

Interactive Selection

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**an Information & Human Centered Computing Project
for COMP8780
as part of Masters of Computing
(Specialization in Information & Human Centered Computing)
July 2009**

Acknowledgements

For *my parents* whose prayers, love and support made this work possible.

Below is a list of people that I would like to thank:

Prof Tom Gedeon (Project Supervisor) for his guidance, ideas, time and concern.

Dr Uwe Zimmer (Project Coordinator) for his knowledge sharing and guidance every Thursday.

Dr Sumudu Mendis and my group mates (*Nandita, Mathew*) for their ideas and time.

My fellow *Masters students* for sharing their opinions and knowledge.

All the *TSG staff* who helped me indirectly for project development.

All *18 users* who spent their time to participate in the project experiments.

My close friend (*Ria Rahayu*) who always supported me throughout this semester.

Abstract

This research investigates the use of two familiar interfaces for an unfamiliar task. A driving interface and a mouse interface were used for certain tasks in previous work. The results in previous work show the shortcomings of the driving interface developed. We address the task of improving it so that it can be compared fairly to the more standard mouse interface. The task used in current and previous work is a selection of pictures (Mondrians) that a user likes. To modify the previous work, both interfaces in this paper display the same or different number of Mondrians at one time in three different experiments. The results, which show the same rating of speed and intuitiveness for both interfaces, indicate that the driving interface is as fast and intuitive as the mouse interface when the difference in number of Mondrians displayed at one time in both interfaces is low. Furthermore, the results indicate that the mouse interface is a bit more tedious to use than the driving interface, which suggests that such a familiar interface could be used for tasks where normally a mouse interface would be used for selection.

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1. Introduction

A driving metaphor has been used in several projects in order to replace or improve the existing mouse driven interface so that the interaction between user and environment becomes better or more natural. Users feel eager to complete the task until the end, as this driving metaphor is engaging and creates an excitement and convenience.

However, in [1], Oliver shows that the driving metaphor (driving interface) developed is much more tedious and slower when compared to the standard mouse interface in performing the selection task. There are several major differences between both interfaces as well as some flaws particularly in the driving interface, which can disadvantage the usefulness of the driving metaphor. One of the differences is that both interfaces display a different number of pictures (Mondrians) at one time to be selected by a user. The driving interface just displays a single picture at one time while the mouse interface displays multiple pictures (up to 20) concurrently. The main flaw identified in the driving interface is the 45° angle of the turn designed for the corner, which is too sharp and which can limit the user's (virtual) driving speed. A user needs to slow down when reaching the corner to avoid any movement off the road. This effect is a result of the engaging nature of the driving interface and was not originally expected by Oliver.

In this report, we attempt to improve the weaknesses of both interfaces in [1] so that we can examine and evaluate the new outcomes from several experiments with both interfaces rigorously. We have done three experiments, which is one of them displayed the same number of picture(s) concurrently in both interfaces and another two displayed the different number of picture(s) concurrently in both interfaces. The number of the pictures displayed simultaneously either same number or different number is used to measure the speed of user when doing the selection task, and the intuitiveness of both interfaces. Further, the new driving interface is designed to reduce the angle of the turn in order to enhance the flow and speed of driving and hence of picture selection. Some feedback to the user is added in the mouse interface so that the user can keep track of their previous actions.

The selection task used in the current and previous experiments is a selection of pictures (Mondrians) that a user likes. All these pictures are drawn in the style of the artwork of Piet Mondrian (informally these images are called Mondrians). This selection task comes from the work in [2]. The author, Jian Yin Shen created a program to generate fine Mondrian-like images by a process controlled by an Interactive Bacterial Evolution Algorithm.

The rest of the report is structured as follows: Section 2 contains a discussion of the related work. In Section 3, there is a detailed description of the modifications to both interfaces, and Section 4 describes the experiments of this work. Section 5 evaluates and compares the results of current and previous experiments, while in Section 6 we discuss the outcomes of the experiments and give some suggestions for future development of this work.

2. Related Work

Driving Interface. In [3,8], the authors provide a driving metaphor for users to traverse a road, which corresponds to the tempo and loudness of music. The road can influence the performance of a piece of music that allows the user to interact with the road designed to create a pleasing performance. Statistics show that the road has the effect of constraining the performance to a particular style with specific gestures, which results in expressively pleasing performance. The work in [4] also uses the familiar driving method to allow comfortable access to a possibly less familiar world of interactive text. The drive-through book developed successfully causes people to consider the origin of the texts they read every day and to ask themselves how it might be read differently. In addition, the authors in [12] show that with the aid of a haptic steering wheel, users need less visual information, which shows the driving interface is a feasible method of transferring bi-directional information. Some researchers argue that driving simulators can lead to a more thorough understanding of human perception and control of self-motion as well as a viable option for secondary tasks [13,14].

Mondrian. In [5], the author analyzes and describes composition and structure of Mondrian artwork via a Mathematical approach. He concludes that it is difficult for a “conventional” view of Mathematics to look into Mondrian’s compositions. However, the study of aesthetics of Mondrian compositions in [6] show that the art of Mondrian produces an optimal aesthetic configuration of lines. Moreover, the art of Mondrian, which is aesthetically more appealing, can lead to greater image exploration [7,9,10,11]. Thus, humans tend to be more engaged with the Mondrians displayed, which can increase the interaction with and excitement of the task that employs the Mondrians as supporting element.

3. Interface Design

3.1. Mouse Interface

Several improvements based on the previous work [1] have been implemented in this design of mouse interface. One of them is to display the same number of Mondrians at one time for both mouse and driving interface.

In the previous design of the mouse interface, it displayed 20 Mondrians originally and each new set showed one less Mondrian until 210 Mondrians are displayed. The new mouse interface in general displays the same number of Mondrians for each set. There are two kinds of design to display the Mondrians for the mouse interface. Firstly, displaying 3 Mondrians at one time for each set until all 210 Mondrians are displayed. This can be seen in Figure 1 below. The second design displays 20 Mondrians simultaneously for the first 10 sets and 10 Mondrians in the final set so 210 Mondrians overall are displayed. Figures 2 and 3 below illustrate this second design clearly.

This new design of mouse interface also provides feedback to the user by displaying some Mondrians, which have been displayed in the previous sets.

The method of Mondrian selection in the mouse interface is simple. When a user clicks a little Mondrian (thumbnail) on the left hand side, then it displays that particular Mondrian in a larger size on the right area. If the user likes it, the user just clicks the *like* button at the bottom area of the interface. After looking at all Mondrians in that set, the user just clicks the "See next generation" button to see a new set of Mondrians.

Below is a picture of the modified version of Jian [2] and Oliver's [1] interface that is used as the mouse interface in this work.

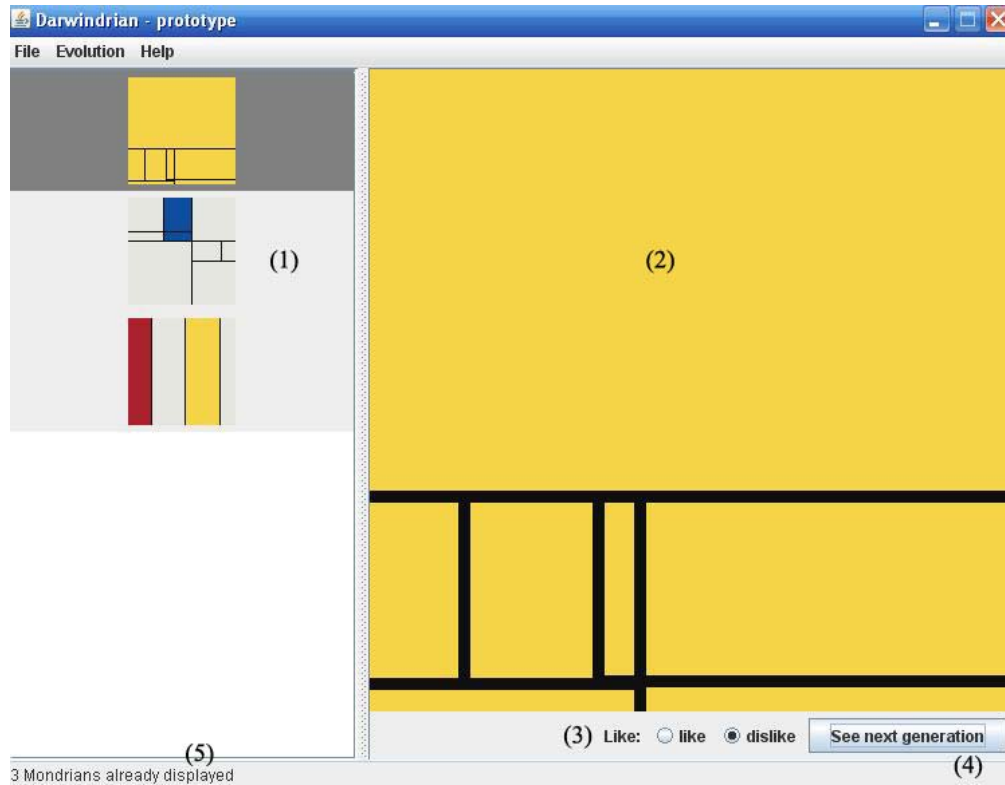


Figure 1. First design of mouse interface

The little Mondrians (1) are displayed on the left hand side so that user can click on them one by one to view the corresponding large Mondrian. The right area (2) of screen is used to display a large Mondrian. The like button (3) is provided to allow user to select or deselect the Mondrians they like or dislike. The “See next generation” button (4) is clicked to show a new set of little Mondrians on the left hand side. The message “ x Mondrians already displayed” (5) at the bottom left of the interface is updated each time user clicks the “See next generation” button in order to inform the user the total number of Mondrians that have been displayed.

The mouse interface was altered by using the Jython language [15].

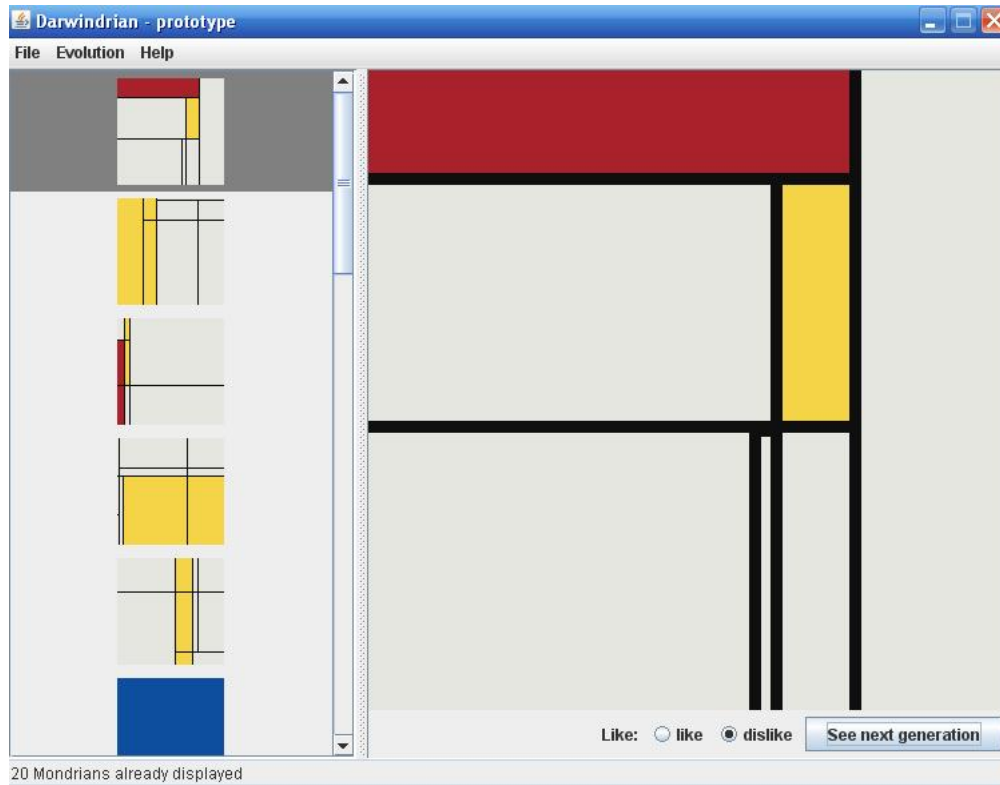


Figure 2. Second design of mouse interface (the first 10 sets)

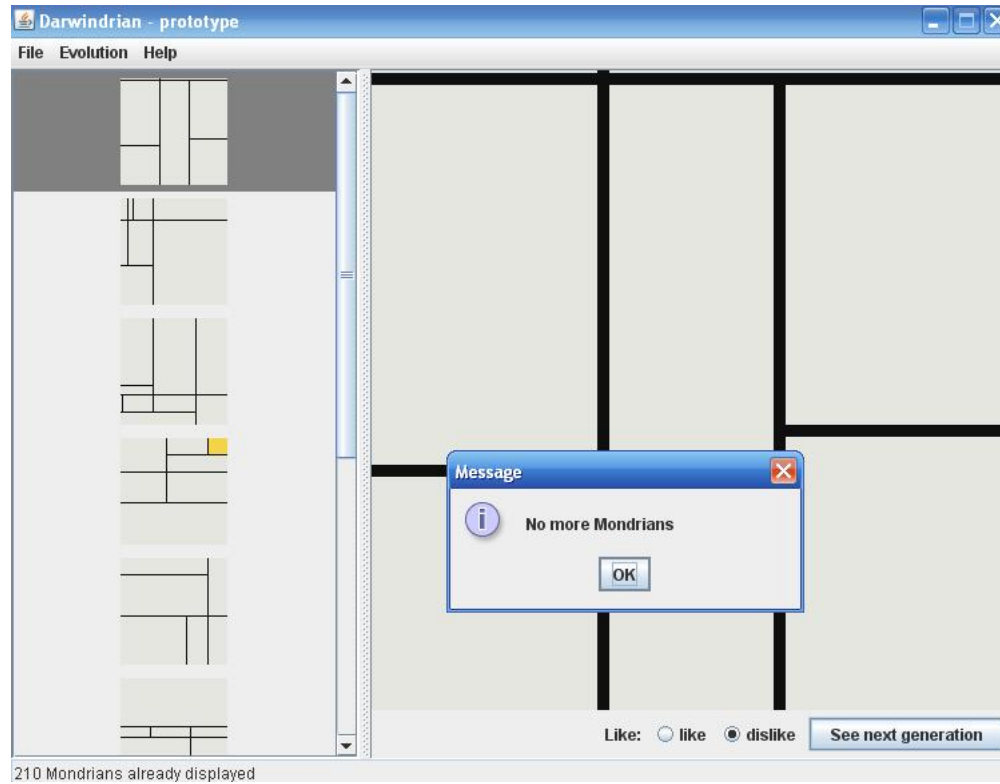


Figure 3. Second design of mouse interface (the final set)

3.2. Driving Interface

There are also some modifications employed in the driving interface so that the new design of mouse interface can be evaluated and compared fairly. Thus, this new design of driving interface also displays 3 Mondrians concurrently. Every Mondrian represents an option on the road. The left and right Mondrians correspond to respectively left and right exits. In addition, the middle Mondrian represents the option if the user wants to go straight ahead.

Other than that, this design of driving interface provides a less sharp angle of turns. As the previous design showed that the 45° turn is too sharp and subsequently restricts the users driving speed, thus this design reduces the angle of the turn to 15°. By reducing the angle, the driving interface may enhance the flow and speed of Mondrian selection, as users do not need to decelerate for the corner (or hit the fence on the far side).

The method of Mondrian selection for this new design of driving interface is similar to the previous work. It still uses the metaphor of driving along a highway, which provides exits (and straight ahead) labeled with Mondrian exit signs. Users drive down a road until reaching the Mondrian exit signs that correspond to those respective exits. Users select the Mondrian they like by driving following that sign, by analogy driving toward a destination they like.

The physics behind the car movement in the driving interface is simple and similar to real driving. The user is able to drive along the road by increasing the speed via the accelerator as well as steer the wheel to change the direction of movement. Any movement off the road results in a push back on the accelerator a bit and the velocity decreases. Users can use the brake to reduce the speed of the car and shift the gear stick for driving or reversing purposes.

Below is a picture of the modified version of Oliver's [1] interface that is used as the driving interface in this work.

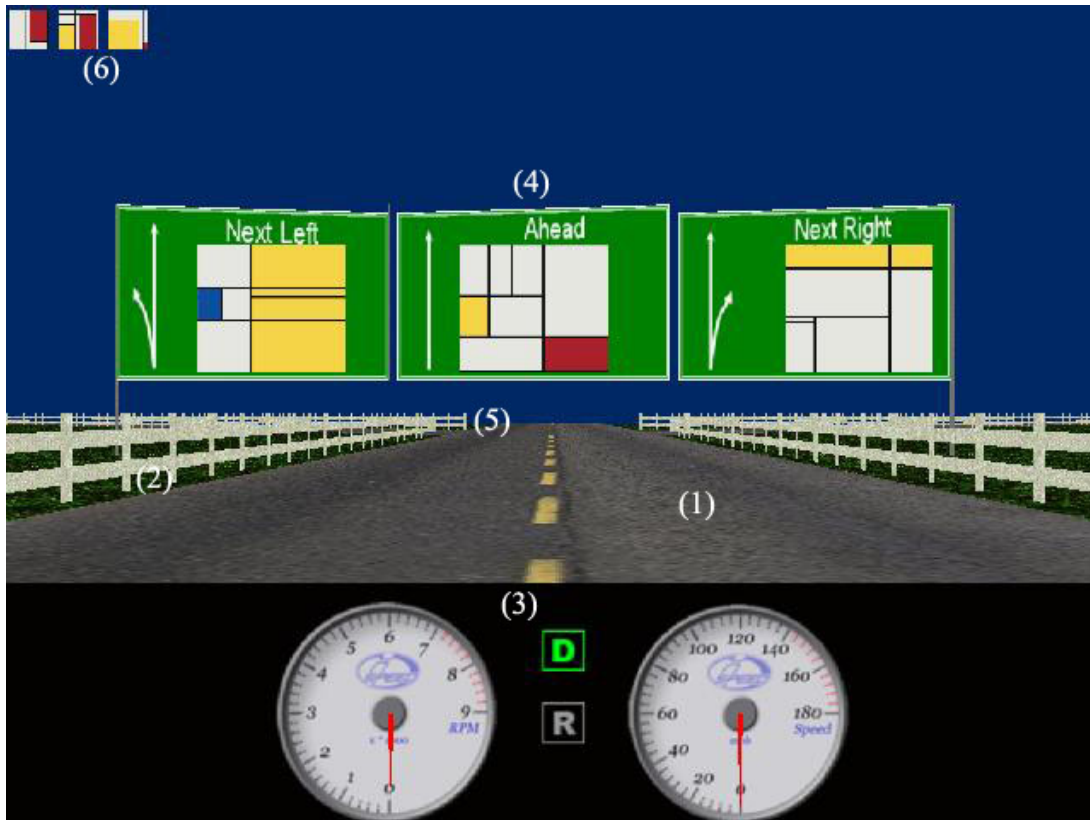


Figure 4. New design of driving interface

The road (1) is placed to guide users to drive on the road. In this driving interface, the user simply can drive on any side of the road as no restriction it is made, as in dual carriageway driving. The fence (2) is added on both sides of the road so that users stay on the road and block the user if they try to venture off the road. The dashboard (3) is included to support the driving metaphor. The left dial is connected to the current acceleration and the right dial is linked to the virtual speed of the car. The D indicates the forward direction of car and R serves the reverse movement. The direction signs (4) display the current Mondrians, which represent the next directions the user can choose from. The branches (5) on the road are driven down to select the Mondrian the user likes. The little Mondrians (6) displayed on the top area of the interface are the Mondrians the user has selected previously. This provides feedback so that the user can keep track of Mondrians chosen before.

The driving interface was modified by using C++ and the DirectX 9.0c library in the Visual Studio .NET 2003 platform.

4. Experiments

This paper describes the three experiments done and compares the result of each experiment with the results of previous work [1]. Table 1 shows the design of these three experiments.

Experiment No. (Description)	Mondrian(s) Displayed At One Time		Users
	Mouse Interface	Driving Interface	
1 (3:3)	3 (70 sets x 3 Mondrians)	3 (70 sets x 3 Mondrians)	6
2 (3:1)	3 (70 sets x 3 Mondrians)	1 (210 sets x 1 Mondrian)	6
3 (20:3)	20 (10 sets x 20 Mondrians) + (1 set x 10 Mondrians)	3 (70 sets x 3 Mondrians)	6

Table 1. Experiment designs (current work)

Both interfaces display 210 Mondrians for each experiment. The driving interface which displays 3 Mondrians at one time is the new design of driving interface. The driving interface which displays 1 Mondrian at one time is the design of driving interface of previous work. Both mouse interfaces, which display 3 Mondrian and 20 Mondrians at one time are the new interface designs proposed here. In order to gain reasonably reliable results, this design suggests 6 users for each experiment. In total, there are 18 users needed for these three experiments.

As this analysis aims to compare to the results of previous work, so this report presents the experiment design of the previous work in Table 2, and styled it as the 4th experiment.

Experiment No. (Description)	Mondrian(s) Displayed At One Time		Users
	Mouse Interface	Driving Interface	
4 (20:1)	20 (20 Mondrians originally and less one for each new set)	1 (210 sets x 1 Mondrian)	14

Table 2. Experiment design (previous work)

The qualitative data is collected through a pair of questionnaires. The first questionnaire is used to discover the user's prior exposure to each style of interface by asking the user about their experience with computer usage and driving. Users are asked about the frequency of usage, duration of usage and level of skill for both computer and driving. The second questionnaire is used to provide feedback on both interfaces. The first two questions are short answer questions, which ask about the methods of selection the user used in the experiment, the time it took the user to work out that method, and the tediousness of the task for both interfaces. The last question asks users to rate the speed, tediousness, ease of selection and ease of learning for both interfaces. The full copy of each questionnaire is provided in Appendix 1.

For quantitative information, each interface records the time taken to select the Mondrians. The mouse interface records the start and end time for each set created. It also records the number of Mondrians a user liked in each set. In the driving interface, it records the time when the user passes the Mondrian exit signs as well as records which Mondrians the user selects.

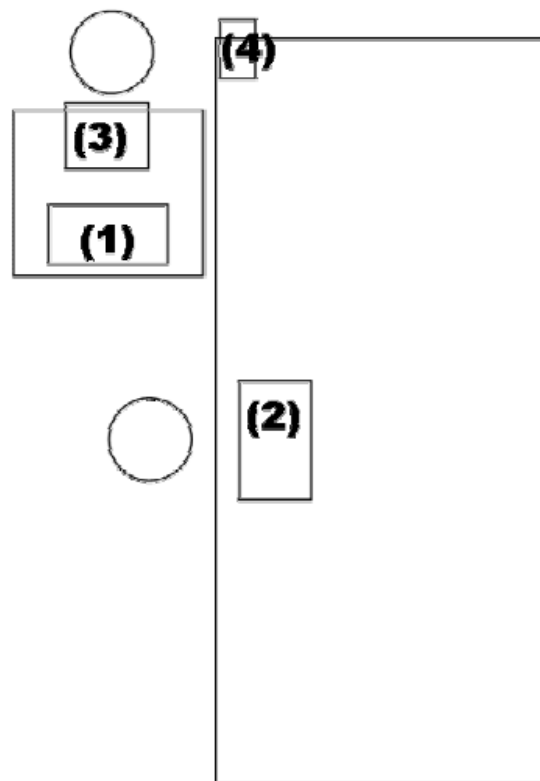


Figure 5. Layout of the setup of the experiment

In order to ensure a similar environment to the experiment of previous work, the same position of hardware is set up. The racing wheel that is equipped with gear stick, accelerator, brake and clutch is connected to the computer in order to present a correct feel to the driving interface. Figure 5 [1] above shows the position of the laptop for mouse and driving interfaces, as well as the position of the steering wheel and gear stick for the driving interface experiment. The laptop is placed at (1) for the driving interface experiment and is moved to (2) for the mouse interface experiment while the user sits in front of the laptop. The wheel is attached to the table at (3) and the gear stick is placed at (4).

As this experiment involves human participation, thus it requires ethics approval, which was received. Each user is required to read an information sheet and sign a consent form. Users are advised that they can leave the experiment at any time. A copy of the information sheet and consent form can be found in Appendix 2.

Each experiment follows this procedure:-

1. User reads the information sheet and consent form.
2. User is semi-randomly assigned a group: either group "Driving then Mouse" or group "Mouse then Driving", ensuring equal numbers in each group. This data is recorded.
3. User is given the first questionnaire to fill in.
4. User starts on the first interface. If the user is in group "Driving then Mouse", this will be the driving interface first and if user is in group "Mouse then Driving", it will be the mouse interface first. User is told that the goal is to select the Mondrian(s) they like most by using the interface. User continues the task until 210 Mondrians are displayed.
5. User is invited to have a break while the laptop is moved to the other position.
6. Then, user starts on the interface they have not yet used. Again, the user is informed that the goal is to select the Mondrian(s) they like most. User continues the task until 210 Mondrians are displayed.
7. User is then given the second questionnaire to fill in.

5. Results

Each user is ranked as Good, Average or Bad for computer and driving skill based on the combination of their frequency of usage and their self-rating of each skill. Table 3 shows the rankings of users in each experiment.

Experiment No. (Description)	Rank of User						Users
	Computer Skill			Driving Skill			
	Good	Average	Bad	Good	Average	Bad	
1 (3:3)	6	-	-	2	2	2	6
2 (3:1)	6	-	-	3	-	3	6
3 (20:3)	6	-	-	1	1	4	6

Table 3. Rank of user (current work)

As this analysis intends to compare with the result of previous work [1], thus this report presents the rankings of users in the previous work in Table 4.

Experiment No. (Description)	Rank of User						Users
	Computer Skill			Driving Skill			
	Good	Average	Bad	Good	Average	Bad	
4 (20:1)	12	2	-	5	5	4	14

Table 4. Rank of user (previous work)

The qualitative and quantitative data are analyzed using T-test under four factors, which are the interface the user rates, the group the user is in, as well as the user's computer skill and driving skill. In each case, the null hypothesis is that there is no difference.

5.1. Qualitative Analysis

The qualitative analysis involves four questions in the second questionnaire, which are rated by users after testing both interfaces.

The following graphs just show the results of Experiment 1 (3:3), but the explanation provided describes or compares the results for four experiments includes Experiment 4 (20:1). All graphs for Experiment 2 (3:1) and Experiment 3 (20:3) can be seen in Appendix 3. Graphs for Experiment 4 (20:1) can be seen in [1].

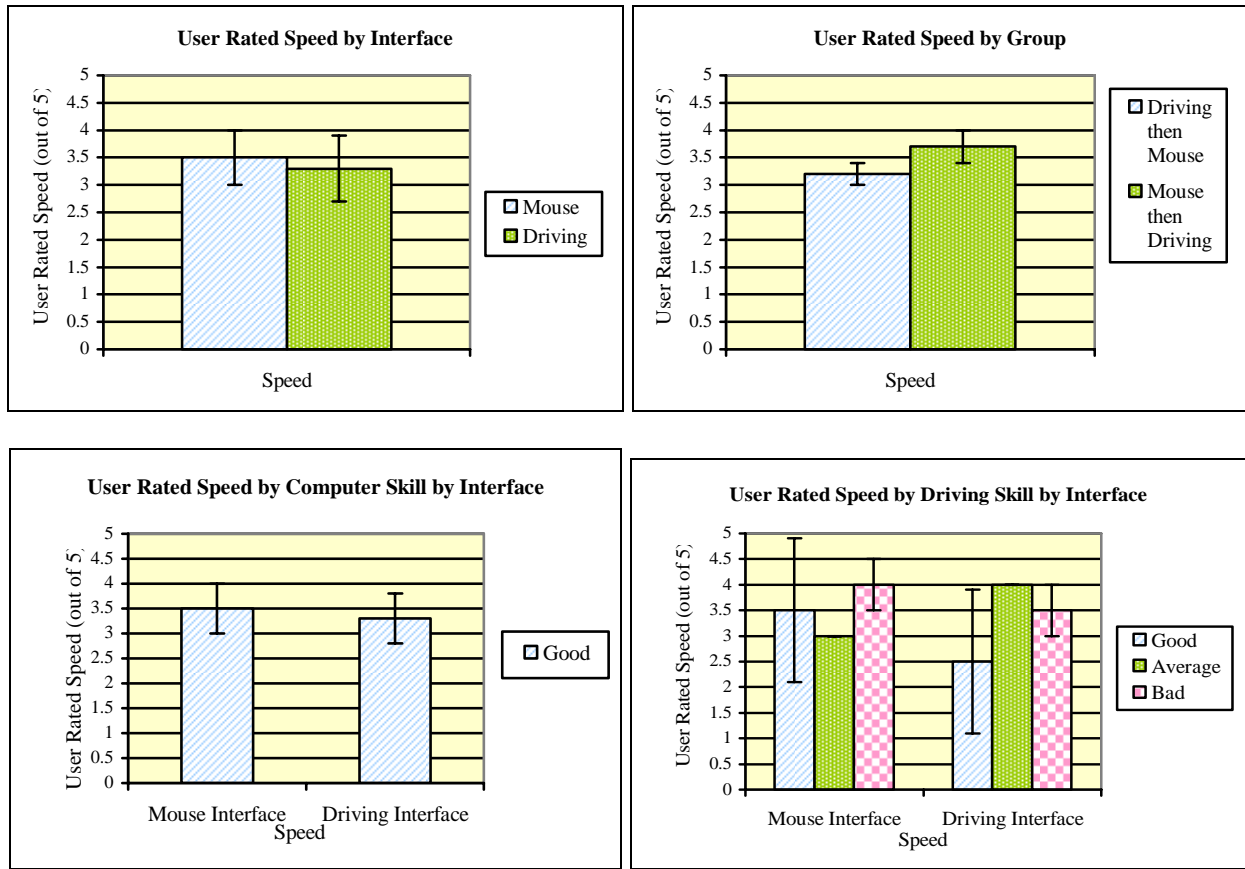


Figure 6. Graphs of data user's rating of speed by different factors - Experiment 1 (3:3)

The analysis of variables for Experiment 1 (3:3), Experiment 2 (3:1) and Experiment 3 (20:3) does not detect any statistically significant effect between the speed and all four factors. Clearly, these results show users rate both interfaces approximately the same in speed. However, in Experiment 4 (20:1) the mouse interface is significantly higher in speed than the driving interface. This indicates that the driving interface is as fast as the mouse interface when the difference in number of Mondrians displayed at one time in both interfaces is zero or less than 20 to 1.

To show the nature of analysis, we show the mean and p-value for "User Rated by Group" (top left diagram) in the Figure 6. These values are usually not shown unless they are statistically significant. The analysis of variables between speed and group gives the p-value of 0.2739 with the group "Driving then Mouse" has a mean of 3.2 while group "Mouse then Driving" has a mean of 3.7.

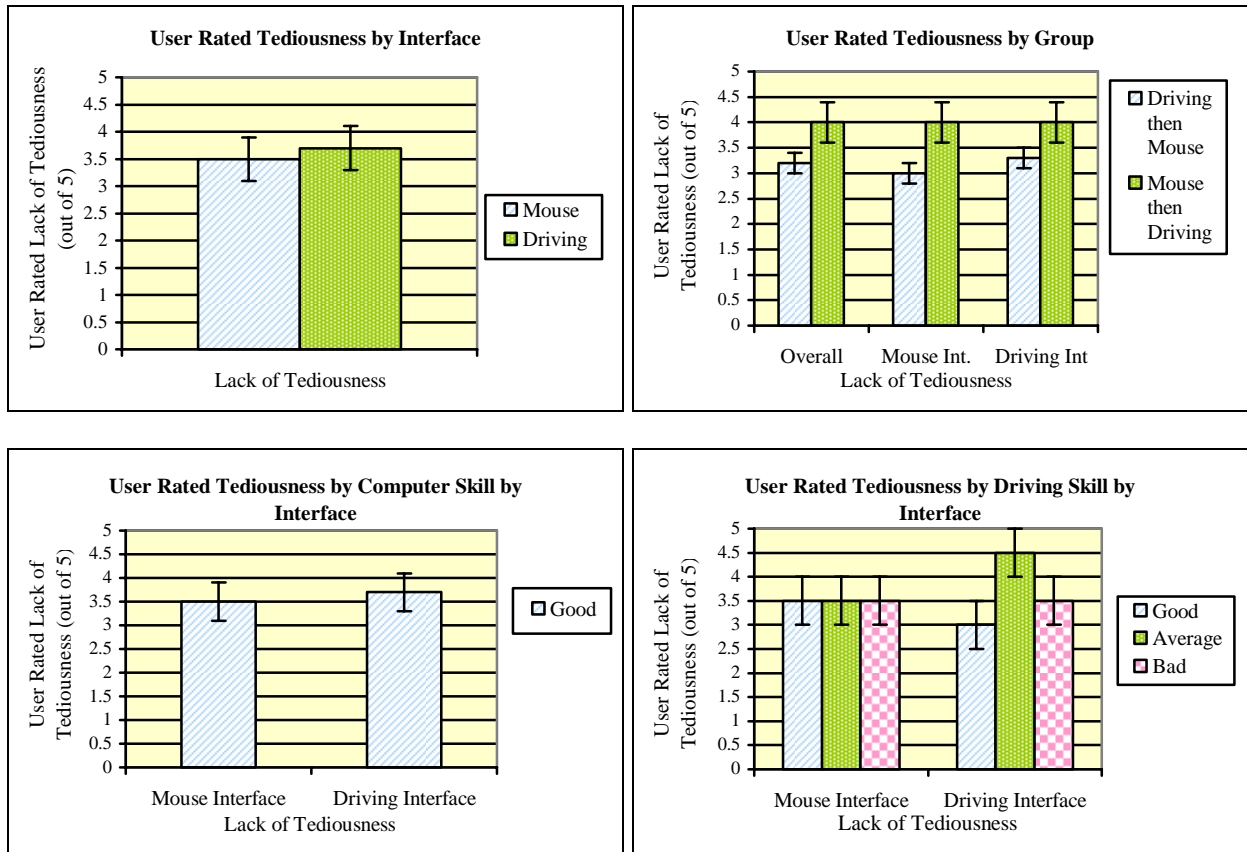


Figure 7. Graphs of data users' rating of tediousness by different factors - Experiment 1 (3:3)

The analysis of users' rating of the tediousness for Experiment 1 (3:3), Experiment 2 (3:1) and Experiment 3 (20:3) does not produce any effect among the four factors. However, the analysis of variables between tediousness and group in Experiment 1 (3:3) nearly rejects the null hypothesis with its p-value, 0.08244. This shows that users in Group "Mouse then Driving" find that both interfaces are not tedious by rating them with four. Experiment 4 (20:1) shows that average computer users find that the driving interface is significantly more tedious than the mouse interface. This difference suggests that displaying 3 Mondrians in both interfaces at one time is enough to eliminate the effect of tediousness found in the Experiment 4 (20:1).

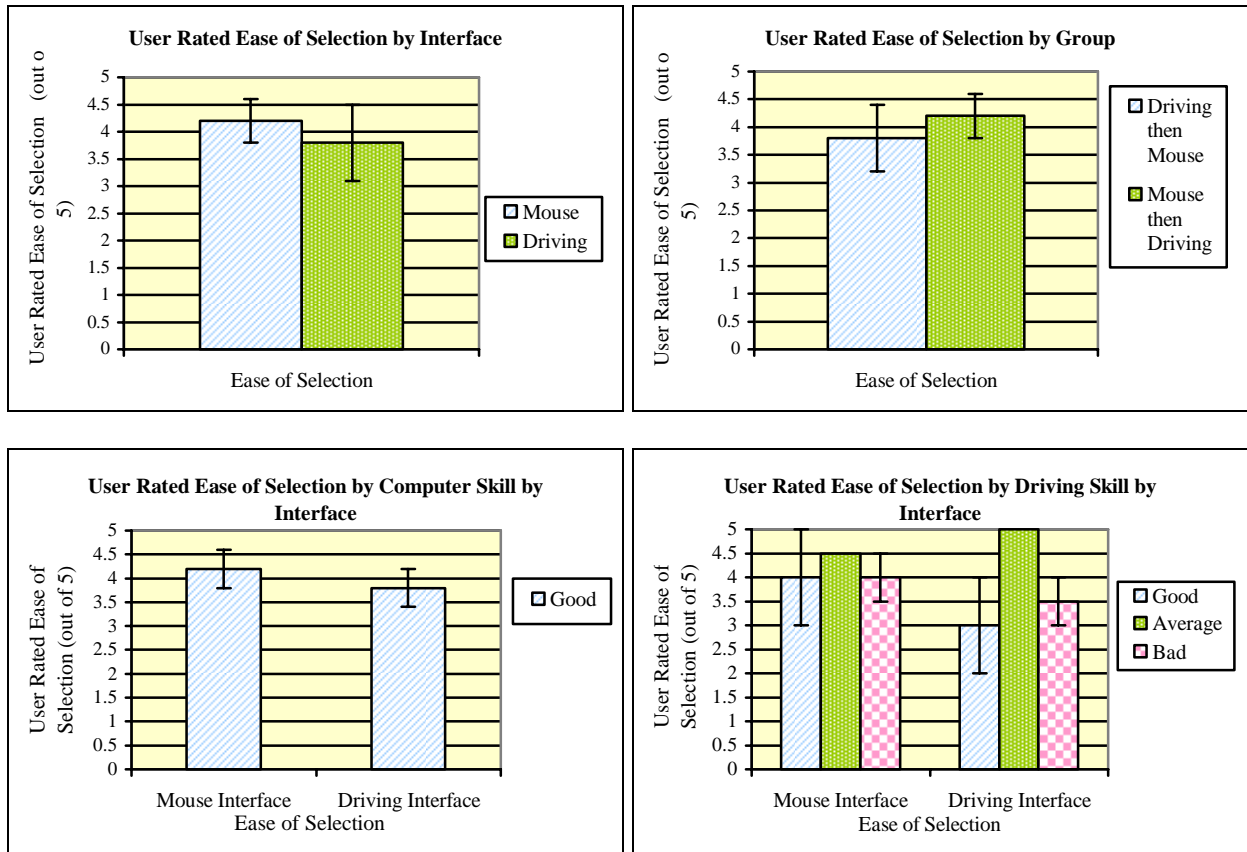


Figure 8. Graphs of data users' rating of ease of selection by different factors - Experiment 1 (3:3)

The analysis of variables for Experiment 1 (3:3), Experiment 2 (3:1) and Experiment 3 (20:3) does not detect any significant effect between the ease of selection and all four factors. These results show that the users do not believe that there is a large difference in the ease of selection for both interfaces. Again, Experiment 4 (20:1) demonstrates the mouse interface is significantly higher in ease of selection than driving interface. This is probably due to the ability to select much larger number of Mondrians by using the mouse interface compared to the driving interface in Experiment 4 (20:1).

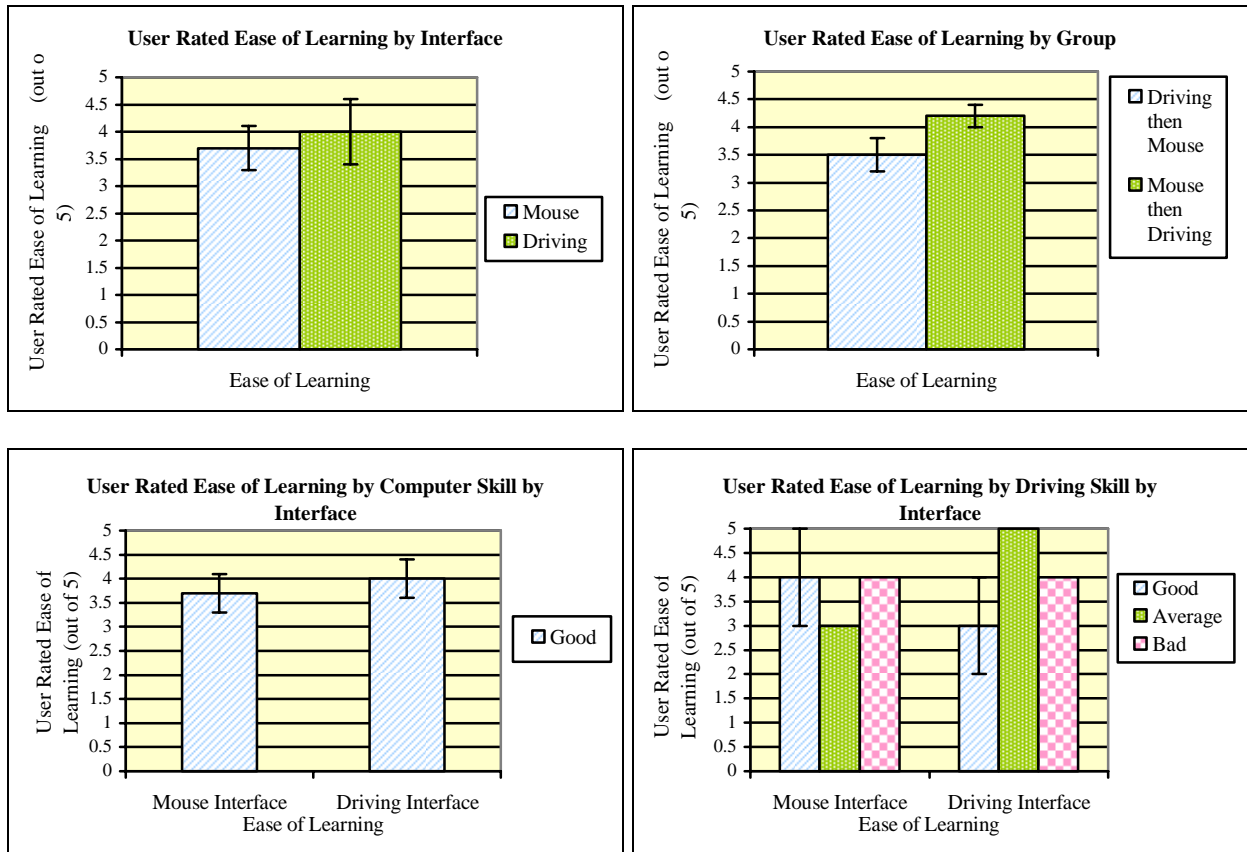


Figure 9. Graphs of data users' rating of ease of learning by different factors - Experiment 1 (3:3)

The analysis of users' rating of the ease of learning for Experiment 1 (3:3), Experiment 2 (3:1) and Experiment 3 (20:3) does not produce any effect among the four factors. Noticeably, users rate both interfaces approximately the same in ease of learning. Experiment 4 (20:1) has the same results for users' rating of ease of learning. The analysis does not detect any effect between the ease of learning and all four factors.

5.2. Quantitative Analysis

The analysis of quantitative data is divided into three parts. The first part illustrates the number of Mondrians selected by each user on each interface. Next, it shows a learning speed of users for both interfaces. The learning speed is calculated by dividing the average time taken per Mondrian for the first Mondrian(s) displayed by the average time taken per Mondrian for the remaining Mondrians displayed. Finally, it demonstrates the average speed of users on each interface. Both learning and average speed are used to compare how intuitive users first find the interface because the more intuitive it is, the faster they will be initially.

The following graphs just show the results of Experiment 1 (3:3), but the explanation provided describes or compares the results for four experiments includes Experiment 4 (20:1). All graphs for Experiment 2 (3:1) and Experiment 3 (20:3) can be seen in Appendix 4. Graphs for Experiment 4 (20:1) can be seen in [1].

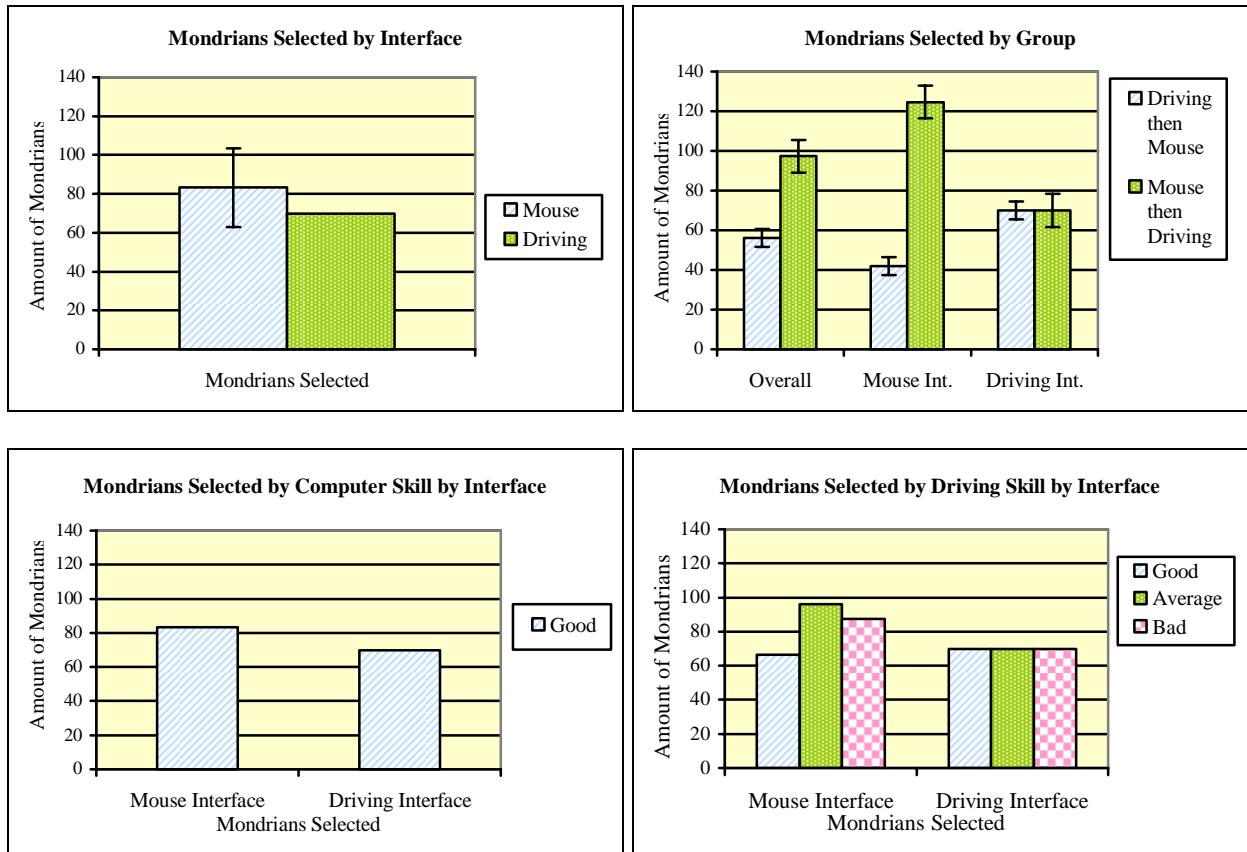


Figure 10. Graphs of data amount of Mondrians selected by users by different factors - Experiment 1 (3:3)

The analysis of variables of the number of Mondrians selected for Experiment 1 (3:3) produces a significant effect between the number of Mondrians selected and group with a p-value of 0.02074. Group "Mouse then Driving" selects significantly more Mondrians than Group "Driving then Mouse" especially using the mouse interface, selecting 124 Mondrians compared to Group "Driving then Mouse" selecting 42 Mondrians. This is probably caused by users in Group "Mouse then Driving" thinking they can select as much as Mondrians they like in the mouse interface without considering the time taken, while users in Group "Driving then Mouse" think they do not need to select more Mondrians in the mouse interface so long as they finish the selection task soon. However, the analysis of variables of the number of Mondrians selected in Experiment 2 (3:1) and Experiment 3 (20:3) does not detect a significant effect among any four factors. Experiment 4 (20:1) illustrates that good drivers select significantly less Mondrians on the driving interface and more Mondrians on the mouse interface. This is probably due to the driving interface in the Experiment 4 (20:1) displaying a single Mondrian only at one time in which leads good drivers to drive faster going straight by selecting less Mondrians (taking few exits).

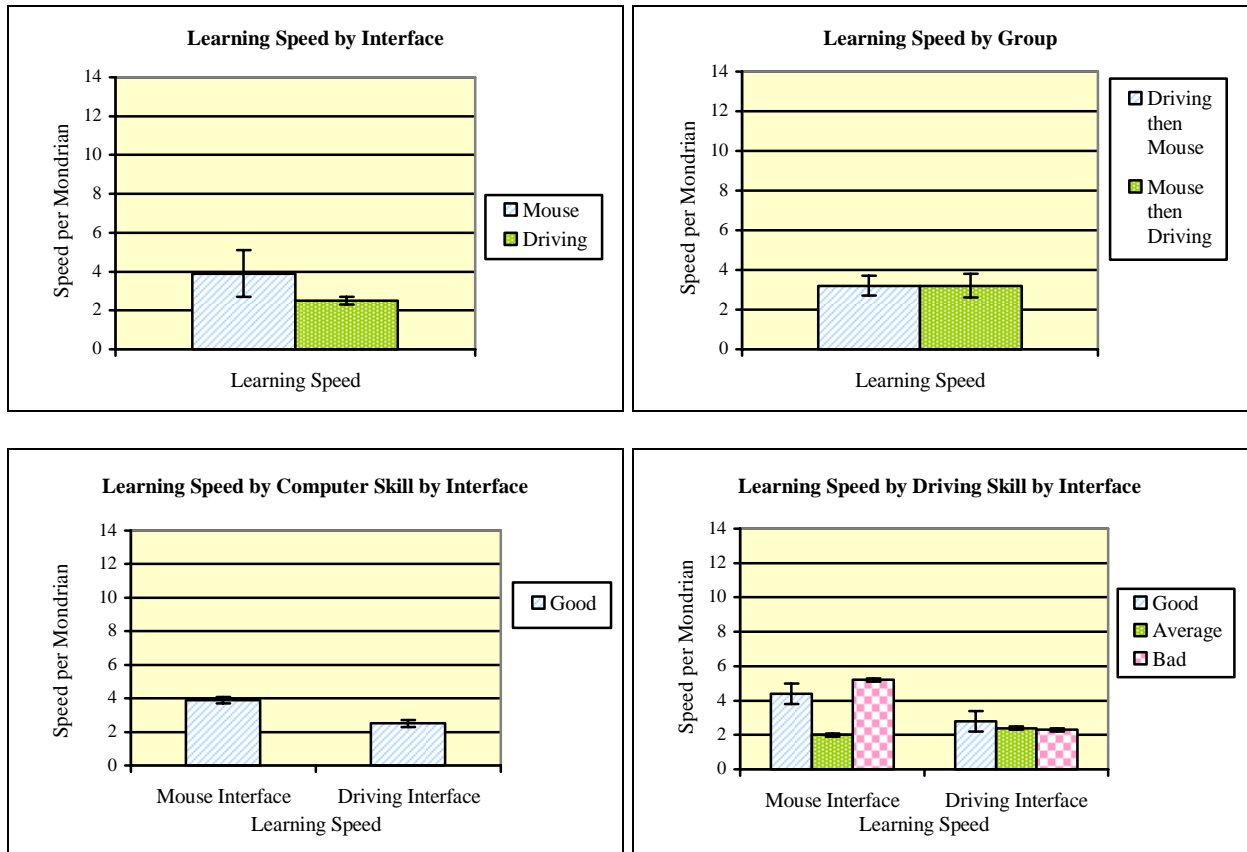


Figure 11. Graphs of data learning speed of users by different factors - Experiment 1 (3:3)

The analysis of variables of learning speed for Experiment 1 (3:3), Experiment 2 (3:1) and Experiment 3 (20:3) does not produce any effect among the four factors. However, the driving interface appears to be better in learning speed than the mouse interface. Experiment 4 (20:1) has the same results for learning speed of users. The analysis does not detect any effect between the leaning speed and all four factors.

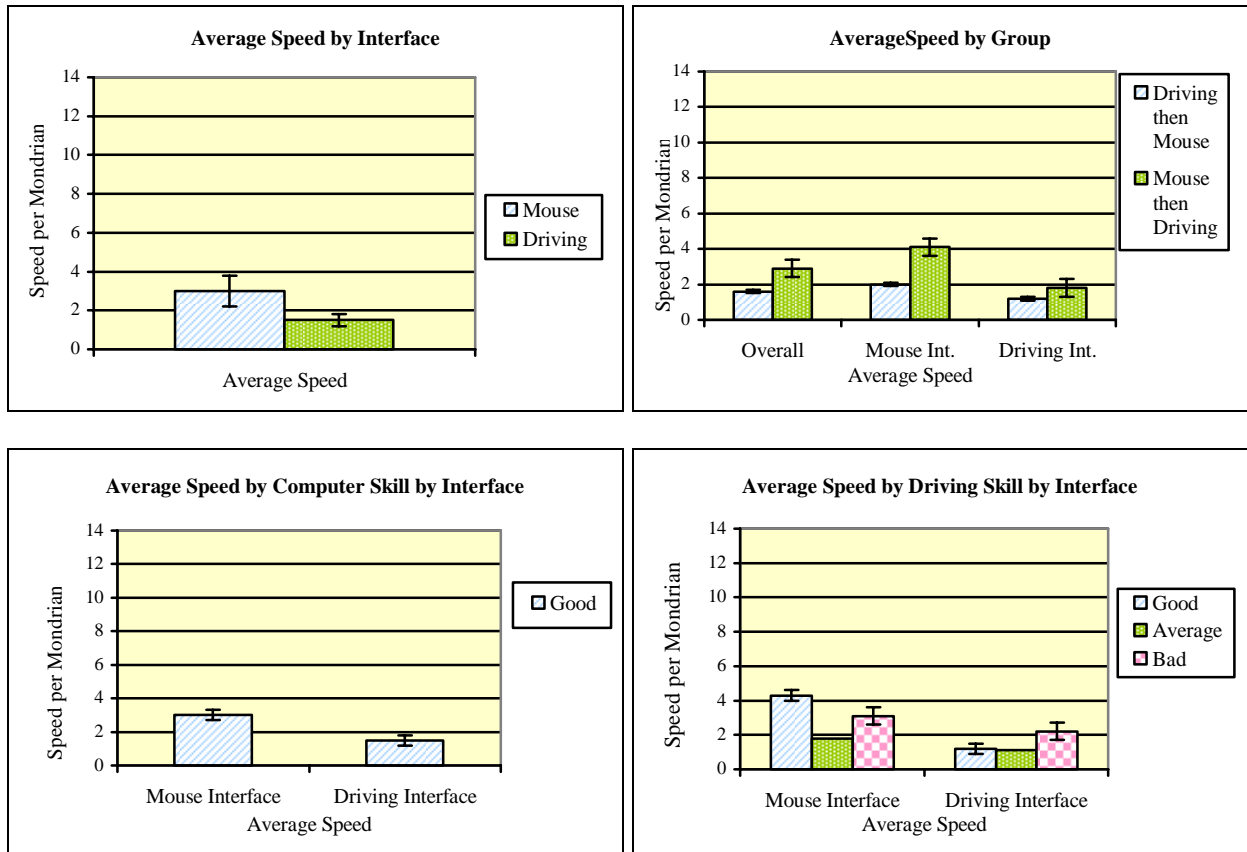


Figure 12. Graphs of data average speed of users by different factors - Experiment 1 (3:3)

The analysis of variables of average speed for Experiment 1 (3:3) and Experiment 3 (20:3) does not produce any effect among the four factors. However, the analysis of variables of average speed for Experiment 2 (3:1) produces a significant effect between the average speed and group with a p-value of 0.01319. Group “Driving then Mouse” proves to be significantly faster particularly on the driving interface with a mean of 1.6 compared to Group “Mouse then Driving” with a mean of 2.9. Experiment 4 (20:1) also shows that Group “Driving then Mouse” is significantly faster than Group “Mouse then Driving”. This suggests that the driving interface provides an interactive environment encouraging users to select the Mondrians they like quickly and enjoyably when doing the selection task and it results in users continuing to be quick in the mouse interface subsequently.

6. Discussion and Conclusion

The same rating of speed for both mouse and driving interface for Experiment 1 (3:3), Experiment 2 (3:1) and Experiment 3 (20:3) implies that the driving interface is as fast as the mouse interface when the difference in number of Mondrians displayed at one time in both interfaces is zero or less than 20 to 1 (like in Experiment 4). Furthermore, the quantitative analysis of average speed in Experiment 2 (3:1) and Experiment 3 (20:3) shows that the driving interface is significantly faster.

These three experiments also show that the driving interface is easy to use and learn when doing the selection task, which is similar to the mouse interface. There is no significant result of tediousness between mouse and driving interface, though Experiment 1 (3:3) has a nearly significant result that the mouse interface is a bit more tedious to use than the driving interface. However, a further experiment needs to be done to verify this.

In addition, the results from these three experiments clearly contradict to the results in [1] when some modifications have been done to both interfaces especially the driving interface. In [1], it was shown that the driving interface developed is much more tedious and slower when compared to the standard mouse interface in performing the selection task. However, it has been proved differently based on these three experiments.

Although this report successfully shows that the driving interface is as good as the mouse interface in terms of speed and intuitiveness when the difference in number of Mondrians displayed at one time in both interfaces is zero or relatively few, some work remains to be done to improve and validate the previous and current results.

Firstly, a more comprehensive test can be done to investigate the effect of the driving interface on the mouse interface and vice versa. More participants can be sought to see if the current design of mouse and driving interface are markedly more effective for users, both in speed and in intuitiveness. A test, which gives user a long break between interfaces could be implemented to see if the effect disappears by giving them time to calm down after “driving”.

Besides, the layout of the mouse interface can be redesigned to improve its clarity and speed such as the function of the “See next generation” button, the purpose of little Mondrians on the left hand side as well as the purpose of the right area on the interface.

Finally, the quality of the driving interface can be improved by providing the appropriate engine sounds in which would enhance the verisimilitude of the driving interface as well as increase the engagement between the user and the environment. It would also be possible to test the interface in a fully immersive environment such as the ANU Wedge [16] and see if this enhances the intuitiveness of use or changes users’ opinion of tedium.

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Appendix 1

QUESTIONNAIRE – BEFOREHAND Interactive Selection

Frequency of usage (*Instruction: Please tick in the box provided*)

Question \ Frequency	Many hours each day	An average of an hour each day	Once or twice a week	Fortnightly	Less
How often do you use a computer?					
How often do you drive a car?					

Duration of usage

1. How long have you been using a computer?
2. How long have you been driving?

Level of skill (*Instruction: Please tick in the box provided*)

Question \ Level	Very Poor	Poor	Average	Good	Very Good
How good a computer user are you?					
How good a driver are you?					

QUESTIONNAIRE – AFTERWARDS
Interactive Selection

Selection method and duration

1. Describe how you selected the Mondrians you liked in the first interface. How long did it take you to work this method out?

2. Describe how you selected the Mondrians you liked in the second interface. How long did it take you to work this method out?

Tediousness of task

1. Could you have continued picking Mondrians in the first interface? If so for how much longer before you became bored?

2. Could you have continued picking Mondrians in the second interface? If so for how much longer before you became bored?

Intuitiveness & Speed

Rate each of these properties from 1 to 5, where 5 is a very good.

Question\Interface	First Interface	Second Interface
Speed of selection		
Tediousness of selecting		
Ease of selection		
Ease of learning how to select		

Appendix 2

INFORMATION SHEET Interactive Selection

This project is studying interface design and is comparing the effectiveness of two different designs to see if the methods used to create the interfaces are effective.

Purpose of Research

Interface design is an important part of computing. In particular, it is meant to create a design that allows the user intuitively to interact with the interface to do the particular task. The purpose of this project is to investigate different approaches to interface design.

The interfaces have been designed to select pictures that you prefer. These pictures resemble those drawn by Piet Mondrian (colloquially called Mondrians). This experiment particularly is designed to test a pair of interfaces that allow the user to perform this task.

What does the research involve?

The experiment is designed to test a pair of interfaces for the selection of Mondrians. It will require you to answer a few questions beforehand about your previous experience on each interface.

The experiment then requires you to use each of the interfaces to select some number of Mondrians you like. The selection process will vary in time depending on the speed of your choices, but should not take more than half an hour. Upon the conclusion of the experiment, you will be asked to evaluate some parts of each interface. Your choice, number and timing of each choice of pictures will be recorded by the program in order to evaluate the interfaces.

If you wish to stop the experiment then you can do so at anytime. If you decide to withdraw from the experiment all information obtained from you will be discarded. Information obtained from the experiment will be used in a report and presentation for the ANU Information & Human Centered Computing project course COMP8780.

Are there any risks if I participate?

There are no known risks to participating in this experiment, and it involves minimal physical and mental exertion. Below you will find contact details in which you can contact if you have any questions or concerns.

Contact Names and Details

If you have any questions about the experiment, please feel free to contact:-

Nor Nazrina Mohamad Nazry, Computer Science student at ANU
Email: u4480137@anu.edu.au

Tom Gedeon, Computer Science academician at ANU (supervisor)
Email: tom@cs.anu.edu.au

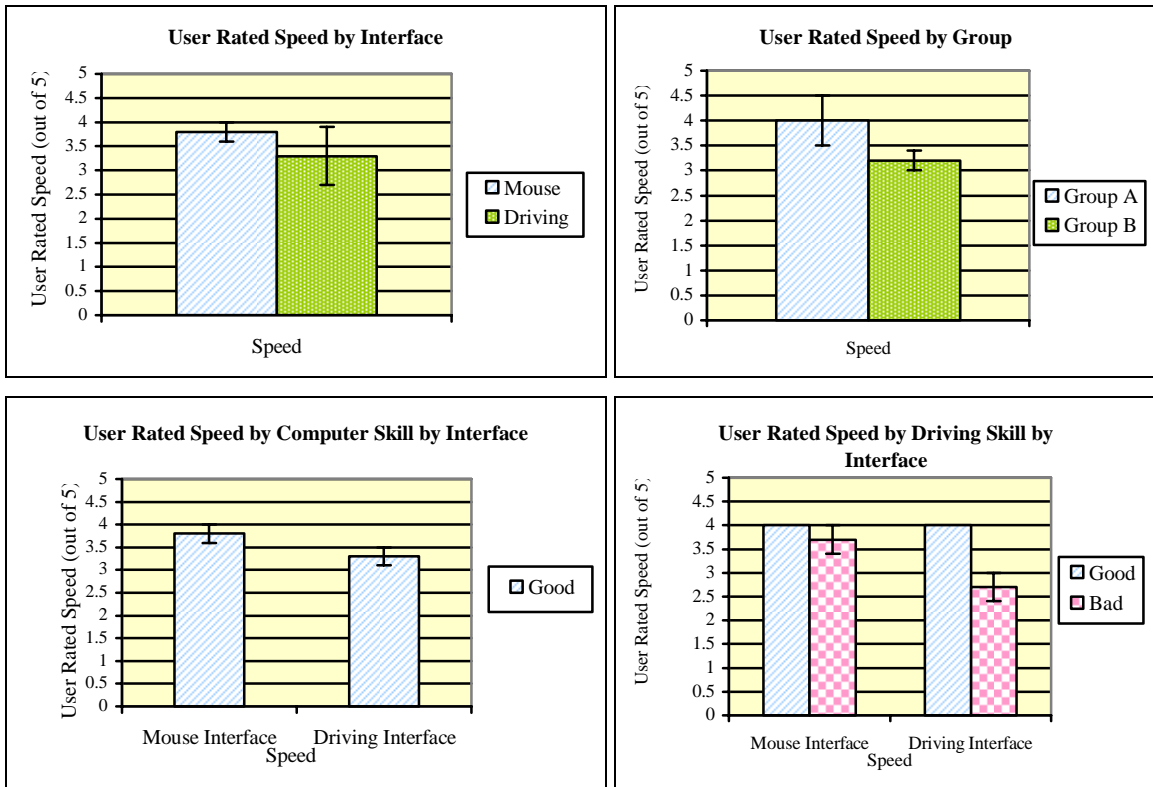
CONSENT FORM
Interactive Selection

Researcher: Nor Nazrina Mohamad Nazry, ANU.

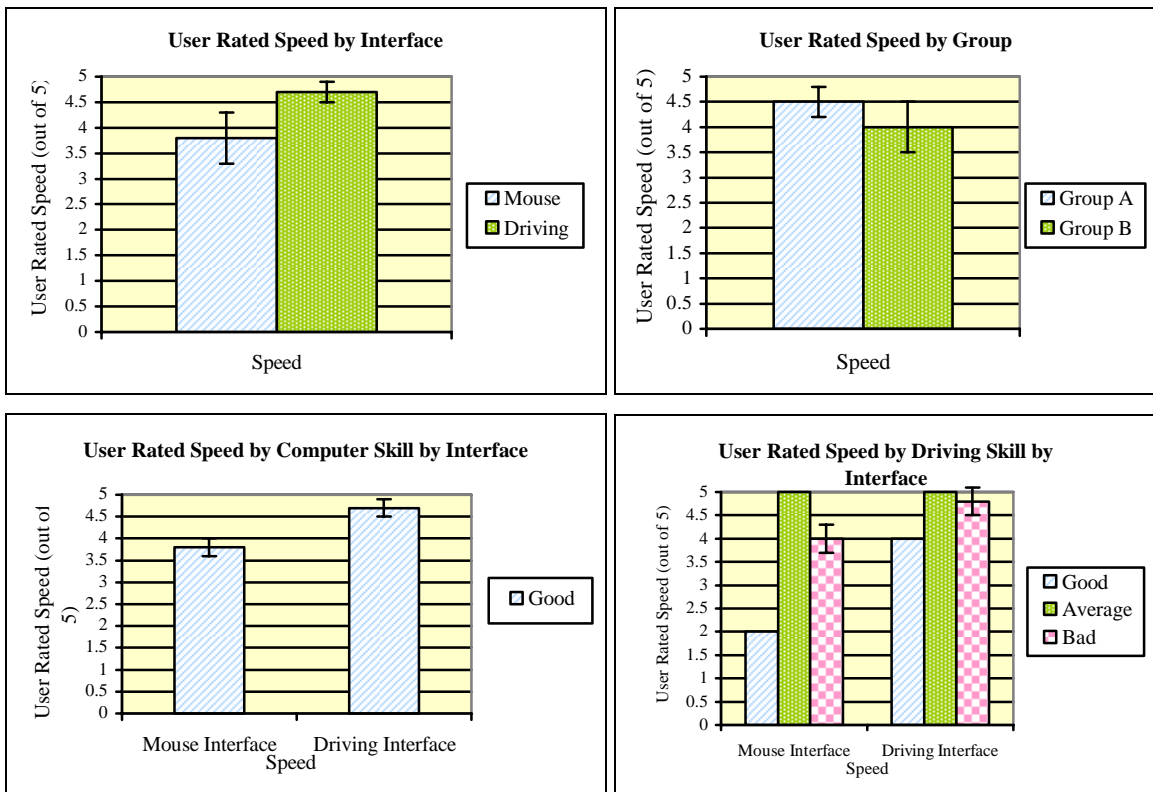
1. I (please print) consent to take part in the Interactive Selection experiment. I have read the information sheet for this project and understand its contents. The information provided explains the nature and purpose of the research project and I understand what I need to do.
2. I understand that if I agree to participate in the research project I will be required to use two interfaces, which is a process that should last no more than half an hour; and that I will be asked to answer some questions before using them and afterwards to determine my experience on such interfaces and evaluate the interfaces.
3. I understand that while information gained during the research project may be in a report and presentation for the ANU Information & Human Centered Computing project course COMP8780. My name and position title will not be used in relation to any of the information I have provided, unless I explicitly consent in writing to be identified.
4. I understand that personal information, such as my name, will be kept confidential as far as the law allows. This form and any other identifying materials will be stored separately in a locked office at the Australian National University. Data entered onto a computer will be kept in a computer accessible only by password by a member of the research team.
5. I understand that I may withdraw from the research project at any stage, without providing any reason and this will not have any adverse consequences for me. If I withdraw, the information I provide will not be used by the project.
6. I understand that it is sometimes essential for the validity of research results not to reveal the true purpose of the research to participants. If this occurs, I understand that I will be debriefed as soon as is practicable after my participation and, at that time, given the opportunity to withdraw from the research and have records of my participation erased.

Signed Date

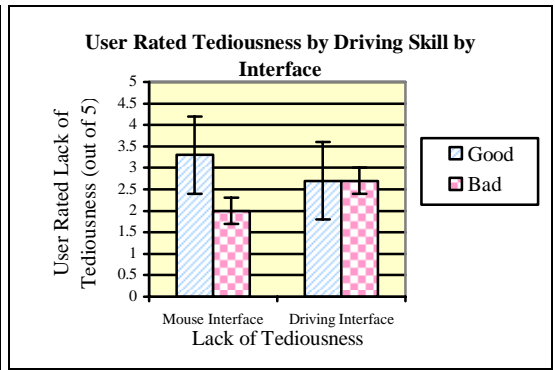
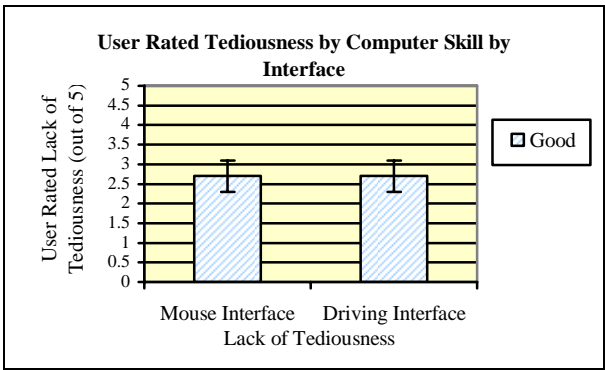
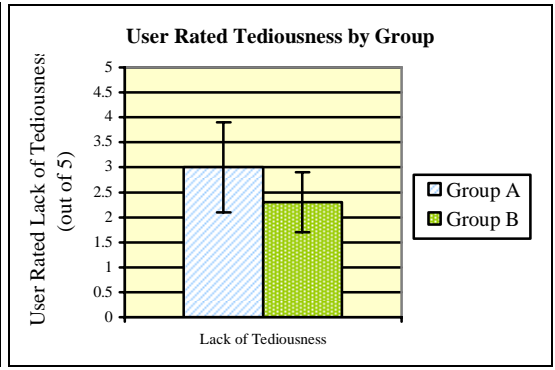
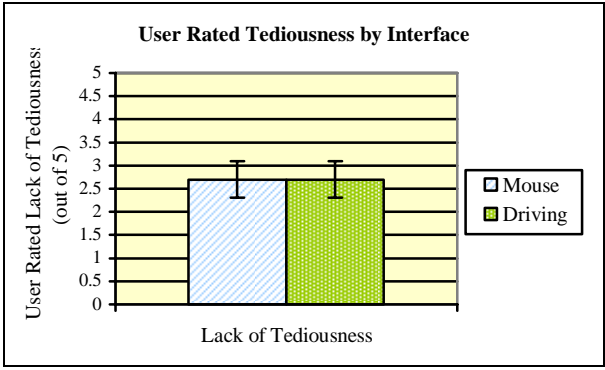
Appendix 3



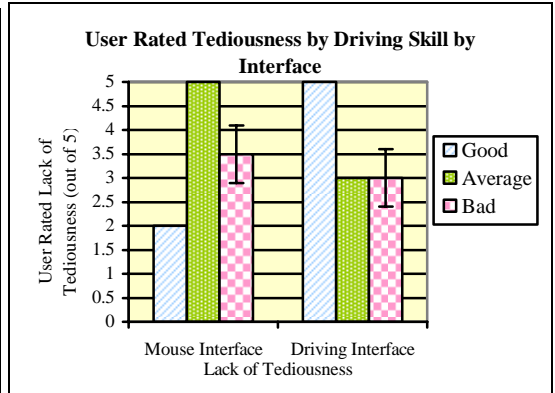
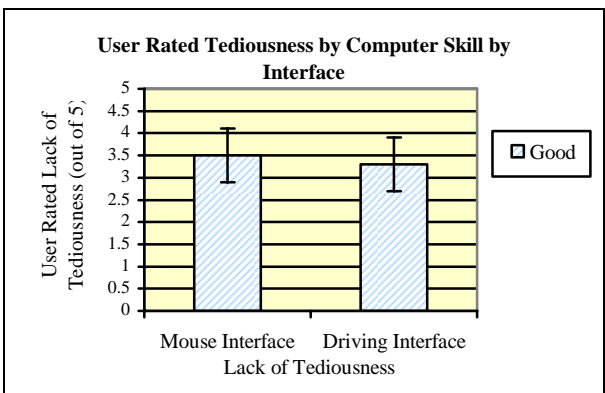
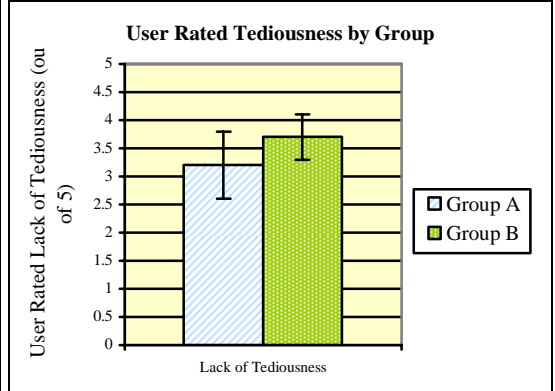
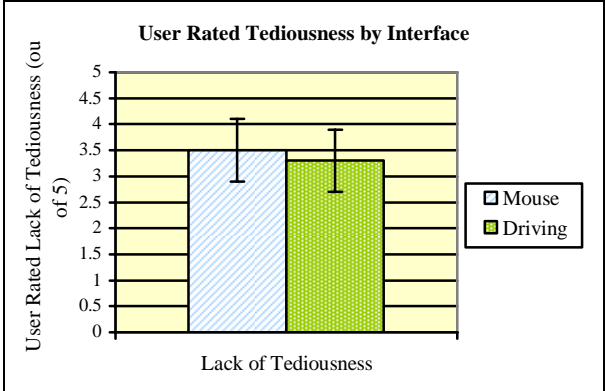
Graphs of data user's rating of speed by different factors - Experiment 2 (3:1)



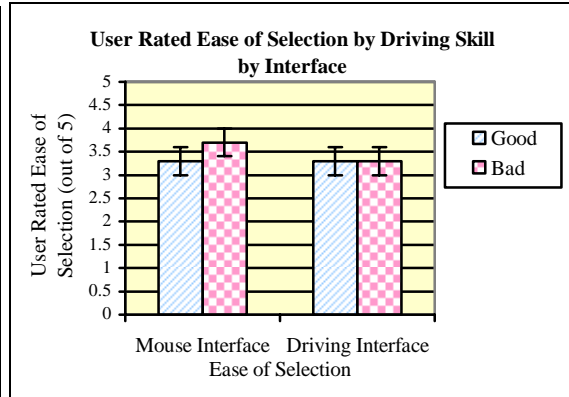
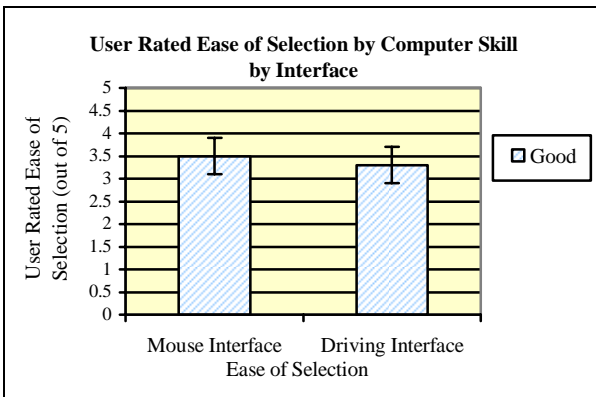
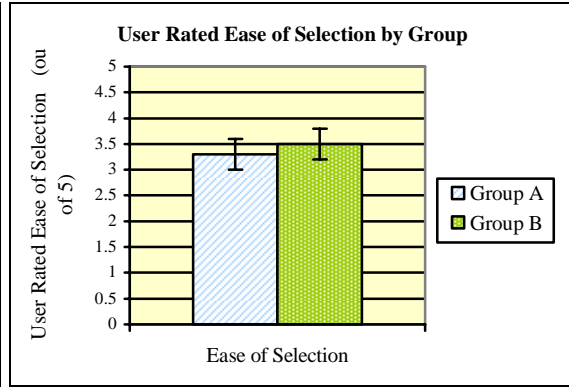
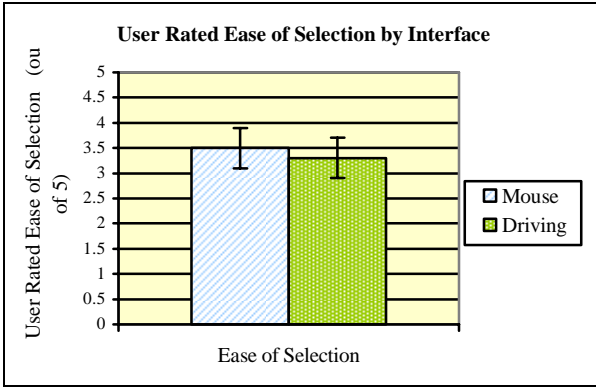
Graphs of data user's rating of speed by different factors - Experiment 3 (20:3)



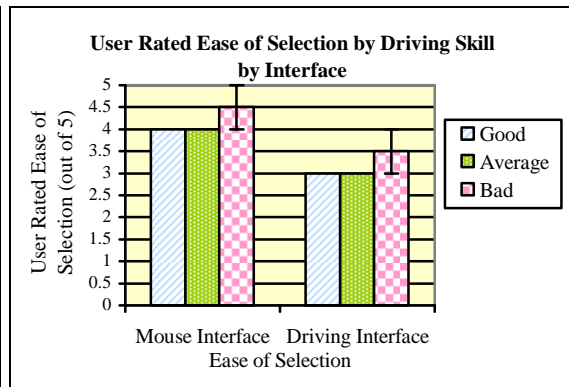
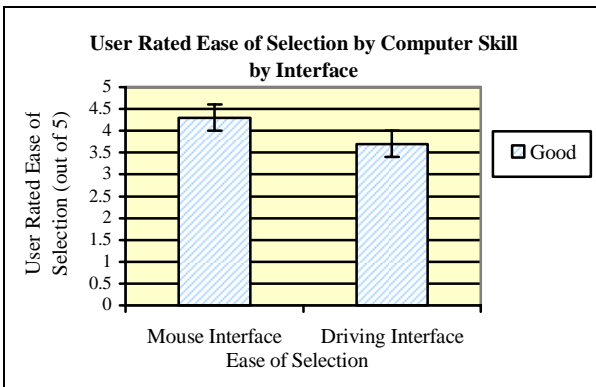
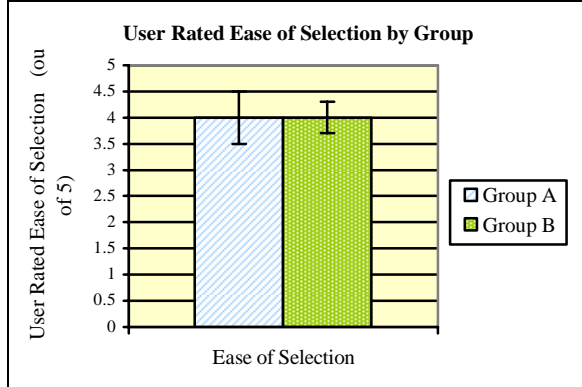
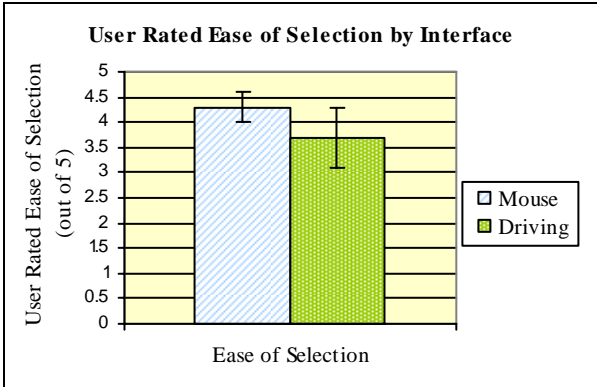
Graphs of data users' rating of tediousness by different factors - Experiment 2 (3:1)



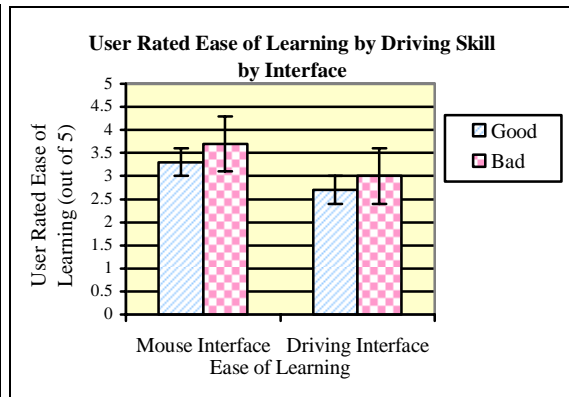
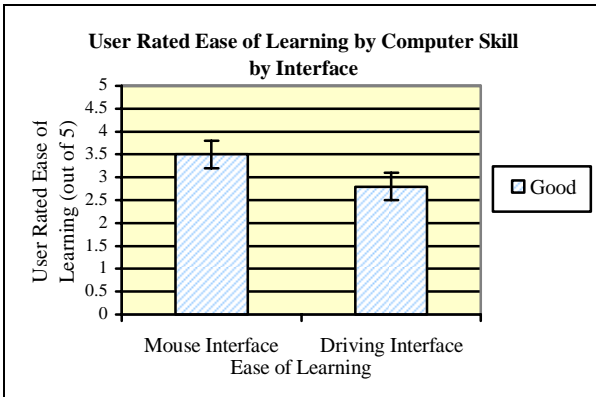
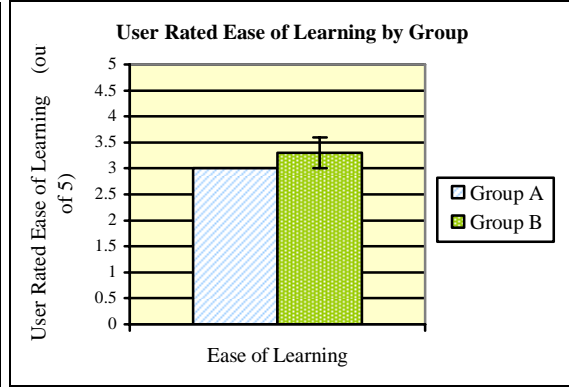
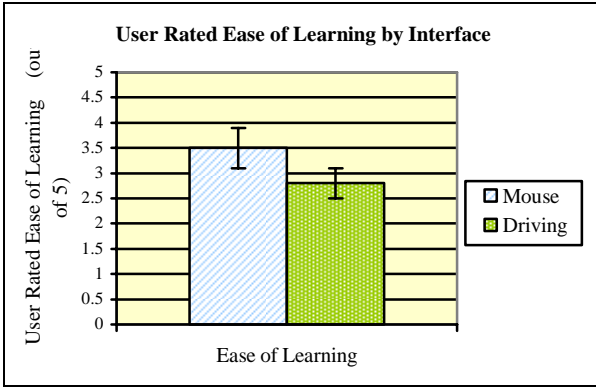
Graphs of data users' rating of tediousness by different factors - Experiment 3 (20:3)



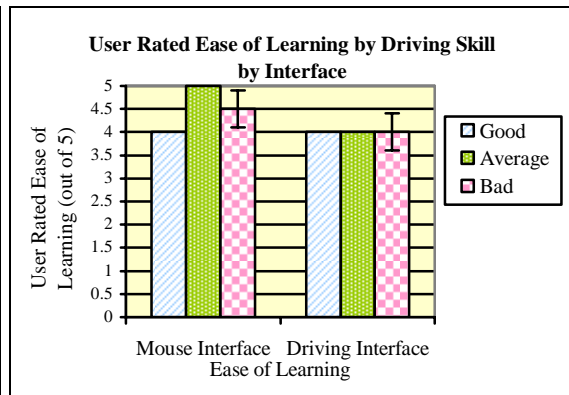
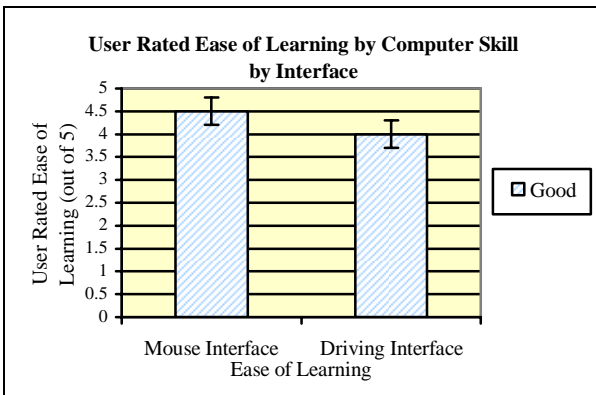
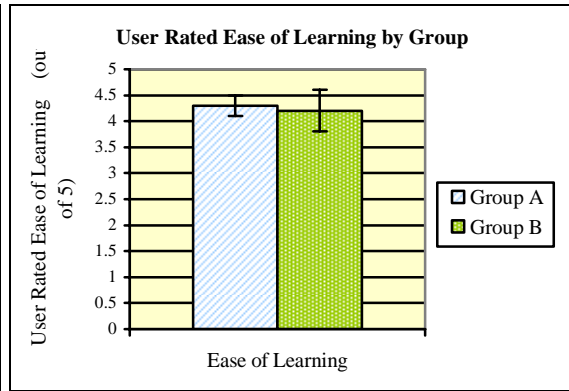
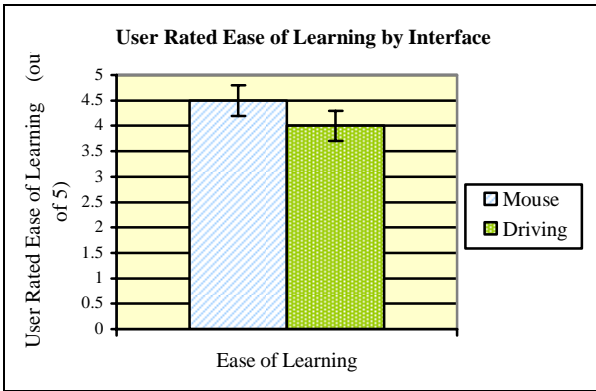
Graphs of data users' rating of ease of selection by different factors - Experiment 2 (3:1)



Graphs of data users' rating of ease of selection by different factors - Experiment 3 (20:3)

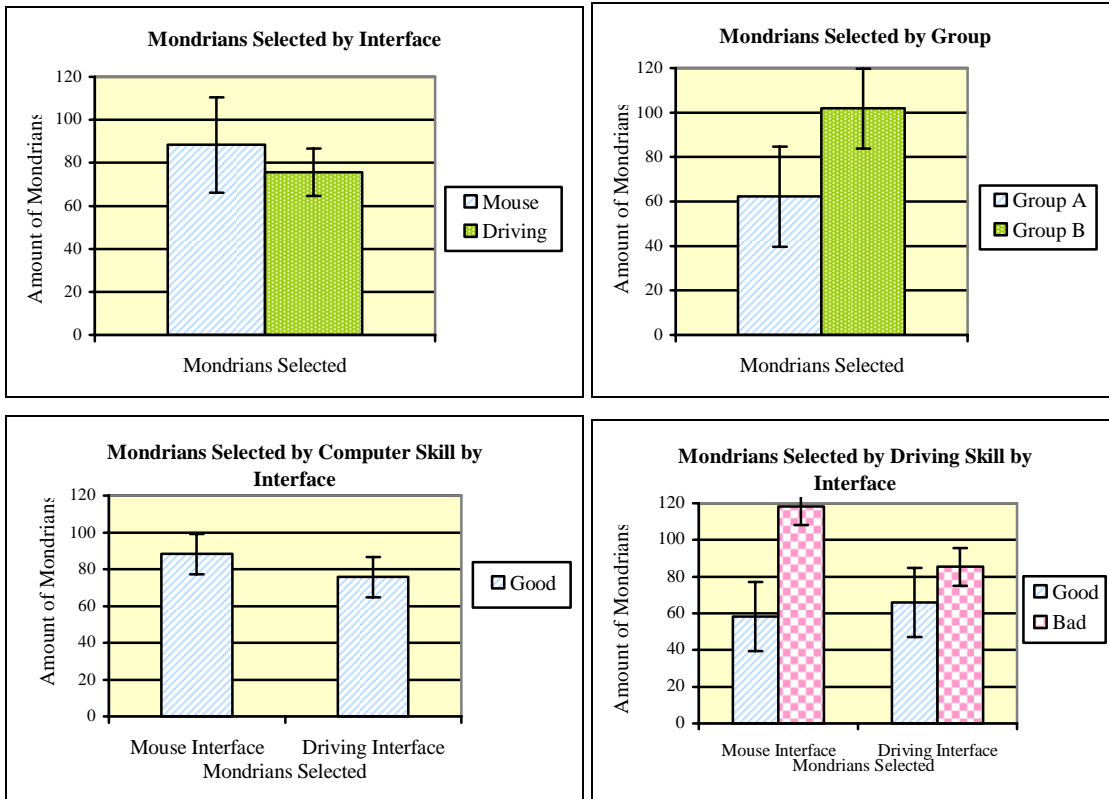


Graphs of data users' rating of ease of learning by different factors - Experiment 2 (3:1)

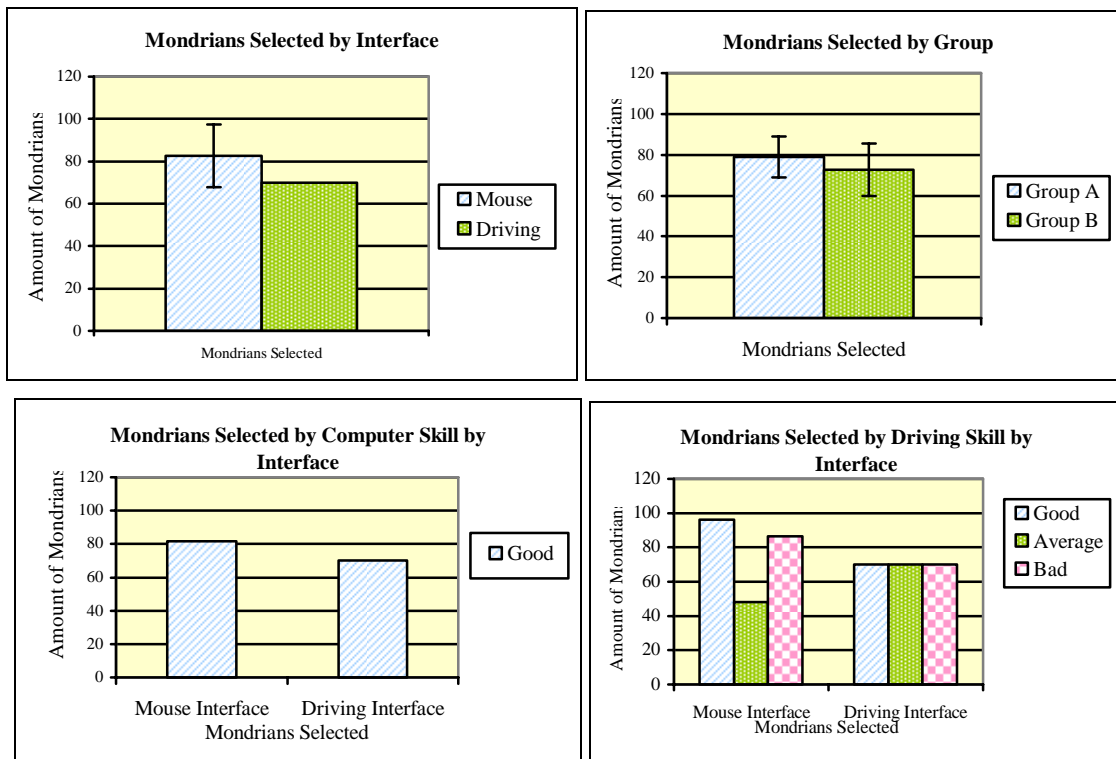


Graphs of data users' rating of ease of learning by different factors - Experiment 3 (20:3)

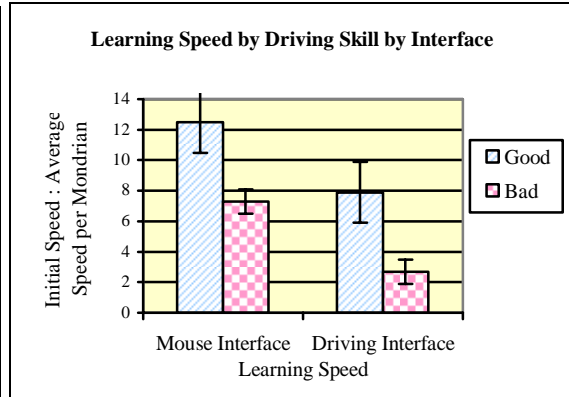
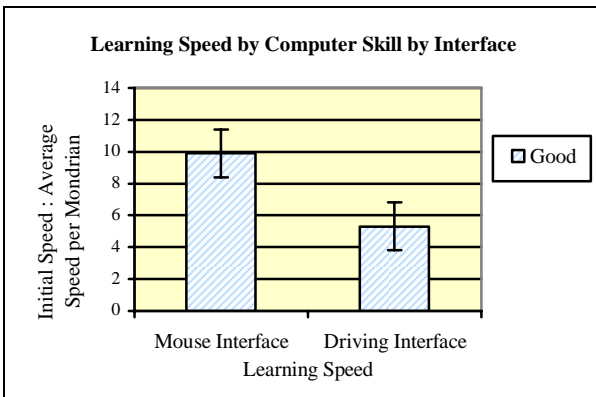
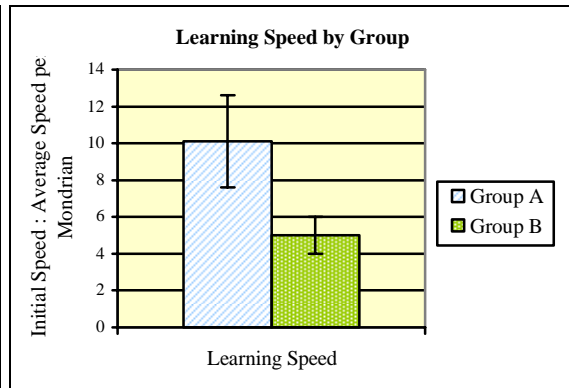
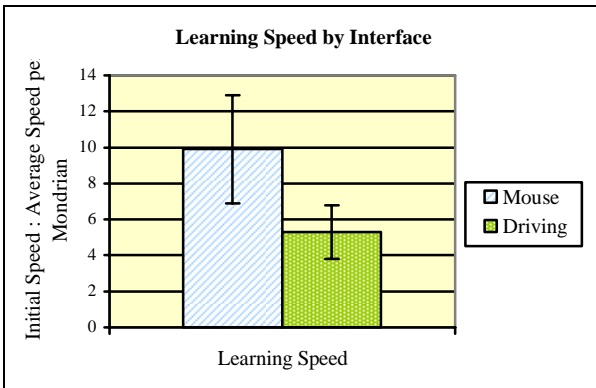
Appendix 4



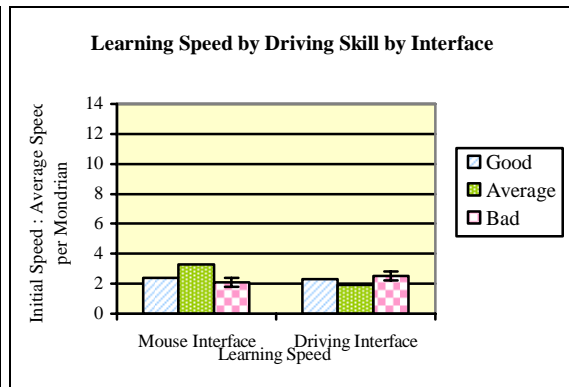
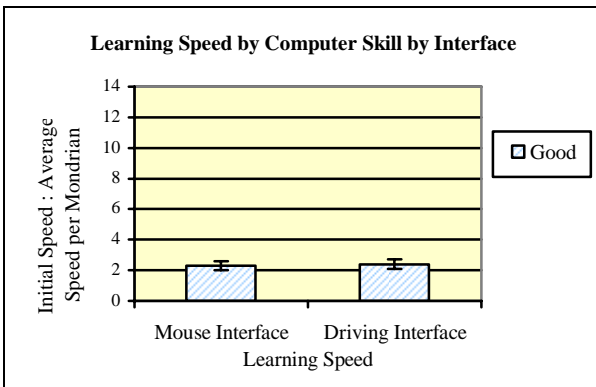
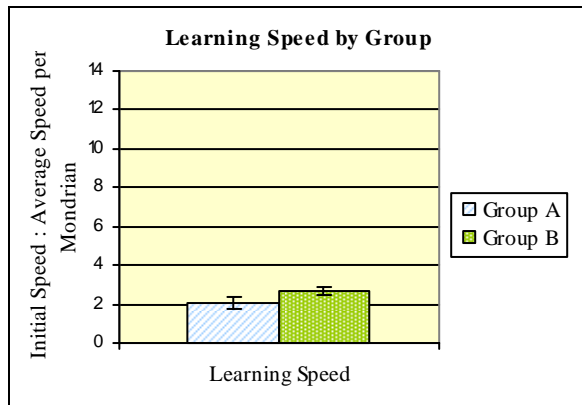
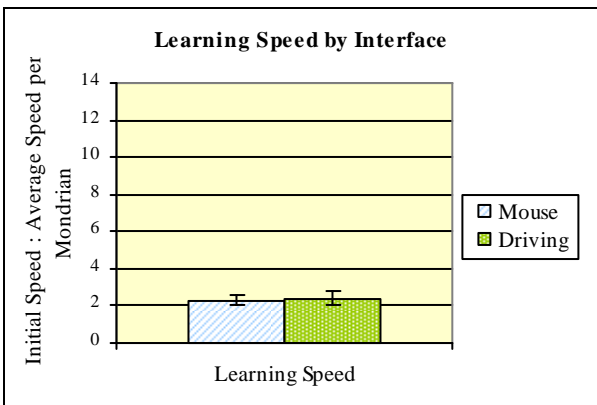
Graphs of data amount of Mondrians selected by users by different factors - Experiment 2 (3:1)



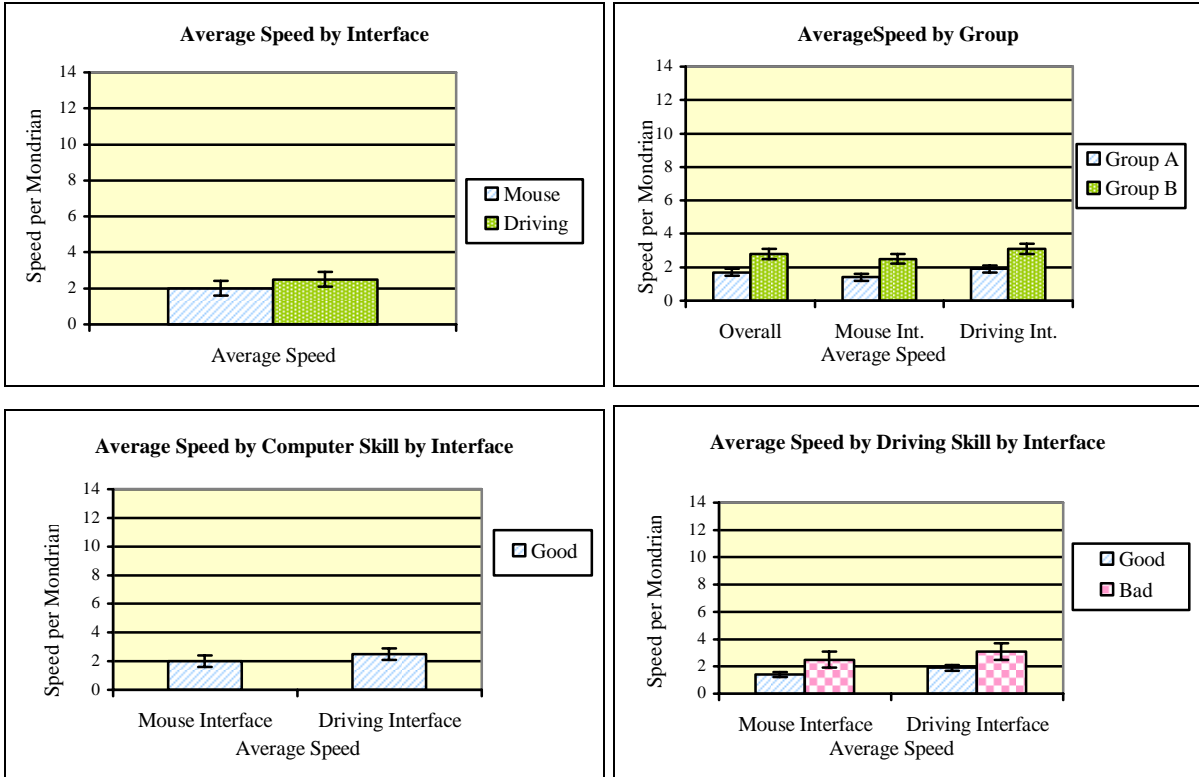
Graphs of data amount of Mondrians selected by users by different factors - Experiment 3 (20:3)



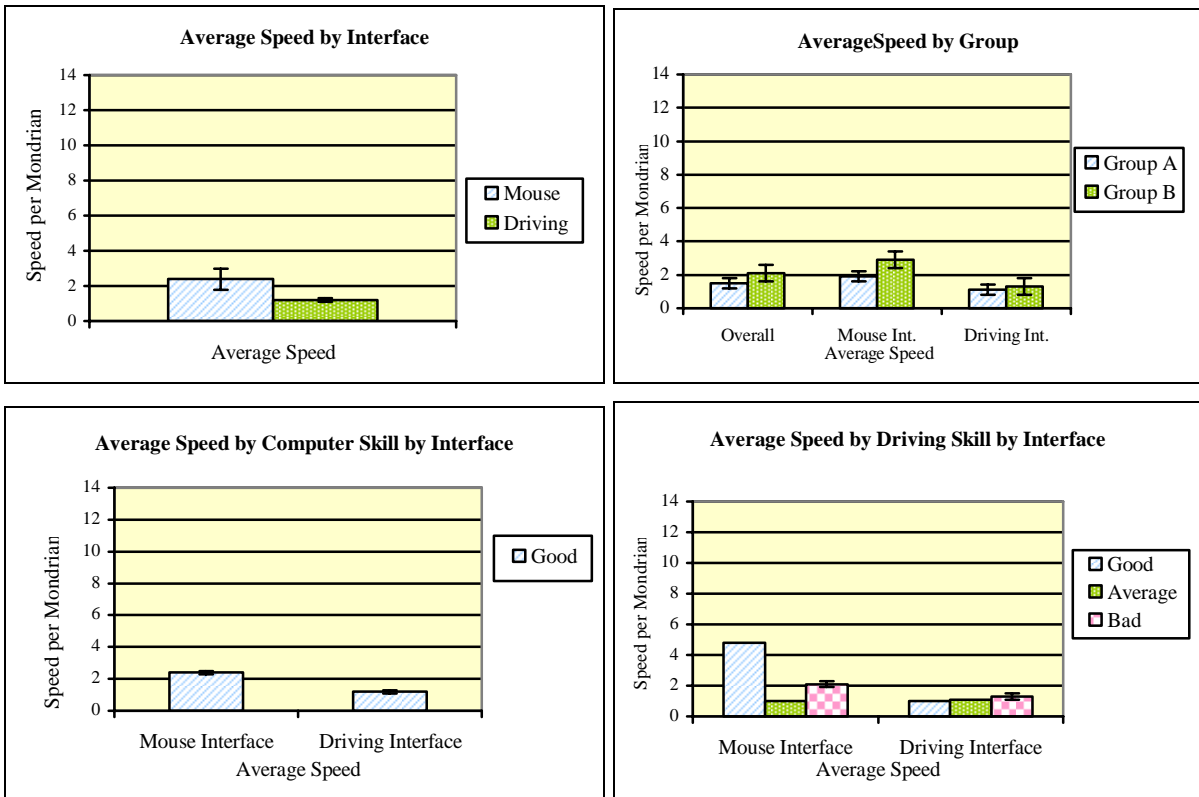
Graphs of data learning speed of users by different factors - Experiment 2 (3:1)



Graphs of data learning speed of users by different factors - Experiment 3 (20:3)



Graphs of data average speed of users by different factors - Experiment 2 (3:1)



Graphs of data average speed of users by different factors - Experiment 3 (20:3)