	8	0.41	12	6	0.83
9th	5	6	(df=1)	6	6	(df=1)
Academic Performance						
Up to 75	9	6	0.52	9	7	0.72
Above 75	7	8	(df=1)	8	6	(df=1)
Time to study in home						
Up to 2 hrs	11	7	1.2#	13	6	6.33#
Above 2 hrs	4	7	(df=1)	3	8	(df=1)
Attention without any distraction						
Up to 30 Min	11	8	0.41	10	9	0.12
Above30 Min	5	6	(df=1)	5	6	(df=1)

Note: # Yates correction value

It could be inferred from table 4 that, there was no significant association between the selected students' background characteristics and the level of attention span before and after virtual reality therapy in control group of school students. Hence the null hypothesis "there will be no significant association between selected demographic variables and the level of attention span before and after virtual reality therapy in the control group of school students" was retained.

Table 5: Association Between the Selected Variables and the Level of Attention Span in School Students Before and After Virtual Reality Therapy in Experimental group (N=30)

Selected Variables	Before therapy		χ^2	After therapy		χ^2
	Up to mean	Above mean		Up to mean	Above mean	
Age						
Up to 14 years	15	9	0.67#	14	10	2.6#
Above14years	4	2	(df=1)	4	2	(df=1)
Gender						
Male	11	8	0.16 #	12	7	0.13
Female	8	3	(df=1)	6	5	(f=1)
Grade						
8th	10	7	0.07	11	6	0.36
9th	7	6	(df=1)	7	6	(f=1)
Academic Performance						
Up to 75%	8	7	0.55	5	6	2.33
Above 75%		5	(df=1)	14	5	(f=1)
Time spend to study in home						
Up to 2 hrs	13	9	11.5#	5	9	0.84#
Above 2 hrs	4	4	(f=1)	13	3	(f=1)
Attention without any distraction						
Up to 30 Min	13	8	0.22#	14	7	0.52#
Above 30Min	4	5	(f=1)	4	5	(f=1)

Note: # Yates correction value

It could be inferred from table 5 that there was no significant association between the selected students' background characteristics and the level of attention span before and after virtual reality therapy in control group of school students. Hence the null hypothesis "there will be no significant association between selected demographic variables and the level of attention span before and after virtual reality therapy in the control group of school students" was retained.

Discussions

The study results show that 60%, 56.7% of the control group of school students' have average level to above average level of attention span before and after virtual reality therapy.

Whereas among experimental group of the school students, majority were found to have average level of attention before administration of virtual reality therapy (60%),whereas after virtual reality therapy most of them had above average level attention span (93.3%).

The difference in mean and standard deviation of attention span scores of school students in pretest (M= 55.6, 57.1, SD= 7.03, 7.4) between control and experimental group which was not statistically significant ($p>0.05$). In experimental group, mean concentration scores (M=57.1 & SD=7.4) was higher in posttest than in the pretest (M= 61.9 & SD= 5.8) which was statistically significant ($P< 0.05$). It can be attributed to the effectiveness of virtual reality therapy upon attention span. Findings are also reported in study conducted by Yang *et al.* (2014) [7] to assess the effectiveness of virtual reality and computer-assisted cognitive rehabilitation upon cognition among brain tumor patients. They found that, virtual reality and computer-assisted cognitive rehabilitation was effective in improving in cognition among brain tumor patients.

Chi – square test was used to find out the association between selected variables and the level of attention span. It is found that there was no significant association between the level of concentration, attention span and the selected variables of the secondary school students. Hence the null hypothesis Ho2 was retained.

Limitations

The study findings cannot be generalized due to small sample size. Investigator could not find much published studies on Virtual reality therapy on concentration. Setting was selected based on the convenience of the researcher.

Conclusion

The study revealed that lack of attention span, are one of the common problems faced by the school students. It may be due to various factors such as neurotransmitter imbalance, increasing nuclear family system and inadequate time to take care of the children by parents, misuse of technology etc. Virtual reality therapy is a non-pharmacological psychosocial intervention for the improvement of attention span, which can be practiced by secondary school students to improve level of attention span.

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