

## Assessing the Efficacy of an Interactive Thinking Tools Based Teaching Program in Teaching Hearing Disable Individuals

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### Abstract

The study aimed to assess the efficacy of an interactive thinking tools based teaching program in teaching hearing disable individuals in Al-Zarqa educational district , and also to develop a scale of achievement motivation among hearing disable students . The sample of the study consisted of 20 male and female students with hearing disability from the high basic stage in the academic year 2010/2011 whom were randomly selected and . were distributed into two main groups : an experimental group ( 10 male and female students ) and a control one( 10 male and female students ) . To check for the equivalence of the two groups of the study, the scale of pre achievement motivation was applied as a tool of the study, means and standard deviation were calculated for the students' pre assessments on each dimension of the dimensions of achievement motivation scale and on the scale as whole . Achievement motivation scale was used as the tool of the study . results of the study indicated that there were plausible differences between the means of the post tests on each dimension of the achievement motivation scale dimensions and on the scale as whole according to the variable of the group ( experimental or control ) and also that there were plausible differences between the means of experimental group students pre and post assessments on each dimension of the achievement motivation scale dimensions and on the scale as whole according to the assessment variable ( pre or post ) . In light of the results of the study, the researchers concluded with a group of recommendations among them : Conducting training courses for teachers to train them on computerized educational programs that are based on interactive tools and methods to stimulate achievement motivation among hearing impaired students .

**Key word:** Interactive Thinking, Teaching, Program, Hearing, Disable Individuals

### Introduction:

Communities and educational and scientific organizations exert great efforts nowadays to employ the whole findings and advances in teaching methods and means revealed by science to progress with qualifying their members and specially the student , as these organizations offer the student information using the whole advanced educational and teaching strategies and methods .

Interactive thinking tools via internet is one of the advanced and developed means that belong to educational technology , as they are based to a theoretical background which in turn helps on creating an interactive educational environment that is directed and greatly focused on the learner's role within this environment by interactive activities that invest the real potentials and abilities of this learner , which enhanced many educational facilities and centers to invest the assistant technology through technological means and methods , and that is by constructing and designing educational programs that are based on using interactive thinking tools as an educational method such as Intel Teach for Future , from which interactive thinking tools are an important part. These tools are characterized by the content that represents an educational; technical and interesting method based on projects teaching program that mainly depends on modern teaching methods such as : problem solving , investigation , cooperative learning , so as to enhance self learning , as these strategies emphasize the development of student ability on communication , dialogue , and on employing information in the daily life situations so as to be meaningful for this student , hence , teacher takes his part that is a student centered role and directed toward the learner as a major role (Jordanian Ministry of Education, 2005) .

### \* Statement and significance of the study :

Responsible parties offer programs and courses for ordinary students paying no attention to the categories of disable individuals as an important component of their students . And if these parties offered these categories something, they offered it with its usual construct with out attention to the characteristics of such categories , as those with hearing disability possess a slow learning abilities not due to mental disorders but because of their hearing disability as it limit their cognitive development . What helps these students to overcome the lack and deficiency in performance is using advanced educational tools and means such as computer and its applications , as such tools and means are visionary tools that offer information interactively ( Al-Sarays, 2001 ) .

The results of Hisky ,Kirk , and Myklebus' study , mentioned in Al-Qarioti ( 2006 ) , that the intelligence of students in hearing disable students, schools has a natural distribution , as many studies such as that of Siddiq ( 2001 ) and Al-Qarioti ( 2006 ) have indicated that there were no significant statistical differences between the intelligence level of students with hearing disability and the level of those ordinary students , and that they have the ability for learning and on Abstractionist thinking unless other disorders such as brain damage or any other disabilities associate their hearing disability .

The problem of the current study is characterized by the main research question of What is the efficiency of an educational program that is based on interactive thinking tools in stimulating achievement motivation among students with hearing disability ?

**\* Question of the study :**

Are there any significant statistical differences between the mean of performance among the members in the experimental group and that of the members of the control group in stimulating achievement motivation and its dimensions ( self-confidence , superiority , endurance, perseverance, competing with others, ambition, and the importance of the time ) that are attributed to the educational program ?

**\* Significance of the study :**

The investment of techniques in the educational and teaching process of hearing disable students is regarded an important and a great step toward achieving outcomes that become apparent through students' interaction with the educational content , and drawing the hearing disable students male and female teachers' attention to the necessity of using educational programs that are based on advanced and modern educational means and methods and according to teaching in projects so as students will be the key focus in this process .

**\* Goals of the study :**

- 1- Constructing interactive thinking tools based teaching program that includes advanced strategies and methods in teaching hearing disable individuals .
- 2- Working on developing a scale of achievement motivation among hearing disable students .

**\* Procedural and conceptual identifications :**

- **Interactive Thinking Tools** : direct interactive thinking tools via internet that develop Knowledge and cognition for students and serve in opening the way for search and investigation and enhance students' interest to gain Knowledge and expands cognitions and thinking , the most prominent among these tools are ( as pointed out by the Jordanian Ministry of Education, 2006 ) :

1- **Visual Ranking Tool** : a group of resources to arrange lists and comparing them within the classroom sitting , and they include an interactive work environment via the internet to assist students and teachers alike in discussions and participations when assessing or evaluating the lists. And in any topic and at any stage, students would use the tool to learn the properties , to discuss the differences , to evaluate relations , and to obtain an agreement and organize their ideas .

- **Seeing Reason Tool** : a tool that has its own work environment for the educational situation to investigate the relationships of cause and outcome in a complex manner , within this tool , there is an interactive tool to draw maps that helps students in drawing the maps of casual relationships in the various subjects and educational stages . These maps which are created by students are stored in a work zone created by the teacher on the internet .

- Procedurally , **Seeing Reason Tool** defined as tools that direct the learner toward thinking and exerting efforts and to seek success , and to compete in implementing the tasks of a lesson through the effective participation of the learner in multiple tasks within presenting the class .

- **Achievement Motivation** : is an activity that motivates and enhance the individual to enjoy the situations of competency , the strong desire to obtain intellectual solutions and results , and preferring the moderate-adventure tasks rather than simple or low-adventure tasks or the hard-adventure ones ( Qtami and A'das , 2002 ).

- Procedurally , **Achievement Motivation** defined as the score the respondent obtains on the test of achievement motivation used in this study .

-**The Educational Program** : a previously constructed general scheme for both educational and teaching processes for an educational stage , through which an abstract for the procedures and topics that will be implemented through a specific period ( a month , sex months , a year ) is presented . the program includes the educational experiences that teacher must sequentially acquire according to years of development and the essential needs ( Al-Laqani and Al-Jamal, 2003 ) .

- Procedurally ,**The Educational Program** is defined as a scheme that has been designed after reviewing the theoretical literature and the previous experiences in which the title, general and specific goals , procedures , and the necessary activities have been defined , and it is consisted of 28 classroom lessons , with a clarification for the interactive thinking tools it relies on . The program also contained the plans of implementing the lessons ,and the assessment models related to the tools and the educational content with an advanced and modern style that aims to enhance achievement motivation among hearing disable individuals .

### **Limits of the study : \***

This study is limited by :

- 1- **Spatial limitations** : schools of hearing disable students in Zarqa.
- 2- **Time limitations** : the study was applied at the second semester for the academic year 2010/2011 .
- 3- **Human related limitations** : hearing disable students in Al-Raja' and Al-A'mal schools whom ages ranged from 14 to 16 years , hence , the results of this study can be generalized only on this society and the similar societies .
- 4- **Material limitations** : the tools used in the study that have acceptable reliability and validity .

### **\* Limitations of the study :**

- 1- The results of the study are related to the concept of motivation that was adapted here in this study , and also related to the tools that were used to assess motivation , therefore , the results may differ according to the different concepts of motivation or the different tool used to assess motivation.
- 2- The results of the study are related to the nature of the educational program that has been developed according to the interactive thinking tools and to the method used to implement this program . So, the results may differ according to the different educational program or the different method used to implement this program.

### **\* Literature Review :**

Hallahan , Kauffman & Pullen ( 2012 ) offer a definition for hearing disable individuals based on the sequent processing for the linguistic information, as deaf person is unable on audio communication via hearing sense wither used hearing aids or not and this is due to his/her severe hearing disability.

The theoretical literature indicates that he studies which used educational or training program with hearing impaired students revealed that there was a positive effect regarding developing multiple abilities in various aspects such as : self-esteem , critical thinking , progressive thinking , creative thinking , facilitating achievement generally and academic achievement in particular , and stimulating motivation ( Al-Sroor, 2010).

Nunes & Moreno's study ( 2002 ) aimed to construct a program to stimulate deaf students' achievement motivation in mathematics . The performance of the experimental group was better than the control one in the post tests and this was attributed to using the Stimulus program .

The study of Al-Harbi ( 2005 ) aimed to investigate the effectiveness of using computer in providing with the Mathematical concepts and stimulating motivation by applying an educational program for the hearing impaired students. The results indicated significant statistical differences between the average performance of both the control and the experimental groups that are attributed to the educational program in favor of the experimental one.

Reed, Antia, and Kreimeyer ( 2008 ) conducted a study that emphasized the effects of a number of factors in increasing the level of motivation among hearing impaired student , among which , helping the families , the good communication with the professionals , and follow - up with parents .

Ju's study ( 2009 ) investigated the influence of a multimedia Featured Stories-based program on stimulating the deaf and hearing impaired students' motivation. The results indicated significant statistical differences in the performance of the experimental group that are attributed to training and the applied program .

Richardson, Marschark, Sarchet, and Sapere ( 2010 ) conducted a study that aimed to a better understanding for a variety of educational situations for academic achievement by hearing impaired students through the level of their motivation and the desire to assess their achievement . The results indicated higher positive expectations in favor of the experimental group regarding gaining analytical skills rather than being taught , and also regarding increasing teachers concern toward these students , the flexibility of their assessment methods compared to being among the ordinary students or being integrated with them .

### **\* Society and sample of the study :**

The society of the study consisted of the whole hearing impaired students in the schools of hearing impaired students in Al-Zarqa municipality for the high basic stage ( 8<sup>th</sup> , 9<sup>th</sup> , and 10<sup>th</sup> grades ) for the academic year 2010/2011 whom accounted for 86 male and female students . The sample of the study consisted of 20 male and female hearing impaired students whom were distributed into to main groups : an experimental group ( 10 male and female students ) and a control one( 10 male and female students ) . The sample of one of the high basic stage grades was randomly selected using lottery between the three grades ( 8<sup>th</sup> , 9<sup>th</sup> , and 10<sup>th</sup> grades ) and that was conducted by writing the level of these grades on papers and then one of these papers selected and hence 10th grade was selected in both schools , and the experimental and the control groups for this stage in both schools were determined using lottery too ( the experimental group was the 10th grade in Al-A'mal school , and the control one was from Al-Raja' school ) .

### **\* Groups equivalence in pre achievement motivation :**

To check for the equivalence of the two groups of the study, the scale of pre achievement motivation was applied as a tool of the study, means and standard deviation were calculated for the students' pre assessments on

each dimension of the dimensions of achievement motivation scale and on the scale as whole as shown in table ( 1 ).

Table ( 1 )

Means and standard deviations for students' pre assessments on each dimension of the dimensions of achievement motivation scale and on the scale as whole

Dimension	Group	No	Lowest Value	Highest value	Mean	SD
Self-confidence	Control	10	1.11	2.78	1.54	0.52
	Experimental	10	1.11	2.56	1.49	0.40
superiority	Control	10	1.10	2.20	1.54	0.35
	Experimental	10	1.20	2.40	1.50	0.34
Endurance and perseverance	Control	10	1.22	2.22	1.61	0.34
	Experimental	10	1.11	2.56	1.49	0.41
Competing with others	Control	10	1.00	2.00	1.44	0.34
	Experimental	10	1.00	2.40	1.50	0.42
Ambition	Control	10	1.22	2.11	1.50	0.34
	Experimental	10	1.11	2.33	1.50	0.33
Importance of time	Control	10	1.00	2.60	1.54	0.49
	Experimental	10	1.20	2.80	1.60	0.48
The scale as whole	Control	10	1.19	2.19	1.54	0.34
	Experimental	10	1.30	2.49	1.51	0.35

Table ( 1 ) indicates plausible differences between the means of students' pre assessments on each dimension of the dimensions of achievement motivation scale and on the scale as whole and according to the variable of the group ( control or experimental ) . To identify the significance of the difference , Mann-Whitney Test was used as shown in table ( 2 ) .

Table ( 2 )

Mann-Whitney Test results for the assessments of the sample of the study on each dimension of the dimensions of achievement motivation scale and on the scale as whole

Dimension	Group	No	Ranks' means	Total ranks	Mann-Whitney Test value	Statistical significance
Self-confidence	Control	10	10.30	103.00	48.000	0.878
	Experimental	10	10.70	107.00		
superiority	Control	10	11.00	110.00	45.000	0.702
	Experimental	10	10.00	100.00		
Endurance and perseverance	Control	10	11.90	119.00	36.000	0.278
	Experimental	10	9.10	91.00		
Competing with others	Control	10	10.15	101.50	46.500	0.787
	Experimental	10	18.85	108.50		
Ambition	Control	10	9.95	99.50	44.500	0.672
	Experimental	10	11.05	110.50		
Importance of time	Control	10	10.05	100.50	45.500	0.730
	Experimental	10	10.95	109.50		
The scale as whole	Control	10	10.05	100.50	47.500	0.850
	Experimental	10	10.95	109.50		

From table ( 2 ) above, it is clear that there are no significant statistical differences at alpha – 0.05 between the ranks' means and the total ranks in the results of Mann-Whitney Test for students' pre assessments on each dimension of the dimensions of achievement motivation scale and on the scale as whole that are attributed to the variable of the group ( control or experimental ) , as Mann-Whitney Test values ranged from 36 to 48 on the dimensions of the scale and was 47.500 on the scale as whole , the significance level on the dimensions of the scale ranged from 0.278 to 0,878 , with a significance level of 0.850 on the scale as whole , and these values are higher than alpha= 0.05 which indicates the equivalence of both the control and the experimental groups on each dimension of achievement motivation scale and on the scale as whole .

**\* Instruments of the study :**

**First : Achievement Motivation Scale .**

The achievement motivation scale used in this study was constructed according to the following steps :

- Reviewing the theoretical literature related to achievement motivation in specialized resource such as ( Khalifah 2000 , Petri & Govern 2004 , A'lawnih 2004 , A'das 2005 , Al-Qdhah & Al-Tartori 2006 , and Gabari 2008 ) to identify the basic dimensions of achievement motivation scale and to check for the functions of their features.
- Reviewing previous scales related to achievement motivation that were used in studies such as those of ( Al-Qadiri 2000, Al-Slili 2008 Abu Talib 2008 ) , in addition to the previous studies mentioned in this study , which also used achievement motivation scales , and hence the possible ideas were identified from the items of these scales and used to construct the current scale . The scale of Abu Talib ( 2008 ) was heavily utilized here due to the nature of the test used in his study, as it consisted of a group of items with a linguistic formulations that allow the respondent to express him / herself by verbal situations and stances.
- In its first version achievement motivation scale consisted of six dimensions : self-confidence: items 1-10 , superiority: items 1-10 endurance and perseverance: items 1-14 competing with others: items 1-12 ambition: items 1-10 , and the importance of the time : items 1-11 , hence , the scale in its initial version consisted of 67 items . The respondent marks the expression that confirm his/her situation with the symbol ( x ) , and in this scale Likert Triple scale ( 3= often , 2= sometimes and 1= rarely ) for the purposes of responding on the items of the scale and calculating it as shown in Index 4 .
- It was taken into account that the sample of the study is hearing impaired one , so , there was a concern in the scale to use simple words and statements to be appropriate with the cognitive characteristics of the sample , and also there was a reliance on the personal experience and the field work in hearing impaired schools .
- After finishing the construction of the scale , the psychometric properties ( reliability and validity ) for the assessment was checked .

**\* Reliability of Achievement Motivation Scale :**

To check for the reliability of achievement motivation scale , two reliability type were used :

1- **Content reliability** : the reliability of the scale was confirmed after submitting it to a jury of 10 experts and specialists in special education , psychology , and Evaluation and assessment fields to give their opinions regarding :

- The clarity of the words' linguistic formulation .
- To how extent the item is related to the dimension it assesses , and to the scale as whole .
- Another perceptions regarding the tool ( delete , add , or modify any items and also judge wither an item is belonging or not ) . In light of the recommendations of 80% of the jury regarding modifying the scale , some items were linguistically reformulated , and some negative items were changed into positive ones , and language was simplified , with 20 items deleted from the scale , and hence the scale emerged with its final 47-item version .

2- **Construct reliability** : for the purposes of checking for the construct reliability of achievement motivation scale , it was applied on a pilot sample consisted of 43 male and female hearing impaired students other than the original sample of the study . Construct reliability was checked using the coefficients between the score of each item and the total score for the dimension and score of the scale as whole by means of the corrective coefficient ( the relation of the item to the dimension it belongs to and the scale as whole ) , as each item with a less than 30% coefficient will be excluded . The results of the pilot study indicated that the whole items were related to the dimensions they belonging to , as item-dimension and item-scale coefficients were 0.32 – 0.77 and 0.35 – 0.76 respectively , and these are acceptable values which means that the items of the scale are valid to assess achievement motivation among students ., and these values were appropriate for the purposes of conducting this study , and hence the scale emerged with its final 47-item version .

( The researcher adopted Ebel standard 1972 that indicates the item is appropriate with a coefficient of 0.30 and more )

**\* Validity of the scale :**

The validity of the scale was determined using two methods :

**1- Test-retest validity :** the validity of the scale was confirmed by applying it on a pilot sample of 43 male and female hearing impaired students from the society of the study but other than the original sample used in the study , with two weeks interval between the first and the second application . Pearson coefficient , the test validity ratio was 0.82 on self-confidence dimension , 0.84 on superiority dimension , 0.86 on endurance and persistence dimension , 0.79 on competing with other dimension , 0.81 on ambition dimension , 0.80 on the dimension of importance of time , and 0.88 on the scale as whole .

**2- Internal consistency :** internal consistency was calculated using Cronbach's Alpha with the first application scores . Internal consistency was 0.86 on self-confidence dimension , 0.86 on superiority dimension , 0.88 on endurance and persistence dimension , 0.84 on competing with other dimension , 0.82 on ambition dimension , 0.74 on the dimension of importance of time , and 0.96 on the scale as whole . These values were regarded appropriate for the purposes of conducting the current study as shown in table ( 3 ) .

Table ( 3 )

Internal consistency correlations ( Cronbach's Alpha ) and test=retest correlations ( Pearson ) for each dimension on achievement motivation scale and the scale as whole

Skill	Items	Items numbers	Internal consistency correlations /Cronbach's Alpha	test=retest correlations ( Pearson )
Self-confidence	1•2•3•4•5•6•7•8•9	9	0.86	0.82
superiority	10•11•12•13•14•15•16•17•18•19	10	0.86	0.84
Endurance and perseverance	20•21•22•23•24•25•26•27•28	9	0.88	0.86
Competing with others	29•30•31•32•33	5	0.84	0.79
Ambition	34•35•36•37•38•39•40•41•42	9	0.82	0.81
Importance of time	43•44•45•46•47	5	0.79	0.80
The scale as whole		47	0.96	0.88

**\* Correcting achievement motivation scale :**

In its final version , the achievement motivation scale consisted of 47 items distributed on six dimensions and after obtaining the final form of the scale , the items were Sequentially arranged for the whole skills ( from 1 to 47 ) so as to make it easy for the students to response during translating the questions into sign language . Hence, the scale consisted of 9 items for self-confidence dimension , 10 for superiority dimension , 9 for endurance and persistence dimension , 5 for the dimension of competition with others , 9 for ambition dimension, and 5 items for the dimension of importance of time . To ensure the accuracy of the statically input data to SPSS software , and to response on the items of the scale , students mark with ( x ) against the statement that confirms his/her situation . Likert triple scale ( 3= often , 2= sometimes and 1= rarely ) was adopted , hence , the highest score a student may obtain is 141 and the lowest score my be obtained is 47 .

**\* Program of the study :**

**-Components of the program :**

The program consisted of an introduction and a clear presentation for the idea and its justifications , and contained the general goal and the specified goals , planning, implementation and assessment models , and a daily lessons plans in which the whole elements of the daily lesson plan are clear which are attached to the program with its final version . Following , is a description for these components :

1- **Reading texts from 10<sup>th</sup> grade materials** , which are two units ( Desertification and Traits inheritance ) which were prepared for the program after conducting the random selection to determine the sample of the study among the three grades ( 8th , 9th ,and 10th ) and as these units are identified by the official parties and the educational settings to be appropriate for the educational level of this category of students .

2- **Assistant technological tools ( or technological aids ) :**

( A laptop , data-show instrument , internet prod-band , presentation screen , light indicator , short and interesting U-tube films related to the educational material , PowerPoint presentations , brochures designed with publisher software ) .

3- **Educational tools and means :** ( colored pens , pencils , notebooks , glossy paper , plastic scissors , different glues , symbolic ( cognitive ) and material reinforces , cardboard and colored cardboard ) .

4- **Educational methods :** ( interactive thinking tools , participative stories , educational magazines , attached applicative models for planning , implementation , and assessment ) .

**5- A period of nearly 7 weeks** with two sessions weekly that include 4 classes , 45 minutes for each class and a 10-minutes break between the two classes each session .

**6- The targeted group :** basic stage hearing impaired students in Jordan.

**\* Program meetings :**

The educational program consisted of 14 meetings , the application of which took a 7-weeks period , these meetings were distributed on 28 classes , with determining the daily preparatory plan within each meeting . The meetings included :

1- **Introduction :** a clarification for the ideas that will be presented each meeting , and presenting an interesting overview for what will be discussed .

2- **Specific goals :** the preparatory plan included specific goals for each meeting , and was constructed consequentially and needs for a particular mechanism to implement it .

3- **Methods , means and tools :** regarding methods , means and tools , computer with its applications was used primarily , in addition , interactive thinking tools and many manual methods and tools such as colored pens , cardboard and scissors were used . For teaching strategies and methods , problem solving , cooperative learning , critical thinking , distribution of tasks , and many other advanced strategies in teaching were utilized .

4- **Assessment :** assessment was continuous through the attached programs within the major program .

5- The program included two long term and comprehensive plans for the whole meetings ( a plan for each unit ) .

**\* Methodology :**

The Quasi-experimental approach was followed in the current study , as the pre assessment was applied on the experimental group members , and then the training program was applied on them , after that , the post assessment was applied , while the control group didn't receive the training program , but the pre and post assessment was applied on this group .

**\* Design and statistical treatment of the study :**

Quasi – experimental approach was utilized in this study , as the participants were randomly selected . To answer the question of the study , the two equivalent groups design was used with a pre and a post test and to achieve the purpose of the study , the experimental-control group design was used when offering the treatment to the experimental group , while the control one didn't receive any kind of treatment as shown in figure ( 1 ) .

**Figure ( 1 )**

**Design of the experimental and control groups**

Group	The pre-test	Treatment ( the program )	The post-test
Experimental	O1	X	O2
Control	O1	-	O2

To answer the question of the study , the following statistical method were used :

- Mann-Whitney Test was used to answer the question of the study , means and standard deviations were calculated , and to check if there were significant statistical differences at  $\alpha = 0.05$  in stimulating achievement motivation and its dimensions between the experimental group members and those in those in control group .

To increase the accuracy of the results and the effectiveness of the program , means of ranks and their total were calculated using Wilcoxon Signed Ranks Test for experimental group students' pre and post assessments which indicated that the significance of the differences was in favor of the post test .

**\* Results and discussions :**

Means and standard deviations for students' post assessments on each dimension of achievement motivation scale and on the scale as whole as shown in table ( 4 ) .

Table ( 1 )

Means and standard deviations for students' post assessments on each dimension of the achievement motivation scale dimensions and on the scale as whole

Dimension	Group	No	Mean	SD
Self-confidence	Control	10	1.71	0.27
	Experimental	10	2.31	0.22
superiority	Control	10	1.84	0.16
	Experimental	10	2.29	0.20
Endurance and perseverance	Control	10	1.98	0.20
	Experimental	10	2.41	0.28
Competing with others	Control	10	1.86	0.21
	Experimental	10	2.28	0.29
Ambition	Control	10	2.14	0.10
	Experimental	10	2.50	0.20
Importance of time	Control	10	1.88	0.23
	Experimental	10	2.36	0.21
The scale as whole	Control	10	1.90	0.12
	Experimental	10	2.36	0.09

From table ( 4 ) , it is clear that there were plausible differences between the means of the post tests on each dimension of the achievement motivation scale dimensions and on the scale as whole according to the variable of the group ( experimental or control ) . To identify the statistical significance of the differences , Mann-Whitney Test was used as shown in table ( 5 ) .

Table ( 5 )

Mann-Whitney Test results for the post assessments of the sample of the study on each dimension of the dimensions of achievement motivation scale and on the scale as whole

Dimension	Group	No	Ranks' means	Total ranks	Mann-Whitney Test value	Statistical significance
Self-confidence	Control	10	6.20	62.00	7.000	*0.001
	Experimental	10	14.80	148.00		
superiority	Control	10	5.95	59.50	4.500	*0.001
	Experimental	10	15.05	150.50		
Endurance and perseverance	Control	10	6.40	64.00	9.000	*0.002
	Experimental	10	14.60	146.00		
Competing with others	Control	10	6.75	67.50	12.500	*0.004
	Experimental	10	14.25	142.50		
Ambition	Control	10	6.05	60.50	5.500	*0.001
	Experimental	10	14.95	149.50		
Importance of time	Control	10	6.05	60.50	5.500	*0.001
	Experimental	10	14.95	149.50		
The scale as whole	Control	10	5.50	55.00	0.000	*0.000
	Experimental	10	15.50	155.00		

Table ( 5 ) indicated significant statistical differences at the value  $\alpha= 0.05$  between the means of ranks and their total in Mann-Whitney Test for students' post assessments on each dimension of the achievement motivation scale and on the scale as whole that are attributed to the group variable ( experimental or control ) and these differences were in favor of the experimental group students' assessments . Mann-Whitney Test values for the dimensions of the scale ranged from 4.500 to 12.500 with a significance value of 0.001- 0.004 , the whole scale test value was 0.000 with a significance value of 0.000 , and the whole significance values were less than  $\alpha= 0.05$  .To check for the effect of the educational program in stimulating achievement motivation , means and standard deviations for the experimental group students' pre and post assessments were calculated on each dimension of the achievement motivation scale dimension and on the scale as whole as shown in table ( 6 ) .



Table ( 6 )

Means and standard deviations for the experimental group students' pre and post assessments were calculated on each dimension of the achievement motivation scale dimension and on the scale as whole

Dimension/ skill	Assessment	Mean	SD
Self-confidence	Pre	1.49	0.40
	Post	2.31	0.22
superiority	Pre	1.50	0.34
	Post	2.29	0.20
Endurance and perseverance	Pre	1.49	0.41
	Post	2.41	0.28
Competing with others	Pre	1.50	0.42
	Post	2.28	0.29
Ambition	Pre	1.50	0.33
	Post	2.50	0.20
Importance of time	Pre	1.60	0.48
	Post	2.36	0.21
Scale as whole	Pre	1.51	0.36
	Post	2.36	0.09

From table ( 6 ) it is clear that there were plausible differences between the means of experimental group students pre and post assessments on each dimension of the achievement motivation scale dimensions and on the scale as whole according to the assessment variable ( pre or post ) . And to identify the statistical significance of the differences , Wilcoxon Signed Ranks test was used as shown in table ( 7 ) .

Table ( 7 )

Wilcoxon Signed Ranks Test for experimental group students' pre and post assessments on each dimension of the achievement motivation scale dimensions and on the scale as whole

Dimension	Rank type	No	Rank mean	Total ranks	Wilcoxon value ( Z )	Statistical significance
Self-confidence	Negative	1	1.00	1.00	2.701	*0.007
	Positive	9	6.00	54.00		
	Marginal	0				
superiority	Negative	1	1.00	1.00	2.708	*0.007
	Positive	9	6.00	54.00		
	Marginal	0				
Endurance and perseverance	Negative	1	0.00	0.00	2.803	*0.005
	Positive	9	5.50	55.0		
	Marginal	0				
Competing with others	Negative	1	3.50	3.50	2.458	*0.014
	Positive	9	5.72	51.50		
	Marginal	0				
Ambition	Negative	1	0.00	0.00	2.805	*0.005
	Positive	9	5.50	55.00		
	Marginal	0				
Importance of time	Negative	1	4.50	4.50	2.363	*0.018
	Positive	9	5.61	50.50		
	Marginal	0				
Scale as whole	Negative	1	1.00	1.00	2.701	*0.007
	Positive	9	6.00	54.00		
	Marginal	0	1.00			

From table ( 7 ) , it can be inferred that there were significant statistical differences at  $\alpha = 0.05$  between the means of ranks and their total for the experimental group students' assessments on each dimension on the achievement motivation scale dimensions and on the scale as whole that are attributed to the variable of assessment ( pre or post ) and in favor of the post assessment . **Wilcoxon** test values for the dimensions of the scale ranged from 2.363 to 2.805 with a significance level of 0.005-0.018 , and the value of the test of the scale was 2.801 with a significance level of 0.007 , and the whole values of the significance level were less than  $\alpha =$

0.05 which indicate an effect for the educational program in stimulating achievement motivation among the experimental group members.

**\* Discussion of the results :**

After calculating the means and the standard deviations , they indicated plausible differences . To identify the significance of these differences , Mann-Whitney test was used , and its results indicated significant statistical differences at the level  $\alpha=0.05$  between the average performance for the experimental group members on whom the interactive thinking tools based educational program was applied , and the average performance of the control group members from the same level whom didn't receive the educational program , and that was on achievement motivation scale with its six dimensions ( self-confidence , superiority , endurance, perseverance, competing with others, ambition, and the importance of the time ) , and these results were in favor of the experimental group pre and post assessments on each dimension of the achievement motivation scale dimensions and on the scale as whole , as there were significant statistical differences , and to check in favor of whom were these differences , Wilcoxon Signed Ranks Test was used , and the results revealed that these differences were in favor of the post test .

These positive results may be due to the nature of the educational material included in the educational program that was based on the interactive thinking tools , as teacher was the instructor and the facilitator for a great amount of students' participation , cooperation , search , and thinking within the classroom , and for students' rearrangements for items and giving justifications for such an arrangement , in addition to reflection in drawing casual maps and extracting the relations between cause and results and then extracting the relations between the results as whole , and students' ability to assume resolutions and exert efforts in mental processes.

The results emphasize the effect for the educational program that was based on interactive thinking tools on stimulating achievement motivation with its six dimensions among hearing disable students in the basic stage , which in turn emphasize the importance of the educational program used to stimulating achievement motivation with its diminutions among the students whom received the treatment in this study .

**Recommendations :**

In light of the results of the study , the researcher conclude with the following recommendations :

- 1- Conducting training courses for teachers to train them on computerized educational programs that are based on interactive tools and methods to stimulate achievement motivation among hearing impaired students .
- 2- Preparing and activate programs and exerting more efforts in designing these programs to include the use of interactive thinking tools to instruct the hearing impaired learner and to focus on his/her role and to develop him/her .

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