

# The Influence of Participant Personality in Usability Tests

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## Abstract

This paper presents the results of a study investigating the impact of participant personality on usability testing. Data were collected from 20 individuals who participated in a series of usability tests. The participants were grouped into 10 introverts and 10 extroverts, and were asked to complete a set of four experimental tasks related to the usability of an academic website. The results of the study revealed that extroverts were more successful than introverts in terms of finding information as well as discovering usability problems, although the types of problems found by both groups were mostly minor. It was also found that extroverts spent more time on tasks but made more mistakes than introverts. From these findings, it is evident that personality dimensions have significant impacts on usability testing outcomes, and thus should be taken into consideration as a key factor of usability testing.

**Keywords:** Usability Testing, Think-aloud Protocol, Personality dimensions.

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## 1. INTRODUCTION

As the Internet continues to grow at a phenomenal pace with millions of websites vying for users' attention, usability is no longer an afterthought for web designers; instead, it has become a crucial aspect of survival on the web. Research demonstrates that usability leads to decreased customer support calls, increased product sales, and lower developmental costs [6]. In addition, good usability for computer products has beneficial effects on the work environment, such as reduced employee turnover, diminished maintenance costs, decreased training costs, and increased user productivity [22]. Standard 9241 of the International Standard Organisation (ISO) [21] defines usability as "the extent to which a product can be used by specific users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" [6]. Efficiency is the extent to which scarce resources such as time, effort and costs are well used for the intended undertaking. A high level of efficiency is required to achieve maximum quantity and quality of productivity. Effectiveness is the degree to which a person is successful in achieving desired results, while satisfaction refers to the extent to which a person's expectations of a task are fulfilled [6].

There are generally three types of methods for evaluating usability of software products: testing methods, inspection methods and model-based methods [31]. Testing methods involve requesting information from users about the usability of a particular product using techniques such as think-aloud protocols. Inspection methods are a group of techniques that depend on expert appraisal of an interface. Model-based methods in usability evaluation, which are less commonly used than usability testing or inspection, have been developed based on data derived from psychology research on human performance. One of the most widely used model-based methods is the GOMS model (Goals, Operators, Methods and Selection rules), which is designed to determine the effectiveness of expert users [31].

Usability testing has been the dominant evaluation paradigm since the 1980s [26] as it provides direct information about how people use a system and their exact problems with a specific interface. Recently, it has emerged that the choice of participants has an impact on the results of usability testing, leading to increased attention to participant characteristics such as cultural background, age, IT skills, and personality traits. This paper presents the findings of a study on the influence of the personality dimensions of extroversion and introversion on the outcome of usability testing. The paper is structured as follows: the next section discusses the existing literature focusing on recent studies related to the effects of participants' characteristics on usability testing, and states the aims and the research question of the current study; further sections discuss the research method, data analysis, and results of this study; and finally, the paper concludes with a brief discussion of the findings.

## 2. RELATED WORK

Research shows that the suitability of different testing methods varies with participants' characteristics. For instance, a study by Prumper *et al* [34] investigating the differences between novice and expert users' computerized office work, which observed 174 clerical workers from 12 different companies, found that expert users revealed more problems than novice users. Another study on the effect of cultural background on thinking aloud usability testing observed significant differences between Western participants' behaviour and Eastern participants' behaviour during think aloud tests [10]. It was found that Eastern users benefited from scenarios rather than instructions and were indirect with their criticisms, and that thinking aloud negatively affected their task performance, while the body language of Western users was more easily read by the researchers. Additionally, a study by Sonderegger *et al* [36] comparing the performance of participants from different age groups found that younger adults completed tasks more quickly than older adults. Researchers must therefore be aware of participants' characteristics before conducting experiments.

There have only been a small number of attempts to investigate the influence of participants' personalities on usability testing. The few studies examining the personality dimensions of extroversion and introversion found that introverts uncovered fewer usability problems than did extroverts, and that extroverts displayed higher levels of motivation than introverts when participating in usability tests [see 6, 7]. However, these studies are limited by their narrow focus on counting the number of problems identified, which may not always benefit usability research. Research in this area must go beyond counting problems and examine the quality and nature of problem sets yielded by testing as well as participants' task performance and testing experience in order to provide a holistic examination of the issue [20, 42].

### 2.1 The Present Study

The purpose of the present study was to further investigate the effect of the personality dimensions of extroversion and introversion on usability testing. The study sought to address the following research questions:

**Research question 1 (RQ1):** Are there discrepancies between extroverts and introverts with regard to their abilities to detect numbers and types of usability problems?

**Research question 2 (RQ2):** Are there discrepancies between extroverts and introverts with respect to their task performances?

**Research question 3 (RQ3):** Are there discrepancies between extroverts and introverts with regard to their subjective testing experiences?

It is hoped that the findings of the study will be of use to web designers, usability practitioners, and researchers by providing empirical evidence regarding the role of personality in usability testing.

### 3. METHODOLOGY

#### 3.1 Study Design

To fulfil its objectives, the study used an experimental method with a between-subjects design. A combination of direct observation and concurrent think-aloud protocol was used to collect both quantitative and qualitative data from participants. The independent variable was the participants' personality traits (i.e. extroversion or introversion). The dependent variables were the number and type of usability problems discovered, task performance data, and the participants' experiences.

#### 3.2 Selection of Test Object

An academic website, hereafter referred to as UL, was used as the test object. The rationale behind this choice was that, while there is limited empirical evidence regarding the effect of participant personality on the usability testing of websites in general [27], the gap is larger in the case of academic websites and most research has been carried out on non-academic websites. Furthermore, the targeted website presented a number of clear usability problems to the researchers during the initial heuristic evaluation conducted by the first author. Some of these usability problems are presented in Table 1 below:

Issue Discovered	Heuristic Principle Violated
Pages do not have unique titles	Visibility of system status
Some links lead to invalid or non-existing pages	Error prevention
Sequence of tasks/navigation is sometimes unclear	Match between system and the real world, help and documentation
Validations are not accurate. For example, on entering invalid details, the room booking is confirmed	Error prevention
Some pages are cluttered making it difficult to find required information	Flexibility and efficiency of use
Use of too many hyperlinks	Aesthetic and minimalist design
Adequate help is not provided for error recovery. For instance, when user enters non-numerical text in the Student ID field, the textbox refuses to accept it but does not specify the issue	Visibility of system status; flexibility and efficiency of use; help users recognise, diagnose, and recover from errors; help and documentation
Search results from main page search cannot be filtered	Flexibility and efficiency of use

**TABLE 1:** Heuristic Evaluation of UL Library Website.

#### 3.3 Designing Tasks

As mentioned earlier, the heuristic evaluation [33] of the UL website was aimed at designing tasks around problematic features of the website. Four tasks were created for the usability testing experiment. All tasks required the participants to begin at the homepage and then to navigate through the website in order to find a particular piece of information (see task set in Appendix A). The tasks were designed to be completely independent of each other so that failure in one task did not negatively affect the overall process. Also, the tasks were arranged in order of difficulty such that each task would be more difficult to accomplish than the one preceding it.

### 3.4 Participants

Twenty participants were recruited through a combination of purposive and snowball sampling techniques. Ten participants exhibited introvert tendencies, and ten exhibited extrovert tendencies. The sample was drawn using personal emails, requests on social networking sites, and conversations with personal contacts of the researchers. In addition, an email was sent through official channels to all students of the School of Computer Science at the University of East Anglia (UEA) in the UK. The participants were offered £5 as a token of appreciation for participating in the study. The email also provided a link to the online pre-experiment questionnaires where interested users could fill out details about themselves and their personality (Appendix B). The personality of participants was established using the Myers-Briggs Type Indicator questionnaire [28]. According to Eysenck [13], a typical extrovert is an individual who has sociable characteristics, including the need to talk to others, the desire to take chances, optimism, an easy-going nature, and a craving for excitement. By contrast, an introvert exhibits aspects of anti-social behaviour, such as disliking excitement, being more retiring and quiet, planning ahead, and being reserved; introverts tend to talk less and reflect more before settling on a course of action [39]. An overall summary of the chosen participants' profiles is presented in Table 2 below:

<b>Total participants</b>	20
<b>Age</b>	18-24: 5 25-29: 13 30+: 2
<b>Gender</b>	Male: 14 Female: 6
<b>Language</b>	English, Arabic, Hindi, Chinese
<b>Nationality</b>	UK, Saudi Arabia, India, China
<b>Educational level</b>	Undergraduate: 5 Masters: 13 PhD: 2
<b>Internet usage</b>	All participants have been using the Internet for 5+ years
<b>Usage Frequency</b>	All participants used the Internet for at least 5+ hours a day
<b>Personality</b>	Extroverts: 10 Introverts: 10

**TABLE 2:** Participant Profile and Personality Summary.

### 3.5 Resources and Equipment

All experiments were conducted in the same laboratory in the School of Computing Sciences at UEA. A single laptop connected to the University's network was used for all experiments. The laptop was equipped with the Windows 8 operating system, and participants were instructed to use Internet Explorer to carry out the tasks. Camstudio software was used to record participants' voices and interactions with the system. The researchers also used the following supporting materials: a task instruction sheet, observation sheets to record information regarding the test sessions (Appendix C), and post-test questionnaires to measure participants' experiences and their satisfaction with the usability of the target website.

### 3.6 Experimental Procedure

As environmental variances can affect experimental results, the usability testing environment was the same for all participants [22]. Likewise, all participants adhered to the same settings and experimental procedures to ensure accuracy of results. The procedural steps were as follows:

- Participants were asked to read the information sheet and then to read and sign the consent form.
- Participants were given a few minutes to familiarise themselves with the experimental settings and the target website.

- Participants were provided with the task instructions and were asked to raise any enquiries regarding these at the outset; they were notified that no help would be available to them during the course of the tasks.
- Participants commenced tasks with the Camstudio software running in the background to capture their interactions with the website. The evaluator (first author) made observations and remained quiet during this period, only reminding participants to think aloud when they forgot to do so,
- Participants were requested to fill in the post-experiment questionnaires.
- Participants were given a £5 as a token of appreciation.
- All documents related to each session were collated and saved in a folder identified by the session ID number.

### 3.7 Piloting and Correction

Undertaking a pilot test is one of the most common ways to test the validity of a study and identify problems in advance [24]. Therefore, a pilot test was conducted with one male and one female participant who were randomly selected from the researchers' pool of contacts at the University of East Anglia. These participants were asked to perform the tasks designed for the experiment in settings similar to those planned for the actual experiment. The pilot results revealed that the directions and success criteria for the first task were unclear. Following this, all tasks were refined further to ensure that success would be self-evident and would not require explicit confirmation from the researcher.

## 4. RESULTS

### 4.1 Usability Problems

Three key aspects of usability problems were considered: the number of problems discovered, the uniqueness of problems discovered, and the types of problems discovered.

#### 4.1.1 Number of Usability Problems

After all the participants had completed all the tasks, the total number of problems encountered by participants in a particular group were summarised, excluding any repeated problems, to arrive at the total number of usability problems found by both groups. These results are summarised in Table 3 below:

	Number	Percentage
Overall non-repetitive usability problems discovered	31	100%
Problems discovered by extroverts	26	83.8%
Problems discovered by introverts	17	54.8%

**TABLE 3:** Total Number of Usability Problems Found.

Extroverts discovered almost 84% of the overall number of problems, while introverts discovered only around 55% of the overall number of problems. The details and summaries of the problems discovered by both groups are available in Appendix E. Analysis also revealed that across both participant groups, male participants discovered more usability problems than their female counterparts. In the case of the extrovert group, male participants discovered close to 69% of their group's problems while female participants discovered 31%. In the case of introverts, male participants discovered more than 76% of their group's problems while female participants discovered less than 24%. These findings are summarised in Table 4 below:

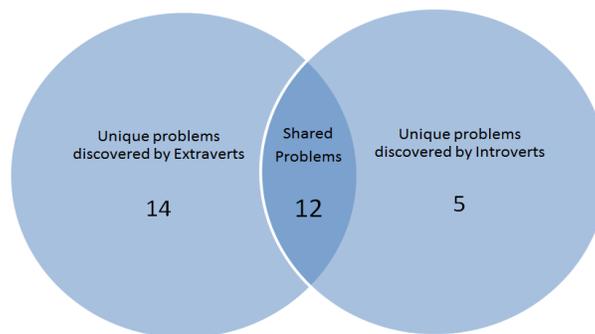
Personality	Usability problems discovered		Total
	Male	Female	
Extroverts	18 (68%)	8 (32%)	26
Introverts	13 (76%)	4 (24%)	17

**TABLE 4:** Total Number of Usability Problems Found by Male and Female Participants.

While the results correspond with expected findings in an absolute context, considering that the sample contains more male than female participants, it is interesting to note that extrovert women discovered a higher proportion of problems than their introvert. While extrovert women discovered more than 31% of their group's problems, which is in line with their sample composition, introvert females discovered less than 24% of their group's problems, which is a lower proportion than expected based on their sample composition. This could suggest that introvert female participants were far more conservative about expressing their thoughts aloud during testing and had to be repeatedly prompted to do so.

#### 4.1.2 Shared and Unique Problems

Figure 1 shows the number of unique and common problems discovered during the experiments. Unique problems are those that are found only by one of the groups involved in testing [2]. Addressing the uniqueness of problems discovered can help shed light on the differences between the problems discovered by extroverts and introverts, and in turn can further understanding of the ways in which they interact with the system. Of the 31 non-repetitive problems found in total, 14 problems were discovered only by the extrovert group, five problems were discovered only by the introvert group and 12 problems were discovered by both groups. It is interesting to note that one of the unique problems highlighted by most of the introverts was the lack of consistent standards on the website [Appendix E], while no extroverts mentioned this problem. On the other hand, most of the extroverts pointed out the lack of shortcuts and features such as “quick search”. It was observed by the evaluator (the first author) that extroverts tended to jump to “search” and type in search terms there, expecting instant results. Such actions conformed to the description of extroverts as preferring quick fixes, even at the cost of accuracy, and of as introverts preferring rules and regulations [39].



**FIGURE 1:** Common and Shared Problems Found by Extroverts and Introverts.

Variances were also noted between the impacts of age and educational levels on the problems discovered by the two participant groups. However, no conclusive results can be formed on the basis of this as the distributions of age and education were not uniform across the groups. Nationality, language and Internet use were found to have no impact on the number of problems discovered. This is not surprising considering that all participants were at comparable levels in these characteristics.

#### 4.1.3 Type of Usability Problems Found

Usability problems can be classified into different types based on their severity ratings. To calculate the severity ratings for the problems discovered in this study, Nielsen's [31] model of rating was followed, which classifies problems into five types (0 for the least important, and 4 for the most important), as shown in Table 5.

Rating	Type
0	Not a usability problem
1	Cosmetic problem
2	Minor problem
3	Major problem
4	Catastrophic problem

**TABLE 5:** Usability Problem Rating Scale [31].

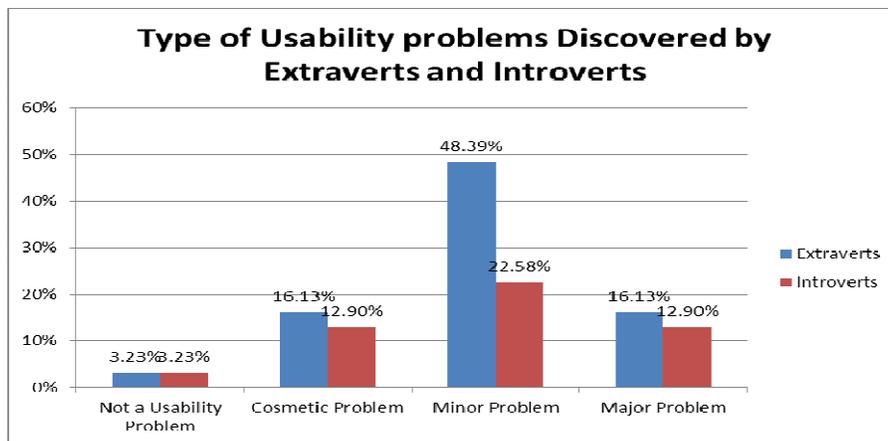
Of the 31 unique problems discovered, one problem was rated as not a usability problem, seven as cosmetic problems, 17 as minor problems and six as major problems. None of the problems were rated as catastrophic. The distribution of the types of problems discovered by the two participant groups is shown in Figure 2 below. As seen below, there were no major variances in the patterns across groups, except with regard minor problems, where the difference between introverts and extroverts was significant. Most of the problems discovered by both groups of participants were minor.

#### 4.2 Task Performance

To measure task performance, three factors were used: the degree to which participants were successful in completing the test tasks, the time they spent on working on tasks, and the number of errors made while performing tasks.

##### 4.2.1 Success Rate

The success rate of tasks was measured as a factor of the number of participants in each group who managed to complete the task successfully. The results yielded two key findings: firstly, extroverts were more successful than introverts in all tasks, and secondly, both extroverts and introverts were less successful as the difficulties of the tasks increased.



**FIGURE 2:** Type of Usability Problems Found by Extroverts and Introverts.

Information became more difficult to find as the tasks progressed. For instance, Task 4, which saw the lowest success rates across both groups, was more complex than all of the preceding tasks as it required customizing multiple search filters to attain a custom search result. It is also possible that the participants were getting tired or losing focus over time, causing their success rates to decline. However, both participant groups blamed lack of adequate help and clutter on the site rather than the difficulty of the task or their own inability to find the information. This indicates that both groups were reasonably confident in their abilities, in contrast to the findings of Choudhury *et al* [8]. The success rates for both groups for each task are shown in Table 6:

	Success Rate of Extroverts	Success Rate of Introverts
Task 1	100%	80%
Task 2	90%	80%
Task 3	60%	40%
Task 4	50%	20%

**TABLE 6:** Success Rates of Extroverts and Introverts.

#### 4.2.2 Time on Task

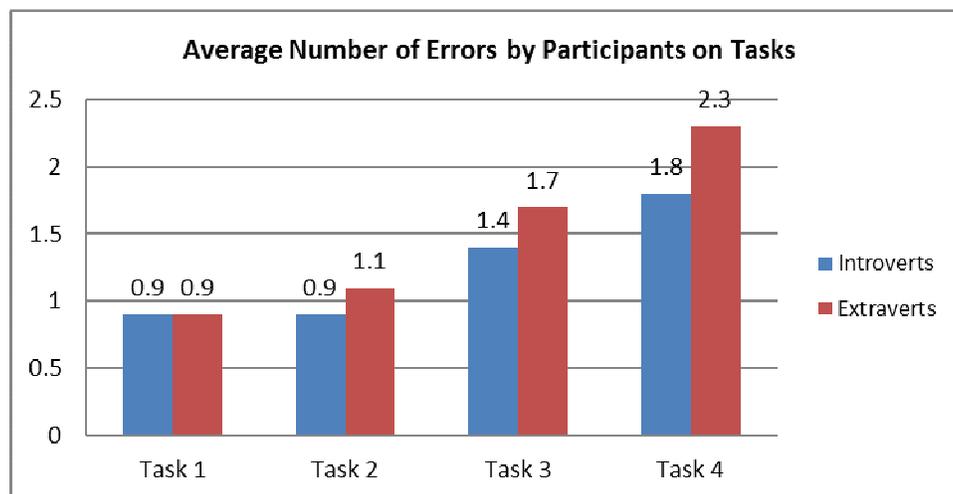
To calculate average task times (in seconds), the total time spent by all participants in each group on each task was divided by the number of participants. The analysis revealed that both participant groups spent increasing amounts of time on each subsequent task, owing to the increasing levels of difficulty, and that extroverts spent much more time than introverts on each task. Table 7 summarises these results:

	Average Time Spent by Extroverts (sec.)	Average Time Spent by Introverts (sec.)
Task 1	44.9	33.2
Task 2	84.7	36
Task 3	118.8	39.2
Task 4	138	41.8

**TABLE 7:** Average Time (In Seconds) Spent by Extroverts and Introverts.

#### 4.2.3 Number of Errors

The number of errors refers to the average number of mistakes made by participants while completing the tasks. These include clicking on incorrect links, typing incorrect keywords, filling in invalid details and other errors. The results of the analysis are summarised in Figure 3 below:



**FIGURE 3:** Comparative Analysis of Average Errors.

The above analysis shows that both participant groups made more errors as the tasks progressed. While this can be attributed to the increasing difficulties of the tasks, it also indicates that the website failed to adhere to Nielsen usability heuristics [31] in terms of providing adequate error prevention mechanisms and help. Further, as seen in the analysis, extroverts made more mistakes on average than introverts.

### 4.3 Participants' Experience

As mentioned earlier, participants were asked to fill out two post-task questionnaires. The first dealt with their experiences of the testing process, while the second focused on their satisfaction with the usability of the website [Appendix D].

#### 4.3.1 Participants' Testing Experience

In the first questionnaire, the participants were asked to rate the ease of participation, performing the tasks and verbalising their thoughts; the impact of thinking aloud on their behaviour and of the evaluator's presence; and their interest in participating in similar experiments. Unsurprisingly, most introvert participants reported discomfort with the process of verbalising their thoughts, which corresponds with perceptions of them as quiet and reserved [14]. However, most introverts and extroverts claimed that thinking aloud did not affect their behaviour, which indicates that this is a useful technique for gathering data in usability testing. No significant variances were found in the responses to other questions, as introverts and extroverts tended to give similar responses to one another. These findings are summarised in Figure 4 below:

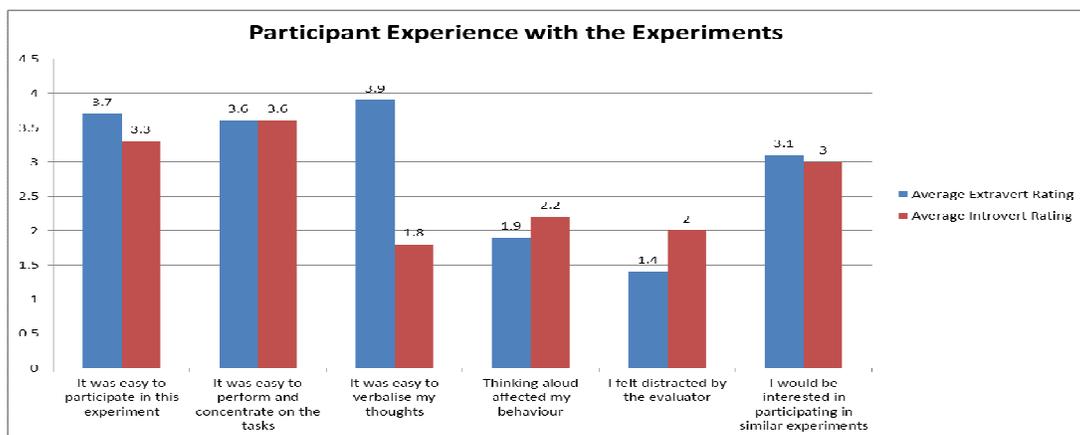


FIGURE 4: Participant Experiences with the Experiment.

Following the above questions, the questionnaire asked three qualitative questions asking participants to talk freely about the testing process. These questions concentrated on three key areas:

- What participants liked about the process: Most extroverts described the process as “fun” and a good learning experience, while some introverts felt that it gave them the confidence to air their views.
- What participants disliked about the process: One prominent complaint from both groups of participants was the rigidity of the process. They indicated that while they understood the point of the experiment, they would have preferred to conduct it via their own systems as they found the unfamiliarity of the laptop irritating. Some of the introverts also stated that they found it distracting having to verbalise their thoughts instead of concentrating on the task.
- Suggestions for improving the process: A few participants suggested that the tasks should have been diversified to provide more opportunities to locate larger issues. Some also indicated that the tasks should be easier to accomplish so that participants could focus more on usability issues rather than the complexities of tasks. Others indicated that a simpler and more usable website would have enhanced the experience. Some participants also suggested that the think-aloud protocol should have been optional, and that they should have been asked to talk only when they felt the need to comment on something.

### 4.3.2 Participants' Satisfaction with the Website

In order to gauge participants' perceptions of the usability of the chosen website, participants were asked to fill out the System Usability Scale (SUS) form designed by John Brooke [4]. An analysis of the responses from both groups is summarised in Figure 5. The overall analysis reveals that both participant groups did not find the system very usable, and instead found it unnecessarily complex and cumbersome. However, the extroverts contended that the system was easy to use despite calling it complex and indicated that they felt confident using it. This is in line with the high levels of confidence and motivation attributed to extroversion [8]. Introverts seemed to be more bothered by the inconsistencies in the system, which went against their preference for planning and reflection [1]. Thus, it was evident that while neither group of users preferred cluttered systems or information overload, their satisfaction with the website varied in line with their personality traits.

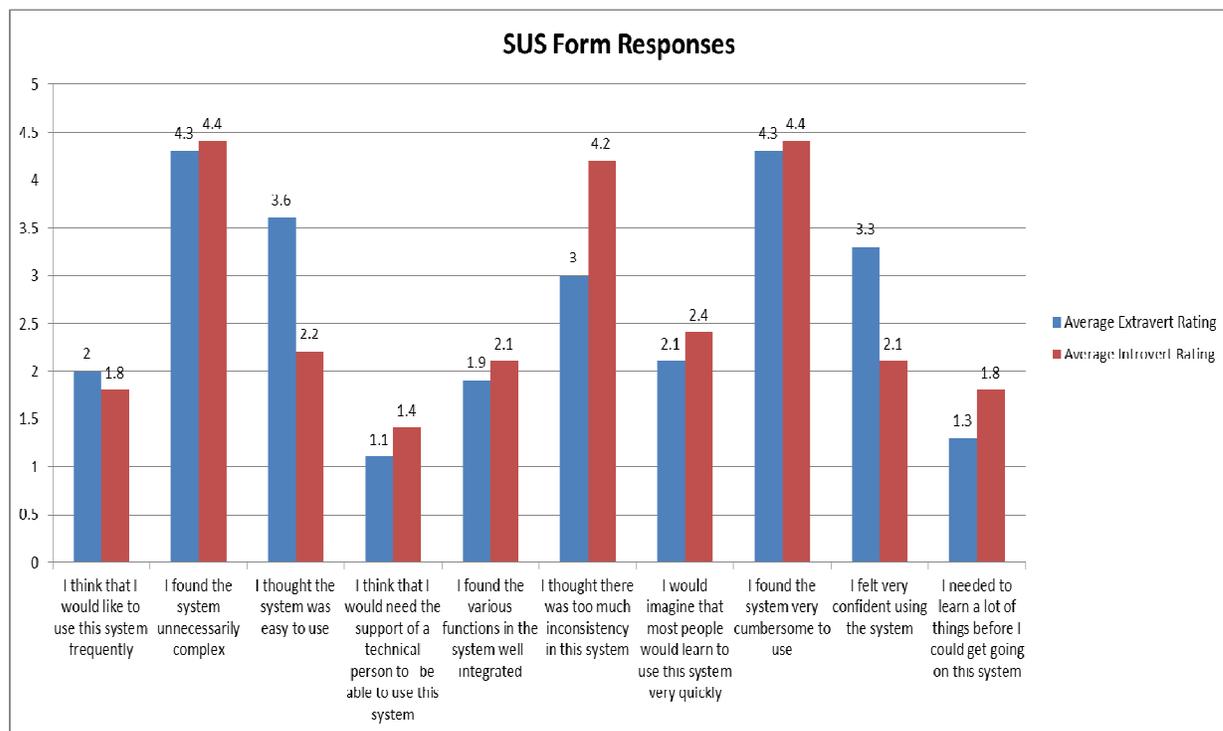


FIGURE 5: SUS Form Responses.

## 5. DISCUSSION AND COMPARATIVE EVALUATION

The following provides a discussion of the study results and a comparison of the findings with those of other empirical studies in the field. As mentioned earlier, this study sought to answer three research questions as set out in section 2.1. With respect to the first question (Are there discrepancies between extroverts and introverts with regard to their abilities to detect numbers and types of usability problems?), the findings revealed that extroverts outperformed introverts in terms of the overall number of usability problems discovered, and the number of unique and minor problems. These results corroborate the findings of Capretz and of Burnett and Ditsikas [5; 6], who found that extroverts discovered significantly more problems than introverts during usability testing. An explanation for these results may be that introverts are uncomfortable sharing their thoughts and tend to reflect more before arriving at conclusions.

Regarding the second research question (Are there discrepancies between extroverts and introverts with respect to their task performances?), the study found that extroverts had a higher success rate than introverts. A possible reason for this is the anxiety typically associated with

introverts [8]. Indeed, it was observed that introverts gave up sooner than extroverts when they could not locate a particular piece of information, while extroverts continued exploring the system for much longer periods of time. This is confirmed by the measurements of the time that each group spent on tasks, which revealed that the extroverts were slower to complete tasks than the introverts. This not only explains the higher task completion rate of extroverts, but also confirms the view that extroverts are more inclined to remain optimistic and motivated without getting anxious about problems or outcomes when working on tasks [13]. It also suggests, in accordance with previous research, that introverts became anxious when they could not locate the information they needed and simply moved on to the next task, leading to lower overall success rates. These findings correspond with those of Burnett and Ditsikas, who also noted that extroverts took longer than introverts to complete usability testing sessions [5]. Furthermore, the present study found that extroverts made a higher number of errors than introverts, which could be attributed to the description of extroverts as acting first and reflecting on their actions later [38].

With respect to the third research question (Are there discrepancies between extroverts and introverts with regard to their subjective testing experiences?), the results of the study showed that most introvert participants find it difficult to verbalise their thoughts while thinking aloud, which is in line with perceptions of them as quiet and reserved [12], although both introverts and extroverts claimed that thinking aloud did not affect their behaviour. The results also show that the two groups of participants were concerned with different type of usability issues. Extroverts focused more on the absence of shortcuts and similar functions, while introverts were more bothered by inconsistencies in the system. Designers must therefore be aware of the needs of users with different personalities when creating websites.

### **5.1 Limitations and Future Work**

One of the key limitations of the current study is that the sample lacked a uniform distribution of demographic factors, which may affect the validity of the findings. A vast majority of the participants were from the School of Computer Science, which meant that they possessed the experience and expertise required to navigate websites efficiently. Further, the male to female ratio among both groups of participants was skewed such that there were 7 males and 3 females in each group. Other demographic factors such as age and educational levels were also not uniformly distributed in the sample; as a result, the sample may not be completely representative of the general population. Further research with uniform breakdown of profiles and more in-depth analysis of these factors could have enhanced the validity of the findings. Additionally, although in-lab testing is common for experimental methods, it may not naturally replicate the settings in which participants typically use the system (such as their homes). Hence, the validity of findings obtained from participants who experience anxiety in unfamiliar settings may have been compromised. It should be noted that some of the participants in the introvert group were borderline introverts, as most respondents claimed to be extroverts and the researchers had trouble finding complete introverts, and that validity issues may be more severe for people who are complete introverts.

## **6. CONCLUSION**

The findings of this study, which aimed to test the effect of participants' personalities on usability testing, indicate that the personality dimensions of introversion and extroversion do affect usability testing outcomes. Extroverts found a higher number of usability problems, had a higher rate of success for completing tasks, and were more comfortable with verbalising their thoughts. The researchers therefore recommend that participants' personalities be considered in usability testing and that processes be tailored according to participants' personality dimensions and preferences in order to enhance the efficiency of testing and the validity of the results obtained. This study also highlights the importance of simplicity and intuitiveness in usability, as it was found that neither introverts nor extroverts were comfortable with cluttered and complex interfaces.

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## 9. APPENDICES

### APPENDIX A: EXPERIMENTAL TASKS

**Task 1:**

Assume that you want to book a room at the library to study. Using the website, find the next available time for study rooms. Can you find it?

**Task 2:**

Assume that you want to find the citation for the book 'The Secrets of Law' to add it to the paper that you are writing. Can you find it?

**Task 3:**

Assume that you are a big fan of the author "Jakob Nielsen" and want to know how many publications are written by your favourite author. Can you find it?

**Task 4:**

You want to find how many books that have the keywords "usability testing" in their titles were published in the last five years. Can you find them?

## APPENDIX B: PRE-TEST QUESTIONNAIRES

### Background Questionnaire

(Please underline the answer)

1. Which of the following categories include your age?  
18-24      25-29      30+
2. Gender:  
Male      Female
3. What is your first language?  
.....
4. What is your nationality?  
.....
5. What is your current education level?  
Undergraduate student  
Master student  
PhD student  
Other (please specify)  
.....
6. How long have you been using the Internet?  
Less than a year    1-2 years  
3-5 years      More than 5 years
7. On average, how many hours a day do you use the Internet?  
Less than an hour    1-2 hours    3-4 hours    5+ hours
8. Have you ever participated in a usability testing experiment?  
Yes      No

### **Pre-Test Personality Questionnaire**

Answering these questions accurately requires honest reflection on how you really think, feel, and act in general. Some of the questions on this test, measure personality traits differently than you might guess so trying to answer the testing a way you think would be ideal is not going to be beneficial, so please just focus on being honest.

Very inaccurate 1 2 3 4 5 Very accurate

- 1) I frequently do things without a specific schedule or plan.
- 2) I frequently come up with ideas/solutions out of nowhere.
- 3) I think rules and regulations are necessary.
- 4) I tend to be more comfortable with the known than the unknown.
- 5) I tend to value fairness more than feelings.
- 6) I am extremely outgoing.
- 7) I tend to pay more attention to my thoughts than my feelings.
- 8) I require lots of time alone to recharge.
- 9) I prefer to keep things open and flexible.
- 10) I feel very comfortable around people.
- 11) I favour the surreal.
- 12) I tend to prefer actual examples to theoretical ones.
- 13) I tend to be more realistic than conceptual.
- 14) I often start/do things at the last minute.
- 15) I tend to make specific plans before taking action.
- 16) I talk a lot.
- 17) I am very open.
- 18) I am a private person.
- 19) I tend to be spontaneous.
- 20) I base my goals in life on inspiration, rather than logic.
- 21) I tend to value competence more than compassion.
- 22) I value solitude immensely.
- 23) I am extremely sentimental.
- 24) I am far more casual than orderly.
- 25) I am extremely passionate.
- 26) I tend to make decisions based on logic and facts.
- 27) I am more of a planner than an improviser.
- 28) I am very introspective.
- 29) I make friends easily.
- 30) I tend to analyse things objectively and critically.
- 31) I am somewhat disorganised.
- 32) I rely mostly on my feelings to guide my decision-making.
- 33) I find it difficult to approach others.
- 34) An argument with feeling has more effect on me than a cold rational one.
- 35) I greatly appreciate strangeness.
- 36) I value compassion over analytical reasoning.
- 37) I prefer structured environments to unstructured ones.
- 38) I tend to prefer the specific to the general.
- 39) I am weird.
- 40) I tend to be more down-to-earth than head-in-the-clouds.
- 41) I prefer to keep my spaces clean.
- 42) I tend to trust the mind more than the heart.
- 43) I tend to be more practical than abstract.
- 44) I focus far more on possibilities than present reality.
- 45) I am very social.
- 46) I am extremely interested in abstract ideas.
- 47) I tend to be organised.
- 48) I avoid unnecessary interaction.

**APPENDIX C: OBSERVATION SHEET**

Task #: ...1.... Time on tasks: ..... No. of errors: ...4....

Task Completion Rate: 75% Successful: ...3.... Unsuccessful: ...1....

No.	Usability Problems Discovered
	.....
	.....
	.....

Task #: ...2.... Time on tasks: ..... No. of errors: .....

Task Completion Rate: Successful: ..... Unsuccessful: .....

No.	Usability Problems Discovered
	.....
	.....
	.....

Task #: ...3.... Time on tasks: ..... No. of errors: .....

Task Completion Rate: Successful: ..... Unsuccessful: .....

No.	Usability Problems Discovered
	.....
	.....
	.....

Task #: ...4.... Time on tasks: ..... No. of errors: .....

Task Completion Rate: Successful: ..... Unsuccessful: .....

No.	Usability Problems Discovered
	.....
	.....
	.....

**APPENDIX D: POST-TEST QUESTIONNAIRES**

A. Please tick the box corresponding to your answer:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
It was easy to participate in this experiment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It was easy to perform and concentrate on the tasks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It was easy to verbalise my thoughts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thinking aloud affected my behaviour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt distracted by the evaluator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would be interested in participating in similar experiments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B. What did you like about the usability testing session that you have just participated in?

.....  
 .....

C. What did you dislike about the usability testing session that you have just participated in?

.....  
 .....

D. Please give any suggestions that could improve the testing experience.

.....  
 .....

**SUS FORM**

1. I think that I would like to use this system frequently

1	2	3	4	5

2. I found the system unnecessarily complex

1	2	3	4	5

3. I thought the system was easy to use

1	2	3	4	5

4. I think that I would need the support of a technical person to be able to use this system

1	2	3	4	5

5. I found the various functions in this system were well integrated

1	2	3	4	5

6. I thought there was too much inconsistency in this system

1	2	3	4	5

7. I would imagine that most people would learn to use this system very quickly

1	2	3	4	5

8. I found the system very cumbersome to use

1	2	3	4	5

9. I felt very confident using the System

1	2	3	4	5

10. I needed to learn a lot of things before I could get going with this system

1	2	3	4	5

## APPENDIX E: LIST OF ISSUES

### Identifiers:

E = Identified by Extroverts

I = Identified by Introverts

### Severity:

- 0 Not a usability problem
- 1 Cosmetic problem
- 2 Minor problem
- 3 Major problem
- 4 Catastrophic problem

#### Task 1:

1. Meaning of blue boxes is not clear (E, I) - Severity 2
2. Organisation of links is unclear (E, I) - Severity 3
3. Search results are not relevant (E) - Severity 3
4. UI does not look very attractive (E) - Severity 1

#### Task 2:

1. Information cannot be found/User cannot be sure if the information is not there or he is unable to find it (E, I) - Severity 0
2. No easy way to get help for an issue (tooltips, pop-ups, alternate site links etc) if information is not available (E, I) - Severity 2
3. Search is not very user-friendly (E, I) - Severity 3
4. Very few videos (E) - Severity 2
5. Page organisation is poor. Too much information on every page, they should be divided into different pages and organised better (E) - Severity 1

#### Task 3:

1. Main search does not give expected results (E, I) - Severity 3
2. Two searches on same page (main page) are confusing. The purpose is not clear (E) - Severity 2
3. On searching for the book through the main "search", the sidebar changes which is very confusing (E) - Severity 2
4. Lot of links just lead to images or informational text, which is frustrating and time wasting (example: all the left side bar links) (E, I) - Severity 2
5. Too much information/clutter on many pages (E, I) - Severity 1
6. Terms are confusing (E, I) - Severity 2
7. There is no easily understandable way to go back to library's main page. Clicking on the logo takes the user to the university home page (E, I) - Severity 2
8. Unnecessary/redundant links. Library search and "Database quick search" essentially seem to take to the same page (E) - Severity 2
9. There is no consistency. Some links take to functional pages whereas others take to static informational pages. Also, Some pages open in new tab, some open in same tab, confusing for the user (I) - Severity 2
10. The filtering feature can be better. There are too many technical terms and the "refine my results" should show number of items in each category for quick reference (E, I) - Severity 2
11. Tooltips should show descriptions and not just name of the link (I) - Severity 1

#### Task 4:

1. There is no "First" and "Last" button for search results (E) - Severity 2
2. Search should have auto-complete (I) - Severity 1
3. After clicking on a dropdown, it remains open unless the user clicks on the same dropdown again (E) - Severity 1
4. Unnecessary categories: Journal articles appear in the search results for "books and more" and vice versa, so "article search" seems redundant (E) - Severity 2
5. The display of search results can be better (better sorting, first and last buttons, options to load more items per page etc) (E) - Severity 2
6. Many links seem to be redundant, the pages can be cleaned up (E, I) - Severity 1
7. No easy way to zoom images, most are non-clickable(I) - Severity 2
8. Some links take back to same page (circular links) (E) - Severity 2
9. Alternate options for hearing or visually impaired are missing in several places (I) - Severity 3

10. Missing images on many pages (for example: "how to search") (E) - Severity 2
11. Suggested alternate searches are not accurate (E) - Severity 3