## Analysis and interpretation:

In an experimental research and from a statistical point of view through the experimental treatment, we shall calculate the frequency of scores which indicates " the number of the same scores obtained by subjects in the same task or activity ". the following table represents the frequency of scores obtained by both experimental and control groups in the listening tests.

| **Experimental group** | | **Control group** | |
|---|---|---|---|
| **Score " $X_E$"** | **Frequency "F"** | **Score " $X_C$"** | **Frequency "F"** |
| 05 | 02 | 05 | 05 |
| 06 | 04 | 06 | 04 |
| 07 | 08 | 07 | 09 |
| 08 | 03 | 08 | 09 |
| 09 | 04 | 09 | 10 |
| 10 | 21 | 10 | 17 |
| 11 | 12 | 11 | 13 |
| 12 | 17 | 12 | 11 |
| 13 | 14 | 13 | 10 |
| 14 | 06 | 14 | 06 |
| 15 | 04 | 15 | 03 |
| 16 | 05 | 16 | 03 |
| **Sum of "F"** | **N= 100** | **Sum of "F"** | **N= 100** |

**Table 84 : Frequency distribution of both group' score values in the listening tests.**

From the above table we deduce the following:

- The scores obtained by the two groups range between ( 05-16)
- The experimental group recorded more frequencies in the scores above the average 10 than the control group.

| Experimental group | Control group |
|---|---|
| 79 scores > 10<br>21 scores < 10 | 37 scores > 10<br>63 scores< 10 |

**Table 85 : The two groups' score frequencies above the average 10.**

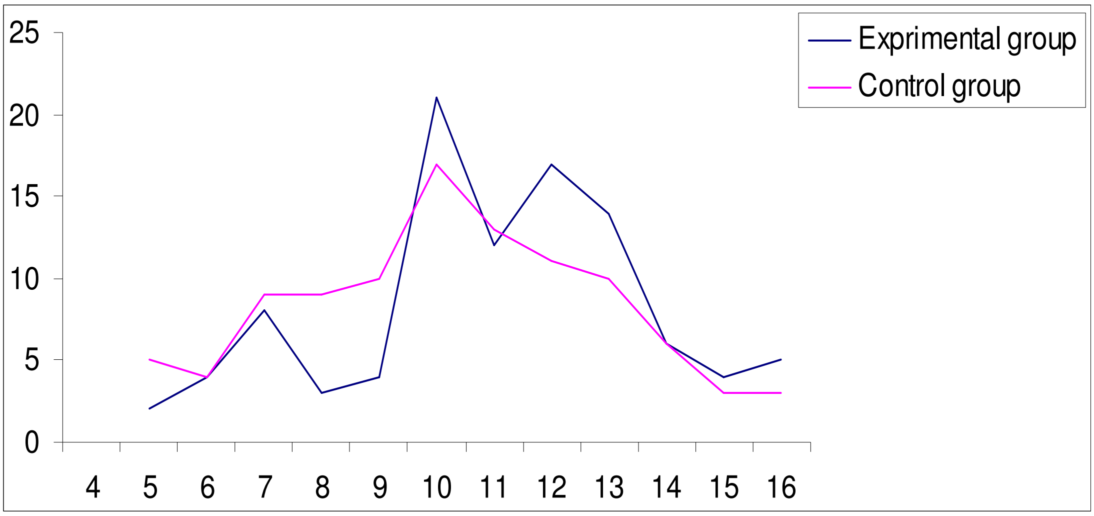


**Figure 01**: **Frequency polygon for the listening tests.**

The following results revealed from the polygon:

- The values of scores more frequent in the experimental group are 10, 11, 12, 13. whereas, the more frequent scores for the control group are 07, 08, 09, 10, 11.
- The experimental group has 02 significant frequency peaks ( the one of the 10 with 21 frequencies, and the one of the score 12 with 17 frequencies.
- The control group has one peak ( the one of the score 10 with 17 frequencies).
- In the same concern, the following table represents the frequency of scores obtained by both experimental and control groups in the speaking tests.

| Experimental group | | Control group | |
|---|---|---|---|
| **Score " $X_E$"** | **Frequency "F"** | **Score " $X_C$"** | **Frequency "F"** |
| 05 | 03 | 05 | 04 |
| 06 | 06 | 06 | 05 |
| 07 | 07 | 07 | 13 |
| 08 | 12 | 08 | 11 |
| 09 | 10 | 09 | 13 |
| 10 | 13 | 10 | 17 |
| 11 | 13 | 11 | 13 |
| 12 | 14 | 12 | 12 |
| 13 | 10 | 13 | 05 |
| 14 | 05 | 14 | 04 |
| 15 | 05 | 15 | 02 |
| 16 | 02 | 16 | 01 |
| **Sum of "F"** | **N= 100** | **Sum of "F"** | **N= 100** |

**Table 86 : Frequency distribution of the groups' score values in the speaking tests.**

- The first remark we get from the table's results is that both group's scores range between (05 to 16).
- The experimental group recorded more frequencies in the scores above the average 10 than the control group.

| Experimental group | Control group |
|---|---|
| 62 scores > 10<br>38 scores < 10 | 54 scores > 10<br>46 scores< 10 |

**Table 87: Control/ experimental groups' frequencies above the average 10.**

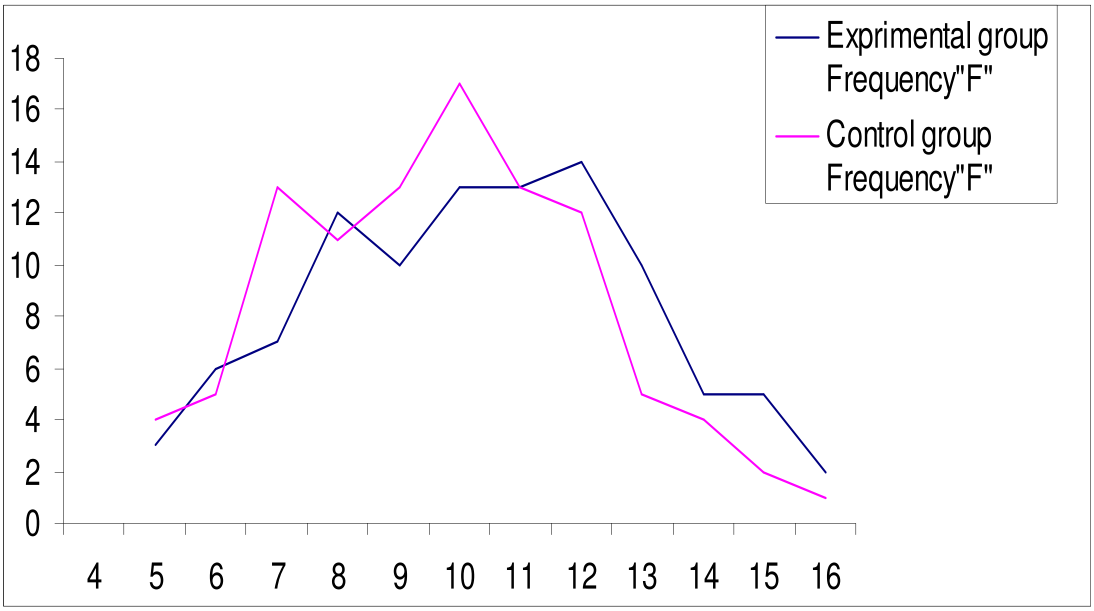


**Figure 02: Frequency polygon for the speaking tests.**

The frequency polygon reveals that:

- The experimental group, its more frequent values of scores are 09, 10, 11, 12, 13 with one significant peak, the one of the score 12 with 14 frequencies.
- The control group, its more frequent values of scores are 07, 08, 09, 10, 11. with one significant peak, the one of the score 10 with 17 frequencies.

## The statistical procedures for listening tests' measures for central tendency

To gain more insight into the possible differences between the two groups and get a clear comparison, necessary statistical procedures needed to be applied.

1) **The mean** :or the statistical average (symbolized by X) : the average of a set of scores " to get information about the central tendency of scores (Nunan, 1999, 28).

Its statistic formula is: $\bar{X} = \frac{\sum Fx}{N}$

**$\bar{X}$:** The mean.

$\sum$ : The sum.

**Fx**: Frequency of scores.

**N**: Number of scores.

To determine the mean of distribution, all of the scores are added together and the sum is then divided by the number of scores.

The mean is the preferred measure of central tendency because it is used more frequently in advanced statistical procedure (Heffner, 2004, 66).

**2)Variance ($S^2e$):**

Its statistic formula is:

$$S^2e = \frac{\sum Fx^2}{Ne} - \bar{X}e^2$$

**3)Standard deviation ( SD):** "the most important measure of dispersion, giving us information on the extent to which a set of scores varies in relation to the mean" (Nunan, 1999, 28).

Its statistic formula is the following:

$$SD = \sqrt{\frac{\sum fx^2}{N} - \bar{x}^2}$$

The following table contains all the necessary calculations to calculate " mean, variance, standard deviation"

| **Score " $X_E$"** | **Frequency "F"** | **Score ($X_E{}^2$)** | **Frequency of score "$F_X$"** | **Frequency of score ($F_X{}^2$)** |
|---|---|---|---|---|
| 05 | 02 | 25 | 10 | 50 |
| 06 | 04 | 36 | 24 | 144 |
| 07 | 08 | 49 | 56 | 392 |
| 08 | 03 | 64 | 24 | 192 |
| 09 | 04 | 81 | 36 | 324 |
| 10 | 21 | 100 | 210 | 2100 |
| 11 | 12 | 121 | 132 | 1452 |
| 12 | 17 | 144 | 204 | 2448 |
| 13 | 14 | 169 | 182 | 2366 |
| 14 | 06 | 196 | 84 | 1176 |
| 15 | 04 | 225 | 60 | 900 |
| 16 | 05 | 256 | 80 | 1280 |
| | **N=100** | | **$F_X$ = 1102** | **$F_X{}^2$ = 12824** |

**Table 88** : Listening tests scores' calculations of mean and standard deviation for the experimental group.

**1) Mean:**

$$\bar{x} = \frac{\sum fx}{Ne} = \frac{1102}{100} = 11.02$$

**2) Variance**

$$S^2 e = \frac{\sum fx^2}{\mathrm{Ne}} - \overline{X}e^2 = \frac{12824}{100} - (11.02)^2 = 6.79$$

### 3) Standard deviation:

$$SD = \sqrt{\frac{\sum fx^2}{N} - \bar{x}e^2} = \sqrt{128.24 - 121.44} = \sqrt{6.79} = 2.60$$

Necessary calculation for the control group mean, variance and standard deviation are presented in the following table:

| **Score " $X_C$"** | **Frequency "F"** | **Score ($X_C{}^2$)** | **Frequency of score "$F_X$"** | **Frequency of score ($F_X{}^2$)** |
|---|---|---|---|---|
| 05 | 05 | 25 | 25 | 125 |
| 06 | 04 | 36 | 24 | 144 |
| 07 | 09 | 49 | 63 | 441 |
| 08 | 09 | 64 | 72 | 576 |
| 09 | 10 | 81 | 90 | 810 |
| 10 | 17 | 100 | 170 | 1700 |
| 11 | 13 | 121 | 143 | 1573 |
| 12 | 11 | 144 | 132 | 1584 |
| 13 | 10 | 169 | 130 | 1690 |
| 14 | 06 | 196 | 84 | 1176 |
| 15 | 03 | 225 | 45 | 675 |
| 16 | 03 | 256 | 48 | 768 |
| | **N=100** | | **$\sum F_X$ = 1026** | **$\sum F_X{}^2$ = 11262** |

**Table 89** : Listening tests scores' calculations of mean and standard deviation for the control group.

### 1) Mean:

$$\bar{x} = \frac{\sum fx}{Ne} = \frac{1026}{100} = 10.26$$

$$\overline{Xc} = 10.26$$

## 2) Variance

$$S^2e = \frac{\sum fx^2}{\text{Ne}} - \overline{X}c^2 = \frac{11262}{100} - 105.26 = 7.36$$

## 3)Standard deviation:

$$SD = \sqrt{\frac{\sum fx^2}{N} - \bar{x}\,c^2} = \sqrt{112.62 - 105.26} = 2.71$$

| **Descriptive statistics** | **Experimental group** | **Control group** | **The difference** |
|---|---|---|---|
| **Mean** | 11.02 | 10.26 | 0.76 |
| **Standard deviation** | 2.60 | 2.71 | 0.11 |

**Table 90 : Two groups different calculations comparison in the listening Tests.**

Comparison's table reveals the fact that the difference between the two groups means in the listening tests is significant. This latter, indicates the out performance of the experimental group. (11.02>10.26) and proved the evidence that this later is due to the fact of introducing storytelling activities

.

-To confirm our assumption that this difference in means is due to the independent variable more than to chance factors, a t-test is calculated.

The t-test is the guarantee of the validity of any experiment based on a two entities comparison once applied; it reveals with a very tiny error probability, the effect of the IV on the DV.

-The following table contains the necessary statistics to calculate it.

| **Descriptive statistics** | **Means** | **The sum of frequencies** | **Standard deviation** |
|---|---|---|---|
| **Experimental group** | 11.02 | 10.26 | 0.76 |
| **Control group** | 2.60 | 2.71 | 0.11 |

**Table 91** : **Statistic calculations necessary for calculating the t-test ( listening).**

**4)t-test**:

$$TN_1 - N_2 = \frac{(X_1\text{-}X_2)\sqrt{(N_1 + N_2 - 2)(N_1 N_2)}}{\sqrt{(N_1 S_1{}^2 + N_2 S_2{}^2)(N_1 + N_2)}}$$

$$= \frac{(11.02 - 10.26)\sqrt{(100 + 100 - 2)(100x100)}}{\sqrt{(100x(260)^2 + 100(2.71)^2(200)}} = 2.01$$

To find the critical value for "t", a degree of freedom is calculated following the coming formula:

df= ($N_1$-1) +($N_2$-1)

= (25-1)+ (25-1)

= 24+24

= 48

df= 48

## Probability of error:

"Since every score has some level of error, researchers must decide how much error they are willing to accept prior to performing in their research. This acceptable error is then compared with the probability of error and if it is less, the study is said to be significant" ( Heffner, 2004, 87).

## Hypothesis testing:

The null hypothesis is $H_0$.

In the present study $H_0$ is: There is no difference between the means of the two groups or $\overline{Xe} = \overline{Xc}$. In our case and since $\overline{Xe} > \overline{Xc}$ we can only accept one alternative hypothesis which states that there is a difference between the means of the two groups and this difference is due to the influence of the independent variable upon the dependent one.

Following "Fisher and Yates" table of critical values, the critical value for t is 2,01. so , t obs = tcrit = 2.01.

-To test our alternative hypothesis; we have all the essential information.

**Statistical hypothesis: $H_0 = \overline{Xe} = \overline{Xc}$**

**$H_1 = \overline{Xe} > \overline{Xc}$**

**- α level is set at α < .02 , one tailed test.**

**-Observed statistics t obs = 2.01**

**-Critical statistics tcrit= 2.01**

**-Degree of freedom: df= 48.**

We came to the following:

The value of the t-test equals the critical one; t obs = tcrit = 2.01 (with 48 degree of freedom), the null hypothesis is rejected in favor of the alternative one at P< .02 which means that we are 98% sure that participants ( listening performances DV) in the experimental group are due to the effect of introducing storytelling activities ( DV) rather than other chance factors.

## The statistical procedures for speaking tests:

**I) <u>Experimental group</u>**

-calculating the mean, variance, and standard deviation of the speaking tests

| Score " $X_E$" | Frequency "F" | Score ($X_E^2$) | Frequency of score "$F_X$" | Frequency of score ($F_X^2$) |
|---|---|---|---|---|
| 05 | 03 | 25 | 15 | 75 |
| 06 | 06 | 36 | 36 | 216 |
| 07 | 07 | 49 | 49 | 343 |
| 08 | 12 | 64 | 96 | 768 |
| 09 | 10 | 81 | 90 | 810 |
| 10 | 13 | 100 | 130 | 1300 |
| 11 | 13 | 121 | 143 | 1573 |
| 12 | 14 | 144 | 168 | 2016 |
| 13 | 10 | 169 | 130 | 1690 |
| 14 | 05 | 196 | 70 | 980 |
| 15 | 05 | 225 | 75 | 1125 |
| 16 | 02 | 256 | 32 | 512 |
| | **N=100** | | $\sum F_X = 1034$ | $\sum F_X^2 = 11408$ |

**Table 92: Calculating the mean and standard deviation of speaking tests 'scores obtained by the experimental group.**

**1) Mean:**

$$\bar{x} = \frac{\sum fx}{Ne} = \frac{1034}{100} = 10.34$$

$$\overline{X}c = 10.34$$

**Variance:**

$$S^2\text{e} = \frac{\sum fx^2}{\text{Ne}} - \overline{X}c^2 = \frac{11408}{100} - (10.34)^2$$

$$= 114.08 - 106.91$$

$$S^2e = 7.17$$

## 3)Standard deviation:

$$SD = \sqrt{\frac{\sum fx^2}{N} - \bar{x}e^2} = \sqrt{114.08 - 106.91} = 2.67$$

**Control group**

| **Score " $X_C$"** | **Frequency "F"** | **Score ($X_C^2$)** | **Frequency of score "$F_X$"** | **Frequency of score ($F_X^2$)** |
|---|---|---|---|---|
| 05 | 04 | 25 | 20 | 100 |
| 06 | 05 | 36 | 30 | 180 |
| 07 | 13 | 49 | 91 | 637 |
| 08 | 11 | 64 | 88 | 704 |
| 09 | 13 | 81 | 117 | 1053 |
| 10 | 17 | 100 | 170 | 1700 |
| 11 | 13 | 121 | 143 | 1573 |
| 12 | 12 | 144 | 144 | 1728 |
| 13 | 05 | 169 | 65 | 845 |
| 14 | 04 | 196 | 56 | 784 |
| 15 | 02 | 225 | 30 | 450 |
| 16 | 01 | 256 | 16 | 256 |
| | **N=100** | | $\sum$ **$F_X$ = 970** | $\sum$ **$F_X^2$ = 10010** |

**Table 93 :Calculating the mean and standard deviation of speaking tests 'scores obtained by the control group.**

## 1) Mean:

$$\bar{x} = \frac{\sum fx}{Ne} = \frac{970}{100} = 09.70$$

$$\overline{X}c = 09.70$$

**2) Variance**

$$S^2e = \frac{\sum fx^2}{\mathrm{Nc}} - \overline{X}c^2 = \frac{10010}{100} - (09.7)^2$$

$$= 100.10 - 94.09$$

$S^2e =$ **6.01**

**3)Standard deviation**:

$$SD = \sqrt{\frac{\sum fx^2}{N} - \overline{x}c^2} = \sqrt{6.01} = 2.45$$

| Descriptive statistics | Experimental group | Control group | The difference |
|---|---|---|---|
| **Mean** | 10.34 | 9.70 | 0.64 |
| **Standard deviation** | 2.67 | 2.45 | 0.22 |

**Table 94** : **the two groups' different calculations' comparison in the speaking tests.**

It is clearly apparent from the table 94 that it exists a clear and significant difference in mean and standard deviation between he two groups, this fact proves again our initial evidence which maintains that the experimental group oral out performance is due to storytelling activities implementation within our second year students ( 10.34 > 9.70)

| Descriptive statistics | Means | The sum of frequencies | Standard deviation |
|---|---|---|---|
| **Experimental group** | $\overline{X}_1 = 10.34$ | $N_1 = 100$ | $S_1 = 0.64$ |
| **Control group** | $\overline{X}_2 = 9.70$ | $N_2 = 100$ | $S_2 = 0.22$ |

**Table 95**: **statistic calculations necessary for calculating the t-test ( speaking)**

**t-test**

$$TN_1 - N_2 = \frac{(X_1\text{-}X_2)\sqrt{(N_1+N_2-2)(N_1N_2)}}{\sqrt{(N_1S_1^{\ 2}+N_2S_2^{\ 2})(N_1+N_2)}}$$

$$= \frac{(10.34-9.70)\sqrt{(100+100-2)(100x100)}}{\sqrt{(100x(2.67)^2+100(2.45)^2(200)}} = 1.75$$

* **Degree of freedom**:

df= $(N_1\text{-}1) + (N_2\text{-}1)$

= (25-1)+ (25-1)

= 24+24

= 48

df= 48

## * Hypothesis testing

**-Degree of freedom = 48.**

**-Alpha level is set at $\alpha$<.05, one tailed test (directional decision).**

**- Observed statistics: t obs=1.75**

**- Critical statistics: t crit = 1.68**

For testing the hypothesis we came to the following:

- t obs > t crit, ( 1.71 > 1.68), as a result the null hypothesis $H_0$ is rejected at P< .05 so the alternative one $H_1$ is acceptable.
- The value of the means of the experimental group is higher than the control group Xe > $X_C$ ( 10.34 > 9.70 ) with df= 48, $H_0$ is rejected in favor of the alternative one at P< .05 which means that there is only 5 % probability that the observed mean difference Xe > $X_C$ occurred by chance. Or a 95% probability that it was due to other factors rather than chance, in other words it is due to the relationship between the

dependent variable( storytelling activities) and independent variable( learners' oral performance)

## Conclusion

Through the experimental treatment untaken in our research study and which lasts a three months period of exposure to a serious storytelling activities based instruction, ( It was clearly apparent that) we tended to introduce this latter within our second year learners and investigate the effects it could have on improving their listening as well as speaking abilities.

As a result, it was clearly apparent that the experimental group recorded numerically higher than the control one in the pre-test and all the three tests in both sections listening / speaking.

The comparison between the means of scores obtained by the two groups was statistically significant. As a matter of fact, the hypothesis set for the research study which claims that providing our second year students with an opportunity to experience their Oral expression course through a regular exploitation of stories and adopt storytelling activities as the main technique will result in a better oral performance and offers them a natural , comfortable and a motivational environment for the learning process to take place.

Students who received this technique based instruction were characterized throughout the experimental study to have a high degree of interest and motivation as they have really succeeded in creating interactive learning context that is engaging, psychologically genuine ,highly motivational and culturally authentic.

Hence, this storytelling activities technique was applicable and proves its usefulness over the short period of time it had been applied in, with the small sample we chose to conduct the treatment with, still our teachers should recognize this latter's effectiveness in enriching their language teaching /learning process through the regular use of stories with their different techniques in their classrooms.