

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents the findings and the discussion of the data collected for this study. The focus of the data analysis and the presentation and discussion of the findings is to answer the following research questions:

1. Do students of differing English proficiency levels perform differently in an Internet information gathering activity?
2. What are some of the possible factors that influenced their performance?

The findings and discussion will be presented concurrently in relation to each research question.

4.2 Research Question 1

“Do students of differing English proficiency levels perform differently in an Internet information gathering activity?”

The information gathering activity was an Internet treasure hunt in which the subjects had to go to various websites to answer a total of 11 questions. The subjects' performance was gauged in terms of the number of correct answers obtained and the length of time taken to complete the task. The researcher observed each subject as he or she went about completing the Internet treasure hunt. Upon completion of the activity, the researcher carried out a retrospective

interview with each subject in order to obtain more information and to clarify certain observations.

The Internet treasure hunt results show that the group with higher English proficiency (S1 - S10) had an average of 8.5 correct answers out of 11 whereas the group with lower English proficiency (S11 - S20) had an average of 7.7 correct answers. The first group took an average of 18 minutes and 40 seconds each to complete the Internet treasure hunt and the second group took an average of 24 minutes to do so (Refer to Table 4.1).

Subject	Number of correct answers	Total time taken	Subject	Number of correct answers	Total time taken
S1	11	2'01"	S11	11	6'49"
S2	11	2'25"	S12	9	6'37"
S3	11	12'31"	S13	8	19'42"
S4	8	16'37"	S14	7	21'48"
S5	6	32'31"	S15	10	26'02"
S6	10	15'44"	S16	6	48'02"
S7	10	13'14"	S17	7	37'40"
S8	9	19'36"	S18	6	32'40"
S9	7	34'17"	S19	6	18'16"
S10	2	37'47"	S20	7	22'19"
Average	8.5	18'40"	Average	7.7	24'00"

Table 4.1 Results of the Internet treasure hunt

Therefore, the results of the Internet treasure hunt have shown that students of differing English proficiency levels do indeed perform differently in the given Internet gathering activity.

In general, the group with the higher English proficiency level outperformed the group with the lower English proficiency level in terms of the number of correct answers obtained and the length of time taken to complete the task.

In terms of the number of correct answers, the average score of all the 20 subjects was 8.1 correct answers out of 11. Nine subjects or 45% of the subjects obtained a high score, that is, a score above 8.1 whereas 11 subjects or 55% obtained a low score, that is, a score below 8.1 (see Tables 4.2 and 4.3).

Subject	SPM English	Computer Use (years)	Internet Use (years)	Main Internet Activity	Frequency of Internet Use (days/week)	Attitude Score	Number of correct answers	Time Taken
S1	A1	>3	>3	Browsing	7	33	11	2'01"
S2	A1	>3	>3	Browsing	2	37	11	2'25"
S3	A1	>3	>3	Chatting	7	29	11	12'31"
S6	A2	2-3	2-3	Downloading songs	5	30	10	15'44"
S7	A2	>3	>3	E-mailing	3	31	10	13'14"
S8	A2	2-3	2-3	E-mailing	2	28	9	19'36"
S11	C4	>3	>3	Browsing	2	28	11	6'49"
S12	C4	>3	1-2	Browsing	3	30	9	6'37"
S15	C6	>3	>3	Browsing	7	37	10	26'02"

Table 4.2 Subjects with high scores (> 8.1)

Subject	SPM English	Computer Use (years)	Internet Use (years)	Main Internet Activity	Frequency of Internet Use (days/week)	Attitude Score	Number of correct answers	Time Taken
S4	A1	1-2	1-2	E-mailing	1	31	8	16'37"
S5	A1	1-2	1-2	E-mailing	2	25	6	32'31"
S9	A2	>3	>3	Chatting	7	35	7	34'17"
S10	A2	1-2	1-2	E-mailing	1	30	2	37'47"
S13	C5	2-3	1-2	E-mailing	1	30	8	19'42"
S14	C5	1-2	1-2	E-mailing	3	26	7	21'48"
S16	C6	1-2	1-2	Chatting	4	33	6	48'02"
S17	C6	>3	1-2	E-mailing	5	29	7	37'40"
S18	C6	>3	2-3	Browsing	2	34	6	32'40"
S19	P7	1-2	1-2	E-mailing	2	30	6	18'16"
S20	P7	>3	>3	E-mailing	2	28	7	22'19"

Table 4.3 Subjects with low scores (< 8.1)

As can be seen from Table 4.2, three or 30% of the subjects with low English proficiency (S11, S12 and S15) obtained high scores in the Internet treasure hunt. All three subjects listed browsing as their main Internet activity. The majority of these subjects had also been using computers or the Internet for more than 3 years.

In Table 4.3, it can be observed that four or 40% of the subjects with high English proficiency (S4, S5, S9 and S10) obtained low scores in the Internet treasure hunt. None of these four subjects listed browsing as their main Internet activity. Their main Internet activity was either e-mailing or chatting. The majority of these four subjects had been using computers or the Internet for only 1-2 years.

The possible reasons for the performance of these subjects which did not correspond with the general results of their respective groups will be discussed in the next section.

In terms of the pathway that the subjects took, the researcher observed that all 20 subjects completed the Internet treasure hunt in a linear method. In other words, regardless of English proficiency levels, all the subjects began with the first question and progressed systematically down the list to the final question.

The researcher also noted in her observations that S3 and S15 used the CTRL+F shortcut function to find the answers. CTRL+F is a shortcut function that opens an additional window for the user to type in a keyword to search the web page

being viewed. However, none of the other subjects made use of any shortcut keys or displayed any other IT skills.

Although it did not have any bearing on the outcome of the Internet treasure hunt, another observation made by the researcher was that some of the subjects were more visual than others. Felder (1995) defines a visual learner as one who prefers visually presented information such as pictures, diagrams, flow charts, time lines, films, and demonstrations – rather than spoken or written words. In answering question 4b which was “If you were coming from the San Francisco International Airport, which highway do you have to take first to get to the California campus?”, some of the students did not scroll down to the text where the answer could be obtained. Rather, they studied the map in the web page and obtained their answers via the visual input instead of the textual one. Six out of the 20 subjects (S1, S7, S8, S11, S13 and S16) displayed this affinity for visual rather than textual input. Based on the retrospective interviews, the following are some of the reasons given by the subjects for studying the map instead of scrolling down to the text:

S1: The map caught my eye.

S7: Too many words, don't want to read. So I read the map.

S8: The map was more attractive.

Interestingly, all six of these “visual” subjects were male. It was not within the scope of this study to look at gender differences but perhaps further quantitative research may be carried out to delve deeper into this interesting observation.

4.3 Research Question 2

"What are some of the possible factors that influenced their performance?"

This section presents and discusses the possible factors that influenced the performance of the subjects in the Internet treasure hunt. The factors include language related factors, prior experience, main Internet activity, interface design and individual differences.

4.3.1 Language Related Factors

The main reason behind the difference in the results of the Internet treasure hunt between the two differing proficiency groups appears to be related to language, namely vocabulary and the phrasing of the questions. Many of the subjects from the lower proficiency group could not answer some of the questions due to their inability to understand the questions and certain words and phrases.

a) Vocabulary

In the case of S5 and S9, the main reason for their performance seemed to be language related. Although they belonged to the group with higher English proficiency, they were unable to understand some of the words they came across during the course of the Internet treasure hunt.

Although she obtained an A1 for her SPM English paper, S5 only managed to obtain 6 correct answers out of 11 in the Internet

treasure hunt. She took 32 minutes and 31 seconds to complete the hunt, significantly longer than the average time taken by her group.

She faced a certain amount of difficulty due to the fact that she did not fully understand the meaning of words like “headline” and “euphoric”. Question 1a which was “What is today’s headline?” and question 3b which was “What is the headline?” were incorrectly answered because she thought “headline” meant “main story” and she therefore proceeded to read the entire article and state the main story in her own words rather than just copy down the headline. For question 5c which was “What did she die of?” her answer was “euphoric”. During the interview, when the researcher asked her why she had answered “euphoric”, she explained that she had done so simply because she “didn’t know what is euphoric (*sic*)”.

As for S9, he only obtained 7 correct answers. The total time he took to complete the treasure hunt was 34 minutes and 17 seconds, which was very much higher than the average time of 18 minutes and 40 seconds for his group.

During the interview, it was discovered that the reason why he could not answer question 5a (“Name William Shakespeare’s maternal grandfather”) was because he did not know what “maternal” meant. Although he could understand question 5c

("What did she die of?"), he could not answer it because of insufficient vocabulary.

I : How come you couldn't answer question 5a?

S9 : I don't know what is *maternal*.

I : Why couldn't you answer question 5c?

S9 : I don't know what is *succumbed*. I thought *baptized* is a disease.

Many subjects from the lower English proficiency group also faced vocabulary problems. For example, S14 was unable to find the answer for question 5c which was "What did she die of?". The answer given by S14 was "She was baptized". The subject obviously did not know what the word "baptized" meant.

b) Phrasing of Questions

The phrasing of some of the questions also appeared to affect the subjects' ability to answer the questions correctly. For example, S5 answered question 4a incorrectly because she had misinterpreted the question. The question was "If you were a volunteer serving as a campus guide, what would your job description be?" Below is an excerpt of the interview illustrating her inability to understand the phrasing of the question:

I : Why did you give this answer? What did
you think the question was?

S5 : I thought... if I was a volunteer what job do I
have to do.

The subject, in spite of her excellent SPM English results, did not fare well in the Internet treasure hunt. She appeared to have problems understanding the phrasing of some of the questions.

S9 also faced similar problems understanding some questions. He could not answer question 4a (If you were a volunteer serving as a campus guide what would your job description be?) because he did not understand the phrasing of the question.

I : Why didn't you answer question 4a?

S9 : I don't understand the question.

Many of the subjects from the lower English proficiency group had similar question-related problems. For example, S17 had trouble answering question 4a as well. The following is an excerpt of the interview which illustrates her misunderstanding of the question:

I : Did you understand question 4a? What did you think
it meant?

S17 : I thought it is if I want to volunteer, what position do
I want.

Therefore, based on the examples presented above, it appears that language-related problems could have been a factor which accounted for the differing performance of the various subjects.

4.3.2 Prior Experience

The findings of the study seem to suggest that prior experience, that is, the number of years the subject has been using computers and the Internet, also has a bearing on the outcome of the Internet treasure hunt.

a) Subjects with High Scores

As Table 4.2 shows, all the subjects with high scores in the Internet treasure hunt had been using computers for at least 2 years. In fact, seven out of the nine subjects (78%) had been using computers for more than 3 years. The other two subjects (S6 and S8) had been using computers for 2-3 years.

As for Internet exposure, six out of the nine subjects (67%) had been using the Internet for more than 3 years. Two of the subjects (S6 and S8) had been using the Internet for 2-3 years and only one subject (S12) had been using the Internet for 1-2 years.

S15, for instance, had obtained a C6 for his SPM English paper. However, he obtained a near-perfect score for the Internet treasure hunt. He was able to answer 10 out of 11 questions correctly albeit

in 26 minutes and 2 seconds, slightly longer than the average time recorded for his group.

The following interview excerpt seems to suggest that this subject took more time to complete the hunt due to the fact that he was a more thorough reader.

I : Why did you take so long to answer question

1a? All you had to do was copy the headline.

S15 : I know but I read through all, just to be sure.

An interesting observation made by the researcher was that this subject made use of the CTRL+F function to locate key words. When one uses CTRL+F, a window will appear which enables the user to type in a key word to be located within the web page. This is especially useful when searching for answers in a text-oriented website like <http://www.shakespeare-online.com>. It was observed that the subject used this function when answering 6 out of the 11 questions. For example, for question 5a, instead of reading through the entire text to find out who Shakespeare's maternal grandfather was, he merely used the CTRL+F function to type in the key word "maternal". Immediately, all the words "maternal" in the web page were highlighted. This eliminated the need to read through the entire text and significantly reduced the length of time taken to answer the question.

However, in spite of using the CTRL+F function, the subject was unable to answer question 5c. Although he had found the sentence which contained the answer, he was unaware of it because he did not know that “succumbed to the plague” meant that she had died of the plague. Hence, although S15 possessed relatively advanced navigation skills, the limiting factor for him in this study appeared to be language-related.

This subject had extensive exposure to the Internet since he had been using it for more than three years. This probably explains why he was able to navigate with ease and use functions like the CTRL+F function. Nevertheless, this study has shown that experience and advanced Internet skills alone do not necessarily guarantee successful information gathering via the Internet. One must also possess an adequate English proficiency level to be able to understand and make use of the information that is on the Internet.

b) Subjects with Low Scores

Comparatively, the subjects with low scores in the Internet treasure hunt had less experience with computers and the Internet. As can be seen from Table 4.3, only 4 out of 11 subjects (36%) had been using computers for more than 3 years. One subject had been using

computers for 2-3 years and the majority, that is, 6 out of 11 or 55% of the subjects had been using computers for only 1-2 years.

The difference between the group with the high scores and the group with the low scores in terms of prior Internet experience was even more pronounced as only 2 or 18% of the subjects had more than 3 years' experience using the Internet. One subject had been using the Internet for 2-3 years. Most of the subjects (73%) had only 1-2 years' experience using the Internet.

S10, who had obtained an A2 in her SPM English paper, was only able to obtain 2 correct answers in the Internet treasure hunt, taking a total of 37 minutes and 47 seconds to do so. As the researcher observed her completing the Internet treasure hunt, it became quite apparent that this subject was quite inexperienced with the Internet. She was the only subject to actually type out "http://" before the rest of the URL. When questioned about this in the interview the subject explained that she was unaware that it was unnecessary to do so. S10 also appeared to have very limited navigation skills. When asked by the researcher why she had chosen not to click on some necessary links, her reply was, "I don't know whether can click or not". Her poor performance in the Internet treasure hunt could have stemmed from her lack of prior experience with computers and the Internet.

These findings imply that the subjects with more experience or exposure to computers and the Internet performed better in the Internet treasure hunt. This could be because the treasure hunt was an Internet information gathering activity and therefore, familiarity or experience with the medium would have been an added advantage. However, in this study, it was discovered that mere length of exposure to the Internet is insufficient in ensuring success in the information gathering activity. The next section will illustrate the fact that *what* the subject does while logged on to the Internet is as important, if not more important than *how long* the subject has been using the Internet.

4.3.3 Main Internet Activity

It appears that the main Internet activity of the subjects could also be a factor which influenced their performance in this study. It is interesting to note that the three subjects (S11, S12 and S15) who obtained high scores in spite of having low English proficiency had indicated in the survey that browsing was their main Internet activity. And, none of the four subjects (S4, S5, S9 and S10) who obtained low scores despite having high proficiency had indicated in the survey that their main Internet activity was browsing. S4, S5 and S10 had listed e-mailing as their main Internet activity whereas S9's main Internet activity was chatting.

This seems to indicate that, apart from prior experience, the main Internet activity of the subject also had an effect on the outcome of the Internet information gathering activity. After all, if a subject had been using the Internet every day for more than 3 years, but only used it for chatting, he would not have acquired the necessary skills to navigate successfully in the Internet. This explains why S11, S12 and S15 displayed the ability to navigate the Internet with competence and ease. S15 even displayed a somewhat more advanced Internet skill of using the CTRL+F function. This concurs with Altun (2000), who found that experienced Internet users develop strategies when gathering information in hypermedia, thus minimizing disorientation and “getting lost in cyberspace”.

4.3.4 Interface Design

Interface design refers to the visual and textual information presented on a web page. The organization of text and graphics on web pages can engage and influence readers in terms of directing their attention, prioritizing the information they see and making their interactions more efficient and enjoyable (Lynch and Horton, 2002).

In this study, it was found that some of the subjects were affected by the interface design of the websites. To answer question 4b, the subjects had to view a web page which contained a map as well as text. One of the subjects, S8, obtained the correct answer, not by scrolling down and reading the text but rather, by reading the map.

When asked about his behaviour in the interview, he described himself as being a very “visual” person. Instead of finding the answer to question 4b from the text, which he found to be “too wordy”, he obtained the answer by studying the map. Six out of the 20 subjects (S1, S7, S8, S11, S13 and S16) were observed to have studied the map in order to obtain the answer. Therefore the presence of the map on the same page as the text enabled the subjects to select their preferred method of obtaining the answer.

According to Schroeder (1994), the design and layout of a hypermedia page can cause people to suffer from disorientation and cognitive overload. S17 was not able to answer any of the questions based on the Shakespeare website. When interviewed, she explained that she felt the website had “too many words” and was “difficult to read”. Lynch and Horton (2002) found that dense text documents are difficult to read, especially on the relatively low-resolution screens of personal computers. Apart from this, the text-oriented web pages found in the Shakespeare website lacked the visual impact of graphics to motivate the subjects.

4.3.5 Individual Differences

In this study, it was also discovered that individual differences affected the subjects’ performance in the Internet gathering activity.

a) Assumptions

Two of the subjects were found to have had certain assumptions which led to their inability to obtain the correct answers for certain questions.

In answering question 3b (What is the headline?), S8 did not write down the correct headline simply because it was pertaining to a local incident. When asked about this in the interview, he explained that he thought headlines had to pertain to either international or political issues. And since, the actual headline was about a local incident, he felt that it could not be the headline.

Another subjects, S14 gave an incorrect answer to question 1a simply because she was attracted by the picture in the website. Instead of writing down the headline of the main story, she jotted down a smaller headline of one of the other stories simply because it was accompanied by a picture. Chun and Plass (1997) found that visual information in a hypermedia environment can help readers to understand better. However, this did not seem to be the case for this subject in this study because S14 had assumed that the main story would be the one which was accompanied by a picture. This assumption caused her to be unable to obtain the correct answer.

b) Carelessness

Some of the subjects were found to have been careless when carrying out the information gathering activity in terms of not reading the questions properly. Six of the twenty subjects (S4, S8, S14, S16, S18 and S19) were not able to answer some of the questions correctly due to carelessness on their part.

For example, the answer given by S8 for question 5c (What did she die of?) was “after September 15”. The following is an excerpt of the interview:

I: Why did you put “after September 15” as
the answer to question 5c?

S8: Because that’s when she died, isn’t it?

I: Read the question again.

(Subject reads the question)

S8: Oh... what did she die of... I didn’t read the
question properly.

Three of the subjects (S14, S16 and S18) obtained incorrect answers for question 2b (How many Canadian dollars is RM2 worth?) because they had not read the question properly. S14 and S18 converted Canadian dollars into US dollars because they had not noticed that the question required a conversion of Malaysian Ringgit into Canadian dollars. As for S16, he admitted in the

interview that he had “read the question too fast”, causing him to misinterpret the question and thus answer incorrectly.

Therefore, as far as these three subjects are concerned, it seems that their carelessness in reading the questions led to a decline in their performance in the Internet treasure hunt. In other words, their gathering of information via the Internet was hampered by the fact that they were not careful when reading the questions.

c) Lack of perseverance

One of the subjects, S10, was the only subject to give up without completing the Internet treasure hunt. She did not answer the last two questions because she had become too de-motivated to complete the hunt. After spending almost 40 minutes on the activity and only obtaining two correct answers, the subject did not wish to persevere further.

In trying to answer question 5a, the subject clicked on various unrelated and unnecessary links. After almost 10 minutes, she became very de-motivated and indicated to the researcher that she wanted to give up.

Although S10 had been using the Internet for 1-2 years and obtained information for assignments and projects mainly from the Internet, her performance on the Internet treasure hunt was

significantly below average for her group. Although there was no clear indication from her completed questionnaire, it was very obvious during the treasure hunt that she was a rather limited Internet user. Her inability or reluctance to complete the hunt was due the fact that she was acutely aware of her limitations and had become extremely de-motivated. Her performance could have stemmed from her extremely limited navigation skills as well as her awareness of this limitation. Lacking the perseverance to carry on, she decided to quit.

This shows that one's ability to gather information via the Internet does not only hinge on adequate English proficiency. This study has shown that other factors such as navigation skills and personality also come into play.

4.4 Conclusion

To sum up, this chapter has presented the findings and discussion of the data obtained in order to answer the research questions. In this study, it has been found that students of differing English proficiency levels do indeed perform differently in an Internet information gathering activity. Five possible factors have been found to influence their individual performances. The factors that have been identified are: language related factors, prior experience, main Internet activity, interface design and individual differences. The factors have been discussed at length in the preceding sections.

These factors were perceived to have had an influence on the performance of the subjects in the information gathering activity based on the survey conducted, the outcome of the activity, the observations of the researcher as well as the retrospective interviews. Therefore, it must be stressed that all these factors are merely *possible* factors which were discovered during the course of this study. More quantitative studies will need to be carried out to fully gauge the true extent of the influence these factors have on information gathering via the Internet.