A COMPARATIVE USABILITY STUDY OF MICROSOFT OFFICE 2007 AND MICROSOFT OFFICE 2003

by

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ABSTRACT

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By

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2010

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This work presents a comparative usability study of the Microsoft Office 2003 and Office 2007 suites. The participants of the study had at least one year of experience using the 2003 and 2007 version of Word, Excel and Power Point. They were given a set of tasks to perform in both versions of these three applications. The dependent variables used to compare the usability of the two versions of the application were completion time, number of tasks completed, user satisfaction and errors committed. The results of the study indicate that it cannot be claimed that one version of Word or PowerPoint is better than the other in terms of usability. However, the results indicate that Excel 2003 is significantly superior to Excel 2007 in all the dependent variables. These results support the conclusion that the user interface of Excel 2007 did change for the worst in comparison with the user interface of the 2003 version. Thus, strictly from the point of view of the usability of the 2007 version of the Office suite, the users are better off keeping their 2003 version. Investing in an upgrade from Office 2003 to 2007 is something to consider if the new capabilities of Office 2007 are worth the investment.

RESUMEN

**ESTUDIO DE USABILIDAD COMPARATIVO
DE MICROSOFT OFFICE 2007 Y MICROSOFT OFFICE 2003**

Por

Edgard Vélez Morales

2010

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Este trabajo presenta un estudio comparativo de usabilidad entre las versiones 2003 y 2007 de Microsoft Office. Los participantes del estudio tenían al menos un año de experiencia utilizando ambas versiones de los programas Word, Excel y PowerPoint de Office. A cada uno se le dio un conjunto de tareas para realizar en ambas versiones de los tres programas. Las variables dependientes del estudio fueron tiempo en completar tareas, número de tareas completadas, satisfacción y número de errores. Los resultados del estudio indican que no se puede reclamar que una versión de Word o PowerPoint es superior a la otra en cuanto a usablidad. Sin embargo, los resultados del estudio mostraron una superioridad significativa de Excel 2003 sobre Excel 2007 en todas las variables dependientes. Estos resultados apoyan la conclusión de que la interfaz de Excel 2007 empeoró en comparación con la de Excel 2003. Entonces, estrictamente desde el punto de usabilidad de Office 2007 los usuarios estarían mejor manteniendo su versión 2003. Invertir en Office 2007 resulta aconsejable sólo si sus nuevas capacidades valen la inversión.

To my family, wife and good friends . . .

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1 INTRODUCTION

Technology has become a very powerful tool for executing different type of tasks. In a short period of time the dependence on technology has increased to a point, where sometimes a task may be very hard to complete if the technology is not available. Taking this into consideration the software design to interact with technology should require the least amount of training as possible i.e. the developed programs should be as intuitive as possible to reduce the effort needed to learn the software to a minimum.

The Learning Process as mentioned by C.L. Michael [Michael03] in his study requires an adaptation and adjusting period for the new program in case of an update and a greater one if the user has never interact with it before. In an Enterprise environment this situation could lower the effectiveness of its employees because they are used to the previous version of the program, at least during the learning period. For an Enterprise a decrease in effectiveness could cause also a decrease in the production which could have a significant impact on their profits. To avoid this kind of situations or at least minimize their effects it is very important to run a study that would take into consideration the possible impact of a software change so a strategy could be developed to ease up the transition process to the new version, if it is in fact the best option. The study should also consider the user learning curve, the amount of time they will need to complete a task in the new version compared with the previous one and the estimated time that the users will need to reach the level of expertise they had with the previous version.

The previous arguments can be applied to the recent changes made to the user interface of Microsoft Office 2007. The icons organization, menu classification and navigation were dramatically modified, compared to the classic model displayed on all the previous versions of the applications. As discussed before, a dramatic change like that could reduce the effectiveness of the employees of a company affecting their performance, which could have a toll in productivity. Taking in consideration the widespread distribution of MS Office in the World, the effects of the changes in user interface could affect millions of users. To have a better idea of how critical those changes made to the user interface could have affected the users performance, a user test is required that compares the aspects related to interface changes made in Office in 2007 with that of Office 2003.

The primary objective of this study, similarly to the study of Beel [Beel07] (discussed in chapter 1.3), is to determine the impact on user performance and satisfaction of the Office 2007 version compared to the 2003 version. A usability test was performed to examine differences for time to complete a set of tasks, task completion rate, number of errors committed, difficulty in performing the tasks and user satisfaction for users interacting with Word, Excel and PowerPoint. A set of statistical analyses were performed to determine significant differences.

A detailed description of this study will be given on the following chapters. A literature review, discussed in Chapter 2 includes a brief description of previous works that are related to the focus of this study.

In chapter 3, a detailed description of the methodology of the study will be given, including the study environment, the participant selection process, a full description of each of the tests given to the participants and the data collection process. Also a brief description of the statistical methods used for the data analysis is included at the end of this chapter.

Chapter 4 will focus primarily on the results obtained from the different tests given to the participants. The statistical methods are explained, including the purpose of each of them and the range in which a significant difference could be present. The study results are included in a series of tables. The tasks where a significant difference was detected are highlighted on the tables.

Chapter 5 will focus on the analysis of the tasks, where a significant difference was detected. By taking a deeper look at the data obtained from each test, analyzing the result graphs, the statistical methods results and the situations observed on the different tests, possible reasons will be given to explain those findings.

The conclusion for this work will be given on Chapter 6. This chapter will also include ideas or suggestions as future work, to further analyze the possible effects on user performance caused by the incorporation of a new version of an application.

2 Literature Review

In any scientific study involving people, the key to success is to always have in mind, the reactions that different kinds of situations could have in users. That is precisely the thought of Lindgaard [Lindgaard91] on his study, in which he concluded that changes made to an application could have a significant impact on the performance of the users. The degree of the change will dictate the effect on performance that it may cause. This kind of reaction has a great probability of increasing, when the user is facing a completely new environment. The study also revealed that the users confront numerous problems very frequently, causing a reduction in their effectiveness, because of the need to learn how to handle the changes.

A study with a similar scope by C.L Michael [Michael03] was trying to determine the adaptation process of a person using a new system. In his study the Windows XP operating system was compared with previous version of the system. The participants of the study were divided into two groups. The first group consisted of the persons who were willing to try the new system. The second group consisted of the persons who were not so interested, or were not interested at all on trying the new system. A questionnaire was given to the participants, to collect their impressions about the new system. The study concluded that the participants who were willing to try the new system, were more interested in trying the new features of the program, and to give their opinion about it compared to the participants who were not so interested on trying new features or try the new system at all.

A similar study by Szajna [Szajna93] examined if there was a relationship between the users expectations and their performance and satisfaction. They argued that when a system fails one cause could be its inability to meet the expectations of the users. They described satisfaction as the extent to which users believe the information system available to them meets their information requirements. They also mentioned that user satisfaction is widely used as a dependent variable in the research studies that seek to determine the users' perceptions of the effectiveness. They present the concepts of disconformation and negative disconformation. Disconformation is described as a situation where the expected performance by the user differs from their actual performance. Negative disconformation is described as the specific case when the actual performance is lower than the expected by the user. The study revealed that there was a close relationship between the user expectation and their satisfaction. Users with high expectations about the system gave higher satisfaction scores that those with lower expectations.

A study that has a close relation with one of the areas of interest of this work, which is the user interaction with graphic interfaces, is the one by Phillip Treweek [Treweek96]. In this study they had two user interfaces for the participants to interact with. The interfaces used were a graphic user interface developed for Apple Macintosh computer and the other was a command line interface developed for IBM Computers. The goal of the study was to determine which of the interfaces the users preferred and if the ease of use influenced their selection. Treweek found that the knowledge people had on an interface influenced their opinion about the ease of use. He found that the participants, who had more knowledge on

the graphical user interface of Macintosh, consider it easier that the command line interface of IBM, while the participants with more experience on command line interface completely differ.

An interesting point is brought by Nicholas [Nicholas90] in his study to measure the level of satisfaction shown by users of different organizations in Australia using a Management Information System (MIS) depending on the participant profession. The study showed that the satisfaction with the system was closely related to the type of position the user had on the organization. The study also showed that the level of satisfaction with the MIS was related to the user participation during the Software Development Life Cycle (SDLC). Many of the users who were not satisfied with the MIS argued that their participation during the SDLC was limited or that their suggestions during this process were given a low priority or in some cases not considered at all. The study was also trying to determine if there was a difference in terms of user satisfaction between different management levels.

They found that there was no significant difference between the users. Some of the users thought that a possible solution for the problems they face, with a new MIS, was the development of a proper documentation that satisfy every user's needs. In many cases some of them thought that the documentation provided by the MIS developers team did not satisfied their needs. They also understood that if they had a wider participation during the SDLC most of these problems could be avoided.

A similar scope was followed in the study of C. Beel [Beel07]. The study consisted of a series of tasks using the user interface of Office 2003 and Office 2007 with Word. Before the tasks were given to the participants a questionnaire was given to them, to obtain information about their previous experience using Office, their general knowledge of the applications, their profession, gender, age and experience with other word processors. The completion time of each task on both versions was recorded for performance analysis purposes. After the participants completed the tasks given to them, a second questionnaire was given to determine if they were able to complete the tasks in both versions, identify what kind of problems they ran into while performing the tasks, what was their opinion on the transition from one version to the other, and which version they thought they were more efficient with. The study concluded that the participants took more time to complete the tasks on the 2007 version. From the questionnaires, they concluded that most participants considered that they took more time to complete the tasks on the 2007 version because of the confusion created with the numerous changes on the interface. They expressed that in time they could get used to the new interface and they could be as efficient as they were with the previous version of the program

In our work the main focus will be to measure how a user interface could affect the user performance on different applications when a new version or upgrade is given to them. Based on the definition from the Oxford Dictionary, Khoo [Khoo06] states that upgrade means raise to a higher grade. For most people a software upgrade is associated with new and better features for the application, but that is not always the case. As he mentions in his study, some

issues could arise from a software upgrade such as new features which purpose was to improve performance and what actually does is the contrary, and also changes made by the vendor to the user interface could also have the same effect. In fact, one of the application upgrades mentioned in his study involved moving from a menu based application to a tab based one which is precisely the change involved from Office 2003 to Office 2007 which is the focus of our study.

Another issue brought by Khoo in his study, which could have not only a negative effect on user performance but also on the user satisfaction with the upgraded version, is the lack of compatibility with the older versions of the same application. That is actually a very common issue with software upgrades, in which a document created on the upgraded version of an application, could not be accessed by the older version or sometimes if the access is possible, the format set by the user to the document, suffer changes when the user opens it on an older version. In terms of users willingness to upgrade to a new version he concurs with Nicholas [Nicholas90] that depending on the position that a user have on a company is how open they will be to accept a new version of an application. He also states that the impact on performance that the users perceive with a software upgrade depends on the degree of change made on the features the users access the most.

The Khoo study concurs with the results found on the study by Beel [Beel07] in which the users stated that their performance was affected by the many changes made on the user interface. In the Beel study the user's performance was definitively affected by the changes made to the user interface, but as mentioned before, the user understands that with time they could get used to the new look and feel of the application.

What affected the user's performance is a process called the learning curve, which as mentioned by one of the participants of the Khoo study, refers to the time it takes the user to get used to the new features of an application or the new look of an interface.

A similar argument is presented by McKeen [McKeen94].The focus of their study was to determine the relationship between the user participation and their satisfaction. They concur with Szajna [Szajna93] that the performance of a user is closely related to their expectation. In this case the measure of task complexity or difficulty is based on the individual's perception. A task that for some users, would consider really easy to execute, some others might consider it very difficult. They also argued that the complexity of a task could arise from the presence of ambiguity and uncertainty regarding the number of options available, the number of options allowable, the combination of options and their interrelationship to one another. They refer to ambiguity as confusion, lack of understanding, and disagreement while they described uncertainty as lack of information or the difference between the information available, and what is needed to properly complete the task. They also concur with C.L Michael [Michael03] that the level of satisfaction was closely related to the participation or willingness to interact with a system.

Software upgrades as described in the study of Shaw [Shaw02] have a close relationship with user satisfaction. As she describes in her study, software upgrades is the only support factor that is consistently correlated with user satisfaction across several studies. In many of those studies the association between software upgrades and user satisfaction has been found to be negative, meaning that fewer upgrades were correlated with higher levels of user satisfaction.

She concurs with Khoo and Beel's studies that the dislocation and disruption created by the "relearning" curve often associated with software upgrades may adversely affect user satisfaction and performance with a system or application. In her study a series of factors were examined to determine if they had a direct impact on the user satisfaction. Her study concluded that even though there are many factors that may or may not affect user satisfaction depending on the case software upgrades is one those factors that almost always will affect the user's satisfaction.

In the study presented in this thesis an approach similar to the Beel's study is taken but also taking a step further, by adding two more applications to determine how much an upgrade can affects the user performance. Contrary to Beel's study in which users were affected by the learning curve, in this study the user performance will be measured after the users have been working with the upgraded version for at least a year. The results will be then compared with the results of Beel's study but ruling out the learning curve factor.

3 Methodology

3.1 Environment

The environments selected for this study were two version of the Microsoft set of applications known as Office. The 2003 and 2007 versions of the application were selected because of the dramatic change on the user interface between them. The three main applications known as Word, Excel and PowerPoint were used for the series of tests developed for the study. The tests were constructed so that the participants would complete a series of tasks on each application. The purpose of the tasks was for the participants to interact with the features and options most commonly used by the typical users of the applications. The participants were asked to do the tasks in both versions of each of the applications.

3.2 Participants

A total of fifty persons participated on this study. The population consisted of students, professors and employees of the University of Puerto Rico at Mayagüez. The basic requirement for eligibility of the participants was that they had at least one year of experience using Microsoft Office 2003 and 2007 versions and a basic knowledge of the Microsoft Windows operating system.

3.3 Tasks

A series of tasks were given to the participants for each version of the Office applications discussed in section 3.1. They are summarized in the following sections. For a list that includes the specific instructions given to the participants **see Appendix F**.

3.3.1 Word

1. Open File on Desktop
2. Change Font
3. Align Paragraph
4. Draw a table
5. Remove column from table
6. Add rows to the table
7. Insert image into document
8. Undo last action
9. Add numbered bullets
10. Run a Spell-check
11. Run a search in the document
12. Replace a word in the document
13. Run a print preview
14. Save the document with a new name
15. Copy content of one section
16. Create a new document and paste the copied content

3.3.2 Excel

1. Open File on Desktop
2. Centralize Title
3. Insert Row
4. Delete a Row
5. Calculate an average
6. Replicate formula
7. Adjust decimal points
8. Centralize Data on cell
9. Generate a Graph
10. Move Graph
11. Assign Title to cell
12. Copy data and paste
13. Highlight cell

3.3.3 PowerPoint

1. Open File on Desktop
2. Change Slide Design
3. Access Slide Master Window
4. Change text color and add effects
5. Change bullets format
6. Access Slide Sorter Window
7. Add a new slide
8. Draw and edit a circle
9. Insert an image into document
10. Insert sound
11. Run a Slide Show
12. Print Presentation Handouts

3.4 Experimental Design

This study was divided into three pre experimental phases and four experimental phases. The first pre experimental phase consisted on selecting the most used applications of the Microsoft Office suite. A meeting was held to discuss this matter and the consensus was that the applications to use for the study were Word, Excel and PowerPoint. On that meeting the proper tasks that may reflect the most common features used were selected for each of the applications.

The second pre experimental phase consisted on designing the proper questionnaires to obtain information about the candidate's background, to determine their eligibility and feedback about their interaction with each version of the chosen applications.

The third pre experimental phase consisted on running a pilot test to determine the time it took the users to finish the tasks for each application, and determine if any adjustment was needed in any of the tests. Three subjects participated in this pilot test. The maximum time adopted was 2 minutes which is twice the maximum time taken by the pilot test users to complete a task. Only minor adjustments were needed in terms of the presentation of the tasks to the participants to aid them understanding what was expected on each task.

In the first experimental phase the purpose of the study was presented to the study candidates. A consent form (see Appendix A) was provided which specified the focus of the study, a description of the different tests, which tools and methods were going to be used to collect the data, and how that data was going to be managed. The study candidate was also informed that the participation was voluntary and that he or she could decide to stop any of the tests at any time.

The second experimental phase consisted of a screening test where data from the participants was collected, with the aid of a questionnaire (see Appendix B), which included questions about the level of knowledge of computers, experience in the technology area and experience with the Microsoft Office programs.

In the third experimental phase the tasks were given to the participants in Office 2003 and Office 2007. The tasks were handed to the participants printed on paper and shown to them one by one for each of the applications (see Appendix F).

In order to compensate for the learning effect, half of the participants conducted the tasks for PowerPoint, Word and Excel first in Office 2003 and the other half in Office 2007. To facilitate the analysis of the execution of the tasks the interaction of each participant was recorded, using a program known as Morae [Morae], developed by the TechSmith Company. With the recordings generated by Morae, it was possible to determine the errors committed by the participants in each application. To determine if the participants committed an error their interaction was compared with a task procedure rubric. Also the Morae recordings aid to determine the tools the participants used to complete each task and how many tasks they were able to complete.

Finally, the fourth experimental phase consisted of collecting the feedback from the participants, by means of a questionnaire (**see Appendix D**) about their experience while performing the given tasks. The questions focused on determining in which areas the participants confronted problems, the degree of difficulty in performing the tasks and the user satisfaction with the system. The last two were measured using a 1-to-5 ranking scale in which 1 is not satisfied and 5 is very satisfied

3.5 Statistical Analysis

Usability is associated with five attributes of a system: learnability, efficiency, memorability, errors, and satisfaction [Nielsen93]. “Learnability” refers to the ease by which users learn to use a system and get some work done. “Efficiency” refers to the level of productivity that can be achieved with a system once the users have learned to use it. “Memorability” refers to the ease by which casual users can use the system without learning it again. “Errors” refers to the capacity of a system to reduce user errors. “Satisfaction”

refers to the level of subjective satisfaction achieve by the users when using the system.[Rodriguez02]

The efficiency, errors and user satisfaction usability attributes were used for this study. The dependent variables *tasks completion time* and the *number of tasks completed* are indicators of efficiency. The time to complete a task was considered between the time the participant move the mouse on the screen until the correct function was executed to complete the task. The completion of a task was determined by observation. If the participants exceeded the time limit he or she was notified that the time was over and was asked to stop, the task was considered as failed and the next task was given to them.

Some tasks required that the previous task was completed to be able to complete the subsequent task, if the participant was unable to complete a task and the subsequent depended of its completion, the participant was instructed on how to complete the failed task so that the participant could be able to try the next.

The dependent variable *errors* was used an indicator of the errors usability attribute. This was measured by observation of the Morae recording using a rubric. The rubric consisted of the proper steps to complete a task. In many cases the proper procedure to complete a task consisted on clicking on a specific menu or icon to complete it. In some cases there was more than one way to properly complete the task. The procedure or procedures to complete a task consisted of a series of steps that were necessary to properly execute a task. If the participant for some reason performed an action that did not comply with the proper step that was defined in the rubric, that action was considered as an error committed by the participant.

The dependent variables *difficulty in performing the tasks* and *user satisfaction* were measured as indicators of the subjective user satisfaction usability attribute. These two variables were measured by questionnaires and a likert scale of 1-5 where 1 is easy and 5 difficult in terms of difficulty. In terms of satisfaction a rate of 1 was considered not satisfied and a rate of 5 very satisfied.

For the analysis of difference in *task completion time* and *errors* committed, the Dependent Samples t Test, also known as Paired-t-test, was selected. The Wilcoxon SUM Rank Test was used to analyze *user satisfaction, difficulty in performing the tasks,* and the *number of tasks completed*.

To analyze if there was a relation between the dependent variables and the participants' information specifically age, gender and profession and also the frequency of use of each application, a Pearson correlation test was selected.

The dependent variables used in this study have also been used in other studies comparing the usability of user interfaces [Rodriguez07, Rodriguez09].

4 Results

4.1 Screening Test

As discussed earlier a screening test was used to determine their experience using computers and their knowledge on the Microsoft Office Suite applications. As mentioned before, the purpose was to determine the eligibility of the candidates to participate on the study. As discussed earlier a description of the study were given to them and if they were willing to participate then the screening were given to them test. All the persons that agreed to participate satisfied the screening test minimum requirements. The results of the screening test are shown below.

A group of 50 participated in this study, which consisted of students, professors and employees of the University of Puerto Rico. As shown on **TABLE 4.1** and **TABLE 4.2** the group consisted of 32 males and 18 female participants, from which 35 were students, 5 were professors and 10 were employees.

TABLE 4.1 Participant's Gender Distribution

Gender	Frequency	Percent	Cumulative Percent
Male	32	64.0	64.0
Female	18	36.0	100.0

TABLE 4.2 Participant's Profession Distribution

Profession	Frequency	Percent	Cumulative Percent
Student	35	70.0	70.0
Professor	5	10.0	80.0
Employee	10	20.0	100.0

In terms of age, previous experience with computers and daily utilization we could see from **TABLE 4.3** that the average age of participants was **28.08** years (Y) with a maximum age of **55** years and a minimum of **20** years with a standard deviation of **7.292**. In terms of years of experience the participants had an average of **14.30** years with a maximum of **32** years and a minimum of **7** years, having a standard deviation of **5.75** and an average of **8.38** hours of daily utilization with a maximum of **14** hours and a minimum of **3** hours.

TABLE 4.3 Participant's Age, Daily Utilization and Computer Experience Distribution

	Mean	Std. Deviation	Minimum	Maximum
Participants' Age (years)	28.08	7.29	20	55
Years of Experience	14.30	5.76	7.0	32.0
Daily Utilization (hours)	8.4	2.9	3.00	14.00

In terms of experience using the Word application we could see from **TABLE 4.4** that the participants had a maximum of **6** years of experience with Word 2003 and a minimum of **1** year while in 2007 they had a minimum of **1** year and maximum of **2** years.

TABLE 4.4 Participant's experience in Word

Experience Word								
Word 2003					Word 2007			
Years	Frequency	Percent	Cumulative Percent		Years	Frequency	Percent	Cumulative Percent
1	2	4.0	4.0		1	42	84.0	84.0
2	1	2.0	6.0		2	8	16.0	100.0
3	10	20.0	26.0					
4	15	30.0	56.0					
5	17	34.0	90.0					
6	5	10.0	100.0					

In the Excel application as we can see from **TABLE 4.5,** the participants had a minimum experience of 1 year and a maximum of 6 years while in Excel 2007 they had a minimum of 1 year and a maximum of 2 years.

TABLE 4.5 Participant's experience in Excel

Experience Excel								
Excel 200					Excel 2007			
Years	Frequency	Percent	Cumulative Percent		Years	Frequency	Percent	Cumulative Percent
1	2	4.0	4.0		1	42	84.0	84.0
2	2	4.0	8.0		2	8	16.0	100.0
3	13	26.0	36.0					
4	16	32.0	66.0					
5	13	26.0	92.0					
6	4	8.0	100.0					

In PowerPoint 2003 as shown on **TABLE 4.6** the participants had a minimum experience of 1 year and a maximum of 6 years while in PowerPoint 2007 they had a minimum of 1 year and a maximum of 2 years.

TABLE 4.6 Participant's experience in PowerPoint

Experience PowerPoint								
PowerPoint 2003					PowerPoint 2007			
Years	Frequency	Percent	Cumulative Percent		Years	Frequency	Percent	Cumulative Percent
1	2	4.0	4.0		1	43	86.0	86.0
2	1	2.0	6.0		1.8	1	2.0	88.0
2.8	1	2.0	8.0		2	6	12.0	100.0
3	12	24.0	32.0					
4	16	32.0	64.0					
5	14	28.0	92.0					
6	4	8.0	100.0					

To further determine their knowledge with the applications, a series of questions were asked to the participants about their experience with some features which were needed to execute some of the tasks. The results of those questions are summarized in the following tables.

As shown on **TABLE 4.7** all of the participants had worked with tables in Office 2003 while in Office 2007 only 2 participants had not worked with tables before.

TABLE 4.7 Participant's experience with tables

Tables 2003					Tables 2007			
Used Before	Frequency	Percent	Cumulative Percent		Used Before	Frequency	Percent	Cumulative Percent
No	0	0	0.0		No	2	4.0	4.0
Yes	50	100.0	100.0		Yes	48	96.0	100.0

In terms of participants' experience using the find feature, we could see from **TABLE 4.8** that 92 % if them had used it in Office 2003 while in 2007 a total of 84 % of the participants did.

TABLE 4.8 Participant's experience using find

Find 2003					Find 2007			
Used Before	**Frequency**	**Percent**	**Cumulative Percent**		**Used Before**	**Frequency**	**Percent**	**Cumulative Percent**
No	4	8.0	8.0		No	8	16.0	16.0
Yes	46	92.0	100.0		Yes	42	84.0	100.0

As shown by **TABLE 4.9** and **TABLE 4.10** all the participants had worked before with images and have used the spell-check feature while in 2007 only one participant had not work with them before.

TABLE 4.9 Participants' experience inserting images

Images 2003					Images 2007			
Used Before	**Frequency**	**Percent**	**Cumulative Percent**		**Used Before**	**Frequency**	**Percent**	**Cumulative Percent**
No	0	0	0.0		No	1	2.0	2.0
Yes	50	100.0	100.0		Yes	49	98.0	100.0

TABLE 4.10 Participants' experience using Spell-Check

Spell-check 2003					Spell-check 2007			
Used Before	**Frequency**	**Percent**	**Cumulative Percent**		**Used Before**	**Frequency**	**Percent**	**Cumulative Percent**
No	0	0	0.0		No	1	2.0	2.0
Yes	50	100.0	100.0		Yes	49	98.0	100.0

4.2 Completion Times

To determine if significant differences were present, between the times required by the participants to complete the tasks, the Dependent t Sample test was used. The results are organized by the application used.

4.2.1 Word

A dependent-samples t test did not reveal a significant difference between the average overall time (in seconds) it took the participants to complete all the tasks on Word 2003 (Mean=192.18, SD=73.84) and Word 2007 (Mean=198.54, SD=79.28). However, there were significant differences in some of the individual tasks. The completion times for the participants in Word 2003 are shown on **Table D.1** and on **Table D.2** (see **Appendix D**) for the Word 2007 times.

The differences in average completion time for all the tasks are denoted in **Figure 4.1**. The average times and standard deviations for the completion time of individual tasks are presented in **TABLE 4.11** The differences in the average completion time for each of the tasks are presented in **figure 4.2.**

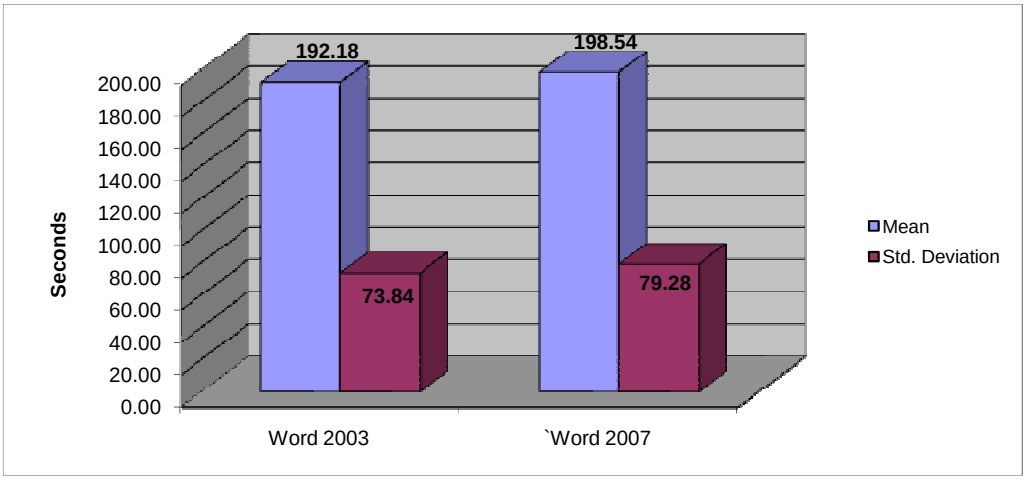

Figure 4.1 Overall Average Completion Times for Word

TABLE 4.11 Paired t test, Significance, Means and Std. Dev. for completion times Word

	Word 2003		Word 2007			
Task	Mean (sec)	Std. Dev (sec)	Mean (sec)	Std. Dev (sec)	Paired t test	Significance
1	4.84	1.43	5.72	1.37	3.861	0.000
2	13.3	5.88	13.46	4.35	.255	0.800
3	3.68	1.11	3.88	1.38	.971	0.336
4	22.94	13.99	13.4	5.37	5.147	0.000
5	5.54	5.55	7	7.98	1.333	0.189
6	22.34	27.98	11.82	10.63	2.918	0.005
7	9.74	5.37	9.98	9.02	.196	0.845
8	1.2	0.45	1.18	0.48	.240	0.811
9	31.52	11.96	32.48	14.7	.583	0.552
10	22.14	15.31	28.42	20.97	2.298	0.026
11	14.08	17.1	16.4	20.39	.903	0.271
12	16.8	12.83	20.84	19.69	2.115	0.040
13	2.92	2.16	7.66	7.5	4.683	0.000
14	11.58	3.14	13.28	4.54	3.440	0.001
15	5.8	2.58	6.28	2.6	1.303	0.199
16	3.76	3.43	6.74	3.83	4.987	0.000

The dependent sample t test revealed that there were significant differences in the average completion time for tasks **1, 4, 6, 10, 12, 13, 14** and **16**. The participants were able to complete tasks **1** (*Open Document*)**, 10** (*Spell-Check*)**, 12 (***Text Replace*)**, 13** (*Preview Document*)**, 14 (***Save Document***)** and **16** (*Create a new document*) faster on Word 2003 than in Word 2007. On the other hand, the participants were able to complete tasks **4** (*Draw Table*) and **6** (*Add Rows*) faster on Word 2007 than on Word 2003.

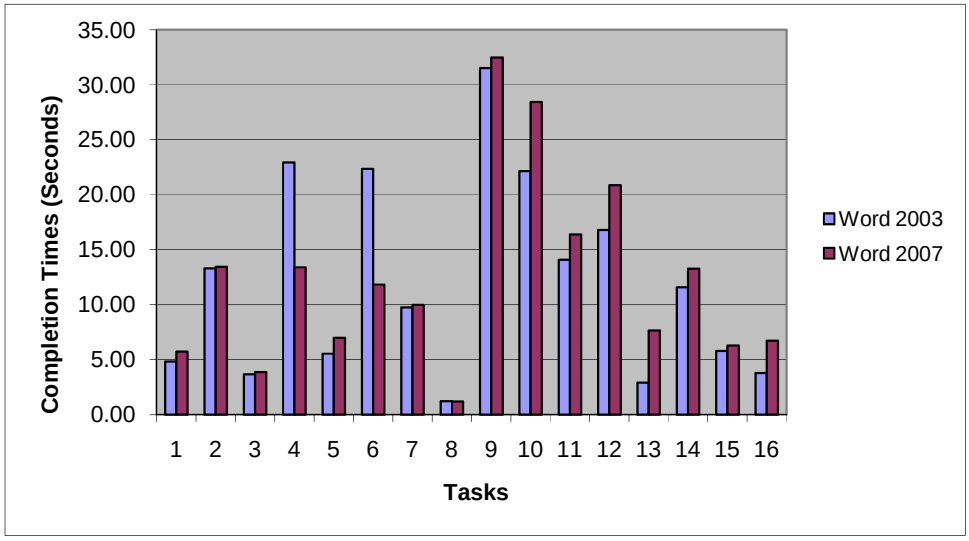

Figure 4.2 Completion Times for Each Task in Word 2003 and Word 2007 Versions.

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4.2.2 Excel

A dependent-samples t test revealed a significant difference between the average overall time it took the participants to complete all the tasks on Excel 2003 (Mean= 170.04, SD= 103.09) and Excel 2007 (Mean= 217.50, SD= 102.55). The participants were able to complete all the tasks in Excel 2003 faster than on Excel 2007.

The completion times for the participants in Excel 2003 are shown on **Table D.4** and on **Table D.5** (see **Appendix D**) for the Excel 2007 Times. The differences in average completion time for all the tasks are denoted in **Figure 4.3** The average times and standard deviations for the completion time of individual tasks are presented in **TABLE 4.12** .

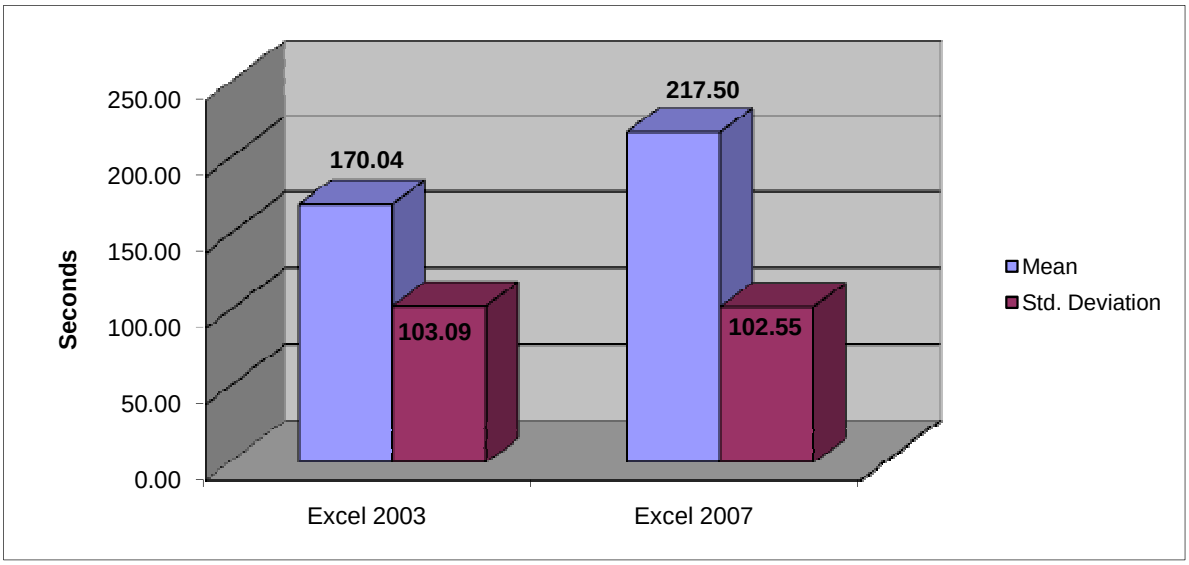

Figure 4.3 Overall Average Completion Times for Excel

TABLE 4.12 Paired t test, Significance, Means and Std. Dev. for completion times Excel

	Excel 2003		Excel 2007			
Task	Mean (sec)	Std. Dev (sec)	Mean (sec)	Std. Dev (sec)	Paired t test	Significance
1	5.08	5.84	5.4	2.09	.441	0.662
2	37.18	43.62	33.76	39.91	1.036	0.305
3	4.7	3.76	8.94	14.91	2.387	0.021
4	5.08	6.29	4.64	4.71	.683	0.498
5	26.02	26.95	24.82	18.01	.428	0.671
6	15.46	30.44	9.42	13.83	2.124	0.038
7	11.62	13.32	18.42	28.27	2.112	0.040
8	7.4	2.91	8.32	4.45	2.025	0.048
9	33.68	13.38	77.56	33.56	8.629	0.000
10	3.94	3.12	3.56	2.36	.840	0.405
11	4.9	2.43	5.06	1.82	.508	0.613

	Excel 2003		Excel 2007			
Task	Mean (sec)	Std. Dev (sec)	Mean (sec)	Std. Dev (sec)	Paired t test	Significance
12	8.4	4.49	9.96	6.05	1.771	0.083
13	6.58	4.71	7.64	5.53	1.206	0.234

The dependent sample t test revealed that there were significant differences in average completion time for tasks **3, 6, 7, 8** and **9.** The participants were able to complete tasks **3** (*Insert Row*)**, 7** (*Adjust Precision*)**, 8** (*Center Data*) **and 9 (***Generate Graph*) faster on Excel 2003 than in Excel 2007. On the other hand, the participants completed **Task #6** (*Replicate Formula*) faster on Excel 2007 than in Excel 2003.

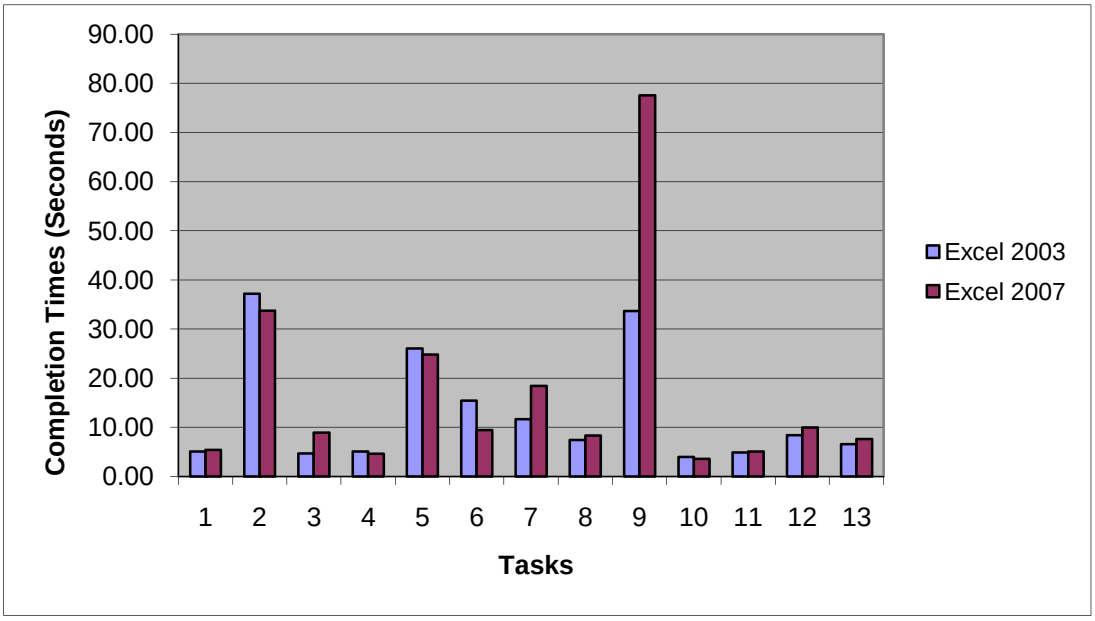

Figure 4.4 Completion Times for Each Task in Excel 2003 and Excel 2007 Versions

4.2.3 PowerPoint

A dependent-samples t test did not reveal a significant difference between the average overall time it took the participants to complete all the tasks on PowerPoint 2003 (Mean= 286.26, SD= 111.29) and PowerPoint 2007 (Mean= 285.38, SD= 95.83). However, there were significant differences in some of the individual tasks. The completion times for the participants in PowerPoint 2003 are shown on **Table D.5** and on **Table D.6** (see **Appendix D**) for the PowerPoint 2007 Times. The differences in average completion times for all the tasks are denoted in **Figure 4.5**. The average times and standard deviations for the completion time of individual tasks are presented in **TABLE 4.13** .

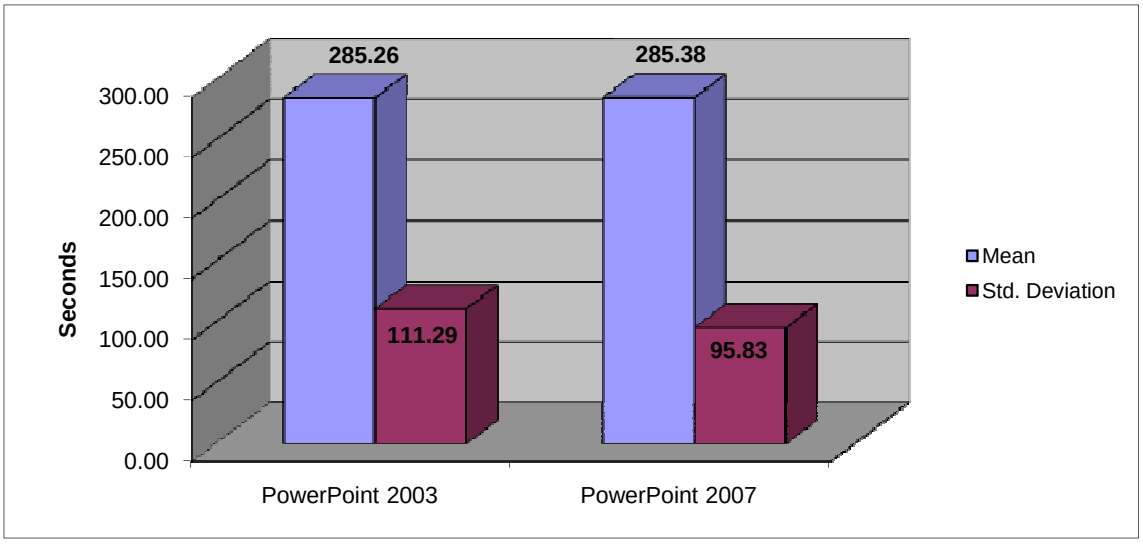

Figure 4.5 Overall Average Completion Times for PowerPoint

TABLE 4.13 Paired t test, Significance, Means and Std. Dev. for completion times PowerPoint

	PowerPoint 2003		PowerPoint 2007			
Task	Mean (sec)	Std. Dev (sec)	Mean (sec)	Std. Dev (sec)	Paired t test	Significance
1	5	1.6	6.3	2.18	5.048	0
2	19.94	17.93	30.44	22.69	3.267	0.002
3	50.92	38.93	64.64	35.12	2.179	0.034
4	61.84	38.48	55.6	27.89	1.244	0.219
5	12.16	7.91	16.66	14.43	2.567	0.013
6	9.62	7.12	14.56	14.76	2.706	0.009
7	5.38	4.62	7.78	7.9	2.132	0.038
8	46.76	33.79	31.8	15.27	3.256	0.002
9	13.46	6.06	16	12.76	1.600	0.116
10	48.32	32.89	28.9	23.8	3.774	0
11	3	5.61	3.24	4.29	.417	0.679
12	8.86	8.91	9.46	4.84	.515	0.609

The dependent sample t test revealed that there were significant differences in the average completion time for tasks **1, 2, 3, 5, 6, 7, 8 and 10.** The participants were able to complete tasks **1** (*Open Document*)**, 2** (*Change Design*)**, 3 (***Slide Master*)**, 5** (*Change Bullets*)**, 6** (*Slide Sorter*) **and 7** (*Add Slide*) faster on PowerPoint 2003 than in PowerPoint 2007. On the other hand, he participants were able to complete task 8 (*Draw / Edit Circle*) and 10 (*Insert Sound*) faster on Power Point 2007 than in 2003.

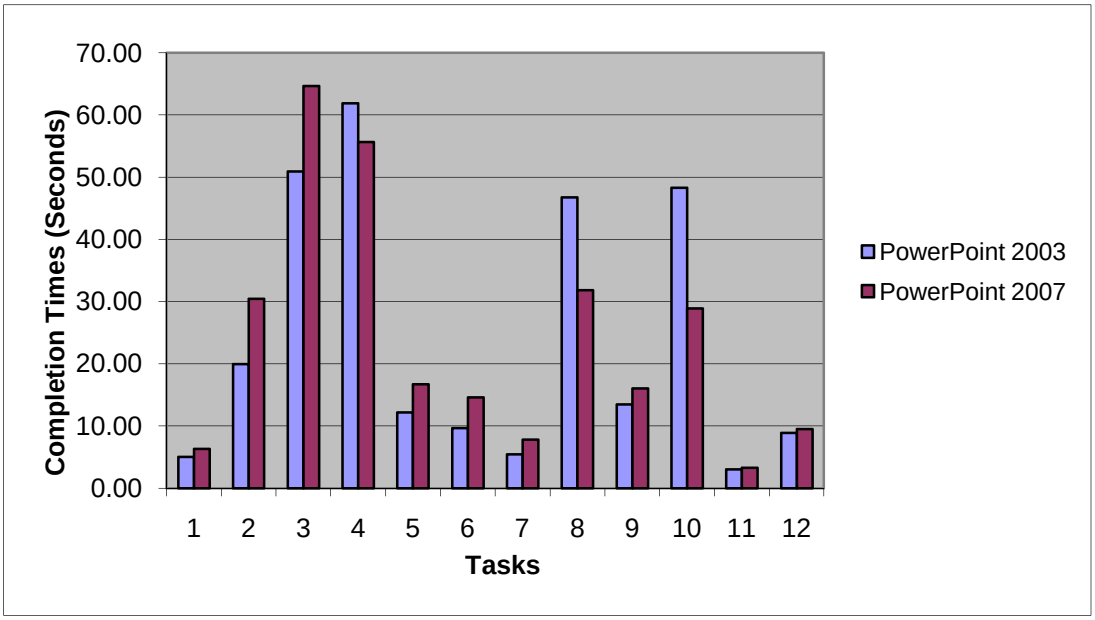

Figure 4.6 Completion Times for Each Task in PowerPoint 2003 and PowerPoint 2007 Versions

4.3 Completed Tasks

To determine if significant differences were present, between the number of tasks completed by the participants between the two systems, the Wilcoxon Sum Rank Test was used. The results are organized by the application used.

4.3.1 Word

Wilcoxon signed ranks tests did not reveal significant differences in the total number of tasks completed by the participants on Word. The participants completed an average of **15.78 tasks** on Word 2003 and also **15.78 Tasks** on Word 2007 (**see Figure 4.7**). No significant differences were found in task completion for individual task on Word 2003 and Word 2007.

The number of completed tasks by each user is denoted on **Table E.1** for Word 2003 and on **Table E.2** (see **Appendix E**) for Word 2007. A summary of the number of participants that completed individual tasks are presented in **TABLE 4.14** The relative differences in the number of tasks completed are denoted in **Figure 4.8.**

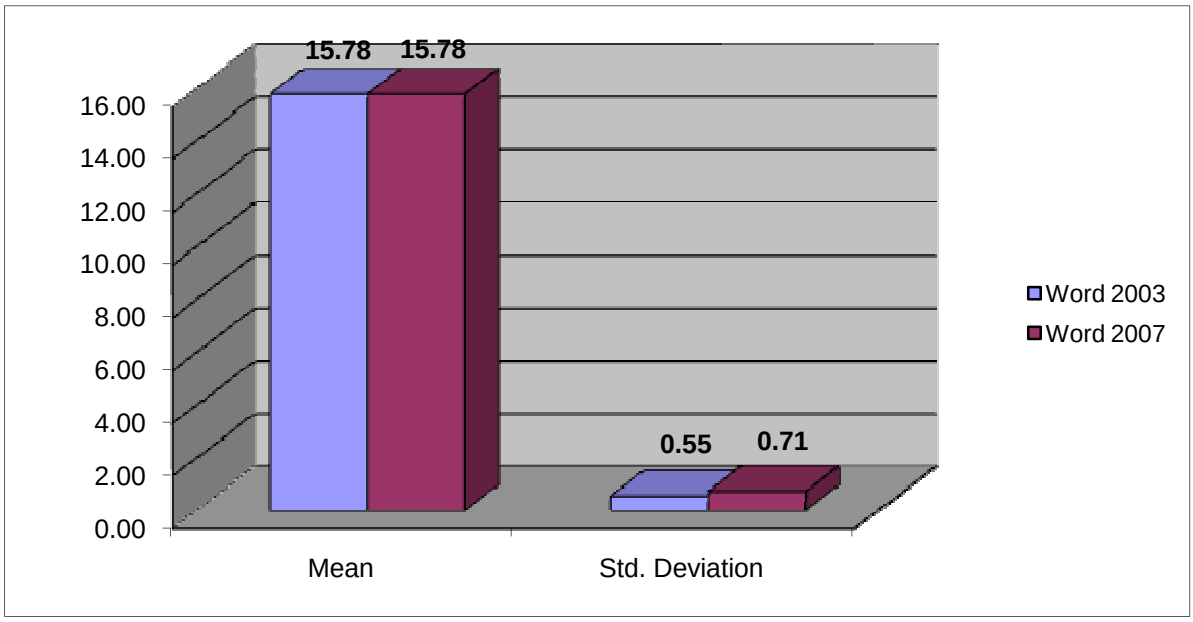

Figure 4.7 Average of completed task by participants in Each Version of Word

TABLE 4.14 Number of Completed Task, Wilcoxon and Significance for Word.

Task	2003	2007	WSRT	Sig.
1	50	50	0	1
2	50	50	0	1
3	50	50	0	1
4	50	50	0	1
5	50	50	0	1
6	47	49	1	0.317
7	50	49	1	0.317
8	50	50	0	1
9	48	49	1	0.317
10	50	48	1.414	0.157
11	48	47	0.577	0.564
12	49	48	0.577	0.564
13	50	49	1	0.317
14	50	50	0	1
15	50	50	0	1
16	50	50	0	1

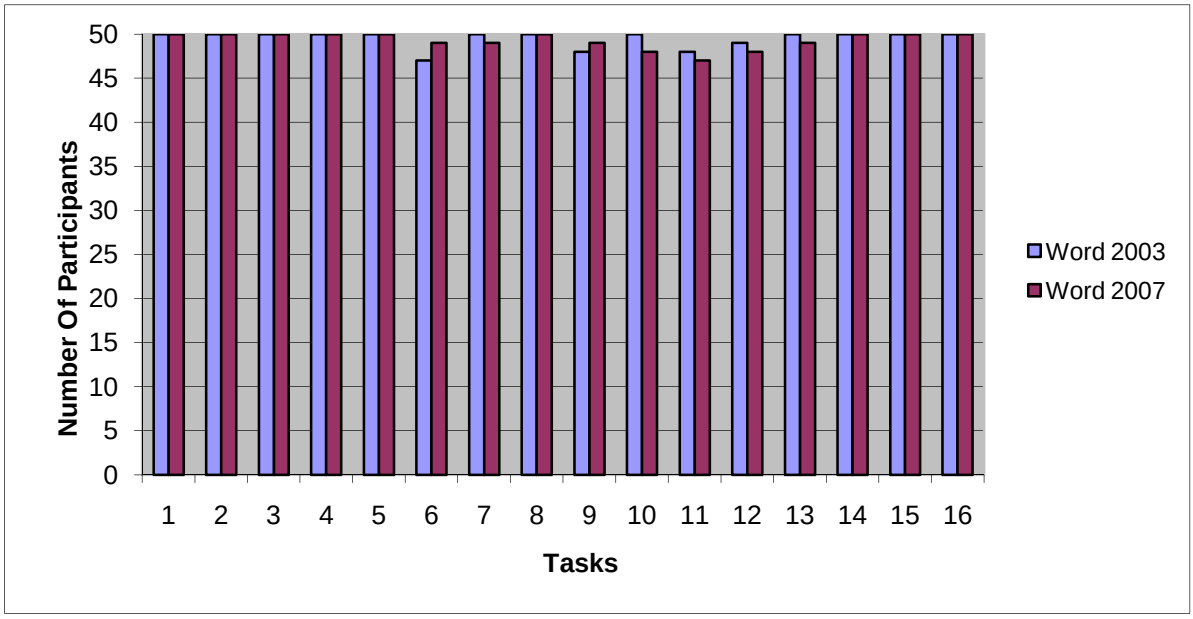

Figure 4.8 Number of Participants that Completed Each Task in Each Version of Word

4.3.2 Excel

Wilcoxon signed ranks test revealed significant difference in the total number of tasks completed by the participants in Excel. The participants completed an average of **12.58** tasks on Excel 2003 and **12.10** on Word 2007 (**see Figure 4.9**). The number of completed tasks by each user is denoted on **Table E.3** for Excel 2003 and on **Table E.4** (see **Appendix E**) for Excel 2007. A summary of the number of participants that completed individual tasks is presented in **TABLE 4.15**. The relative differences in the number of tasks completed can be appreciated in **Figure 4.10**.

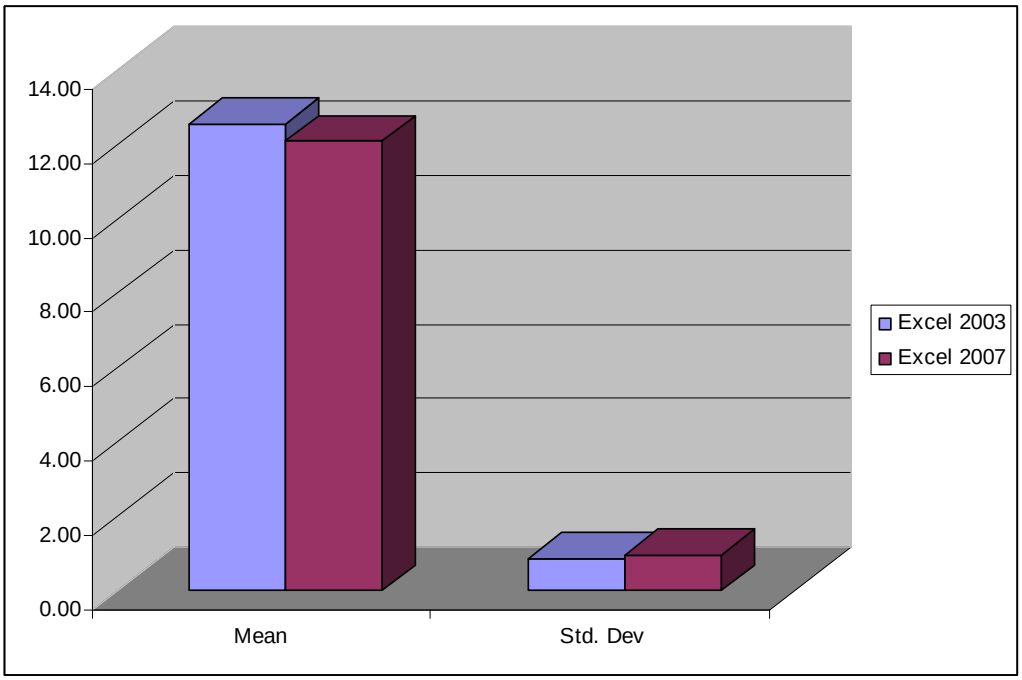

Figure 4.9 Average of completed task by participants in Each Version of Excel

TABLE 4.15 Number of Completed Task, Wilcoxon and Significance for Excel

Task	2003	2007	WSRT	Sig.
1	50	50	0	1
2	40	40	0	1
3	50	50	0	1
4	50	50	0	1
5	47	47	0	1
6	46	44	1.414	0.157
7	48	47	1	0.317
8	50	50	0	1
9	48	27	4.379	0
10	50	50	0	1
11	50	50	0	1
12	50	50	0	1
13	50	50	0	1

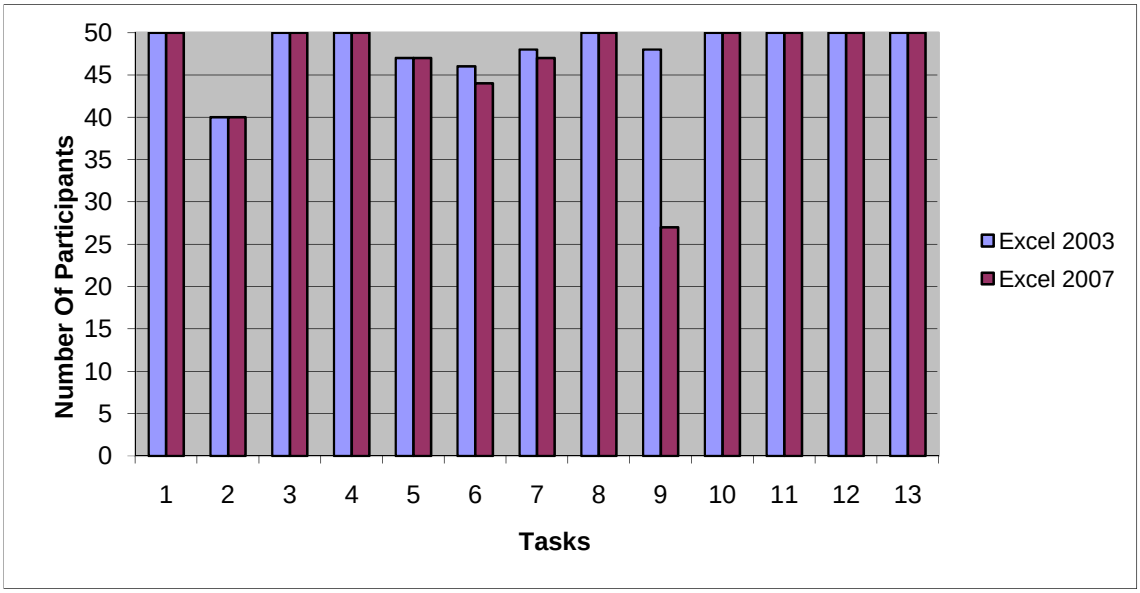

Figure 4.10 Number of Participants that Completed Each Task in Each Version of Excel

Even though the Wilcoxon Sum Rank Test revealed that there was a significant difference in the total number of tasks completed between the two systems, the only individual task that showed a significant difference was **Task #9 (***Generate Graph***).** Almost all the participants

(48) were able to complete Task #9 in Excel 2003 while almost half (27) of the participants were able to complete it in Excel 2007.

4.3.3 PowerPoint

Wilcoxon signed ranks tests did not reveal significant difference in the total number of tasks completed by the participants in PowerPoint. However there was a significant difference in one of the individual tasks. The participants completed an average of **10.98 tasks** on PowerPoint 2003 and **11.08 Tasks** on PowerPoint 2007 (**see Figure 4.11**). A significant difference was found in **Task #10**. The number of completed tasks by each user is denoted on **Table E.5** for PowerPoint 2003 and on **Table E.6** (see **Appendix E**) for PowerPoint 2007. A summary of the number of participants that completed individual tasks is presented in **TABLE 4.16**. The relative differences in the number of tasks completed can be appreciated in **Figure 4.12.**

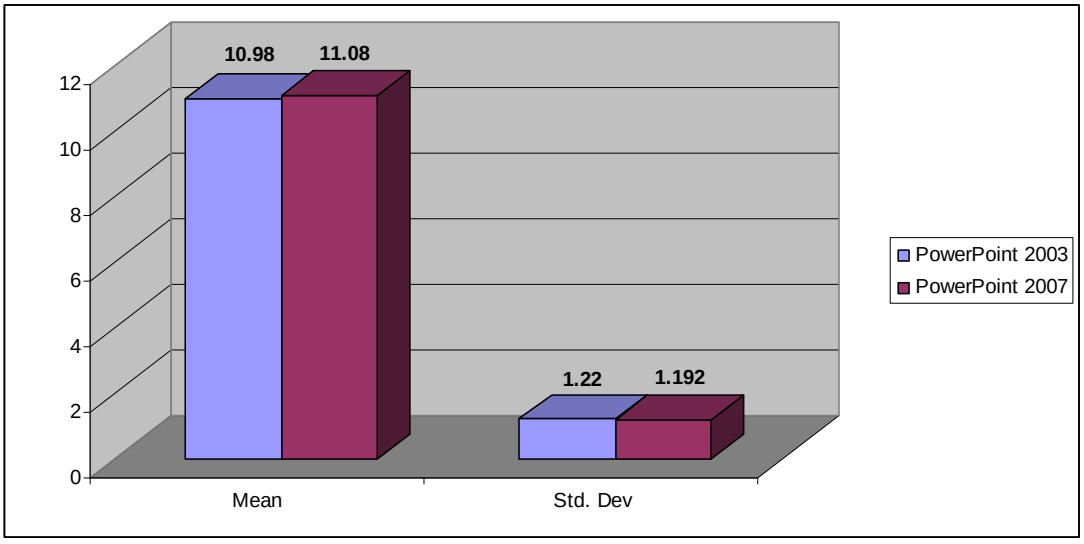

Figure 4.11 Average of completed task by participants in Each Version of PowerPoint

TABLE 4.16 Number of Completed Task, Wilcoxon and Significance for PowerPoint

Task	2003	2007	WSRT	Sig.
1	50	50	0	1
2	47	45	0.816	0.414
3	38	31	1.698	0.09
4	36	38	0.577	0.564
5	50	49	1	0.317
6	49	48	1	0.317
7	50	50	0	1
8	44	47	1.732	0.083
9	49	48	1	0.317
10	37	49	3.207	0.001
11	50	50	0	1
12	49	49	0	1

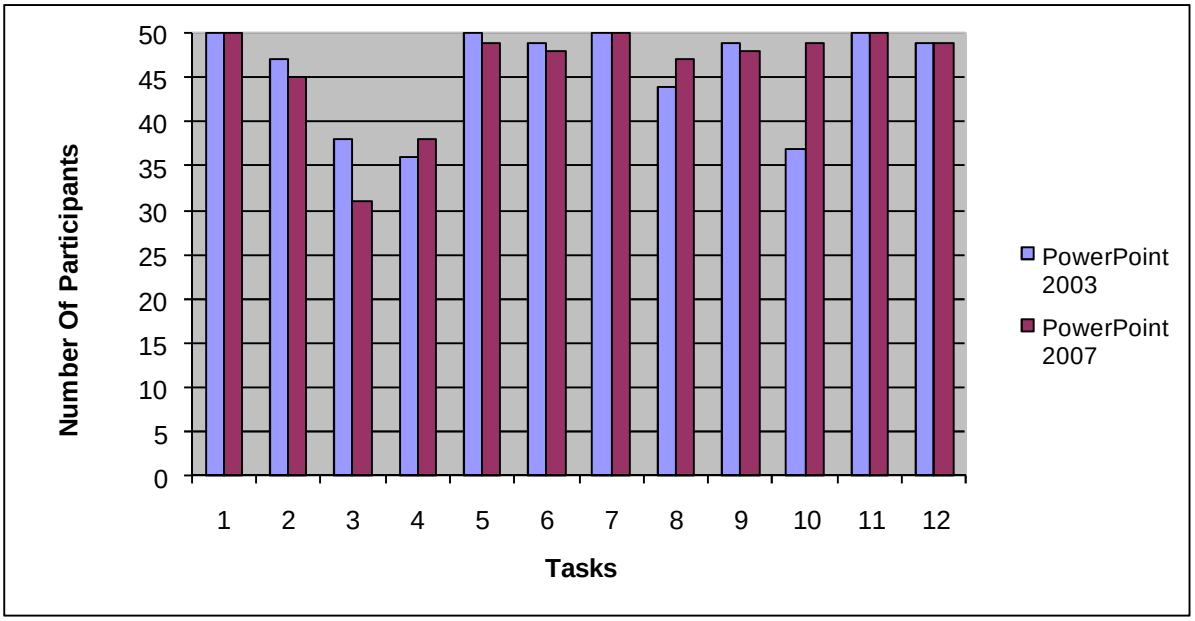

Figure 4.12 Number of Participants that Completed Each Task in Each Version of PowerPoint

Even though the Wilcoxon Sum Rank Test did not reveal that there was a significant difference in the average total number of tasks completed between the two systems the only task that showed a significant difference is **Task #10 (***Insert Sound***).** Almost all the participants completed this task on Power Point 2007 while only 37 participants completed the task in Power Point 2003.

4.4 Difficulty in performing the tasks

4.4.1 Word

Wilcoxon tests did not reveal a significant difference in the average overall Difficulty in performing the tasks between the two versions of Word. However there were significant differences on some of the individual tasks. The overall average Difficulty in performing the tasks rating for Word 2003 was **4.80** while for Word 2007 was **4.82**. The average ratings given by the participants to each of the tasks on both version of Word are summarized in **TABLE 4.17**. The relative differences in the average Difficulty in performing the tasks ratings given by the participants are shown in **Figure 4.13**.

TABLE 4.17 Average, Wilcoxon and Significance in Difficulty in performing the tasks for Word

Task	2003	2007	WSRT	Sig.
1	5	4.98	1	0.317
2	4.94	4.96	0.577	0.564
3	4.9	5	1.89	0.059
4	4.44	4.8	2.457	0.014
5	4.72	4.82	1.406	0.160
6	4.34	4.8	2.566	0.01
7	4.78	4.76	0.284	0.776
8	5	4.96	1	0.317
9	4.7	4.7	0.047	0.963
10	4.8	4.66	1.425	0.154
11	4.64	4.6	0.06	0.952
12	4.6	4.58	0	1
13	4.9	4.68	1.872	0.061
14	4.98	4.92	1.342	0.18
15	4.98	5	1	0.317
16	5	4.9	2.236	0.025

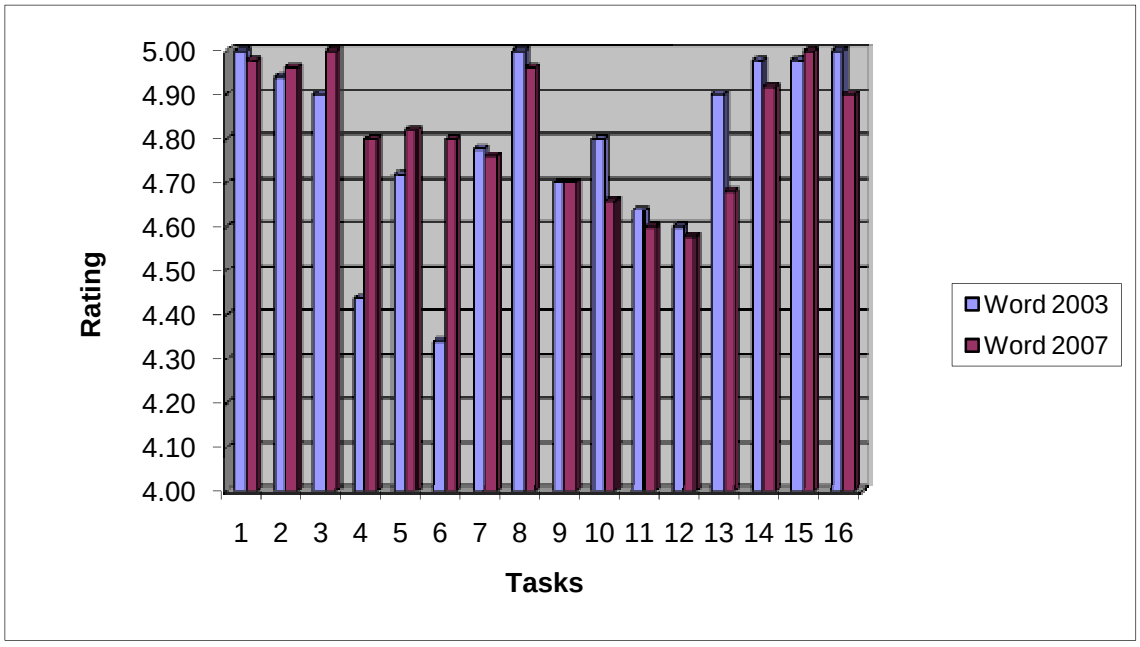

Figure 4.13 Average Difficulty in performing the tasks Ratings For Word

Wilcoxon Sum Rank test revealed that there were significant differences in user difficulty in performing the tasks for **Tasks 4, 6 and 16**. The participants had fewer difficulties with Word 2003 only for **Task #16** (New Document). On that particular task as we can see from **Table 4.7** the average rating for Word was 5.0 while on Word 2007 the average rating was 4.9.

The participants had fewer difficulties with Word 2007 for Tasks **4 and 6**. On **Task #4** (Draw Table) the average rating given by the participants to Word 2007 was **4.8** while for 2003 the average rating was **4.4**. On **Task #6** (*Add Rows*) the average rating given by the participants for Word 2007 was **4.8** while for Word 2003 the average rating was **4.34.**

4.4.2 Excel

Wilcoxon tests revealed significant difference in the average overall difficulty in performing the tasks between the two versions of Excel. The test also revealed that there were significant differences in some of the individual tasks. The participants had fewer difficulties with Excel 2003 than with Excel 2007. The overall average difficulty in performing the tasks rating for Excel 2003 was **4.71** while for Excel 2007 was **4.60**. The average ratings given by the participants to each of the tasks on both version of Excel are summarized in **TABLE 4.18**. The relative differences in the average difficulty in performing the tasks ratings given by the participants are shown in **Figure 4.13.**

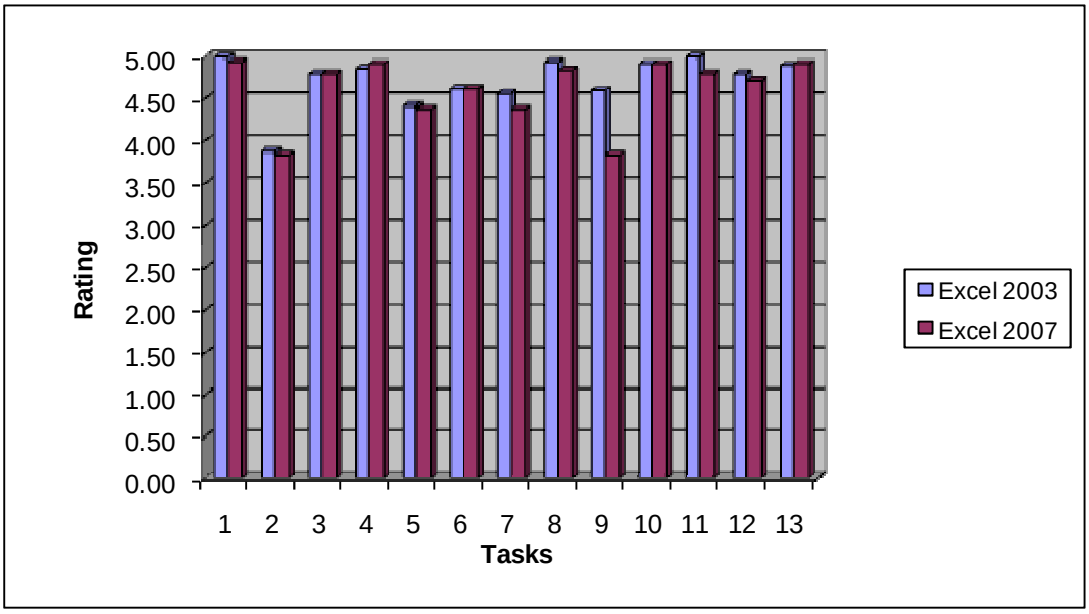

Figure 4.14 Average Difficulty in performing the tasks Ratings Excel

TABLE 4.18 Average, Wilcoxon and Significance in Difficulty in performing the tasks for Excel

Task	2003	2007	WSRT	Sig.
1	5	4.94	1.342	0.18
2	3.88	3.84	0.36	0.72
3	4.8	4.8	0	1
4	4.86	4.92	1.134	0.257
5	4.42	4.38	0.449	0.663
6	4.62	4.62	0	1
7	4.56	4.38	1.199	0.231
8	4.94	4.84	1.89	0.059
9	4.6	3.84	3.345	0.001
10	4.92	4.92	0	1
11	5	4.8	2.232	0.026
12	4.8	4.72	0.877	0.28
13	4.9	4.92	0.447	0.665

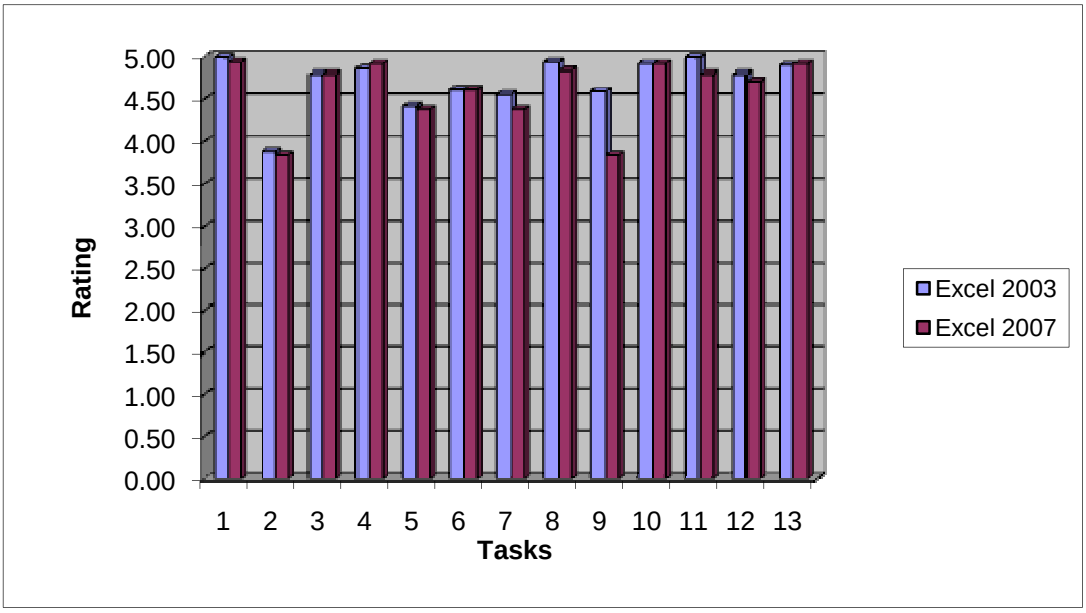

Figure 4.14 Average Difficulty in performing the tasks Ratings Excel

Wilcoxon Sum Rank test revealed that there were significant differences in user difficulty in performing the tasks for **Tasks 9 and 11**. On both tasks, as shown on **Table 4.8** and **Figure 4.14,** the participants had fewer difficulties with Excel 2003 than with Excel 2007. On **Task #9** (*Generate Graph*) the average rating given by the participants to Excel 2003 was **4.6** while for 2007 the average rating was **3.84**. On **Task #11** (*Title Cell*) the average rating given by the participants for Excel 2003 was **5.0** while for Excel 2007 the average rating was **4.80.**

4.4.3 PowerPoint

Wilcoxon tests did not reveal a significant difference in the average overall difficulty in performing the tasks between the two versions of PowerPoint. However there were significant differences on some of the individual tasks. The overall average difficulty in performing the tasks rating for PowerPoint 2003 was **4.51** while for PowerPoint 2007 was **4.43**. The average ratings given by the participants to each of the tasks on both version of PowerPoint are summarized in **TABLE 4.19**. The relative differences in the average difficulty in performing the tasks rating given by the participants are shown in **Figure 4.15.**

TABLE 4.19 Average, Wilcoxon and Significance in Difficulty in performing the tasks for PowerPoint

Task	2003	2007	WSRT	Sig.
1	5	4.86	2.333	0.02
2	4.26	4	1.35	0.178
3	3.48	3.08	1.8	0.072
4	4.58	4.46	0.75	0.454
5	4.82	4.72	1.072	0.284
6	4.66	4.5	1.597	0.11
7	4.94	4.86	1.127	0.26
8	4.24	4.34	0.765	0.444
9	4.76	4.8	1	0.317
10	3.44	3.94	1.94	0.052
11	4.94	4.88	1	0.317
12	4.84	4.66	2.31	0.021

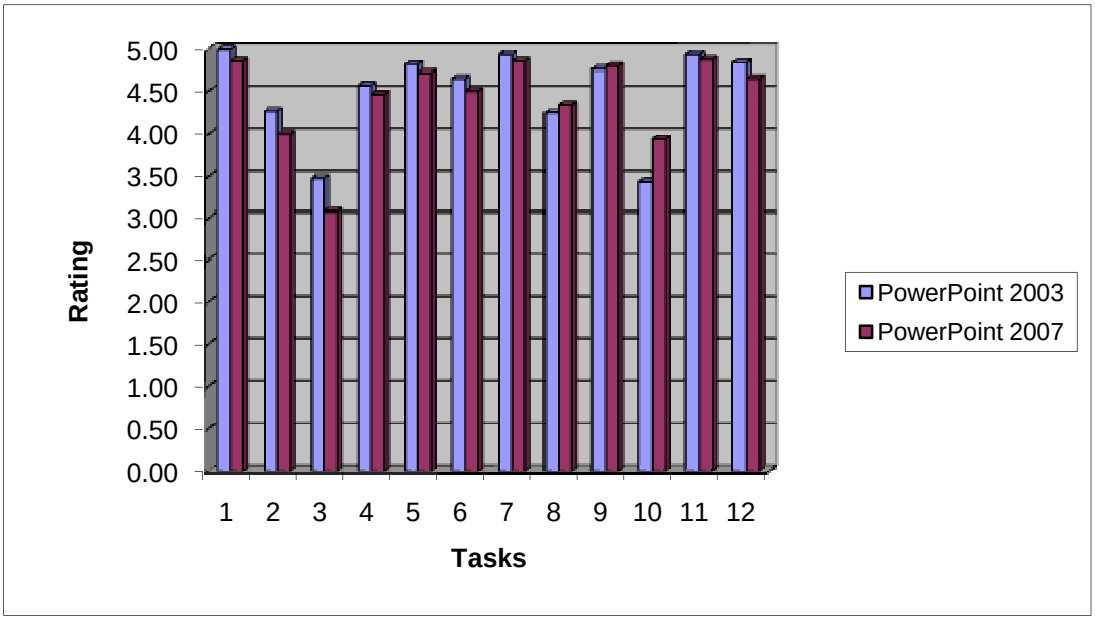

Figure 4.15 Average Difficulty in performing the tasks Ratings PowerPoint

Wilcoxon Sum Rank test revealed that there were significant differences in user difficulty in performing the tasks for **Tasks 1 and 12**. On tasks **1** and **12**, as shown on **Table 4.21** and **Figure 4.15** the participants had fewer difficulties with PowerPoint 2003 than with PowerPoint 2007. On **Task #1** (*Open Document*) the average rating given by the participants to PowerPoint 2003 was **5.0** while for 2007 the average rating was **4.86**. On **Task #12** (*Print Handouts*) the average rating given by the participants for PowerPoint 2003 was **4.84** while for Excel 2007 the average rating was **4.66.**

4.5 Number of Errors

During the participants' interaction the errors made by them were recorded. The results are summarized in the following sections.

4.5.1 Word

The dependent sample t test revealed that there were significant differences in terms of errors committed by the participants being the most common clicking the wrong icon and looking for a specific function in the wrong menu on Word 2003 and looking for various functions on several menus on Word 2007 that were not there. As shown on **Figure 4.16** the participants had more difficulties to execute the tasks on Word 2003 with a total of **102** errors with an average of **2.02** errors per tasks, compared to **56** total errors committed by the participants on Word 2007 with an average of **1.12** errors per task.

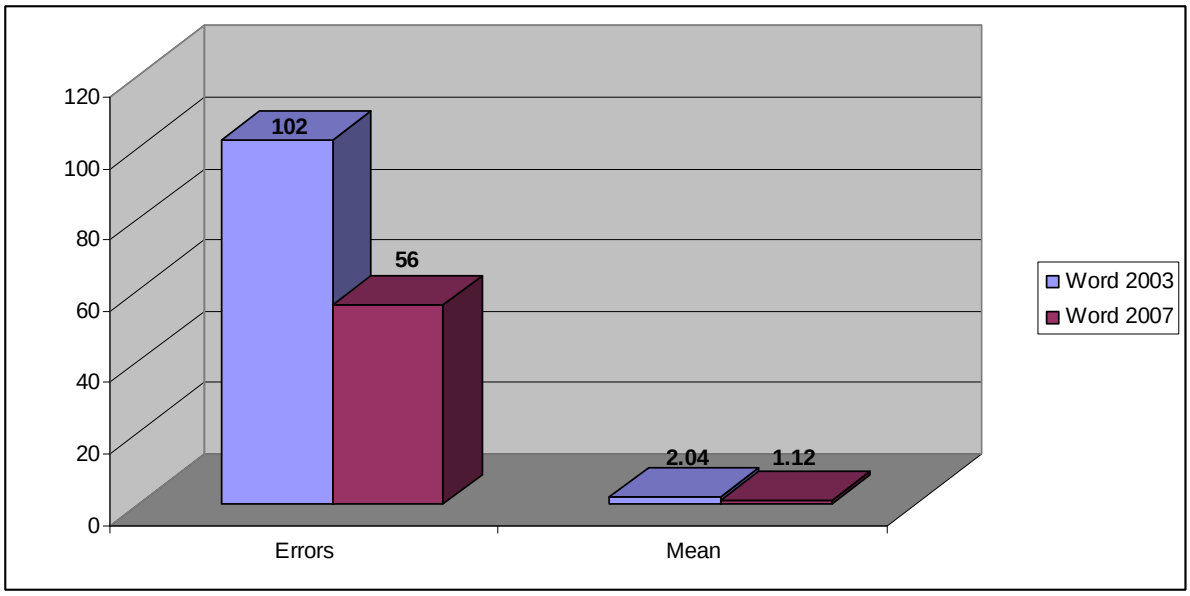

Figure 4.16 Overall and average of errors committed in Word

4.5.2 Excel

The dependent sample t test revealed that there were significant differences in terms of errors committed by the participants being the most common, trying to centralize the title of a Table with the wrong icon and not choosing the correct data to create a graph for Excel 2003 and in Excel 2007 trying to assign a title to a graph by accessing different menus. As shown on **Figure 4.17** the participants had more difficulties to execute the tasks on Excel 2007 with a total of **164** errors with an average of **3.28** errors per tasks, compared to **110** total errors committed by the participants on Excel 2003, with an average of **2.2** errors per task.

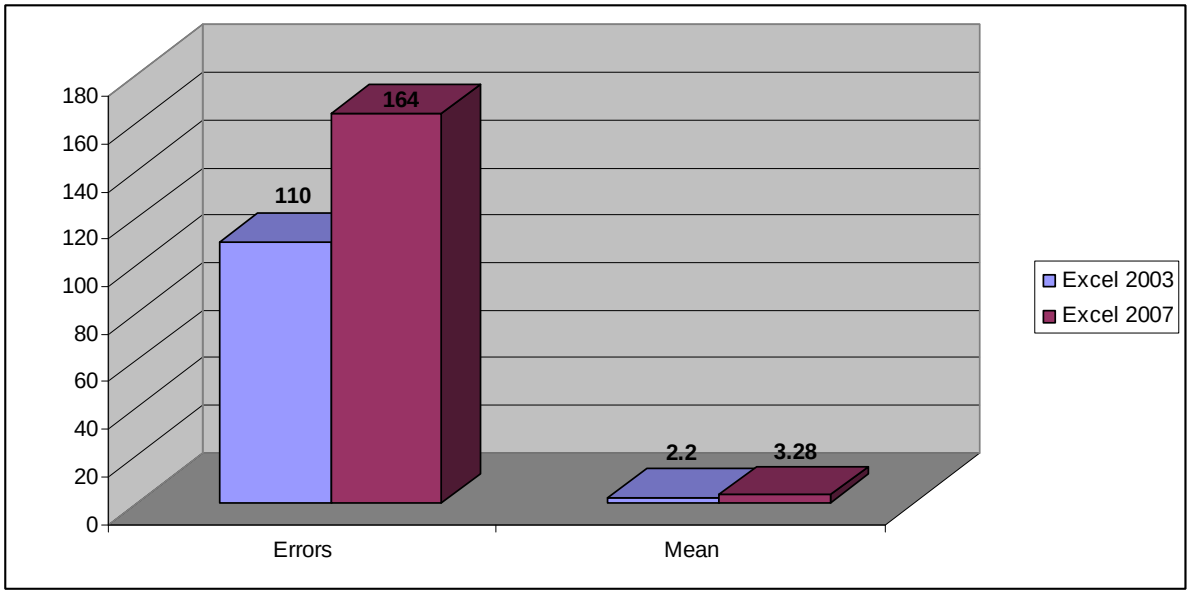

Figure 4.17 Overall and average of errors committed in Excel

4.5.3 PowerPoint

The dependent sample t test revealed that there were significant differences in terms of errors committed by the participants being the most common trying to access the slide master menu by looking on various menus on both versions, trying to animate text with the wrong option on PowerPoint 2003, and trying to execute different functions by using the right click menu on PowerPoint 2007. As shown on **Figure 4.18** the participants had more difficulties to execute the tasks on PowerPoint 2007 with a total of **153** errors with an average of **3.06** errors per tasks, compared to **113** total errors committed by the participants on PowerPoint 2003, with an average of **2.26** errors per task.

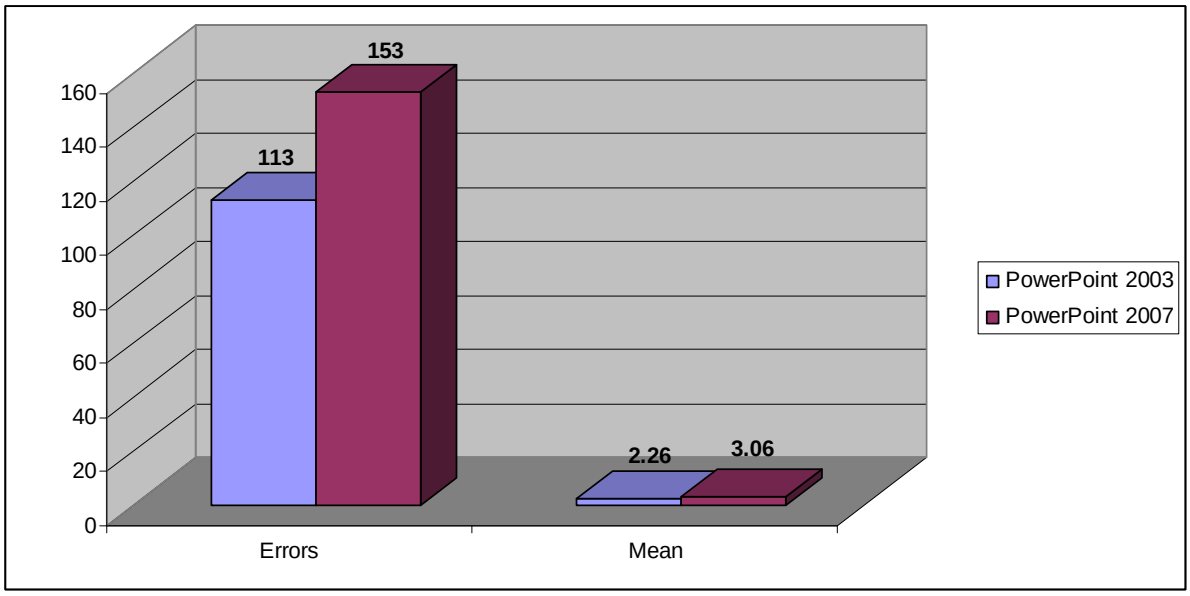

Figure 4.18 Overall and average of errors committed in PowerPoint

4.6 Satisfaction

4.6.1 Word

Wilcoxon tests did not reveal a significant difference in the average overall satisfaction or the icons arrangement in Word. The overall satisfaction rating for Word 2003 was **3.98** while for Word 2007 was **4.2**. The overall rating for icons arrangement for Word 2003 was **3.78** while for Word 2007 was **4.06.** The average rating given by the participants to the icons arrangement and overall satisfaction on both version of Word are summarized in **TABLE 4.20**. The relative differences in the average satisfaction and icons arrangement rating given by the participants are shown in **Figure 4.19.**

TABLE 4.20 Average, Wilcoxon and Significance in icons arrangement and satisfaction for Word

Word	2003	2007	WSRT	Sig
Icons Arrangement	3.78	4.06	1.665132	0.095886
Satisfaction	3.98	4.2	1.398018	0.162108

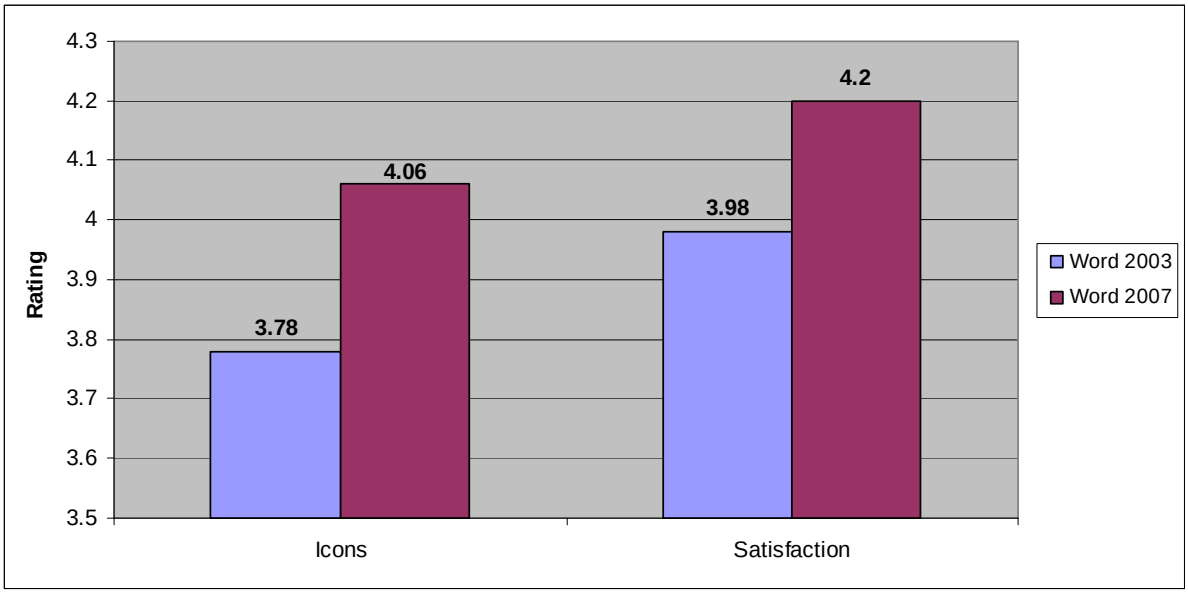

Figure 4.19 Overall Rating for Icons Arrangement and Satisfaction in Word

The participants as shown in **Figure 4.20** are very satisfied with Word 2007 as almost all of them expressed that they were willing to use it again and also recommend it to a friend.

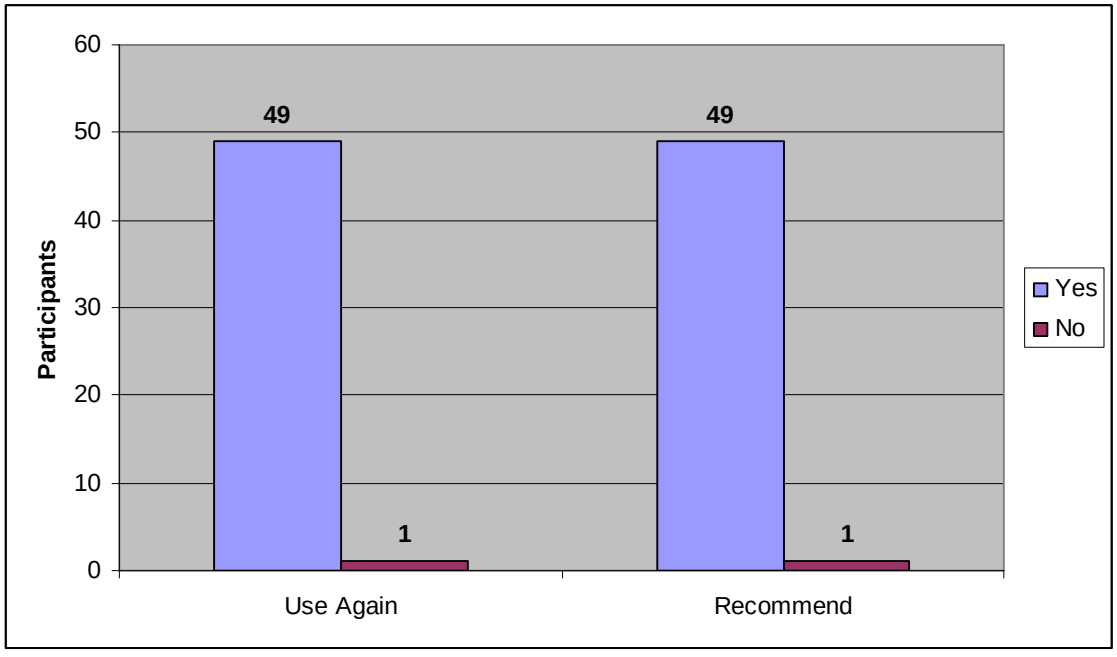

Figure 4.20 Participants opinion about using and recommending Word 2007

In terms of which of the 2 versions of Word was easier to use, the opinion of the participants as shown in **Figure 4.21** was almost a tie. For 24 of the participants Word 2003 was easier to use while 26 of them consider Word 2007 easier to use.

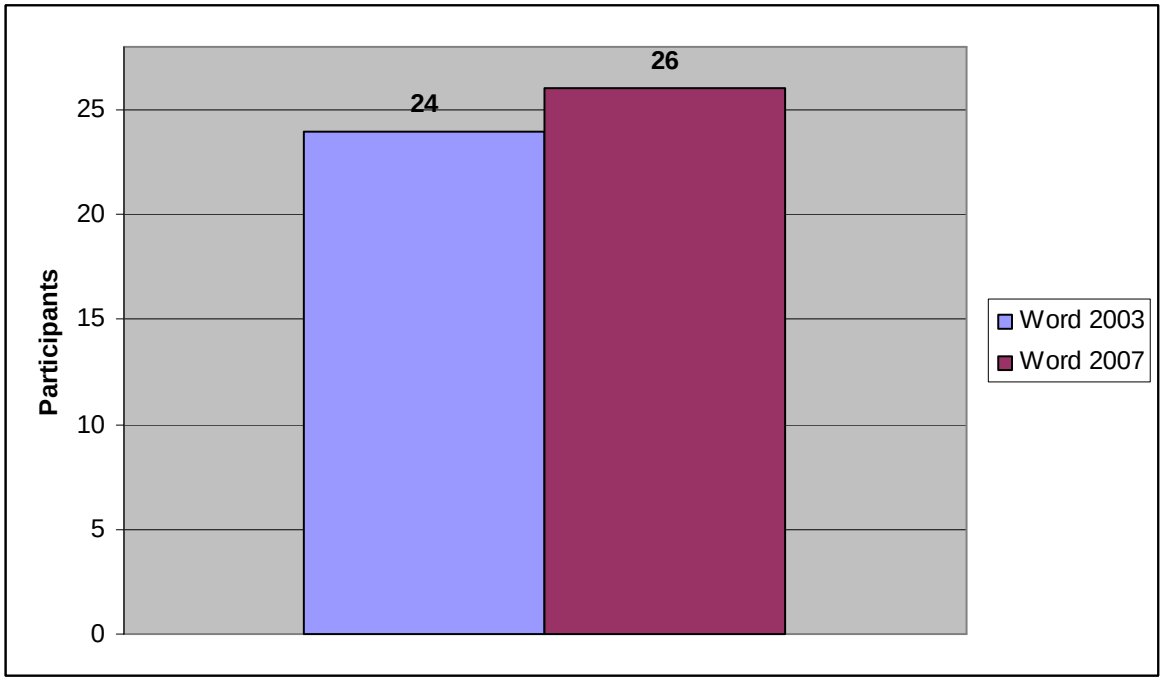

Figure 4.21 Total of Participants that consider one version of Word easier than the other

4.6.2 Excel

Wilcoxon tests reveal a significant difference in the average in both the overall satisfaction and the icons arrangement in Excel. The overall satisfaction rating for Excel 2003 was **4.24** while for Word 2007 was **3.7**. The overall rating for icons arrangement for Word 2003 was **4.3** while for Word 2007 was **3.86.** The average rating given by the participants to the icons arrangement and overall satisfaction on both versions of Excel are summarized in **TABLE 4.21**. The relative differences in the average satisfaction and icons arrangement rating given by the participants are shown in **Figure 4.22**

TABLE 4.21 Average, Wilcoxon and Significance in icons arrangement and satisfaction for Excel

Excel	2003	2007	WSRT	Sig
Icons Arrangement	4.3	3.86	2.122658	0.033782
Satisfaction	4.24	3.7	2.447944	0.014367

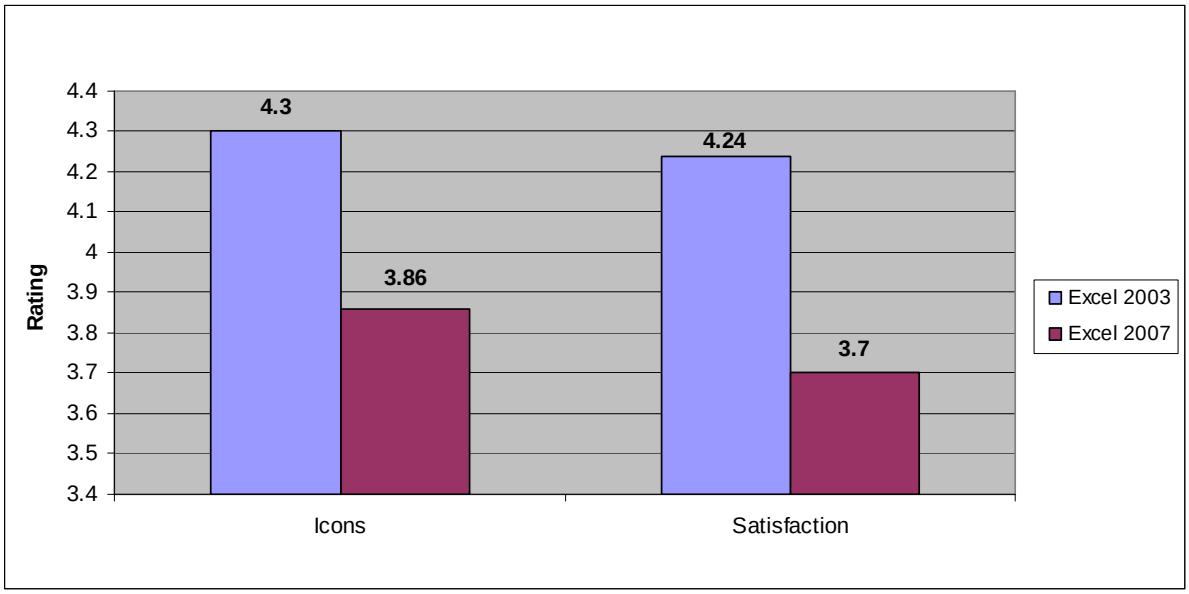

Figure 4.22 Overall Rating for Icons Arrangement and Satisfaction in Excel

Even though the participants were more satisfied with Excel 2003, a vast majority of them expressed that they were willing to used Excel 2007 again and also recommend it to a friend as shown on **Figure 4.23**

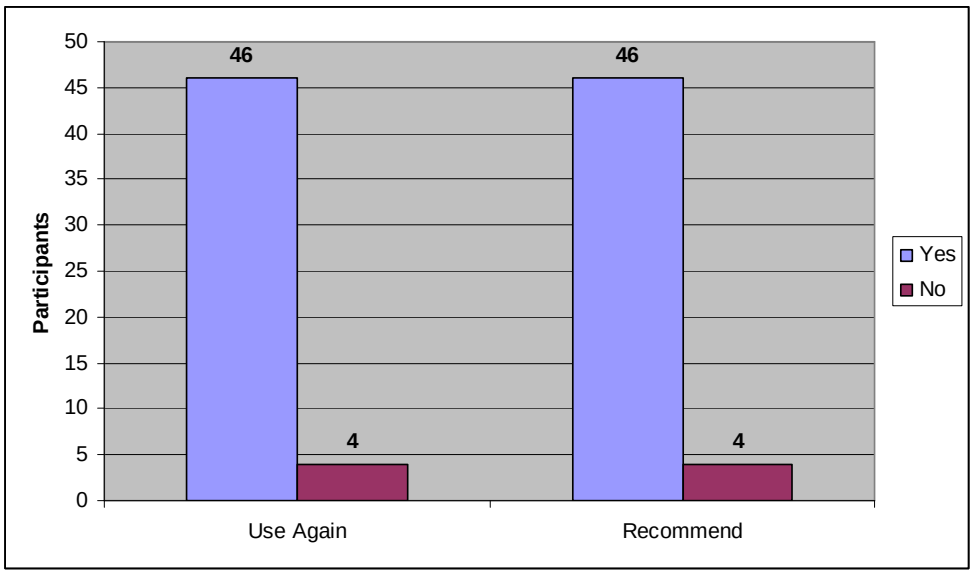

Figure 4.23 Participants opinion about using and recommending Excel 2007

In terms of which of the 2 versions of Excel was easier to use, the opinion of the participants as shown in **Figure 4.24** was mostly in favor of Excel 2003. A total of 32 participants consider Excel 2003 easier to use compared to 18 who consider Excel 2007 easier to use.

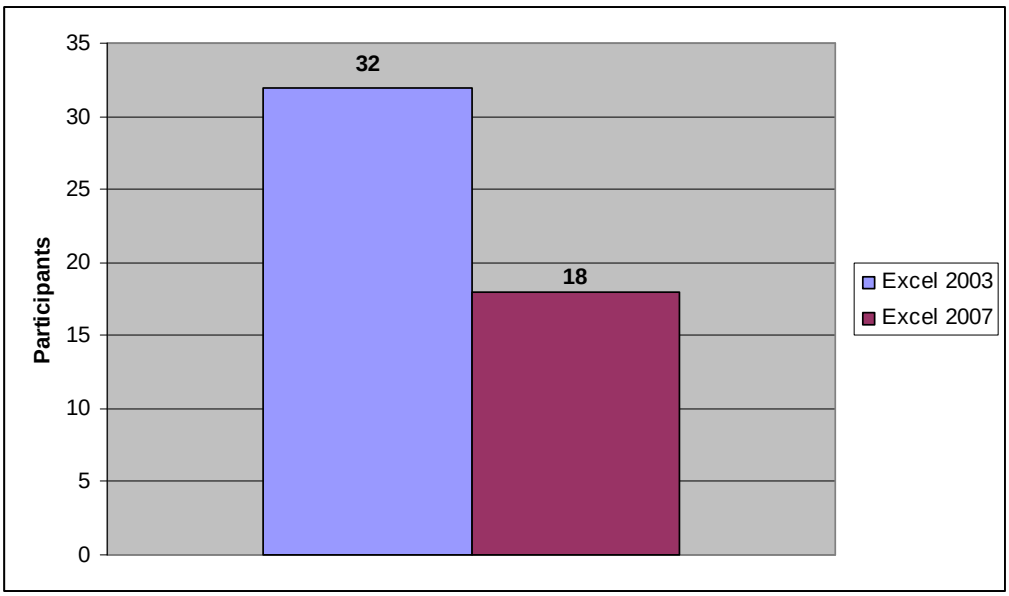

Figure 4.24 Total of Participants that consider one version of Excel easier than the other

4.6.3 PowerPoint

Wilcoxon tests did not reveal a significant difference in the average overall satisfaction or the icons arrangement in PowerPoint. The overall satisfaction rating for PowerPoint 2003 was **3.54** while for PowerPoint 2007 was **3.84**. The overall rating for icons arrangement for PowerPoint 2003 was **3.54** while for PowerPoint 2007 was **3.9.** The average rating given by the participants to the icons arrangement and overall satisfaction on both version of PowerPoint are summarized in **TABLE 4.22**. The relative differences in the average satisfaction and icons arrangement rating given by the participants are shown in **Figure 4.25**

TABLE 4.22 Average, Wilcoxon and Significance in icons arrangement and satisfaction for PowerPoint

PowerPoint	2003	2007	WSRT	Sig
Icons Arrangement	3.54	3.84	1.370981	0.170381
Satisfaction	3.54	3.9	1.751437	0.079871

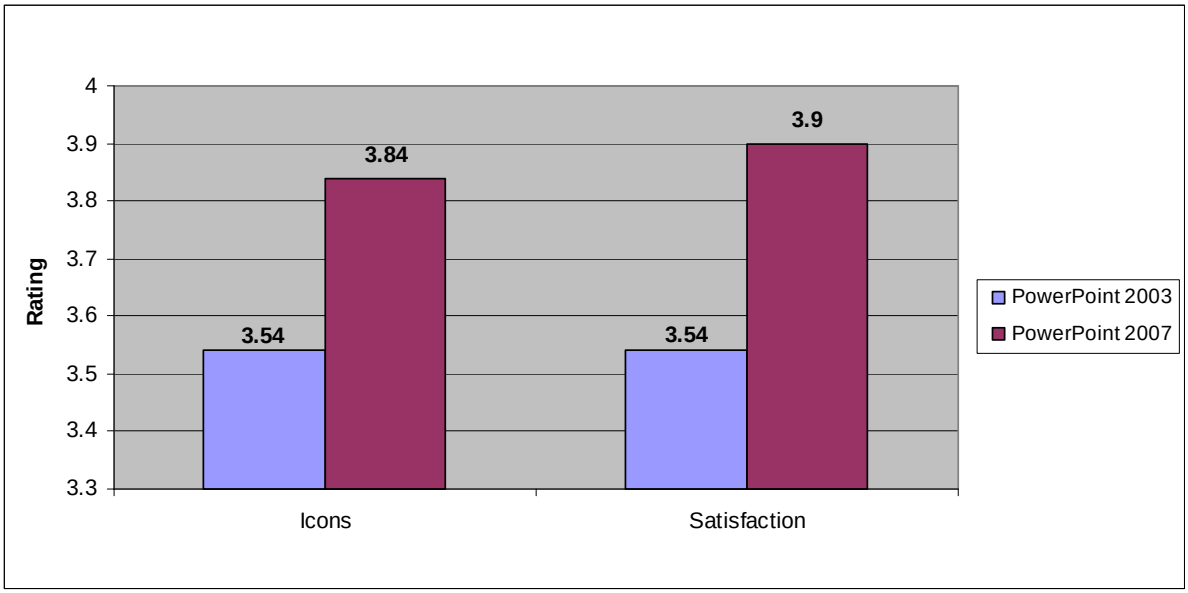

Figure 4.25 Overall Rating for Icons Arrangement and Satisfaction in PowerPoint

As shown in **Figure 4.26** the participants are very satisfied with PowerPoint 2007 as all of them expressed that they were willing to use it again and almost all of them would recommend it to a friend

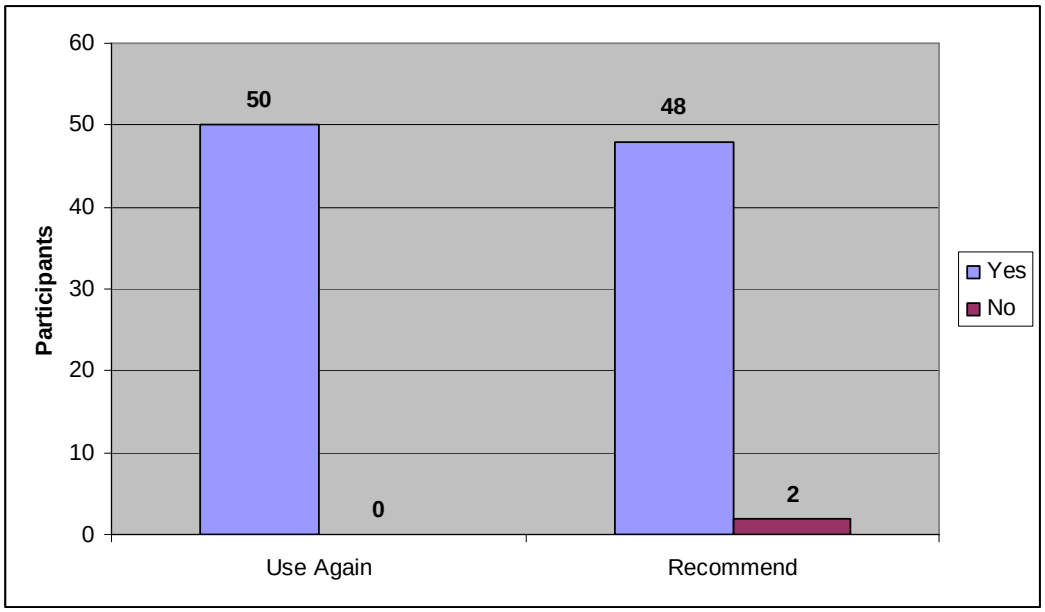

Figure 4.26 Overall Participants opinion about using and recommending PowerPoint

In terms of which of the 2 versions of PowerPoint was easier to use, the opinion of the participants as shown in **Figure 4.24** was mostly in favor of PowerPoint 2007. A total of 36 participants consider PowerPoint 2007 easier to use compared to 14 who consider PowerPoint 2003 easier to use.

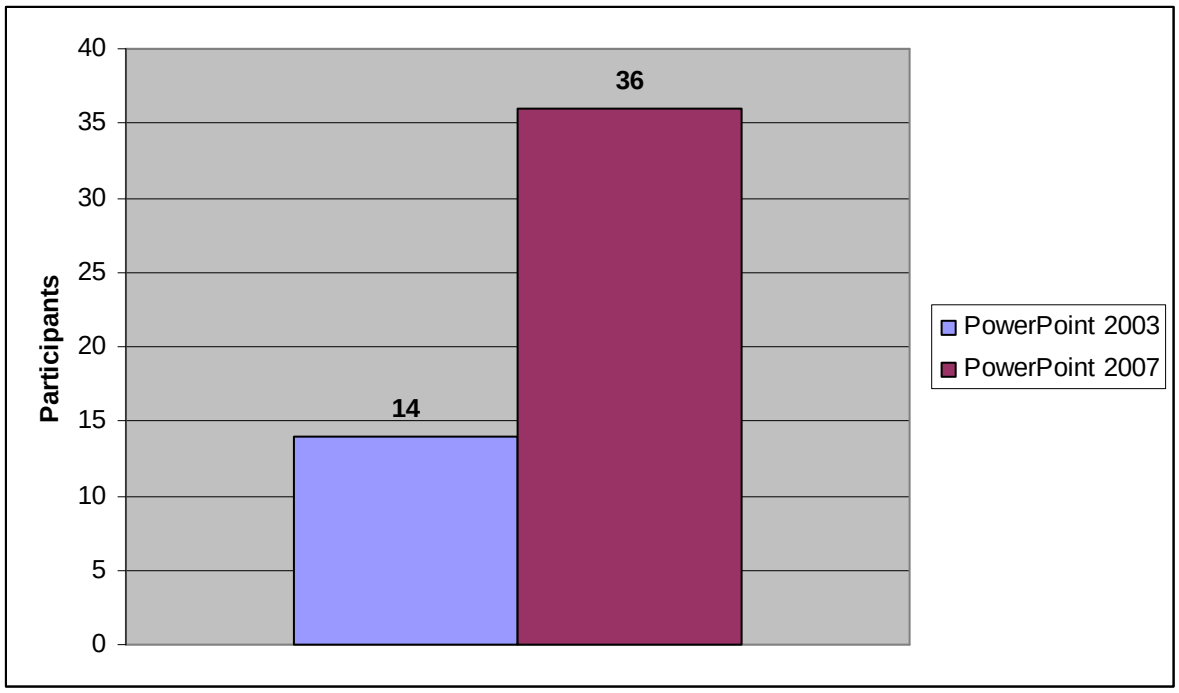

Figure 4.27 Total of Participants that consider one version of PowerPoint easier than the other

4.7 Correlation

As mentioned before to determine if there was a correlation between the variables observed in this study and the information provided by the participants in terms of Profession, Gender, Age and Frequency of use of the applications, a Pearson Correlation test was used. For this study the critical value of Pearson to determine a possible correlation was 0.279. Any value equal to this critical value or higher is considered as a correlation between the variables.

4.7.1 Word

TABLE 4.23 Correlations of observed variables and participants' information in Word 2003

Word 2003	Frequency of use	Age of Participants	Profession	Gender
Completion Time	.197	.359*	.060	.096
Completed Tasks	-.238	-.226	-.161	-.235
Difficulty in performing tasks	-.107	.167	.072	.012
Number of Errors	.261	-.115	-.081	-.126
Icons Arrangement	.045	.268	.286*	-.117
Satisfaction	.029	.143	.217	-.140

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

As shown on **Figure 4.23** there are correlations with the completion time and the age of the participants where the completion time increased as the age increased. There is also a correlation between the profession of the participants and their satisfaction with the icon arrangement in Word 2003 where the students were the least satisfied with icon arrangement and the employees the most satisfied.

TABLE 4.24 Correlations of observed variables and participants' information in Word 2007

Words 2007	Frequency of use	Age of Participants	Profession	Gender
Completion Time	.161	.545**	.160	.342*
Completed Tasks	.025	-.174	.053	-.240
Difficulty in performing tasks	-.112	-.023	.114	-.241
Number of Errors	.148	.198	.209	.188
Icons Arrangement	-.009	-.033	.101	-.116
Satisfaction	.006	.029	.188	-.142

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

As shown on **TABLE 4.24** there is a correlation between the completion time where time completion increased as the age of participants increased and also a correlation with the age and gender where many of the women participants had longer completion times. No other correlations were found for Word 2007.

4.7.2 Excel

TABLE 4.25 Correlations of observed variables and participants' information in Excel 2003

Excel 2003	Frequency of use	Age of Participants	Profession	Gender
Completion Time	.338*	.356*	.174	.368**
Completed Tasks	-.089	-.223	-.071	-.355*
Difficulty in performing tasks	-.224	-.253	-.295*	-.185
Number of Errors	.063	.125	-.129	.092
Icons Arrangement	-.019	.123	.194	.080
Satisfaction	-.031	.085	.157	-.014

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

As shown on **TABLE 4.25** there is a correlation between the completion time and the frequency of use of Excel 2003, age where the completion times increased as the age of participants increased and gender of the participants where many women participants had longer completion times. There is also a correlation between the completed task and the participants' gender where women participants completed less tasks than male participants. Also a correlation was found between the profession of the participants and the difficulty in performing tasks.

TABLE 4.26 Correlations of observed variables and participants' information in Excel 2007

Excel 2007	**Frequency of use**	**Age of Participants**	**Profession**	**Gender**
Completion Time	.314*	.270	.013	.287*
Completed Tasks	-.201	-.176	.064	-.294*
Difficulty in performing tasks	-.222	-.064	-.028	-.266
Number of Errors	.273	.110	-.064	-.019
Icons Arrangement	-.203	.129	.255	-.224
Satisfaction	-.225	.103	.241	-.216

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

As shown on **TABLE 4.26** there was a correlation between the completion time and the frequency of use of Excel 2007 where the completion time increased as the frequency of use increase and the gender of the participants where women participants had longer times. Also a correlation between the gender of the participants and the number of tasks they completed where the women participants completed less tasks than male participants.

4.7.3 PowerPoint

TABLE 4.27 Correlations of observed variables and participants' information in PowerPoint 2003

PowerPoint 2003	Frequency of use	Age of Participants	Profession	Gender
Completion Time	.341*	.380**	.177	.391**
Completed Tasks	-.224	-.293*	-.113	-.367**
Difficulty in performing tasks	-.230	.019	.058	-.102
Number of Errors	.068	-.142	-.063	-.082
Icons Arrangement	.026	.164	.107	-.029
Satisfaction	-.234	.076	.088	-.115

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

As shown on **TABLE 4.27** there was a correlation between the completion time and the age, where the completion time increased as the age of the participant increased and gender of the participants where women had longer completion times and also with the frequency of use of PowerPoint 2003. There was also a correlation between the number of completed tasks and the participants' age where the younger participants had shorter completion times and gender where women participants completed fewer tasks than male participants.

TABLE 4.28 Correlations of observed variables and participants' information in PowerPoint 2007

PowerPoint 2007	Frequency of use	Age of Participants	Profession	Gender
Completion Time	.353*	.357*	.151	.314*
Completed Tasks	-.135	-.339*	-.063	-.474**
Difficulty in performing tasks	-.154	-.014	.067	-.334*
Number of Errors	.259	-.048	-.118	-.234
Icons Arrangement	.031	-.117	-.097	-.329*
Satisfaction	.029	-.139	-.037	-.381**

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

As shown on **TABLE 4.28** there was a correlation between the completion time and the age where the younger participants had shorter completion times and gender where many of the women participants had longer completion times and also their frequency of use of PowerPoint 2007. There was also a correlation on the number of completed task and the age and where the younger participants were able to complete more tasks, and also a correlation was found with the gender of the participants. Finally there was also a correlation between the gender of the participants and their overall satisfaction and icon arrangement, where male participants were more satisfied than women with PowerPoint 2007.

4.8 Normality

To determine if the data distribution complies with a normal distribution a series of normality test where ran for the variables where the dependent sample t test was used. A summary of the results of those tests is given on **TABLE 4.29**

TABLE 4.29 Normality tests

		Word 2003	**Word 2007**	**Excel 2003**	**Excel 2007**	**PowerPoint 2003**	**PowerPoint 2007**
Completion Times	Skewness/Kurtosis	Not Normal	Not Normal	Not Normal	Not Normal	Not Normal	Not Normal
	Normality t Test	Not Normal	Normal	Not Normal	Normal	Normal	Not Normal
	Stem and Leaf	Not Normal	Normal	Not Normal	Normal	Normal	Not Normal
	Histogram	Not Normal	Normal	Not Normal	Normal	Normal	Not Normal
	Q-Q Plot	Not Normal	Normal	Not Normal	Normal	Normal	Not Normal
Number of Errors	Skewness/Kurtosis	Normal	Normal	Normal	Normal	Normal	Not Normal
	Normality t Test	Not Normal	Not Normal	Not Normal	Normal	Normal	Not Normal
	Stem and Leaf	Not Normal	Normal	Normal	Normal	Normal	Normal
	Histogram	Not Normal	Normal	Normal	Normal	Normal	Normal
	Q-Q Plot	Normal	Not Normal	Normal	Normal	Normal	Normal

For the variables which data distribution did not complied with a normal distribution, a Wilcoxon or Mann Whitney could be used as discussed by Kühnast [Kühnast 2008]. In this study the Wilcoxon test was ran in addition to the dependent sample t test that was already ran for the cases that a normal distribution was not found. The Wilcoxon test indicated the there were the same significant differences, as discussed in **section 4.2** and **section 4.5**

5 Analysis of Results

This chapter is dedicated to the analysis of the results found in chapter 4. On that chapter we presented some significant differences, for some of the tasks given to the participants on the 3 applications. In this chapter these results are analyzed. The discussion on the following sections is based on the results, observation of the interaction recording and exit interviews with the participants to find out what they were trying to do in the cases they confronted difficulties accomplishing a task.

5.1 Completion times

Sections 4.1.1, 4.1.2 and **4.1.3** showed that there were some significant differences in completion time in some of the tasks given to the participants. Let's take a look at the completion times for those tasks to determine why there were significant differences between those values.

5.1.1 Word

As discussed on **Section 4.1.1** there were significant differences in completion time between Word 2003 and Word 2007 on the *Open Document* (Task #1), *Draw Table* (Task #4), *Add Rows* (Task #6), *Spell check* (Task #10), *Text Replace* (Task #12), *Save Document* (Task #13), *Preview* (Task #14) and *New Document* (Task #16) tasks**.**

In the case of the *Open Document* task the slower times in **Word 2007** may be due to the fact that a shortcut for opening documents, available in Word 2003, is no longer available in the 2007 version, at least not as a default feature. The lack of this feature forces the users in Word 2007 to look for the option in the menus, which consumes additional time.

The differences in time completion for the *Draw Table* task may be due to a change in the option for inserting a table. In previous versions of the program up to the 2003 version, the procedure to insert a table was to access a menu called **table**. From that menu the user would have to access the option **insert** and from the insert option choose the **table** option. This was totally changed in the 2007 version. The procedure in this version consists of accessing the **insert** menu and the clicking on the **icon table**. From the point of the steps required to perform the tasks, the 2007 version have improved the method because of one less step required.

The reason why the participants may have had a better performance on the 2007 version is because they have been using this version for at least a year. They are most probably used to the new procedure in the 2007 version and have forgotten the previous one in the 2003 version. The test recordings showed that most of the participants who took a longer time in completing the tasks tried the 2007 version procedure while they were doing the tasks on the 2003 version. Because of the change in the location of the table creation option, most of those participants spend more time trying to remember how it was done in the 2003 version.

The main reason for difference in performance for the *Add Rows* task may be that in the 2007 version there were some improvements in terms of options available for the user. The most noticeable is the incorporation of the **add row** option on the right click menu. The tests recordings showed that many of the people who completed the task in shortest amount of time used this option. Just as with the previous task discussed, many of the participants spent more time to complete the tasks in the 2003 version because they were trying to execute it like in the 2007 version. Many of the participants were trying to add rows to a table using the right click option which it is not available in the 2003 or any previous versions.

The main reason for the difference in completion times for the *Spell-check* task could be that in the 2003 version these tasks can be performed by accessing the **Tools menu** and selecting the first option called **Spelling and Grammar**. However, in the 2007 version the **Tools menu** was completely eliminated and the options included were moved to other menus. In the case of the **Spell-check** option it was moved to a Tab called **Review**. This change took a toll on the participant's performance because not only they had to remember there was no tools menu, they also needed to remember where it was now.

The difference in completion times for the *Text-Replace* task may be attributed to a change in task procedures. In the 2003 version the task could be done by accessing the **Edit menu** and selecting the replace option. In the 2007 version the **Edit menu** was eliminated and the replace option is now in the Home Tab. Some of the participants, as the test recordings show, know the equivalent keyboard shortcut. The participants who did not know this shortcut had higher completion times in the 2007 version because they were

overwhelmed with the great amount of icons available, making it harder for the **replace option** to be found or they were looking for the Edit menu.

The main reason for the difference in time completion for the *Print Preview* may be due to the elimination of the print preview shortcut icon that was included in the 2003 and earlier versions. The tests recordings show that many of the participants while executing the task in 2007 were looking for that shortcut. Those participants were forced to execute the task by accessing a menu known as the **Office button** (introduced in the 2007 version), select the **Print option** and then select the **Print Preview option**, thus requiring **3 steps** compared to **1 step** required in 2003 and earlier versions.

For the case of the *Save Document* task the time completion differences may be due to the extensive number of icons that are on a same area in the 2007 interface. The tests recordings showed that even though the task could have been completed in the same way on both versions, by using an icon shortcut, the participants were most successful in finding this shortcut in the 2003 version that in the 2007 version. Most of the participants who had higher completion times were overwhelmed by having to look for the correct option within so many icons, making it harder for them to find it.

The difference in time completion times for the *New Document* task may be due to the fact that the 2003 version has a shortcut icon for executing that task while in the 2007 version that icon is not available by default. If the user of 2007 wants to use the icon it has to be configured in the application. The tests recordings showed that while executing these tasks on the 2007 version, many of the participants spent some time looking for the shortcut. They

were basically forced to execute the task by using the **Office button** and selecting the New option causing a slower performance.

In the overall completion times there is also a possible factor that could have been involved in having longer completion times. That may be the age of the participants. As we saw in **section 4.7.1** there was a positive correlation between completion times and age of the participants in both versions of Word. This basically means that as the age of the participants increases the completion time also increases. Another factor that may have caused longer times in this case only in Word 2003 was the participants' profession. For this study it means that the students had lower completion times that the employees whose age in almost all cases are older. There was also another possible factor, in this case in Word 2007 and that was the participants' gender. In this case most of the women participants had longer completion times that the male participants.

5.1.2 Excel

As discussed earlier on **section 4.1.2** there were significant differences in the completion times of the following individual tasks: *Insert Rows* **(task #3)**, *Copy Formula* **(task #6)**, *Adjust Precision* **(task #8)**, *Center Data* **(task #8)** and *Generate Graph* **(task #9)**. There was also a significant difference in the completion times of the tasks between Excel 2003 and 2007. Let's take a closer look at these results to determine the cause of these differences.

The main factor involved in the differences in completion times for the *Insert Rows* task may be that in 2003 and earlier versions, the task could be performed by accessing the **insert menu** and selecting the **rows option**. In 2007, even though there is an **insert tab,** the **insert**

row option is not available. In fact, in 2007 there is an **insert tab** and an **insert drop down menu** inside the **home tab**.

The tests recordings showed that many of the participants did not use the **insert drop down menu**. Many of them went directly to the **insert tab** to execute the task even though they have been using the 2007 version for over a year. When most of the participants noticed that the option was not available in the **insert tab** most of them used **the right click option** instead. Other participants decided to use the **right click option** at the first try. Those participants are the ones who completed the task in very fast times in 2003 and also in 2007.

The tests recordings showed that the higher completion times in both versions of Excel for the *Copy Formula* task were caused by the lack of a shortcut on the user interface. In both versions the easiest way to execute these tasks was by using the drag option, available using the right click menu. The participants who knew this shortcut were the ones who accomplished the task in very short times. Those who did not know about the shortcut went to look for it on the menus. Since there is no option in the menus available, some of the participants chose to copy the formula from one cell and paste it on the other, consuming much more time by doing so.

Even though there is no shortcut on the user interface in both versions, there were more participants with longer completion times with the 2003 version. This may have been due to the fact that when the participants used the menus for accomplishing these tasks and there are 10 menus to choose from in the 2003 version compared to 7 in the 2007 version.

Even though both versions of Excel include practically identical shortcut icons for executing the *Adjust Precision* task, the participants in 2003 version of Excel had a better performance. The reason for this may be that in the 2007 version the main tab, which includes the most common features, is too cluttered with icons. The tests recordings showed that the participants spent more time looking for the shortcut in 2007 because of this situation.

The main reason for this difference in completion times for the *Center data* task may be the clutter of icons in the main tab of the 2007 version. The tests recordings showed that most of those longer completion times were caused because the participants had difficulties finding the correct icon in 2007, even though in this version the icon in fact is closer to the left side of the screen, where the menus in case of 2003 and tabs in 2007 are concentrated.

There are a series of possible reason why such noticeable difference in completion times was evidenced for the *Generate graph* tasks. The first one is the change in the procedure to execute the tasks. The tasks asked the participant to generate a specific graph from a series of numbers and assign to it a given title. In the 2003 version this was done by accessing the ***insert menu***, selecting the ***insert chart option.*** After the option is selected, the ***chart type menu*** is displayed and then the program gives you the option of selecting from which data you want to create the graph. Once the data is selected and confirmed, the program displays an option for adding a title to the graph. After the title is inserted and confirmed the graph is created.

In the 2007 version some portions of the previously discussed procedure were kept the same but most were changed. In 2007 the option to execute the task is inside a tab called insert, contrary to the 2003 version which is a menu. Basically that is the only thing similar between the two versions. After the insert tab is selected the user has to select the type of graph that he or she wants. Once the type of graph is selected the graph is created.

From this point on is where the problem starts. In the 2003 version the user has the option of selecting the data and then selecting the insert chart option to create the graph but also could select the insert chart option and the program will ask for the data. In 2007 if the user did not select the data before selecting the type of graph the program will not ask for the data and will automatically create an empty graph. Also in 2003 there is a step where the user is asked for the title of the graph. In 2007 this step was eliminated so if the user did select the data first and then selects the type of graph, the program will generate the graph but without a title.

To include the title in 2007 an extra step is required where the user has to select from a series of options in a box called chart layout. After the layout is selected the graph is modified so that it includes a title space. After that the user is required to click on the title which by default is named “title” and change it to the proper one.

The situations discussed above, were basically the main reasons for such high completion times in Excel 2007. The test recordings showed that some of the participants confronted problems creating the graph, because they did not select the data before selecting the type of graph.

As it was mentioned before, this creates an empty graph. Most of those participants thought they made a mistake and tried to execute the task in the same way again, with the same results. The test recordings also showed that many of the participants, who did not confront the previously discussed situation, had problems assigning the title to the graph.

The two changes made in the 2007 version took a toll on the performance of the participants in this task. Many of the participants, who confronted those problems, spent a considerable amount of time trying to figure out how to accomplish the missing part of the task.

Overall in Excel 2003 the average completion time was **170.04 seconds**, while for Excel 2007 the average completion time was **217.50 seconds**. There is a difference of **47 seconds,** which is definitively a statistically significant factor**.**

In the overall completion times there are a series of possible factors that could have been involved in having longer completion times as we saw in **section 4.72**. One of these factors may have been the frequency of use. In both versions of Excel the participants that more frequently use the application had shorter completion times. Another factor that may have caused longer completion time in both versions was the gender of the participants. In this case most of the women participants had longer completion times that the male participants'. Another factor that may have caused longer times, in this case only in Excel 2003 was the participants' age. As the age of the participants increases the completion time also increased.

5.1.3 PowerPoint

As discussed earlier on **section 4.1.3** there were significant differences in the tasks *Open Document* **(Task #1)**, *Change Design* **(Task #2)**, *Slide Master* **(Task #3)**, *Change Bullets* **(Task #5),** *Slide Sort* **(Task #6),** *Add Slide* **(Task #7)** and *Draw / Edit Circle* **(Task #8),** and *Insert Sound* (**task #10**). Let's take a closer look at these results to determine the cause of these differences.

The main reason for the slower times for the *Open Document* task in the 2007 version seems to be the change in the user interface. The shortcut that was available in the 2003 and earlier versions of the program to execute this task was removed as a default option on the 2007 version. The user of the 2007 version has to add this shortcut to the interface to make it available. The participants who did not know about this option were forced to execute the task by clicking the **Office Button** and then select the **Open document option**.

The test recordings showed that many of the participants, even though they have been using the 2007 version for more than a year, they still have the tendency of looking for the shortcut on the menu. The test recordings also showed that most of the lower times achieved by the participants in the 2007 version were possible because the participants did not used the interface to execute the task. Those participants use the keyboard shortcut, which did not suffer any changes in the 2007 version.

There may be two reasons for the performance difference executing the *Change Design* task. The first one is that in the 2003 and earlier versions the option to execute this task was found in a menu called **format**. In the 2007 version the **format menu** is no longer available and was substituted by a tab called **Design**.

The second reason for higher completion times with the 2007 version is the fact that if the participant already knew where the option for changing the design was for the in 2007 version some of them had a hard time finding the design asked for the task.

The second reason for higher completion times with the 2007 version, is the fact that even though some of the participants may have known where the option for changing the design was located in 2007, in some cases they still confronted problems in finding the design requested in the task.

The reason for this is that in 2003 and earlier versions when the change design option was selected, the program opened a window on the right with the designs previews in a vertical manner and a scroll bar for viewing the rest of the list. In 2007 when the user selects the design tab there are already some preview designs in a horizontal manner and no scroll bar. Instead of a scroll bar there are 3 buttons that let you see more designs in a sequential way or change between the previous page and the next.

The test recording showed that most of the participants, who had high completion times in 2007, confronted one of the problems discussed before, or in some cases both problems. Some of the participants had a tough time trying to find the option to see more designs.

This situation was very likely caused by the size and look of the buttons for managing the display. These buttons are very small and also had a transparent look, which made them look as if they were disabled, and in some cases the participants did not notice they were there at all.

For the *Slide Master* task the procedure to execute the task was basically the same in both versions. However, there is an issue in terms of how the program presents the options. In 2003 after the user clicks on the view menu a drop down menu is displayed and the respective action could be found in an option called master. In 2007 after the user selects the view tab the user only needs to click on the slide master icon.

Even though in 2007 the process for executing the task is simpler and requires less action from the user, a greater percentage of participants completed the task in time over 100 seconds.

The main reason for this is the clutter of icons found in the 2007 version user interface. One of the main problems of this is that the user is overwhelmed by too many icons which in most cases distract the attention of the user.

The tests recordings showed that many of the participants with high completion times had trouble finding the correct option in the 2007. Many of those participants accessed the right menu, but because many of the icons were similar, some of them did not recognize at first the correct icon, or spent quite some time trying to identify it. This situation definitively took a toll on their performance, because many participants went looking for the option in other menus, spending even more time.

There are a series of reasons that may explain the differences in time completion for the *Change Bullets* task. The main one is the difference in the procedure required to execute the task. In the 2003 and earlier versions the bullets option could be found by accessing the format menu and then selecting bullets and numbering. In 2007, even though the Format menu still exists, the bullets option is no longer available in that menu. That change alone caused some trouble for the participants, because even though they have been using the 2007 version for over a year, their first reaction is to look for it in the format menu.

The second reason is that in the 2007 version the bullets option is in the home menu. The problem with this change is that, first, is not located in an intuitive menu, and second the icon used for this option is not properly identified. In addition there is also the cluttering of icons problem present. The test recordings showed that many of the participants spent time looking for the change bullets option.

The main reason for the difference in completion times for the *Slide Order* task is very likely to be a position change of the icon in the 2007 version. In the 2003 and earlier versions the icon to execute the task was located on the bottom left corner of the user interface. In the 2007 version that icon was moved to the bottom right corner of the interface. The test recordings showed that many of the participant's first reaction was to look for the icon on the left corner which took a toll on their completion time.

The main reason for difference in completion times for the *Add Slide* task seems to be the cluttering of icons in the 2007 version. The test recordings showed that even though in 2007 there is a big icon, clearly identified, most of the participants did not notice it and therefore did not used it.

For the *Draw / Edit Circle* tasks the difference in time completion seems to be caused by a change in the position of the shortcut icon and the insert menu on the 2007 version. In the 2003 and earlier versions the shortcut icons were positioned in the bottom part of the user interface. In 2007 those shortcuts were moved to the home menu on the right side. Even though those shortcuts were available in the home menu of 2007, they were also included on the insert menu. If the user selects the insert menu he or she will find an option called shapes which contains the shortcuts. In 2003 and earlier versions even though there is an insert menu available the shapes option is located on a sub-menu called **insert picture** in an option called **Auto shapes**.

The tests recordings showed that many of the participants, while executing the task in 2003, accessed the **insert menu** as their first reaction. Even though they were on the right track, many of them did not associate the **insert picture option** as the correct menu for executing the task. Many of those participants started to look for the option on the different menus, consuming a lot of time by doing so.

The test recordings also showed that many of the participants were able to find within a few seconds the shortcuts available in the 2007 **home menu,** and others, even though they did not noticed the shortcuts in the **home menu**, were able to execute the task in a short amount of time, by accessing the **insert menu** and selecting the **shapes option**.

For the *Insert Sound* tasks the main reason for higher completion times in the 2003 version in comparison to the 2007 version seems to be how the participants associated the menu names with the task they were given. In both versions many of the participant's first reaction was to look for it on the **insert menu**. In both cases they were on the right track. They right option to execute the task is using the insert menu. There is a saying that goes "A picture is worth a thousand words", that is precisely the reason for the noticeable difference in completion times between the two versions. In 2003 to execute the task the participants needed to access the insert menu and then select the movies and sound sub-menu and finally select the proper sound option. In 2007 the procedure at first is the same. The participant needs to select the insert menu but in this case instead of selecting from a submenu, there is an icon of a speaker which contains the insert sound options, reducing the steps needed to execute the task.

The test recordings showed that many of the participants in 2003 selected the insert menu as their first option but they did not notice the movies and sounds submenu or they had trouble finding it. This situation forced the participants to look on other menus trying to find the right option. By doing so, many of them spent a great deal of time, which explains why there were so many cases with high completion times in 2003. In 2007 the story is quite different. The test recordings showed that many of the participants were able to execute the task with the aid of the sound icon located in the insert menu.

In the overall completion times there are a series of possible factors that could have been involved in having longer completion times as we saw in **section 4.7.3**. One of these factors may have been the frequency of use. In both versions of PowerPoint the participants that

more frequently use the application had shorter completion times. Another factor that may have caused longer completion time in both versions was the gender of the participants. In this case most of the women participants had longer completion times that the male participants. Another factor that may have caused longer times in both versions was the participants' age. As the age of the participants increases the completion time also increased.

5.2 Completed Tasks

The results presented in section 4.2 revealed that there were some significant differences in the total number of tasks completed among the participants. The following sections will explore the reasons.

5.2.1 Word

As discussed earlier on **section 4.2.1** there were no significant differences in the number of tasks completed between the two versions o Word. In addition no significant differences were found among individual tasks. Even though some participants confronted some troubles while executing the tasks, most of them were able to finish most of them.

5.2.2 Excel

As discussed earlier on **section 4.2.2** there were significant differences in the number of tasks completed between the 20003 and 2007 versions of Excel. It seems very evident that this difference was caused mainly by the *Generate Graph* task which was the only one that resulted in a significantly different number of users completing it. As indicated in **Figure 5.1**, 48 out of 50 (96%) participants were able to complete the task in Excel 2003 while only 27

(54 %) were able to complete it in Excel 2007. The main reason for this huge difference seems to be the changes in the procedure to execute this task in the 2007 version.

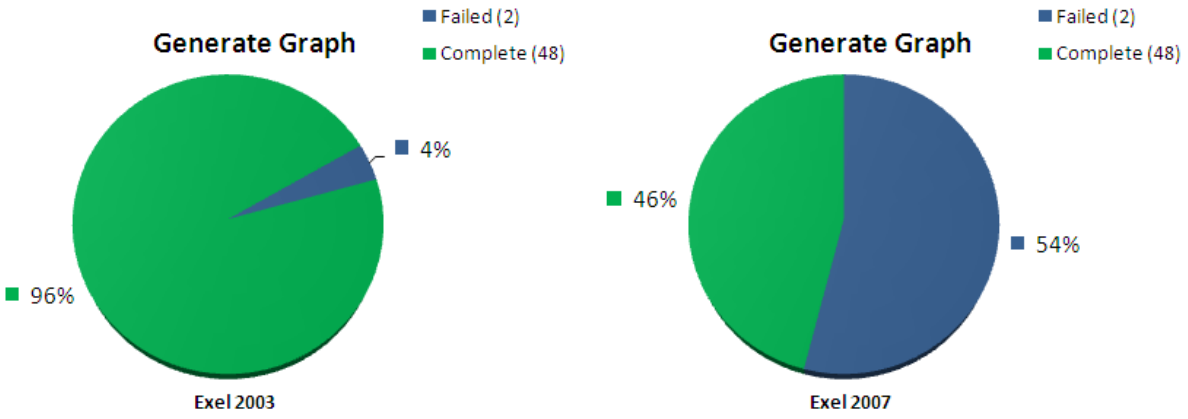

Figure 5.1 Generate Graph task percentage completion/failure for Excel 2003-07

Even though task # 9 was a huge factor in finding significant differences between Excel 2003 and Excel 2007 there were some other factors that may have indirectly affected the number of completed tasks by the participants. One of these factors in both versions of Excel as discussed in **section 4.7.2** may have been the gender of the participants. In this case most of the women participants completed less tasks that the male participants.

5.2.3 PowerPoint

As discussed earlier on section 4.1.3 no significant differences were found in the total number of task completed among the participants on both versions of Power Point. The *Add Sound* task was the only one that resulted in a significantly different number of users completing it.

As indicated in **Figure 5.2**, 37 out of 50 participants (74%) were able to complete the task in Power Point 2003 while 49 (98 %) were able to complete it in Power Point 2007**.** The main reason for this difference, as discussed in **section 5.1.3**, seems to be a shortcut icon added to the user interface in the 2007 version. That change was a great aid for the participants while performing the task in the 2007 version because they were able to identify the faster option quicker than they did in the 2003 version. In 2003 version the faster option to execute the tasks is submerged in several menus.

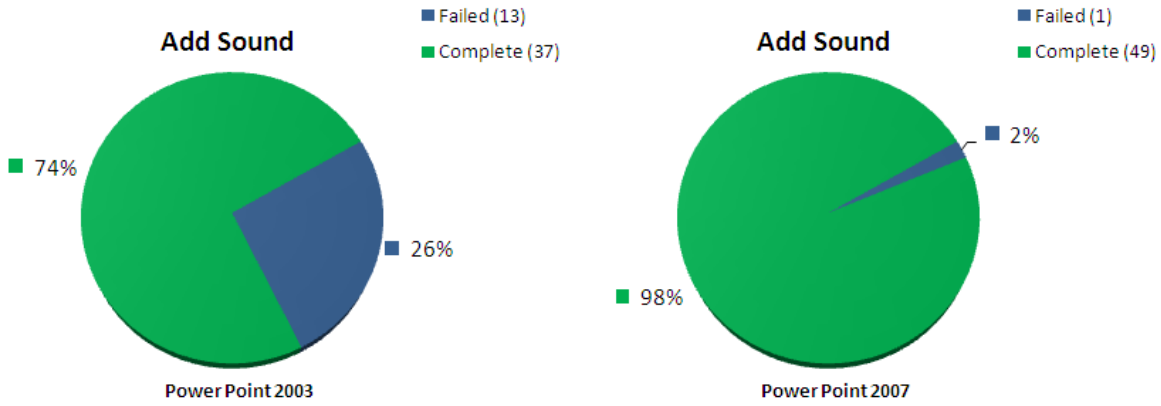

Figure 5.2 Add Sound Figure 5.3 Generate Graph task percentage completion/failure for PowerPoint 2003-07

In the overall completion tasks there are a series of possible factors that could have been involved causing some participants to complete more tasks than others as we saw in **section 4.7.3**. One of these factors may have been the gender of the participants. In this case many of the women participants completed fewer tasks than the male participants. Another factor that may have affected the number of completed tasks was the participants' age. As the age of the participants increases the completion time also increased.

5.3 Difficulty in performing the tasks

Sections 4.3.1, 4.3.2 and **4.3.3** revealed that there were some significant differences in user difficulty in performing the tasks for some of the tasks given to the participants. The following sections will explore the reasons.

5.3.1 Word

As discussed earlier on **section 4.3.1** there were significant differences, in terms of the participants' difficulty in performing the tasks with the *Draw Table, Add Rows* and *New Document* tasks**.** In the three cases the user difficulty in performing the tasks seems to be related to the difficulties confronted by the user executing these tasks.

5.3.2 Excel

As discussed earlier on **section 4.3.2** there were significant differences in user difficulty in performing the tasks with the *Generate Graph* and *Name Cell* tasks**.** In the case of the *Generate Graph* task the differences in difficulty in performing the tasks seem to be related to the difficulties confronted by the users in executing this task. In the case of the *Name Cell* task the difference in user difficulty in performing the tasks may be due to the fact that most of the participants, who gave a low score rating to the task, had some trouble locating the right location to execute it. Those participants may have been distracted by the large amount of icons available which may also cause user fatigue. It seems that these two tasks were the major reason for the difference in the overall user difficulty in performing the tasks between the 2003 and 2007 version of Excel.

5.3.3 PowerPoint

As discussed earlier on **section 4.3.3** there were significant differences, in terms of the participants' difficulty in performing the tasks for the *Open Document, Insert Sound* and *Print Handouts* tasks**.** The differences in difficulty in performing the tasks with these tasks seem to be related to the difficulties confronted by the users in executing these tasks as evidenced by the significant differences found in time completion for them.

5.4 Errors

Sections 4.4.1, 4.4.2 and **4.4.3** revealed that there were some significant differences in terms of errors committed by the participants. The following sections will explore the reasons.

5.4.1 Word

As discussed earlier on **section 4.4.1** there were significant differences, in terms of errors committed by the participants. The differences in errors committed with these tasks seem to be related to user's perception of what action will be executed when they click on an icon. Many of the errors committed were caused by the participants clicking on an icon that executed an action in some cases very different from what they expected. This phenomenon occurred more frequently on Word 2003 which user interface relies mostly on icons. In 2007 this phenomenon was less frequent because even though it's user interface still handles icons, some of them now include a short name that describe the action it should execute.

In Word 2003 the lack of this short name causes confusion on the users when some of the icons look similar. In Word 2007 the majority of the errors committed by the participants were looking for the icon to execute the task on the wrong tab. The participants had a hard time remembering in which tab was the option they were looking for. Even though Word 2007 now includes the short name help on icons the users need to remember where is the icon placed. This may explain why the participants needed more time to execute some of the tasks in the 2007 version as discussed on **section 4.1.1**.

5.4.2 Excel

As discussed earlier on **section 4.4.2** there were significant differences, in terms of errors committed by the participants. The participants confronted difficulties executing some of the tasks on both versions of Excel mostly because of their perception of how an action should affect the document versus how the application handles it. Two examples where this phenomenon occurred were on the tasks *Center Title* and *Insert row*. On the first many of the participants tried to center the title of a table using the icon they are use to click to execute this task. The application responded by centering the title on the cell it was located instead of the corresponding center of the table. Some of the participants tried to highlight the adjacent cells and tried to use the same icon or expand the cell containing the title of the table but in both cases they were unsuccessful.

They were not successful because in Excel there is a specialized icon which function is to merge the first cell and the adjacent cells into one and then centralized the text contained in it. Some of the participants did not know or forgot about that icon even tough in 2007 there is a short name beside it describing it.

The error rate between both versions of Excel remained almost the same until the participants were given the task *Generate Graph*. On that specific task the error rate increased dramatically on Excel 2007. The main reason for this sudden change was the several changes made to the process needed to execute the task which included menu changes and steps removed from the **insert graph wizard** available in most of the previous versions. The most noticeable was the removal of the option that allowed users to assign the title to the graph. In Excel 2007 the user is required to assign the title to a graph after it is created by choosing from different options found in one box called **chart layouts**. The test recordings showed that many of the participants were able to create the graph without major problems, but then many of them were not able to assign the title to the graph. Those who managed to find the option took a longer time to finish the task which explains why there was a significant difference in terms of completion time as discussed in **section 4.1.2,** and also a significant difference in terms of completed task as discussed in **section 4.2.2**.

5.4.3 PowerPoint

As discussed earlier on **section 4.4.3** there were significant differences, in terms of errors committed by the participants. The participants confronted difficulties executing some of the tasks on both versions of PowerPoint mostly because of their perception of where should an icon to execute a certain action should be located or similarities in menu names. On both versions of the application the participants had difficulties locating the correct menu to complete the *Slide Master* task. The participants had a harder time executing the task in Excel 2007 as test recordings show because of the clutter of icons and tabs placed in the user interface. An interesting situation is revealed on the task *Change text color and add effects* where participants where ask to animate a text. In Excel 2003 some participants had trouble executing this task because in this version there are 2 options to animate text. One of those options is **custom animation** and the other is **animation schemes.** Even though both options are for animating the text and they share many of the animations, the way they are ordered is really different. This situation created a big problem for the participants, because they needed to look in some cases in both options to find the correct effect. In Excel 2007 they corrected that by eliminating the animation schemes option and putting all things related to animations in a tab called animations and also adding icons for the slide transition animations. Even though this change resolve the issue found in Excel 2003 it brought a new one as the test recording show that many participants in Excel 2007 focused their attention on the slide transition icons and tried to animate the text with them.

As discussed in section 4.4.3 the total errors committed by participants was greater in Excel 2007 than in 2003. The main reason for this situation was the removal of functions from menus on Excel 2007. Many errors committed by the participants in Excel 2007 beside the situation discussed earlier were the result of the removed functions. The test recordings showed that many participants tried to execute some of the tasks by using the **right click** option. In Excel 2003 the participants were able to complete some of the tasks by using that option, because it provided some of the functions that are available within the main menus, which makes it easier for them to find what they were looking for. In Excel 2007 those sub-menus were removed, forcing the user to access them through the main menus only.

5.5 Satisfaction

Sections 4.6.1, 4.6.2 and 4.6.3 revealed that there were significant differences in user satisfaction for some of the applications used by the participants. The following sections will explore the possible reasons.

5.5.1 Word

As discussed earlier on **section 4.6.1** there were no significant differences, in terms of *Icons Arrangement* and *Overall Satisfaction* between the two versions of Word. The participants' ratings between the two versions were similar and this may be due to the fact that they did not encounter great difficulties while executing the tasks on either version.

5.5.2 Excel

As discussed earlier on **section 4.6.2** there were significant differences in the *Overall Satisfaction* and *Icons Arrangement* between the two versions of Excel**.** In the case of the *Overall Satisfaction* seems to be related to the difficulties confronted by the users in executing this task. In the case of the *Icons Arrangement* may be due to the fact that many of the participants had trouble locating the right location of an icon or feature in Excel 2007. Those participants may have been distracted by the large amount of icons available in 2007 which may also cause user fatigue. That could be one of the reasons why the participants expressed that the 2003 version was easier to use than the 2007 version. Even though the participants were clearly more satisfied with the 2003 versions, most of them were expressed that they were willing to continue using the 2007 version and also recommended to a friend. A possible explanation for this situation could be that the participants understand that with time they could overpass the difficulties they confronted with the 2007 version and get used to the new interface and the changes that came along with it.

5.5.3 PowerPoint

As discussed earlier on **section 4.6.3** there were no significant differences, in terms of *Icons Arrangement* and *Overall Satisfaction* between the two versions of PowerPoint, even though the male participants were apparently more satisfied that the women participants in PowerPoint 2007. However, many of the participants considered that the 2007 version of PowerPoint was easier to use than the 2003 version. Also almost all of them expressed that they would recommend the 2007 version to a friend and all of them would be also be willing

to continue using it. A possible explanation for this would be the fact that some features of the 2007 version were improved, like for example the *insert sound* option in which there is an icon in a shape of a speaker, that the participants had no problem associating it with an option to handle sounds.

6 CONCLUSIONS AND FUTURE WORK

As discussed in previous chapters there were significant differences in terms of completion time, completed tasks, user difficulty in performing the tasks and errors committed by users for some of the applications involved in the study. A summary of those results is shown on **Table 6.1**. The cases highlighted in **Table 6.1** indicate the version that resulted significantly better with respect to the corresponding dependent variable.

TABLE 6.1 Versions of applications with overall better results where significant differences where found

Application	Completion Times	Completed tasks	Difficulty in performing the tasks	Errors	Satisfaction
Word				2007	
Excel	2003	2003	2003	2003	2003
PowerPoint				2003	

The results of the study shows that there are significant differences in the overall time it took the participants to complete the tasks, the number of completed tasks and the overall difficulty in performing the tasks and overall satisfaction only on Excel. On all these variables the participants had better results on Excel 2003 than in Excel 2007.

The results also indicate that there are significant differences in terms of errors committed by the participants in all the applications used on this study. The participants were more successful on the 2003 versions of Excel and PowerPoint. In Word the results were exactly the opposite where the participants were more successful on the 2007 version.

In fact in the Excel application the participants had better results in all the variables that were observed. It is clear that the user interface of the 2007 version of Excel had a negative effect on the participant's performance and difficulty in performing the tasks levels.

This study demonstrated that age, gender and profession are factors that can influence the performance of the participants. Young, male and student participants tend to be faster performing the tasks.

Excluding the Excel case we could see that there was no significant difference between the two versions of Word and PowerPoint, with the exception of the variable errors committed, where the participants had better results on Word 2007 than in Word 2003, but exactly the opposite in PowerPoint where they had better results in the 2003 version.

These results support the conclusion that there is no concrete evidence of an improvement in terms of the user interface of the 2007 versions of Word and Power Point. Also it cannot be claimed that the 2003 versions of Word and Power Point are better than the 2007 versions. However, the results support the conclusion that the user interface of Excel 2007 did changed for the worst in comparison with the user interface of the 2003 version. Thus, strictly from the point of view of the usability of the 2007 version of the Office suite, the users are better off keeping their 2003 version. Investing in an upgrade from Office 2003 to 2007 is something to consider if the new capabilities of Office 2007 are worth the investment.

In order to determine if the result of the study with respect to the Excel 2007 application persists and are not due to the learning curve the experiment can be repeated with users having at least three years using this version. The experiment can also be repeated to compare the user interfaces of Office 2007 with the new 2010 version of Office.

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APPENDIX A. PARTICIPANT'S CONSENT

Consentimiento para realización de la prueba

Como parte de un estudio comparativo estamos realizando unas pruebas de interacción con las versiones 2003 y 2007 del conjunto de aplicaciones conocido como Microsoft Office. El propósito de dicho estudio es determinar las ventajas y desventajas de ambas versiones cuando una persona interactúa con los mismos. Para dicho estudio se utilizaran los programas Word, Excel y PowerPoint.

A los/las participantes de este estudio se les solicita que completen un cuestionario sobre su información personal y su experiencia de uso con las computadoras. Luego de esto se les solicita que realicen una serie de tareas con cada uno de las aplicaciones. Con motivos de posterior análisis se procederá a grabar dicha interacción mediante el uso de un programa llamado Morae de la compañía TechSmith. En dicha grabación solo se tomara record de la realización de las tareas en los programas antes mencionados. Finalmente los/las participantes completarán un cuestionario sobre su interacción con los dos procesadores de palabras. La identidad de los/las participantes será protegida y solamente los/las investigadores/as tendrán acceso a dicha información.

Yo, _____, voluntariamente consiento a participar en el estudio antes descrito. Entiendo que puedo abandonar este estudio en el momento que así lo desee y que se garantiza mi confidencialidad.

_____ _____

Firma del Participante Fecha

APPENDIX B SCREENING QUESTIONNAIRE

Cuestionario Pre-Prueba Usuario #____

1. Género: Masculino ___ Femenino ___

2. Edad: _____

3. Ocupación: Estudiante ____ Profesor _____ Empleado _____

4. ¿Cuántos años llevas utilizando computadoras? _____

5. ¿Cuántas horas al día típicamente utiliza las computadoras? _____

6. ¿Ha utilizado Office 2003 anteriormente? Si____ No____

De haber contestado si a la pregunta 6 favor contestar lo siguiente:

7. Indique el tiempo que lleva utilizando los siguientes programas:

Word 2003 _____ Años _____ Meses Excel 2003 _____ Años _____ Meses

PowerPoint 2003 _____ Años _____ Meses

8. Indique la frecuencia con la que usa los siguientes:

Word 2003: A diario _____ Regularmente _____

Ocasionalmente _____ Nunca _____

Excel 2003: A diario _____ Regularmente _____

Ocasionalmente _____ Nunca _____

PowerPoint 2003: A diario _____ Regularmente _____

Ocasionalmente _____ Nunca _____

9. ¿Ha trabajado con la creación y/o modificación de tablas utilizando office 2003?

Si ____ No ____

10. ¿Ha utilizado anteriormente las herramientas de búsqueda y remplazo de texto en Office 2003?

Si ____ No ____

11. ¿Ha insertado y/o manejado imágenes dentro de documentos?

Si ____ No ____

12. ¿Ha utilizado el corrector de palabras anteriormente?

Si ____ No ____

13. ¿Ha utilizado Office 2007 anteriormente? Si____ No____

De haber contestado si a la pregunta 13 favor contestar lo siguiente:

14. Indique el tiempo que lleva utilizando los siguientes programas:

Word 2007 _____ Años _____ Meses Excel 2007 _____ Años _____ Meses

PowerPoint 2007 _____ Años _____ Meses

15. Indique la frecuencia con la que usa los siguientes:

Word 2007: A diario _____ Regularmente _____

Ocasionalmente _____ Nunca _____

Excel 2007: A diario _____ Regularmente _____

Ocasionalmente _____ Nunca _____

PowerPoint 2007: A diario _____ Regularmente _____

Ocasionalmente _____ Nunca _____

16. ¿Ha trabajado con la creación y/o modificación de tablas utilizando office 2007?

Si ____ No ____

17. ¿Ha utilizado anteriormente las herramientas de búsqueda y remplazo de texto en Office 2007?

Si ____ No ____

18. ¿Ha insertado y/o manejado imágenes dentro de documentos?

Si ____ No ____

19. ¿Ha utilizado el corrector de palabras anteriormente? Si ____ No ____

APPENDIX C POST TEST QUESTIONNAIRES

APPENDIX C1 WORD

Cuestionario Post-Prueba Word Usuario #____

1. Utilizando la escala de 1 a 5 provista adelante, donde 1 es fácil y 5 es difícil, indique el nivel de complejidad que experimentó al realizar cada una de las acciones que se indican a continuación. Circule el número que mejor refleje su opinión.

Tarea	Word 2003	Word 2007
1. Abrir un documento	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
2. Cambiar formato de texto	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
3. Cambiar formato de párrafos	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
4. Insertar una tabla	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
5. Eliminar una columna	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
6. Añadir filas	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
7. Insertar imagen	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
8. Utilizar Undo	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
9. Añadir bullets	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
10. Ejecutar el corrector de texto	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
11. Ejecutar el buscador de texto (Find)	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
12. Reemplazar texto	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
13. Ejecutar una vista preliminary	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
14. Grabar documento	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
15. Copiar texto	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
16. Crear documento Nuevo	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
17. Pegar texto	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)

2. ¿Cuál de las interfases graficas le parece mas fácil de utilizar, la de Word 2003 o la de Word 2007?

Word 2003 _____ Word 2007 _____

3. ¿Que le parece la organización de los iconos según el tipo de tarea?

Word 2003: (mala) 1 2 3 4 5 (buena)
Word 2007: (mala) 1 2 3 4 5 (buena)

4. Indique su nivel de satisfacción general con cada interfaz de Word

Word 2003: (poca) 1 2 3 4 5 (mucha)
Word 2007: (poca) 1 2 3 4 5 (mucha)

5. ¿Volvería a utilizar la versión de Word 2007? Si _____ No _____

6. De haber contestado no a la pregunta anterior, explique sus razones.

_____
_____
_____
_____
_____

7. ¿Le recomendaría usar Word 2007 a un colega o amigo? Si _____ No _____

8. En el espacio que sigue puede anotar comentarios sobre su interacción con Word 2003 ó 2007.

_____
_____
_____
_____

APPENDIX C2 EXCEL

Cuestionario Post-Prueba Excel Usuario #____

1. Utilizando la escala de 1 a 5 provista adelante, donde 1 es fácil y 5 es difícil, indique el nivel de complejidad que experimentó al realizar cada una de las acciones que se indican a continuación. Circule el número que mejor refleje su opinión.

Tarea	Excel 2003	Excel 2007
18. Abrir un documento	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
19. Centralizar titulo	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
20. Insertar una fila	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
21. Eliminar una fila	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
22. Generar una formula	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
23. Replicar la formula	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
24. Ajustar cifras de datos	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
25. Centralizar datos horizontalmente	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
26. Generar una grafica	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
27. Mover la grafica	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
28. Titular una celda	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
29. Copiar y pegar Datos	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
30. Sombrear una celda	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)

2. ¿Cuál de las interfases graficas le parece mas fácil de utilizar, la de Excel 2003 o la de Excel 2007?

   Excel 2003 _____ Excel 2007 _____

3. ¿Que le parece la organización de los iconos según el tipo de tarea?

   Excel 2003: (mala) 1 2 3 4 5 (buena)
   Excel 2007: (mala) 1 2 3 4 5 (buena)

4. Indique su nivel de satisfacción general con cada interfaz de Excel

Excel 2003:	(poca) 1 2 3 4 5 (mucha)
Excel 2007:	(poca) 1 2 3 4 5 (mucha)

5. ¿Volvería a utilizar la versión de Excel 2007? Si _____ No _____

6. De haber contestado no a la pregunta anterior, explique sus razones.

_____
_____
_____
_____
_____

7. ¿Le recomendaría usar Excel 2007 a un colega o amigo? Si _____ No _____

8. En el espacio que sigue puede anotar comentarios sobre su interacción con Excel 2003 ó 2007.

_____
_____
_____
_____

APPENDIX C3 POWERPOINT

Cuestionario Post-Prueba PowerPoint Usuario #____

1. Utilizando la escala de 1 a 5 provista adelante, donde 1 es fácil y 5 es difícil, indique el nivel de complejidad que experimentó al realizar cada una de las acciones que se indican a continuación. Circule el número que mejor refleje su opinión.

Tarea	PowerPoint 2003	PowerPoint 2007
31. Abrir un archive	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
32. Cambio de diseño de slide	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
33. Acceder configuración maestra de slides	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
34. Ennegrecer el título	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
35. Cambiar formato a primer nivel de texto	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
36. Cambiar formato de “bullets”	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
37. Acceder ordenador de “slides”	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
38. Añadir un slide	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
39. Dibujar un círculo	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
40. Cambiar formato de circulo	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
41. Insertar una imagen	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
42. Añadir sonido a un slide	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
43. Correr un slide show	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)
44. Imprimir handouts	(fácil) 1 2 3 4 5 (difícil)	(fácil) 1 2 3 4 5 (difícil)

2. ¿Cuál de las interfases graficas le parece mas fácil de utilizar, la de PowerPoint 2003 o la de PowerPoint 2007?

   PowerPoint 2003 _____ PowerPoint 2007 _____

3. ¿Que le parece la organización de los iconos según el tipo de tarea?

   PowerPoint 2003: (mala) 1 2 3 4 5 (buena)
   PowerPoint 2007: (mala) 1 2 3 4 5 (buena)

4. Indique su nivel de satisfacción general con cada interfaz de PowerPoint

PowerPoint 2003: (poca) 1 2 3 4 5 (mucha)
PowerPoint 2007: (poca) 1 2 3 4 5 (mucha)

5. ¿Volvería a utilizar la versión de PowerPoint 2007? Si _____ No _____

6. De haber contestado no a la pregunta anterior, explique sus razones.

_____
_____
_____
_____
_____

7. ¿Le recomendaría usar PowerPoint 2007 a un colega o amigo? Si _____ No _____

8. En el espacio que sigue puede anotar comentarios sobre su interacción con PowerPoint 2003 ó 2007.

_____
_____
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_____

APPENDIX D PARTICIPANT'S COMPLETION TIMES

TABLE D.1 Completion Times of Participants on Word 2003

	Word 2003															
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
U1	9	31	3	42	7	34	10	1	26	27	12	25	3	18	10	2
U2	7	36	7	34	6	2	29	2	23	33	11	15	1	10	10	2
U3	8	13	4	36	7	6	17	1	43	48	24	21	3	15	13	9
U4	8	15	5	14	4	13	7	3	30	27	28	18	2	10	4	4
U5	5	22	2	30	6	13	4	1	20	13	4	9	3	9	4	2
U6	4	22	5	42	5	10	29	2	60	46	68	48	6	25	12	9
U7	4	10	4	60	4	93	7	1	24	12	6	6	3	9	3	7
U8	4	12	3	50	4	21	12	1	36	107	7	17	3	15	8	20
U9	6	15	2	10	4	32	7	1	21	13	7	12	6	10	6	2
U10	5	14	3	32	25	70	15	1	31	34	68	67	2	12	4	15
U11	4	11	4	18	3	16	7	1	44	16	10	12	1	8	7	3
U12	7	14	5	39	5	78	11	2	37	31	13	20	6	11	6	3
U13	6	17	4	20	4	13	7	1	30	18	14	44	3	12	8	3
U14	5	12	2	13	3	7	6	1	27	37	6	11	2	11	3	2
U15	4	10	5	13	4	2	6	1	25	16	20	12	4	9	7	4
U16	3	11	5	43	7	4	8	1	35	12	7	10	3	12	6	2
U17	7	15	5	13	4	15	11	1	38	32	9	13	4	11	9	4
U18	4	11	4	16	2	3	8	1	27	23	8	11	2	9	5	2
U19	5	12	3	25	3	4	7	1	19	13	7	9	2	10	7	2
U20	5	10	5	9	4	7	10	1	25	21	7	11	2	12	5	3
U21	3	10	4	11	4	2	9	1	25	16	4	9	3	10	3	2
U22	3	10	3	11	4	4	7	1	25	19	5	10	4	13	3	2
U23	7	11	3	48	4	6	7	1	36	24	7	12	2	9	4	2
U24	6	13	5	24	6	3	7	2	54	22	12	21	2	16	7	8
U25	6	28	2	21	11	19	8	1	35	23	29	13	10	10	6	4
U26	4	13	4	12	4	26	8	1	27	10	7	11	4	12	6	5
U27	4	9	5	23	4	20	9	1	9	10	3	9	3	8	3	1
U28	4	11	4	26	3	78	6	2	36	13	17	15	3	13	8	4
U29	4	12	3	5	2	8	3	1	20	12	3	10	1	8	2	2
U30	4	18	5	35	35	13	13	1	25	34	6	16	3	12	10	3
U31	4	11	6	20	7	3	11	1	34	18	9	17	5	10	4	4
U32	5	6	3	8	4	33	6	1	10	9	4	9	2	12	6	2
U33	5	9	4	16	3	93	10	1	28	20	64	19	1	10	3	3
U34	6	13	4	17	3	45	19	2	60	29	68	17	1	14	5	3
U35	5	8	4	13	5	3	8	1	24	21	26	18	2	9	9	6
U36	4	8	4	19	4	2	11	1	27	14	3	67	2	11	5	2
U37	6	9	3	7	2	6	11	1	23	10	4	14	1	12	4	2
U38	5	13	3	14	3	7	7	1	23	20	12	9	3	11	3	2
U39	5	6	3	16	4	25	7	1	51	12	3	9	3	8	6	2
U40	3	9	3	7	7	21	6	1	33	15	6	14	1	10	4	2

TABLE D.1 Completion Times of Participants on Word 2003 Continuation

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
U40	3	9	3	7	7	21	6	1	33	15	6	14	1	10	4	2
U41	3	11	3	10	2	2	10	1	25	15	4	13	1	12	4	4
U42	4	6	3	9	13	2	6	1	21	15	7	11	2	10	4	2
U43	4	16	2	36	5	38	11	1	50	16	5	12	1	11	6	2
U44	5	17	3	12	4	6	7	1	25	12	5	13	2	12	3	2
U45	3	10	3	17	5	3	9	1	53	32	3	10	1	13	6	2
U46	4	10	3	21	4	15	7	2	24	20	22	16	1	12	10	3
U47	4	10	3	56	6	93	10	1	60	19	11	18	2	16	5	2
U48	5	16	4	42	4	93	23	1	32	19	7	16	5	19	6	6
U49	4	14	2	20	2	3	8	2	29	18	7	13	2	9	2	2
U50	3	15	3	12	2	2	5	1	31	11	5	8	12	9	6	2

TABLE D.2 Completion Times of Participants on Word 2007

	Word 2007															
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
U1	8	20	6	20	4	15	8	1	15	18	16	18	8	15	5	7
U2	6	30	2	22	5	2	9	2	56	39	14	15	2	20	12	6
U3	7	13	5	17	4	14	9	1	45	23	27	14	7	15	7	10
U4	5	12	6	20	5	15	11	1	38	16	18	13	35	15	7	7
U5	6	17	4	15	5	9	4	1	17	26	7	12	5	10	3	2
U6	8	25	7	30	40	49	16	2	66	85	55	35	6	38	13	10
U7	5	10	4	16	7	14	8	2	24	18	7	15	3	11	8	3
U8	6	14	5	25	4	24	9	1	34	85	17	11	3	14	6	7
U9	5	22	3	12	5	10	8	1	22	42	6	10	11	20	8	8
U10	4	19	5	17	48	57	50	1	20	85	75	80	4	12	5	13
U11	6	12	3	18	9	9	4	1	38	21	9	13	6	9	6	6
U12	8	11	4	15	5	15	7	1	28	24	10	16	8	16	6	9
U13	6	18	4	8	7	12	11	1	36	30	75	80	2	14	7	8
U14	5	12	2	13	4	2	8	1	31	14	5	11	5	11	4	6
U15	4	11	5	11	5	2	8	2	32	40	12	21	7	9	7	7
U16	6	10	6	12	6	4	7	1	35	15	7	13	3	11	6	4
U17	6	14	6	13	4	15	13	1	43	30	9	10	3	15	9	7
U18	4	11	4	15	4	12	8	1	29	16	10	12	3	11	4	5
U19	3	14	3	9	7	10	7	1	28	89	2	12	22	13	10	2
U20	6	13	3	10	3	11	7	1	28	28	12	35	5	14	4	5
U21	5	11	3	6	4	2	5	1	28	16	5	11	3	16	4	2
U22	7	10	3	30	4	3	8	1	27	57	5	13	19	13	4	7
U23	6	12	4	13	5	2	8	1	24	25	4	8	4	11	3	6
U24	7	15	4	18	7	3	10	1	32	19	20	15	22	16	8	9
U25	7	10	2	10	12	15	6	1	27	42	53	19	12	12	7	8

TABLE D.2 Completion Times of Participants on Word 2007 Continuation

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16
U26	7	12	7	11	6	12	7	2	26	12	7	16	3	14	7	6
U27	4	9	4	9	4	16	10	1	10	9	5	10	4	12	3	2
U28	8	21	4	16	10	10	9	3	58	19	28	37	6	16	7	18
U29	4	10	2	7	2	7	4	1	29	13	2	12	7	9	4	2
U30	6	12	4	9	4	22	7	1	25	15	9	13	7	19	6	3
U31	5	15	5	14	8	4	11	1	39	11	9	66	35	13	6	21
U32	5	9	3	6	5	7	5	1	8	10	5	9	4	7	5	2
U33	6	13	4	13	8	16	5	1	32	32	21	19	6	14	14	8
U34	8	13	4	19	4	10	19	1	80	37	14	15	6	12	8	8
U35	7	13	4	11	10	4	11	1	40	29	75	80	4	10	7	8
U36	3	12	4	12	6	4	50	1	31	14	6	75	3	10	6	12
U37	7	12	4	10	2	9	7	1	22	10	4	13	3	12	6	7
U38	8	12	2	13	5	12	12	1	26	21	75	12	5	11	3	6
U39	5	8	3	10	10	13	4	1	25	19	4	11	5	8	4	6
U40	4	8	2	14	3	13	5	1	30	33	6	8	12	11	3	5
U41	6	10	2	10	3	1	7	1	27	19	3	10	6	11	6	6
U42	6	11	4	12	8	4	6	1	20	69	10	15	4	12	6	7
U43	6	18	3	9	8	17	10	1	64	21	8	11	4	12	5	3
U44	5	15	3	9	5	15	8	1	30	10	4	17	3	14	8	2
U45	6	10	3	9	4	2	9	1	71	12	3	17	3	12	5	2
U46	5	16	6	8	4	22	4	1	28	22	10	12	10	14	12	8
U47	6	10	4	12	3	26	6	1	21	15	10	10	2	15	7	8
U48	4	12	2	12	6	14	23	3	32	34	8	18	6	12	6	12
U49	6	14	2	12	5	3	7	1	27	16	5	14	6	14	2	7
U50	3	12	6	8	4	2	4	1	20	16	9	10	21	9	5	4

TABLE D.3 Completion Times of Participants on Excel 2003

	Excel 2003												
	T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**	**T10**	**T11**	**T12**	**T13**
U1	8	23	4	3	10	1	10	6	70	16	5	11	7
U2	9	108	4	8	45	5	16	5	31	4	5	6	8
U3	7	15	2	3	38	8	7	9	38	12	12	5	11
U4	5	5	3	4	14	2	9	10	54	5	8	8	13
U5	3	20	2	3	22	3	11	6	39	6	3	5	9
U6	5	108	20	39	40	5	58	15	53	16	10	16	19
U7	2	8	2	3	19	100	8	14	38	2	6	7	19
U8	5	9	4	2	30	2	8	9	40	3	4	5	4
U9	4	10	6	6	18	3	6	11	19	3	5	5	8
U10	5	108	11	22	110	100	58	7	53	6	7	16	12
U11	2	6	1	3	21	100	9	7	28	4	6	7	5
U12	5	120	5	6	22	2	13	8	41	2	8	7	2
U13	5	4	3	3	13	5	2	4	70	2	4	9	5
U14	9	12	10	16	20	10	9	14	39	6	14	19	10
U15	6	5	8	3	27	3	6	7	28	5	5	8	2
U16	3	15	3	3	12	11	8	6	24	2	4	7	11
U17	6	108	1	3	23	3	7	14	30	3	5	13	5
U18	3	4	4	2	6	1	2	5	22	1	2	8	6
U19	5	108	12	2	110	4	33	11	28	6	8	6	5
U20	4	70	6	3	12	2	6	10	25	4	4	15	7
U21	2	4	3	3	25	2	9	10	21	2	4	4	5
U22	3	108	6	4	24	68	30	7	26	2	7	10	5
U23	5	6	3	3	16	6	6	8	20	2	6	12	2
U24	44	10	7	15	31	27	16	9	26	5	4	11	6
U25	5	74	7	4	110	100	22	10	26	3	4	11	6
U26	5	13	7	5	18	6	9	7	25	6	4	5	15
U27	3	12	2	3	9	2	8	8	21	4	5	4	9
U28	6	47	5	10	13	2	4	6	33	2	3	7	3
U29	3	11	3	2	8	1	4	3	25	2	2	6	4
U30	4	6	3	3	42	35	8	6	43	2	5	7	4
U31	5	108	16	7	18	4	4	8	28	5	6	5	9
U32	3	6	1	1	6	3	3	5	31	2	2	7	2
U33	4	3	3	2	38	2	7	5	35	2	3	3	2
U34	3	108	4	8	110	100	9	5	70	5	3	9	8
U35	4	20	2	2	19	2	4	6	27	3	3	4	2
U36	4	108	8	4	16	2	7	5	42	3	4	6	6
U37	4	9	3	4	14	1	2	5	19	2	4	4	1
U38	4	58	5	6	13	12	58	11	26	2	3	7	2
U39	3	2	2	2	6	3	2	3	25	2	3	8	2
U40	3	6	2	2	12	2	6	5	28	4	3	3	2

TABLE D.3 Completion Times of Participants on Excel 2003 Continuation

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13
U40	3	6	2	2	12	2	6	5	28	4	3	3	2
U41	4	4	2	3	9	3	14	5	52	2	6	4	8
U42	4	3	2	2	37	3	7	5	32	2	3	26	3
U43	5	9	4	2	20	2	8	8	23	2	3	10	10
U44	4	10	4	2	9	2	11	4	20	3	5	4	5
U45	2	19	3	2	12	2	11	7	33	5	4	13	21
U46	3	108	2	2	15	3	7	5	23	3	3	13	3
U47	4	5	4	3	9	2	4	6	22	5	5	7	2
U48	3	108	7	7	16	2	8	8	54	3	7	12	7
U49	5	3	2	2	9	2	3	8	26	2	3	6	5
U50	2	5	2	2	5	2	4	4	32	2	3	9	2

TABLE D.4 Completion Times of Participants on Excel 2007

	Excel 2007												
	T1	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**	**T10**	**T11**	**T12**	**T13**
U1	10	12	3	3	19	2	10	6	67	3	6	15	3
U2	14	99	9	16	45	6	19	8	107	8	8	8	8
U3	6	4	3	3	9	3	6	5	55	2	5	6	7
U4	4	12	4	6	28	3	10	12	107	2	5	8	19
U5	5	99	8	2	50	7	110	10	107	3	6	9	11
U6	7	99	64	29	71	7	27	28	107	10	7	14	9
U7	2	5	2	7	49	41	8	18	107	6	9	6	9
U8	4	17	2	2	33	1	5	7	23	6	3	10	4
U9	4	40	2	2	24	3	4	13	107	3	6	9	10
U10	6	99	84	5	71	41	110	8	41	4	7	10	6
U11	4	8	4	4	19	41	20	16	107	3	6	7	9
U12	7	120	4	3	16	2	5	7	45	2	6	30	8
U13	6	7	4	6	15	6	4	6	107	3	4	16	9
U14	7	9	15	4	30	2	9	11	70	4	7	5	30
U15	5	3	17	5	29	3	10	7	107	12	5	5	25
U16	5	13	5	4	18	36	13	8	107	4	5	8	11
U17	6	60	2	2	22	4	14	14	107	2	6	11	11
U18	4	3	3	2	8	1	2	6	100	2	3	6	4
U19	9	10	23	10	18	10	7	13	95	7	11	28	14
U20	5	99	5	3	12	4	17	7	26	2	3	7	7
U21	3	4	3	3	14	2	7	9	35	2	5	7	3
U22	6	99	6	3	22	41	18	6	66	1	6	9	10
U23	6	7	2	4	8	3	9	3	23	2	5	19	4
U24	10	11	33	3	19	10	7	9	96	3	5	12	2
U25	6	24	13	2	71	41	110	16	107	3	9	16	9

TABLE D.4 Completion Times of Participants on Excel 2007 Continuation

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13
U26	5	29	17	5	20	41	10	8	107	8	6	7	14
U27	3	10	3	2	12	2	7	12	107	2	4	5	8
U28	7	44	10	8	13	3	31	6	107	2	5	10	5
U29	4	10	4	4	7	2	4	7	107	1	3	5	5
U30	7	4	3	2	41	2	3	5	68	2	4	5	4
U31	5	99	12	3	10	9	42	10	107	4	3	14	6
U32	3	2	3	2	8	3	4	4	21	2	3	4	4
U33	5	10	4	6	44	2	19	7	107	3	4	6	2
U34	4	99	16	16	71	41	9	8	32	2	6	11	3
U35	7	46	5	7	22	4	6	7	107	6	3	3	3
U36	5	99	9	5	20	2	9	6	107	4	6	7	10
U37	6	9	2	2	8	2	2	6	23	2	4	6	1
U38	6	7	5	3	15	4	110	8	107	5	5	6	10
U39	4	5	2	2	8	2	3	3	44	2	4	8	4
U40	3	4	3	2	13	2	7	3	107	2	3	5	3
U41	4	4	2	2	21	4	9	4	57	2	5	5	7
U42	4	5	3	2	34	5	12	6	38	2	2	15	3
U43	6	12	2	2	14	2	7	4	25	2	3	20	7
U44	4	6	4	3	18	2	14	10	78	2	5	4	6
U45	5	10	3	2	16	2	10	6	34	2	5	20	5
U46	5	99	4	3	23	7	10	8	75	3	5	20	3
U47	5	5	3	3	46	2	7	6	44	7	3	3	3
U48	5	99	4	9	25	2	11	7	107	6	7	13	12
U49	4	6	2	2	9	2	6	8	29	2	4	8	4
U50	3	2	2	2	3	2	8	4	107	4	3	7	8

TABLE D.5 Completion Times of Participants on PowerPoint 2003

	PowerPoint 2003											
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
U1	9	60	110	31	6	10	4	53	12	38	2	14
U2	6	22	23	104	7	7	1	15	16	56	6	6
U3	8	40	35	55	7	8	11	86	11	42	2	8
U4	4	34	27	23	12	13	8	19	10	69	2	8
U5	5	12	25	104	5	11	1	38	13	10	1	6
U6	8	64	110	35	22	30	20	110	31	92	31	13
U7	6	5	10	23	20	6	1	21	25	22	2	6
U8	3	24	20	22	8	32	4	24	12	92	3	7
U9	3	10	28	108	6	8	4	99	11	11	1	4
U10	8	64	33	108	7	32	19	110	31	88	27	50
U11	5	7	8	21	15	9	9	110	7	16	1	6
U12	6	13	30	64	9	13	8	37	14	92	1	13
U13	5	12	23	35	9	5	6	21	8	60	1	7
U14	7	18	53	108	30	10	4	55	14	60	1	7
U15	5	10	16	18	6	7	10	35	11	26	1	6
U16	3	16	110	15	8	7	5	41	9	10	1	4
U17	8	20	50	42	20	9	3	36	9	16	1	8
U18	5	14	26	34	7	8	1	38	11	44	3	10
U19	7	7	55	39	6	5	9	11	15	92	1	13
U20	5	36	23	75	12	4	1	24	8	92	1	5
U21	3	8	11	19	8	5	10	30	17	92	1	4
U22	3	13	46	108	21	6	16	23	9	41	1	9
U23	7	5	75	13	6	5	1	20	20	4	1	6
U24	5	9	11	24	20	5	2	35	11	24	3	50
U25	5	15	47	108	13	7	3	26	10	19	3	6
U26	5	7	110	27	10	5	2	22	8	77	1	5
U27	4	14	15	59	7	5	2	51	11	11	1	4
U28	7	40	16	108	12	5	3	110	10	92	1	5
U29	4	5	10	18	16	4	1	13	6	21	1	3
U30	5	12	31	108	9	4	2	30	10	27	1	8
U31	4	43	110	108	9	26	12	73	25	15	5	12
U32	3	8	110	15	3	6	5	15	9	18	1	2
U33	5	5	26	29	21	4	2	39	13	92	2	7
U34	3	31	110	108	34	10	10	105	22	92	1	6
U35	5	18	110	108	19	18	10	11	13	92	3	5
U36	5	40	110	108	40	15	3	110	16	30	7	10
U37	4	8	18	33	4	8	6	12	9	92	1	6
U38	5	7	10	94	6	9	4	110	12	92	3	4
U39	3	2	25	42	10	3	2	30	14	12	1	6
U40	3	64	110	40	16	5	2	29	5	92	1	9

TABLE D.5 Completion Times of Participants on PowerPoint 2003 Continuation

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
U41	6	6	110	108	12	4	1	19	17	92	2	5
U42	4	11	110	60	6	6	4	20	10	16	1	6
U43	7	14	110	63	16	4	2	19	13	22	1	10
U44	5	8	91	27	5	11	8	26	9	27	1	6
U45	4	10	22	20	16	10	2	46	16	27	1	10
U46	4	8	46	120	3	19	9	51	18	10	1	9
U47	4	19	17	120	13	5	7	110	9	60	6	8
U48	5	64	29	120	17	16	4	95	25	54	7	9
U49	4	7	62	76	11	9	2	37	21	21	1	5
U50	3	8	23	37	3	8	3	38	7	24	1	7

TABLE D.6 Completion Times of Participants on PowerPoint 2007

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
U1	9	49	36	57	8	10	4	46	17	10	4	7
U2	7	17	100	91	14	66	3	71	8	110	12	12
U3	8	6	39	40	10	10	3	27	11	48	3	14
U4	9	24	57	47	16	14	2	40	19	62	2	14
U5	12	12	40	24	22	26	2	46	5	10	1	17
U6	6	77	100	32	72	19	12	71	23	80	20	16
U7	5	42	63	31	18	12	10	19	25	11	6	24
U8	4	20	32	66	19	10	2	61	11	33	10	7
U9	3	27	47	91	24	15	36	36	17	18	1	7
U10	14	32	100	91	9	66	20	23	57	49	11	24
U11	6	15	70	47	15	8	15	36	7	27	2	10
U12	7	68	15	44	5	7	3	24	11	33	1	11
U13	7	23	49	27	14	8	6	25	8	110	1	8
U14	9	42	41	91	29	9	3	29	57	10	1	9
U15	7	15	100	30	14	20	4	23	12	50	1	8
U16	5	30	24	29	12	7	27	18	7	27	1	5
U17	8	77	94	40	45	23	16	30	29	40	3	20
U18	7	77	100	12	6	8	3	39	14	37	1	10
U19	8	22	17	91	15	10	4	33	18	13	3	13
U20	6	9	12	91	8	7	2	20	21	42	1	5
U21	4	12	9	12	10	34	14	13	29	38	1	4
U22	7	19	29	48	26	5	9	44	8	16	1	9
U23	6	10	100	39	29	4	6	18	17	9	1	5
U24	7	18	36	15	20	7	2	15	10	22	1	10
U25	6	16	100	61	9	8	2	21	10	8	2	6

TABLE D.6 Completion Times of Participants on PowerPoint 2003 Continuation

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
U26	7	40	100	91	9	7	23	34	9	30	3	8
U27	4	51	57	13	8	5	5	20	11	9	1	3
U28	10	77	100	45	43	13	18	71	22	29	1	10
U29	5	37	12	27	18	9	2	20	9	13	1	3
U30	7	11	76	77	11	8	3	28	11	13	1	3
U31	6	39	100	91	4	66	9	24	12	18	4	13
U32	3	9	100	14	11	4	7	12	8	22	1	10
U33	5	52	100	91	14	22	2	28	6	12	3	17
U34	7	29	100	49	72	18	10	32	16	52	1	8
U35	7	26	100	68	10	15	22	33	11	14	17	5
U36	3	77	40	91	13	17	12	71	57	23	13	10
U37	7	7	9	27	5	6	6	18	13	8	1	6
U38	5	23	18	74	12	10	1	29	10	8	4	3
U39	4	7	100	57	12	5	2	13	16	19	2	8
U40	5	23	100	53	5	5	1	15	8	6	1	9
U41	8	60	100	91	9	8	1	30	15	13	2	8
U42	5	17	54	89	5	9	6	33	7	25	3	7
U43	5	35	15	69	25	6	2	39	10	7	1	8
U44	5	7	104	45	16	9	15	32	11	33	1	5
U45	6	18	59	91	10	8	2	34	11	15	1	9
U46	5	8	100	29	6	10	6	35	8	16	2	9
U47	6	11	67	91	15	10	2	21	7	33	1	7
U48	4	77	100	90	20	32	19	35	45	30	1	12
U49	6	13	100	22	8	6	2	19	7	17	1	7
U50	3	9	11	48	3	7	1	36	9	67	4	10

APPENDIX E PARTICIPANT'S COMPLETED TASKS

TABLE E.1 Completed tasks by Participant on Word 2003

	Word 2003 0 = Fail 1 = Success																
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	Total
U1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U6	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	15
U7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U10	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	14
U11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
U15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
U20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U21	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U29	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U31	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U32	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U33	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	15
U34	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	14
U35	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U36	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U37	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U38	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U39	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16

TABLE E.1 Completed Tasks By Participants on Word 2003 Continuation

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	Total
U41	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U42	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U43	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U44	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U45	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U46	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U47	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	15
U48	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	15
U49	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16

TABLE E.2 Completed tasks by Participant on Word 2007

Word 2007 0 = Fail 1 = Success

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	Total
U1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U8	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	15
U9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U10	1	1	1	1	1	0	0	1	1	0	0	1	1	1	1	1	12
U11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U13	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	14
U14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U21	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16

TABLE E.2 Completed Tasks By Participants on Word 2003 Continuation

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	Total
U26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U29	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U31	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	15
U32	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U33	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U34	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	15
U35	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	14
U36	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U37	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U38	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U39	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U41	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U42	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U43	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U44	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U45	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U46	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U47	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U48	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U49	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16
U50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16

TABLE E.3 Completed tasks by Participant on Excel 2003

Excel 2003 0 = Fail 1 = Success														
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	Total
U1	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U2	1	0	1	1	1	1	1	1	1	1	1	1	1	12
U3	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U4	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U5	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U6	1	0	1	1	1	1	1	1	1	1	1	1	1	12
U7	1	1	1	1	1	0	1	1	1	1	1	1	1	12
U8	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U9	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U10	1	0	1	1	0	0	0	1	1	1	1	1	1	9
U11	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U12	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U13	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U14	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U15	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U16	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U17	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U18	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U19	1	0	1	1	1	1	1	1	1	1	1	1	1	12
U20	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U21	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U22	1	0	1	1	1	1	1	1	1	1	1	1	1	12
U23	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U24	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U25	1	1	1	1	0	0	1	1	1	1	1	1	1	11
U26	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U27	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U28	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U29	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U30	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U31	1	0	1	1	1	1	1	1	1	1	1	1	1	12
U32	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U33	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U34	1	0	1	1	0	0	1	1	0	1	1	1	1	9
U35	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U36	1	0	1	1	1	1	1	1	1	1	1	1	1	12
U37	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U38	1	1	1	1	1	1	0	1	1	1	1	1	1	12
U39	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U40	1	1	1	1	1	1	1	1	1	1	1	1	1	13

TABLE E.3 Completed Tasks By Participants on Excel 2003 Continuation

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	Total
U41	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U42	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U43	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U44	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U45	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U46	1	0	1	1	1	1	1	1	1	1	1	1	1	12
U47	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U48	1	0	1	1	1	1	1	1	1	1	1	1	1	12
U49	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U50	1	1	1	1	1	1	1	1	1	1	1	1	1	13

TABLE E.4 Completed tasks by Participant on Excel 2007

	Excel 2007 0 = Fail 1 = Success													
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	Total
U1	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U2	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U3	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U4	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U5	1	0	1	1	1	1	0	1	0	1	1	1	1	10
U6	1	0	1	1	0	1	1	1	0	1	1	1	1	10
U7	1	1	1	1	1	0	1	1	0	1	1	1	1	11
U8	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U9	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U10	1	0	1	1	1	0	0	1	1	1	1	1	1	10
U11	1	1	1	1	1	0	1	1	1	1	1	1	1	12
U12	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U13	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U14	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U15	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U16	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U17	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U18	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U19	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U20	1	0	1	1	1	1	1	1	1	1	1	1	1	12
U21	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U22	1	0	1	1	1	0	1	1	1	1	1	1	1	11
U23	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U24	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U25	1	1	1	1	0	0	1	1	0	1	1	1	1	10

TABLE E.4 Completed Tasks By Participants on Excel 2007 Continuation

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	Total
U26	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U27	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U28	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U29	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U30	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U31	1	0	1	1	1	1	1	1	0	1	1	1	1	11
U32	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U33	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U34	1	0	1	1	0	0	1	1	1	1	1	1	1	10
U35	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U36	1	0	1	1	1	1	1	1	0	1	1	1	1	11
U37	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U38	1	1	1	1	1	1	0	1	0	1	1	1	1	11
U39	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U40	1	1	1	1	1	1	1	1	0	1	1	1	1	12
U41	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U42	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U43	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U44	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U45	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U46	1	0	1	1	1	1	1	1	1	1	1	1	1	12
U47	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U48	1	0	1	1	1	1	1	1	0	1	1	1	1	11
U49	1	1	1	1	1	1	1	1	1	1	1	1	1	13
U50	1	1	1	1	1	1	1	1	0	1	1	1	1	12

TABLE E.5 Completed tasks by Participant on PowerPoint 2003

PowerPoint 2003 0 = Fail 1 = Success													
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	Total
U1	1	1	0	1	1	1	1	1	1	1	1	1	11
U2	1	1	1	1	1	1	1	1	1	1	1	1	12
U3	1	1	1	1	1	1	1	1	1	1	1	1	12
U4	1	1	1	1	1	1	1	1	1	1	1	1	12
U5	1	1	1	1	1	1	1	1	1	1	1	1	12
U6	1	1	1	1	1	1	1	0	1	0	1	1	10
U7	1	1	1	1	1	1	1	1	1	1	1	1	12
U8	1	1	1	1	1	1	1	1	1	1	1	1	12
U9	1	1	1	0	1	1	1	1	1	1	1	1	11
U10	1	0	1	0	1	0	1	0	0	1	1	0	6
U11	1	1	1	1	1	1	1	0	1	1	1	1	11
U12	1	1	1	1	1	1	1	1	1	0	1	1	11
U13	1	1	1	1	1	1	1	1	1	1	1	1	12
U14	1	1	1	0	1	1	1	1	1	1	1	1	11
U15	1	1	1	1	1	1	1	1	1	1	1	1	12
U16	1	1	0	1	1	1	1	1	1	1	1	1	11
U17	1	1	1	1	1	1	1	1	1	1	1	1	12
U18	1	1	1	1	1	1	1	1	1	1	1	1	12
U19	1	1	1	1	1	1	1	1	1	0	1	1	11
U20	1	1	1	1	1	1	1	1	1	0	1	1	11
U21	1	1	1	1	1	1	1	1	1	0	1	1	11
U22	1	1	1	1	1	1	1	1	1	1	1	1	12
U23	1	1	1	1	1	1	1	1	1	1	1	1	12
U24	1	1	1	1	1	1	1	1	1	1	1	1	12
U25	1	1	1	0	1	1	1	1	1	1	1	1	11
U26	1	1	0	1	1	1	1	1	1	1	1	1	11
U27	1	1	1	1	1	1	1	1	1	1	1	1	12
U28	1	1	1	0	1	1	1	0	1	0	1	1	9
U29	1	1	1	1	1	1	1	1	1	1	1	1	12
U30	1	1	1	0	1	1	1	1	1	1	1	1	11
U31	1	1	0	0	1	1	1	1	1	1	1	1	10
U32	1	1	0	1	1	1	1	1	1	1	1	1	11
U33	1	1	1	1	1	1	1	1	1	0	1	1	11
U34	1	1	0	0	1	1	1	1	1	0	1	1	9
U35	1	1	0	0	1	1	1	1	1	0	1	1	9
U36	1	1	0	0	1	1	1	0	1	1	1	1	9
U37	1	1	1	1	1	1	1	1	1	0	1	1	11
U38	1	1	1	1	1	1	1	1	1	0	1	1	11
U39	1	1	1	1	1	1	1	1	1	1	1	1	12
U40	1	0	0	1	1	1	1	1	1	0	1	1	9

TABLE E.5 Completed Tasks By Participants on PowerPoint 2003 Continuation

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	Total
U41	1	1	0	0	1	1	1	1	1	0	1	1	9
U42	1	1	0	1	1	1	1	1	1	1	1	1	11
U43	1	1	0	1	1	1	1	1	1	1	1	1	11
U44	1	1	1	1	1	1	1	1	1	1	1	1	12
U45	1	1	1	1	1	1	1	1	1	1	1	1	12
U46	1	1	1	0	1	1	1	1	1	1	1	1	11
U47	1	1	1	0	1	1	1	0	1	1	1	1	10
U48	1	0	1	0	1	1	1	1	1	1	1	1	10
U49	1	1	1	1	1	1	1	1	1	1	1	1	12
U50	1	1	1	1	1	1	1	1	1	1	1	1	12

TABLE E.6 Completed tasks by Participant on PowerPoint 2007

	PowerPoint 2007 0 = Fail 1 = Success												
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	Total
U1	1	1	1	1	1	1	1	1	1	1	1	1	12
U2	1	1	0	0	1	0	1	1	1	1	1	1	9
U3	1	1	1	1	1	1	1	1	1	1	1	1	12
U4	1	1	1	1	1	1	1	1	1	1	1	1	12
U5	1	1	1	1	1	1	1	1	1	1	1	1	12
U6	1	0	0	1	0	1	1	0	1	1	1	1	8
U7	1	1	1	1	1	1	1	1	1	1	1	1	12
U8	1	1	1	1	1	1	1	1	1	1	1	1	12
U9	1	1	1	0	1	1	1	1	1	1	1	1	11
U10	1	1	0	0	1	0	1	1	0	1	1	0	7
U11	1	1	1	1	1	1	1	1	1	1	1	1	12
U12	1	1	1	1	1	1	1	1	1	1	1	1	12
U13	1	1	1	1	1	1	1	1	1	0	1	1	11
U14	1	1	1	0	1	1	1	1	1	1	1	1	11
U15	1	1	0	1	1	1	1	1	1	1	1	1	11
U16	1	1	1	1	1	1	1	1	1	1	1	1	12
U17	1	1	1	1	1	1	1	1	1	1	1	1	12
U18	1	0	1	1	1	1	1	1	1	1	1	1	11
U19	1	1	1	1	1	1	1	1	1	1	1	1	12
U20	1	1	1	0	1	1	1	1	1	1	1	1	11
U21	1	1	1	1	1	1	1	1	1	1	1	1	12
U22	1	1	1	1	1	1	1	1	1	1	1	1	12
U23	1	1	0	1	1	1	1	1	1	1	1	1	11
U24	1	1	1	1	1	1	1	1	1	1	1	1	12
U25	1	1	0	1	1	1	1	1	1	1	1	1	11

TABLE E.6 Completed Tasks By Participants on PowerPoint 2003 Continuation

U26	1	1	0	0	1	1	1	1	1	1	1	1	10
U27	1	1	1	1	1	1	1	1	1	1	1	1	12
U28	1	0	0	1	1	1	1	0	1	1	1	1	9
U29	1	1	1	1	1	1	1	1	1	1	1	1	12
U30	1	1	1	1	1	1	1	1	1	1	1	1	12
U31	1	1	0	0	1	1	1	1	1	1	1	1	10
U32	1	1	0	1	1	1	1	1	1	1	1	1	11
U33	1	1	0	0	1	1	1	1	1	1	1	1	10
U34	1	1	0	1	1	1	1	1	1	1	1	1	11
U35	1	1	0	1	1	1	1	1	1	1	1	1	11
U36	1	0	1	0	1	1	1	0	0	1	1	1	8
U37	1	1	1	1	1	1	1	1	1	1	1	1	12
U38	1	1	1	1	1	1	1	1	1	1	1	1	12
U39	1	1	0	1	1	1	1	1	1	1	1	1	11
U40	1	1	0	1	1	1	1	1	1	1	1	1	11
U41	1	1	0	0	1	1	1	1	1	1	1	1	10
U42	1	1	1	1	1	1	1	1	1	1	1	1	12
U43	1	1	1	1	1	1	1	1	1	1	1	1	12
U44	1	1	1	1	1	1	1	1	1	1	1	1	12
U45	1	1	1	0	1	1	1	1	1	1	1	1	11
U46	1	1	0	1	1	1	1	1	1	1	1	1	11
U47	1	1	1	0	1	1	1	1	1	1	1	1	11
U48	1	0	0	1	1	1	1	1	1	1	1	1	10
U49	1	1	0	1	1	1	1	1	1	1	1	1	11
U50	1	1	1	1	1	1	1	1	1	1	1	1	12

APPENDIX F Tasks

APPENDIX F1 WORD

Tarea #1

Abra el archivo llamado “Conozca a Borinquen”
localizado en el escritorio(desktop)

Tarea #2

Cambie el tipo de letra del titulo a “Algerian” en tamaño 14 en **negrillas** (“bold”) y centralícelo

Tarea #3

Alinee en ambos lados el párrafo de la sección III de la siguiente manera:

La isla de Borinquen consta de una extensión de terreno en la isla principal de aproximadamente 100 millas de oeste a este y unas 35 de norte a sur. Adicional a esta extensión de terreno la isla cuenta con una serie de pequeñas islas de las cuales 2 son parte de los 78 municipios que constituyen a Borinquen, Los nombres de estas islas son Mona, Monito, Desecheo, Culebra y Vieques siendo estas últimas 2 las islas municipio antes descritas.

Tarea #4

Inserte una tabla de 6 columnas y 4 filas al final del documento.

Tarea #5

Elimine la tercera columna de la tabla creada en la tarea anterior.

Tarea #6

Añada 2 filas debajo de la última fila de la tabla creada.

Tarea #7

Inserte al final del documento la imagen con nombre “imagen1.jpg” localizada en el escritorio (Desktop).

Tarea #8

Deshaga la acción anterior.

Tarea #9

Añada “bullets enumerados (ver ejemplo abajo)” a los lugares de interés de cada pueblo en la sección VI.

Ej.

A. La Parguera

1.
2.
3.

B. Cabo Rojo

1.
2.

Tarea #10

Corra el corrector de palabras para corregir los errores del párrafo de la sección III.

Tarea #11

Haga una búsqueda en el documento de la palabra “oeste” desde el principio del documento.

Tarea #12

Reemplace el nombre “Borinquen” por “Puerto Rico” en todo el documento con opción de reemplazo.

Tarea #13

Verifique como se vería el documento antes de imprimir (vista preliminar)

Tarea #14

Grabe el documento con el nombre “Documento arreglado” en el escritorio (desktop).

Tarea #15

Copie el contenido de la sección VI.

Tarea #16

Cree un nuevo documento y pegue la información que copió en la tarea anterior.

APPENDIX F2 EXCEL

Tarea #1

Abra el archivo llamado “UPR-CAAM” localizado en el escritorio

Tarea #2

Centralice el titulo de la tabla superior de la siguiente forma:

Antes

Notas de los esstudiantes			
Estudiante	Examen 1	Examen 2	Examen 3
1	90	86	78
2	86	89	97
3	50	78	87
4	100	89	92

Despues

Notas de los esstudiantes			
Estudiante	Examen 1	Examen 2	Examen 3
1	90	86	78
2	86	89	97
3	50	78	87
4	100	89	92

Tarea #3

Inserte una fila en blanco debajo del titulo de la tabla superior

Antes

	A	B	C	D
1	Notas de los estudiantes			
2	Estudiante	Examen 1	Examen 2	Examen 3
3	1	90	86	78
4	2	86	89	97
5	3	50	78	87

Despues

	A	B	C	D
1	Notas de los estudiantes			
2				
3	Estudiante	Examen 1	Examen 2	Examen 3
4	1	90	86	78
5	2	86	89	97

Tarea #4

Elimine la fila que corresponde al estudiante numero 11.

Tarea #5

Calcule el promedio de los exámenes del estudiante #1 bajo la columna titulada promedio utilizando formulas

Notas de los estudiantes			
Estudiante	Examen 1	Examen 2	Examen 3
1	90	86	78
2	86	89	97
3	50	78	87
4	100	89	92
5	80	96	88
6	87	78	79
7	60	72	79
8	75	82	76
9	67	56	79
10	50	60	49
11	67	96	79
Estudiante	Promedio	Nota	
1		F	
2		F	

Tarea #6

Calcule el promedio de los exámenes de los demás estudiantes replicando la formula

Tarea #7

Ajuste a una cifra decimal los promedios obtenidos.

Tarea #8

Centralice en la celda los números de estudiante en ambas tablas de la siguiente manera:

Antes

Estudiante
1
2
3

Despues

Estudiante
1
2
3

Tarea #9

Genere una grafica de tipo barras con los promedios de los estudiantes y titúlela “Promedio de los estudiantes” en la parte superior de la grafica

Tarea #10

Coloque la grafica al lado derecho de la columna nota en la tabla Inferior.

Tarea #11

Titule la celda que le sigue a la titulada “Examen 3” como “Nota final”

Tarea #12

Copie las notas de la columna “Nota” y pegue estos bajo la columna titulada Nota final

Tarea #13

Sombree en azul la celda titulada Nota final

APPENDIX F3 POWERPOINT

Tarea #1

Abra el archivo llamado
"Estudio_PowerPoint"
localizado en el escritorio (desktop)

Tarea #2

Seleccione el segundo slide
y cambie el diseño a Balance (ver abajo)

Tarea #3

Acceda la ventana de configuración maestra de los slides (slide master) y ponga en **negrillas** (“bold”) el titulo de los slides

Tarea #4

Cambie el color del primer nivel de texto(en slide master) a verde y asígnele la animación
"fly in"

Tarea #5

Cambie el formato de los bullets de todos los niveles (en slide master) a numerados (ver abajo):

Antes

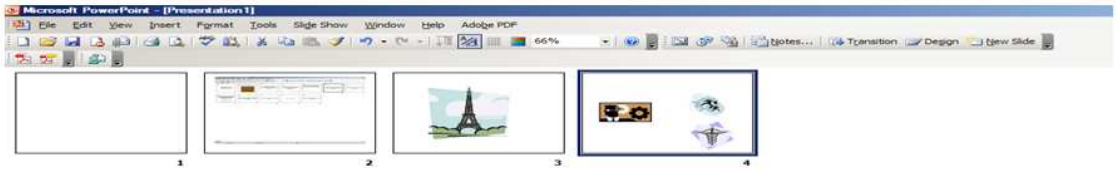
- Click to edit Master text styles
  - Second level
    - Third level
      - Fourth level
        - » Fifth level

Despues

1. Click to edit Master text styles
   1. Second level
      1. Third level
         1. Fourth level
            1. Fifth level

Tarea #6

Cambie a la vista de ordenador de slides (ver ejemplo abajo) y mueva el último slide a la posición 3

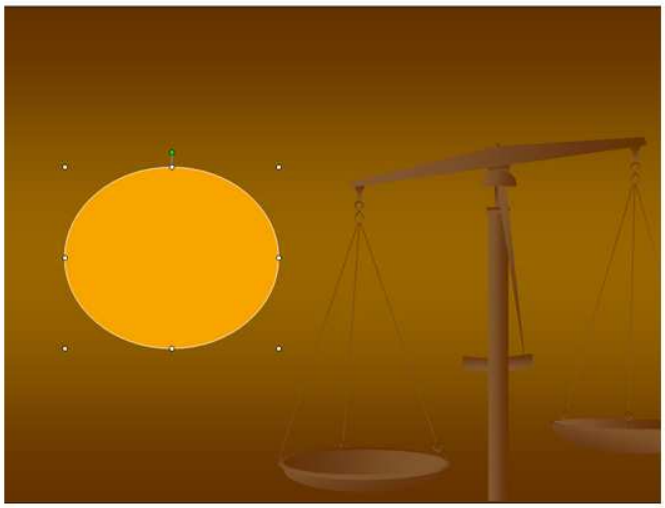


Tarea #7

Añada un slide en blanco al final del documento

Tarea #8

Dibuje un círculo en el slide añadido en la tarea anterior (ver figura de abajo), muévalo a la extrema izquierda superior y cambie el color de este a blanco



Tarea #9

Inserte la imagen “imagen2” localizada en el escritorio (“desktop”) dentro del círculo

Tarea #10

Añada sonido de “aplausos” al último slide

Tarea #11

Corra un slide show

Tarea #12

Imprima los slides (handouts) colocando 6 slides por página