

# **Experimental Report of AVT**

( AVT : Audio Visual Entrainment Technology )

**Experimental school:** Zheng Yu Tong middle school, Shunde district

**Experimental group:** Class 5 of Junior Three, 50 students

**Control group:** Class 1 of Junior Three, 50 students

## **Experimental purpose:**

The purpose of this experiment is to see if the Audio Visual Entrainment Technology is helpful to develop Chinese youth's intelligence.

## **1. Experimental material and methods**

### **1.1 General material:**

Experimental group, Class 5, is a class in the lower level of study in Junior Three, including 14 male students and 36 female students, its average age is 15.

Control group, Class 1, is a class in the common level of study in Junior Three, including 21 male students and 29 female students, its average age is 15.

### **1.2 Experimental methods:**

The experimental group students used AVT for three month, sixth times a week, each time last 20 minutes (6: 50 am~7: 10 am).

The control group didn't use AVT.

### **Evaluation methods:**

- **IQ test:**

Utilized Raven's Progressive Matrices to test the experimental group students' IQ before and after using AVT, so did the control group at the same time, comparing the difference between the former and latter IQ score for two groups.

- **Major courses scores comparisons:**

Using the SPSS statistical analysis software, chose t-test to compare the difference between the former score and the latter score of each course for two groups.

- **Self-evaluation:**

Self-evaluation is mainly according to the experimental group students' experience of using AVT

## **2. Experimental result**

### **2.1 IQ score comparison**

#### **IQ score comparison of experimental group:**

26 students' IQ scores were improved, 14 students' IQ scores were descended, 10 students' IQ scores had no change

#### **IQ score comparison of control group:**

15 students' IQ scores were improved, 30 students' IQ scores were descended, 5 students' IQ scores had no change

### 2.2 Major courses scores comparison

Experimental group students got much higher mean of score in all major courses after using AVT. The increased range was respectively Math: 22 points, Chinese: 30.48 points and English: 19 points.

As to the control group, the latter means of Math and English scores were better than their former ones. The increased range was respectively Math: 8.42 points and English: 2.6 points, however, Chinese score is contrary, the latter means of Chinese score was 4.64 points poorer than the former one.

## 3. Discussion (analysis)

### 3.1: Statistical analysis:

#### Statistical analysis of IQ (Z - test)

	N	Min.	Max.	Mean	Std. Deviation
Experimental group former IQ	50	76	137	111.70	14.171
Experimental group latter IQ	50	76	140	117.36	16.723
Control group former IQ	50	79	140	116.06	16.930
Control group latter IQ	50	83	140	114.32	16.152
Valid N (list wise)	50				

Since there are two means of IQ scores from two groups, and we want to see if their representative collectivities are significant different, so we select Z –test method.

#### Relation between P and |Z|

Z	P	Significance of the Difference
Z ≥2.58	P≤0.01	Extraordinary significant different
Z ≥1.96	P≤0.05	Significant different
Z <2.58	P>0.05	Non-significant different

#### Former Z value:

$$\frac{111.70 - 116.06}{\sqrt{\frac{14.17^2}{50} + \frac{16.93^2}{50}}} = -1.397$$

|Z|=1.397<1.96

The former IQ difference of the two groups is non-significant.

**Latter Z value:**

$$\frac{117.36 - 114.32}{\sqrt{\frac{16.72^2}{50} + \frac{16.15^2}{50}}} = 0.925$$

$|Z|=0.925 < 1.96$

The latter IQ difference of the two groups is also non-significant.

The results indicated that at the 0.05 level of significance, AVT has not significant effect upon student’s IQ.

**Statistical analysis of major Course scores (t - test)**

t-test was used to perform the statistical analysis on the scores of major courses from two groups, via the SPSS statistical analysis software.

**Relation between P and t**

t	P	Significance of the Difference
$t \geq t(df)0.01$	$P \leq 0.01$	Extraordinary significant different
$t \geq t(df)0.05$	$P \leq 0.05$	Significant different
$t < t(df)0.05$	$P > 0.05$	Non-significant different

**A. Results analysis of comparing the former and latter scores of major courses (Paired samples t-test )**

First, do a t-test for the former and latter major courses scores of each group, respectively. Judge the effectiveness of this experiment by the significance of the difference between the means of the former score and the latter score of each course.

**a) t-test results of experimental group**

**Table 1: Paired samples t-test results of experimental group (e2:e1)**

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Math 2 – Math 1	22.000	5.447	.770	20.452	23.548	28.558	49	.000
Pair 2	Chinese 2 – Chinese 1	30.480	11.990	1.696	27.072	33.888	17.975	49	.000
Pair 3	English 2 – English 1	19.000	7.228	1.022	16.946	21.054	18.587	49	.000

**Analysis of Statistical Results:**

Table 1 illustrates that all the latter means of each major course score are higher than their former ones. The increased range was respectively Math: 22 points, Chinese: 30.48 points and English: 19 points.

On the other hand, in table 1, all *Significance Probability*,  $P < 0.01$ , that is to say, there is a extraordinary significant difference between the former and latter major courses

scores, moreover, as mention above, all the latter means of major courses scores are better than the former ones, so we can make a conclusion that the experimental group gain obvious improvement in all major courses after using AVT.

**b) t-test results of control group:**

**Table 2: Paired samples t-test results of control group (c2:c1)**

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Math 2 – Math 1	8.420	13.285	1.879	4.644	12.196	4.482	49	.000
Pair 2	Chinese 2 – Chinese 1	-4.640	7.093	1.003	-6.656	-2.624	-4.625	49	.000
Pair 3	English 2 – English 1	2.600	7.801	1.103	.383	4.817	2.357	49	.022

**Analysis of Statistical Results:**

According to table 2, we can see that the control group students also got better means of scores in Math and English than their former ones. The increased range was respectively Math: 8.42 points and English: 2.6 points. However, Chinese score is contrary, the latter mean of Chinese score was 4.64 points poorer than the former one.

we can also see that all *Significance Probability*,  $P < 0.05$ , that means there is significant difference between the means of the former scores and the latter scores for all major courses, combined with mention above, we can conclude that the control group students got some progress in Math and English study.

**B. Results analysis of comparing the mean of the difference between the former and latter scores of two groups ( independent samples t-test )**

As the results mentioned above, both experimental group and control group students performed better in Math and English study in this experiment, especial the experimental group. In terms of Chinese, the experimental group had a raise, while the control group descends a little.

In order to confirm the effectiveness of AVT for students’ study, we use independent samples t-test to compare the mean of the difference between the former and latter score of each course for two groups

**Table 3: Independent samples statistics of two groups**

	Group	N	Mean	Std. Deviation	Std. Error Mean
Math difference	Experimental group	50	22.00	5.447	.770
	Control group	50	8.42	13.285	1.879
Chinese difference	Experimental group	50	30.48	11.990	1.696
	Control group	50	-4.64	7.093	1.003
English	Experimental group	50	19.00	7.228	1.022

**Experimental Report of AVT**

difference	Control group	50	2.60	7.801	1.103
------------	---------------	----	------	-------	-------

**Table 4: Independent samples t-test results of two groups (e2-e1) : (c2-c1)**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Math difference	Equal variances assumed	30.197	.000	6.688	98	.000	13.580	2.031	9.550	17.610
	Equal variances not assumed			6.688	65.024	.000	13.580	2.031	9.525	17.635
Chinese difference	Equal variances assumed	9.650	.002	17.826	98	.000	35.120	1.970	31.210	39.030
	Equal variances not assumed			17.826	79.556	.000	35.120	1.970	31.199	39.041
English difference	Equal variances assumed	.397	.530	10.904	98	.000	16.400	1.504	13.415	19.385
	Equal variances not assumed			10.904	97.435	.000	16.400	1.504	13.415	19.385

**The results are summarized below:**

From Table 3 and Table 4, we can see that all the means of the difference between the former and latter scores of the experimental group are better than those of the control group. The difference range is respectively Math: 13.58 points, Chinese:35.12 points and English:16.40 points.

We can also see from table 4:

About Math, the Sig. value of “Levene's Test for Equality of Variances” is  $0 < 0.05$ , that means “Equal variances not assumed”, so we should adopt the sig. value in the row of “Equal variances not assumed”, that is  $0 < 0.05$ , in conjunction with analysis above (Math: 13.58 points), we can concluded that that the experimental group gain greater improvement in Math than the control group after they used AVT.

In terms of Chinese, the Sig. value of “Levene's Test for Equality of Variances” is  $0.002 < 0.05$ , so we should also adopt the sig. value in the row of “Equal variances not assumed”, that is  $0 < 0.05$ , combined with analysis above (Chinese: 35.12), we can make a conclusion that the experimental group made more significant progress in Chinese than the control group after they used AVT.

As to English, the Sig. value of “Levene's Test for Equality of Variances” is  $0.530 > 0.05$ , therefore, we should adopt the sig. value in the row of “Equal variances assumed”, that is  $0 < 0.05$ , combined with analysis above (English: 16.40 points), we can deduce that the experimental group had a better improvement in English than the control group after they used AVT.

To sum up the analysis above, we draw a conclusion that the experimental group had great progress in all major course study after they used AVT, that is to say, AVT can significantly promote the students’ study.

**Statistical analysis of Questionnaire (Percentage test)**

We adopted percentage test to do the statistical analysis of the student’s self-evaluation questionnaire.

**Table Q1**

Q1	No effect	Fair effect	Good effect	Excellent effect
How do you think of	0	24	23	1

## Experimental Report of AVT

the effectiveness of AVT to your study?				
Percentage	0%	50%	48%	2%

Table Q1 indicated that all students using AVT think it's effective to their study, and half of students have a good evaluation on AVT.

**Table Q2**

Q2	Attention concentration	Memory improvement	Emotion stabilization	Others
What is the most significant effect of AVT to you?	16	4	19	9
Percentage	33.3%	8.3%	39.6%	18.8%

We can see from Table Q2, AVT has various effects upon student's study. Particularly, "Attention concentration" and "Emotion stabilization", both of them were chosen by over 1/3 students.

**Table Q3**

Q3	Stop at once	Use occasionally	Keep on use
Will you keep on use AVT?	3	9	36
Percentage	6.2%	18.8%	75%

Table Q3 illustrates most of the experimental group students will continue to use AVT, 75% students will keep on use it.

**Table Q4**

Q4	Morning	Noon	Afternoon	Evening
What is the best time for you to use AVT?	29	5	3	11
Percentage	60.4%	10.4%	6.2%	23%

Table 4 indicated that more than 60% students believe that morning is the best time to use AVT. The following better time is evening, 23% students choose it.

**Table Q5**

Q5	Excellent	Fair	poor
How do you think of our work in this experiment?	48	0	0
Percentage	100%	0	0

It's obvious in the results of Table Q5 that all experimental group students are satisfied with our work in this experiment.

**GuangDong Social Medical Seminar  
Dr. Koo Psychological Consultancy & Training Institute**