Full Length Research Paper

Effect of Microsoft Word-Based Computer Assisted Instruction Method on General Proficiency of Iranian Medical Students

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Abstract

The researcher's personal teaching experience with unwanted sequalae of problems related to the use of the lecturing method in teaching EGP (English for General Purposes) to the medical students led him to do a randomized clinical trial (RCT) research in which he compared the Microsoft Word-Based Computer Assisted Instruction Method to the Traditional Lecturing Method in Teaching English for the Students of Medicine at the Medical School of Yazd Shahid Sadoughi University of Medical Sciences. Thirty medical students, matched for language proficiency, were assigned to the experimental group and 30 to the control group. Then, a pretest based on the teaching materials was given to both groups and the obtained scores were recorded for the final analysis. Next, the new teaching method was given to the experimental group as treatment and the traditional lecturing method was given to the control group as placebo. Teaching method was considered as the independent variable and language proficiency as the dependent variable. The teaching materials for both groups were the same with the exception that the book "ESM I" was converted to a virtual electronic book and taught to the experimental subjects for a whole semester using the data projector and the computer via Microsoft Word and its many applications and tools. The physical book was used for the control group. At the end of treatment, a post-test based on the materials covered in the classroom was given to both groups. The findings showed that the Traditional Lecturing Method caused a statistically significant difference in the post-test scores of the control group and improved their language proficiency moderately. Also, it was found that the Microsoft Word-Based Computer Assisted Instruction Method caused a statistically significant difference in the post-test scores of the experimental group and improved their language proficiency to a higher degree than the control group meaning that the new method is much more effective in teaching ESM I to medical students compared to the traditional lecturing method. We concluded that although both of the methods were effective in teaching EGP to the medical students, the new method was much more efficient than the traditional lecturing method.

Key Words: Teaching Method, Language Proficiency, English for the Students of Medicine, Microsoft Word, Physical book, Virtual Electronic Book, Yazd.

INTRODUCTION

Language learning is one of the most important sociocultural needs of the human society and one of the principal challenges of tourism today. The need for the use of various language teaching methods is an obvious issue in the present world and the choice of language teaching methodology betrays its special significance.

According to Rossiter Charles M. Jr. (2005), the teaching method and the way it is applied is so important and effective that it demands to be assessed not only before application but also after completion and its success needs to be measured. In second language teaching methodology, many studies have so far been carried out on comparing various language teaching methods including Hill R. (2006), Tistaret (2006), Trenzini P. (2001), Lakdizji et al (2004), Safari et al (2005), Mortazavi et al (2005), Ganji et al (2006), and Fattahi Bafghi et al (2006). On the basis of the definitions given in Longman Dictionary of Applied Linguistics (2003), the acronym CALL stands for "Computer Assisted Language Learning" and CAI stands for "Computer Assisted Instruction". Different language teaching methods are studied at the university at the BA, MA, and PhD levels and are collectively referred to as "Language Teaching Methodology". According to Richards and Rodgers (1986, p. 68) it is estimated that about %60 of the world population today are bilingual or multilingual. So, we can fairly declare that there has been a special concern in this regard throughout the teaching history. By the 16th century, French, Italian, and English gained importance and gradually replaced Latin, removing it from the scene. The study of classic Latin in which the works of Virgil, Ovid, and Cicero were written, and syntax analysis and rhetoric formed a model for teaching languages from the 17th to the 19th centuries. In this way, the Grammar Translation Method emerged from the experience of teachers as Sidon Stocker, Carl Plotz, H. S. Elendorov, and John Medinger. Then, as Richards and Rodgers (1986) state, other teaching methods appeared including the Direct method, the Audiolingual Method, the Silent Way, Suggestopedia, Desuggestopedia, Community Language Learning, the Total Physical Response Method, the Communicative Approach, the Oral Method, the Reading Method, the Phonetic Method, etc. These methods also gradually faded into oblivion and were replaced by more innovative ones. Larsen-Freeman (1986) has also reviewed these methods giving some details of the principles, strategies and classroom activities of each one. Another group of teaching methods are collectively called the social family (M. Behrangi, 1986, p. 11). These methods address us as social beings that can create better and more effective relations to develop learning and improve our linguistic abilities. "Partners in learning" has also been applied in teaching literature (Joyce et al, 1992, p. 105). Some teaching methods emphasize collectivism. Basically, collectivism is an approach to solving problems through learning collectively. At the present century, researchers in the field of teaching methodology compare the effectiveness and efficacy of different teaching methods considering variables as age, gender, nationality, social class, multilingualism, monolingualsim, language aptitude, linguistic motivation, IQ, and memory span. Occasionally, the new teaching methods are scientifically and statistically evaluated and made widespread.

On the basis of a decade of my own teaching experience at the school of medicine, it appears that the traditional lecturing method using the physical book is no longer as effective as once it was. So, the use of new educational technology renders itself as mandatory. Some research has been carried out on CAI (Computer Assisted Instruction) and CALL (Computer Assisted Language Learning) around the globe. In Iran, Mojtahedzadeh et al (2011) worked recently on designing an electronic learning system based on the principles and requisites of the learning-teaching process and the systemic and comprehensive need for educational designing. The e-learning and teaching is still in bud in Iran, but I made the first step in this research to familiarize myself and colleagues with some of its applications. The present study focused on comparing the effectiveness of the "Microsoft Word-Based Computer Assisted Instruction Method" and the traditional "Lecturing Method". The new method makes beneficial use of computer software and data projector. The overall purpose was to present teachers with a more convenient experience of teaching languages to arrive at a more effective teaching and learning through using the wide range of applications and tools available in "Microsoft word".

The New Language Teaching Method

Teaching an English course basically needs the use of multimedia since it includes such demanding skills as listening, speaking, reading, and writing. In this respect, the use of educational equipment as video films, CD's, DVD's, tapes, slides, and a wide range of computer software can prove effective. Unfortunately, this fact has been overlooked in the educational system of Iran including secondary schools, high schools, and universities, the traditional frontal teaching, with its use of chalk and duster, being the dominant method. In the new method, i.e., the "Microsoft Word-Based CAI Method", the traditional physical book (English for the Students of Medicine I) has been converted to an electronic virtual book including the original text, objectives of each lesson, new added explanations, answers to problems, added jokes and riddles, pictures, films, tips, etc. The virtual book is presented to the students using computer, wall screen, and data projector. The teacher's principal working tool here is "Microsoft Word" and its many applications and utilities. The teacher should first convert the physical book (teaching materials) into a virtual one. Point type, size, color, special effects, background, zoom, etc. are prepared beforehand. The data in the virtual book is projected onto the wall screen. The advantages of this method include:
1. Objectives of the lesson are typed beforehand and presented. So, the valuable time of

the class and teacher is not wasted writing them.

2. The teacher can point to anywhere in the text by the mouse, present his point or meaning, and answer the students' questions. Using the scroll bar, he/she can quickly and easily find and show whatever they want.

3. The required grammatical explanations, tips, pronunciations, phonetic transcriptions, stress patterns, spellings, etc. are prepared in advance with sufficient time and patience.

4. On the basis of "discourse analysis", the teacher adds the intentionally omitted words, phrases, or clauses in parentheses using different colors and points to help clear any obscurity in understanding the sentence by the students.

5. To emphasize any element, the teacher can make use of "Bold, Italic, and Underline" icons.

6. The teacher can use different colors for different characters, words, clauses, sentences or paragraphs. For example, s/he can put the answers to the questions or problems in white so that they are invisible to the students. After getting the right answer from the students, they can put them in black to make them visible to everybody.

7. The prior preparation of the necessary materials not only saves the time used for writing on the board and cleaning it, but also removes the danger of hazards posed by factors as the teacher's fatigue, exhaustion, impatience, sickness, forgetting, etc.

8. The teacher can use tools for phonetic transcription, the actual loud pronunciation of the word by the software, stress pattern, intonation and pitch, etc.

9. If necessary, the teacher can use the spelling and grammar check to correct anything wrong.

10. Most importantly, this software is equipped with the synonyms, antonyms, definitions, etc. It can also give exemplifications of words as use and usage labels.

11. The software is equipped with thesaurus which gives the definitions of terms, labels, genre, part of speech, etymology, etc.

12. The teacher can show required pictures or slides to the class via the pictures icon.

13. The peripheral tools include windows media player to play the necessary films, cartoons, entertainments, etc.

14. The teacher can present the class with some jokes and riddles as refreshment and break. They can also play some computer games collectively. This helps improve the students' reservoir of vocabulary.

15. To familiarize the students with test items, the teacher can show the class some items and explain it to them. This helps the students have a better performance on their midterm and final exams.

16. In case there is internet in the class, the teacher can use online services of language teaching and update the students' knowledge of any topic.

Subjects, Methods, Materials, and Sampling

The present study was an RCT (Randomized Clinical Trial) field study carried out on one experimental and one control group. The researcher made an effort to compare the Microsoft Word-Based Computer Assisted Instruction Method to the Traditional Lecturing Method in Teaching English for the Students of Medicine at the Medical School of Yazd University of Medical Sciences and Health Services, I. R. of Iran. Due to practical problems, the availability method of sampling and nonprobability sampling design were used to select subjects (Nachmias and Nachmias 1981, cited in Eslami et al, 2010). To do so, a group of 30 medical students who entered the university at September 2009 were selected randomly out of 45 subjects in Group A, matched for language proficiency on the basis of their pre-university scores, and then assigned to the experimental group. These subjects were the central %75 of the medical students in group A who had passed the pre-university English course. In this way, the outlier scores were excluded from the study. A number of 30 students of Group B were assigned to the control group using the same procedure. The other subjects participated in the class, but their scores were excluded from the study. Then, a pretest based on the teaching materials, i.e., "English for the Students of Medicine I" was given to both groups and the obtained scores were recorded for the final analysis. Next, the new teaching method, i. e., the Microsoft Word-Based Computer Assisted Instruction Method was given to the experimental group as treatment and the old method, i. e., the Traditional Lecturing Method was given to the control group as placebo. Teaching method was considered as the independent variable and language proficiency as the dependent variable. The role of sex as a moderator variable was overlooked as it was supposed to have little or no effect on the outcome of the study. General language proficiency as the control variable was matched for both groups on the basis of their pre-university test score. The role of intervening variables as health status, social class, etc was overlooked as they were supposed to have little or no effect on the outcome of the study. The teaching materials for both groups were the same with the exception that the book "English for the Students of Medicine I" was converted to a virtual electronic book and taught to the experimental subjects

for a whole semester using the data projector and the computer via Microsoft Word and its many applications and tools. The traditional physical book was used for the control group. The experimental subjects made benefit of the applications and tools explained above under "The New Teaching Method". At the end of 16 teaching sessions of 100 minutes duration both experimental and control groups were given a post-test based on the materials covered in the classroom. The obtained scores were collected, sorted, and analyzed using Minitab 15. Use was made of the statistics "paired T-test and Two-sample T-test" to analyze the data. The research hypotheses were formed as the following: 1. There is no difference between the pretest and post-test mean score of the control subjects. 2. There is no difference between the pretest and post-test mean score of the experimental group. 3. There is no difference between the post-test mean score of the experimental group and the post-test mean score of the control group. Ethical issues were considered as not to violate any rights of the control subjects.

Results

The data were collected and analyzed using the software Minitab 15. The following findings were obtained after analyzing the pretests and post-tests scores of both groups:

1. Comparing the pretest and post-test of the control group: regarding the findings obtained by Minitab 15, it was observed that the pretest mean score of the control group was 11.42 ($\overline{X}_{pre.con}$ = 11.42) with a standard deviation of 1.545 ($SD_{pre.con}$ = 1.545), while the post-test mean score of the control group was 13.59 ($\overline{X}_{post.con}$ = 13.59) with a standard deviation of 1.688 ($SD_{post.con}$ = 1.688). Also, the difference of means between the pretest and post-test of the control group was 2.17 ($\overline{X}_{di.con}$ = $\overline{X}_{post.con}$ − $\overline{X}_{pre.con}$ =2.17) with a standard deviation of 1.526 ($SD_{di.con}$ = 1.526).

To test the following hypothesis: ($\mu_{di.con}$ = $\mu_{post.con}$ − $\mu_{pre.con}$) H_0: $\mu_{di.con}$ = 0

H_1: $\mu_{di.con}$ > 0

paired T-test was used. The T-value equaled 7.79 and P-value=0.00. Regarding the fact that at the significance level of P=0.05, the value obtained was less than 0.05, so the H_0 was rejected meaning that the Traditional Lecturing Method caused a statistically significant difference in the post-test scores of the control group and improved their language proficiency.

2. Comparing the pre-test and post-test of the experimental group: regarding the findings obtained by Minitab 15, it was observed that the pretest mean score of the experimental group was 12.643 ($\overline{X}_{pre.exp}$ = 12.643) with a standard deviation of 1.905 ($SD_{pre.exp}$ = 1.905), while the post-test mean score of the experimental group was 16.247 ($\overline{X}_{post.exp}$ = 16.247) with a standard deviation

of 2.4 ($SD_{post.exp}$ = 2.4). Also, the difference of means between the pretest and post-test of the experimental group was 3.603 ($\overline{X}_{di.exp}$ = $\overline{X}_{post.exp}$ − $\overline{X}_{pre.exp}$ =3.603) with a standard deviation of 1.27 ($SD_{di.exp}$ = 1.27).

To test the following hypothesis: ($\mu_{di.exp}$ = $\mu_{post.exp}$ − $\mu_{pre.exp}$) H_0: $\mu_{di.exp}$ = 0

H_1: $\mu_{di.exp}$ > 0

paired T-test was used. The T-value equaled 15.54 and P-value=0.00. Regarding the fact that at the significance level of P=0.05, the value obtained is less than 0.05 (0.000< 0.05), so the H_0 is rejected meaning that the Microsoft Word-Based Computer Assisted Instruction Method caused a statistically significant difference in the post-test scores of the experimental group and improved their language proficiency.

3. Comparing the post-test mean score of the experimental group and the post-test mean score of the control group: To test the following hypothesis:

$$\left. \begin{array}{l} H_0: \mu_{post.exp} = \mu_{post.con} \\ H_1: \mu_{post.exp} > \mu_{post.con} \end{array} \right\}$$

We need first to test the hypothesis of equality of the variances of the two groups, i. e., :

$$\left. \begin{array}{l} H_0: \sigma_{con} = \sigma_{exp} \\ H_1: \sigma_{con} \neq \sigma_{exp} \end{array} \right\}$$

The findings given by Minitab 15 show that the value obtained for the equality of the two variances was F= 2.02 with P= 0.063. Since this value is not less than 0.05 (0.063>0.05), so the null hypothesis is not rejected and the variances of the experimental and control groups are equal. On the basis of the hypothesis of equality of the variances and regarding the findings: $\overline{X}_{post.exp}$ = 16.247 ، $\overline{X}_{post.con}$ = 13.59 ،$SD_{post.exp}$ = 2.4 ،$SD_{post.con}$ = 1.688, and T =4.96 and P-value = 0.00 which is less than 0.05, we conclude that the null hypothesis, i. e., H_0: $\mu_{post.con}$ = $\mu_{post.exp}$ is rejected meaning that the new method is much more effective in teaching ESM I to medical students compared to the traditional lecturing method.

$$T = \overline{X}_{post.exp} - \overline{X}_{post.con} / S_p \sqrt{1/30 + 1/30}$$

$$S_P^2 = 29(SD_{post.con})^2 + 29(SD_{post.exp})^2 / 58$$

DISCUSSION

The T-value obtained for the control group equaled 7.79 and P-value=0.00. Regarding the fact that at the significance level of P=0.05, the value obtained was less than 0.05, so the H_0 was rejected meaning that the Traditional Lecturing Method caused a statistically significant difference in the post-test scores of the control group and improved their language proficiency. Also, The

T-value obtained for the experimental group equaled 15.54 and P-value=0.00. Regarding the fact that at the significance level of P=0.05, the value obtained is less than 0.05 (0.000< 0.05), so the H_0 is rejected meaning that the Microsoft Word-Based Computer Assisted Instruction Method caused a statistically significant difference in the post-test scores of the experimental group and improved their language proficiency. The findings given by Minitab 15 showed that the value obtained for the equality of the two variances of the experimental and control groups was F= 2.02 with P= 0.063. Since this value is not less than 0.05 (0.063>0.05), so the null hypothesis is not rejected and the variances of the experimental and control groups are equal. On the basis of the hypothesis of equality of the variances and regarding the findings: $\overline{X}_{post.exp} = 16.247$ ، $\overline{X}_{post.con} = 13.59$ ، $SD_{post.exp} = 2.4$ ، $SD_{post.con} = 1.688$, and T =4.96 and P-value = 0.00 *which* is less than 0.05, we conclude that the null hypothesis, i. e., $H_0: \mu_{post.con} = \mu_{post.exp}$ is rejected meaning that the new method is much more effective in teaching ESM I to medical students compared to the traditional lecturing method. Our findings are in line with similar studies as Fattahi et al (2007) who compared two teaching methods of Group Discussion and Lecturing method and found that both methods increased the level of parasitology students' knowledge significantly, but this increase was more in discussion group compared to the lecture group (P=0/002 and P=0/003). The research findings showed a higher rate of learning for group discussion method that was due to the more efficacy of this method in promoting inter-group relations, brain-storming, group-activity, group assimilation, and elevating level of judgment and analytic ability. The findings of the research by Lakdizji et al (2005) who compared the effect of Discussion and Lecturing Methods on nursing students' learning are consistent with ours. Also*,* Safari et al (2005) found similar patterns in studying the effect of training nurses using Group Discussion on nursing quality of myocardial infarctus patients. Further, Mortazavi et al (2005) gained similar findings in studying the effectiveness of Teaching Methods and Interactionist Learning in the educational process. Finally, Ganji et al (2006) also compared the teaching quality of epidemiology course using lecturing and problem-based learning in Shar-e-Kord Students and found the new method more effective. The greater proficiency improvement of the experimental subjects is attributed to the new teaching method. However, part of this variable is attributable to the virtual electronic book used for the experimental subjects as compared to the control group's physical book, yet this was not proved in this study and needs to be explored by future research. This proficiency gain cannot be attributed to Hawthorne effect as the experimental subjects did not know in which group they are. The interested parties can go on this line of research by replicating it with other majors, other college levels, and emphasizing variables as age, sex, social background, language background, etc. The findings of this study have practical implications and it is recommended that teachers, instructors and profs, and other interested parties apply the new teaching method in teaching the EGP, EAP, and ESP courses, etc. of different majors at the high school, BA, BS, MA, MS, and PhD levels and see the positive effects it brings about in their educational setting.

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APPENDIX I

Paired T-Test and CI: Post cont; Pre cont

Paired T for Post cont - Pre cont

```
            N   Mean  StDev  SE Mean
Post cont   30  13.590  1.688   0.308
Pre cont    30  11.420  1.545   0.282
Difference  30   2.170  1.526   0.279
```

95% lower bound for mean difference: 1.697
T-Test of mean difference = 0 (vs > 0): T-Value = 7.79 P-Value = 0.000

Paired T-Test and CI: Post Exp; Pre Exp

Paired T for Post Exp - Pre Exp

```
            N   Mean  StDev  SE Mean
Post Exp    30  16.247  2.400   0.438
Pre Exp     30  12.643  1.905   0.348
Difference  30   3.603  1.270   0.232
```

95% lower bound for mean difference: 3.209
T-Test of mean difference = 0 (vs > 0): T-Value = 15.54 P-Value = 0.000

Test for Equal Variances: Post Exp; Post cont

95% Bonferroni confidence intervals for standard deviations

```
            N   Lower    StDev    Upper
Post Exp   30  1.85282  2.40039  3.37628
Post cont  30  1.30307  1.68816  2.37449
```

F-Test (Normal Distribution)
Test statistic = 2.02; p-value = 0.063

Two-Sample T-Test and CI: Post Exp; Post cont

Two-sample T for Post Exp vs Post cont

```
            N   Mean  StDev  SE Mean
Post Exp   30  16.25  2.40    0.44
Post cont  30  13.59  1.69    0.31
```

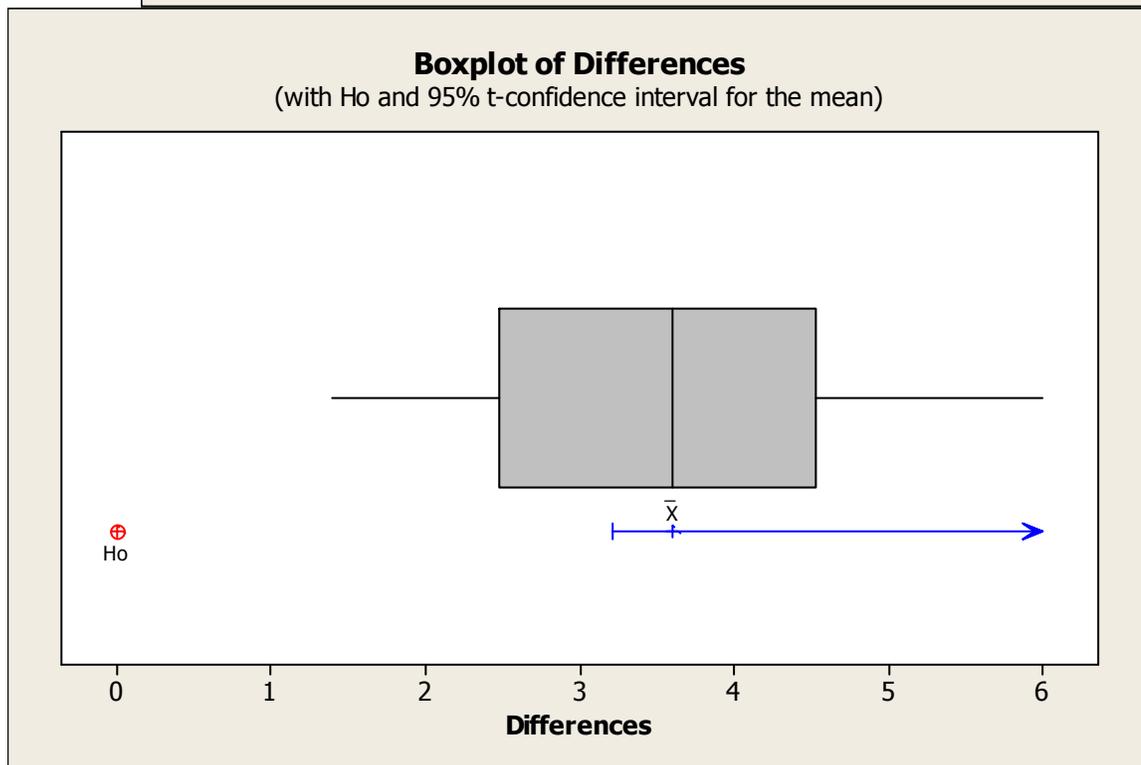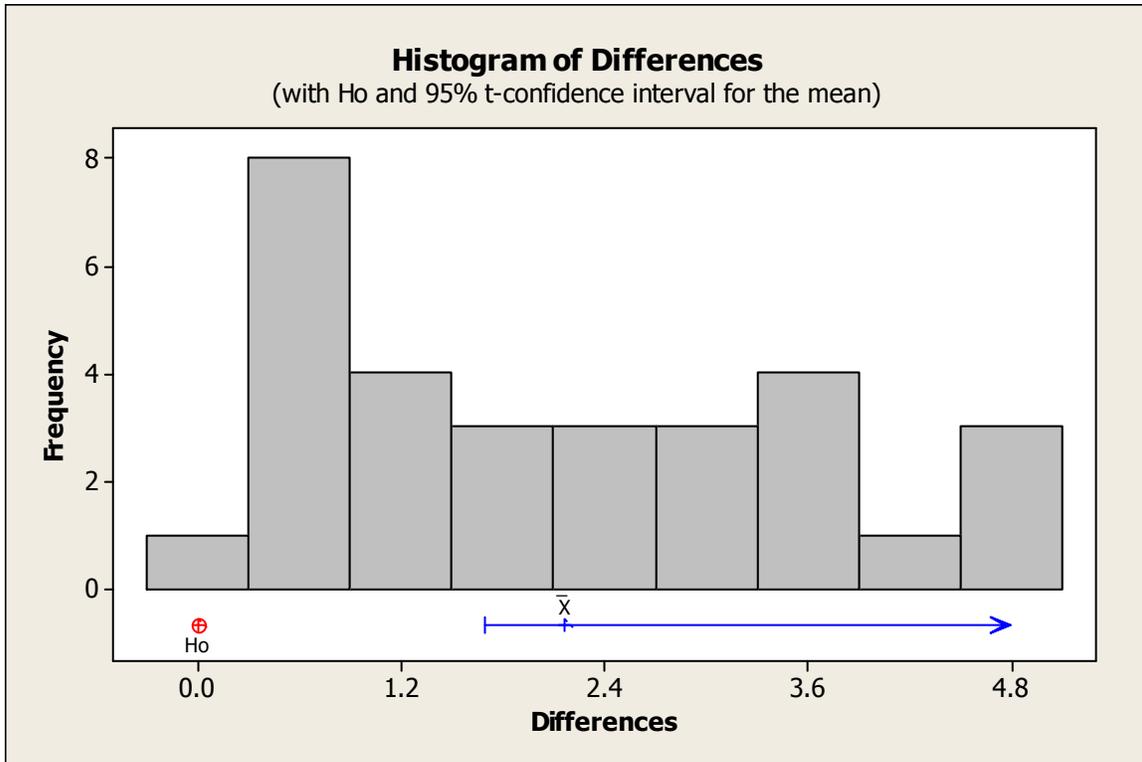Difference = mu (Post Exp) - mu (Post cont)
Estimate for difference: 2.657
95% lower bound for difference: 1.761
T-Test of difference = 0 (vs >): T-Value = 4.96 P-Value = 0.000 DF = 58
Both use Pooled StDev = 2.0751

APPENDIX II

Histogram of Differences
(with Ho and 95% t-confidence interval for the mean)

Boxplot of Differences
(with Ho and 95% t-confidence interval for the mean)

APPENDIX II Contd.,