Cost and Benefit of Information Search using Two Different Strategies

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Abstrak

Pencarian informasi merupakan salah satu aktifitas utama ketika menggunakan internet bagi para tempat pencari informasi untuk mendapatkan manfaat dengan membayar biaya tertentu. Secara umum, pencari informasi jarang menggunakan strategi pencarian untuk mengeksplorasi ruang informasi. Di sisi yang lain, pada keadaan tertentu, pencari informasi akan menggunakan strategi khusus, terutama bagi mereka yang melakukan aktifitas pencarian fakta. Tujuan penelitian ini adalah untuk memahami penggunaan strategi pencarian untuk mendapatkan manfaat terbesar selama aktitas pencarian informasi berlangsung. Penelitian ini menggunakan teori dua-faktor yang mengelompokkan elemen perancangan Web ke dalam manfaat dan biaya yang dimanifestasikan sebagai motivator dan faktor higienis. Metode penelitian yang digunakan adalah eksperimen yang melibatkan 235 responden yang berpartisipasi secara sukarela. Responden dikelompokkan menjadi dua grup, yang diberi nama 'plan-group' dan 'unplan-group.' Kedua kelompok responden diberikan tugas tertentu yang berkaitan dengan pencarian informasi. Eksperimen diakhiri dengan survei. Hasil penelitian menunjukkan bahwa responden yang berada di 'plan-group' memperoleh manfaat yang lebih kecil, dan biaya yang lebih besar, dibandingkan dengan responden yang berada di 'unplan-group'. Di bagian akhir makalah ini ditunjukkan salah satu arah untuk mengembangkan penelitian ini.

***Kata kunci**: eksperimen, pencarian informasi, survei, teori dua-faktor*

Abstract

Searching for information is one major Internet activities during which information seekers may gain benefit as well as incurred some cost. In general, information seekers seldom employ any search strategy for general browsing to explore information space. On the other hand, in certain situation, they may employ certain search strategy, especially those who engage in a fact-finding activity. The objective of this research is to shed light on how search strategy can be used to gain the maximum benefit of information search activities. It borrows the two-factor theory to group Web design elements into benefit and cost manifested as motivating and hygiene factors. This research employed a laboratory experiment with 235 respondents who were participated on this research voluntarily. Respondents were divided into two groups, namely 'plan-group' and 'unplan-group'. Both groups were given certain tasks related to information search. The experiment was followed by a post experiment survey. The result shows that respondents who were in the 'plan-group' perceived less benefit and incurred more cost compared to those in the 'unplan-group'. The future research is proposed at the end of this manuscript.

***Keywords**: information search, two-factor theory, experiment, post experiment survey*

1. Introduction

The Internet is a jungle of information where individuals can find a vast collection of information. The volume of information on the Internet keeps growing as every individual has every right to put any information they want other people to read. The ever-increasing amount of information on the Web creates problems for individuals who try to find information on the

Internet. The problems came from the fact that Web search engines are designed to support only one type of information-seeking strategy, i.e. specifying queries by using terms to select documents from the database [1]. To overcome this limitation, users often have to go back and forth between pages to find information of interest. In one hand, besides getting the intended information, they may get other related important information. On the other hand, they may not be able to get anything at all. In the first case, consumers get some sort of benefits in return for their time browsing the Internet. In the second case, consumers get nothing, but have lost their precious time without getting anything.

The above elaboration shows that Web surfing activity is bounded by a cost-benefit analysis. When surfing a Website, surfers may obtain some benefits, e.g. knowing that new products have been released in the market, and incur costs, e.g. time. Surfing benefits and costs may also be attributed to the way the Web is designed, thus related to the Web design factors. For example, slow download speed may be due to the slow Internet connection, but may also be due to the need to download many images, not to mention the size of each image itself. Motivated by the above concern, the purpose of this study is to shed light on how Web design factors can be assessed as the benefits and costs that users obtain or perceive during information search. This study also tries to compare the perceived benefit and cost for users who employ different strategy during their information search activities.

2. Approach

Search strategy is the approach that the information seekers employ to find information of interest (www.merriam-webster.com). Marchionini [2] divides strategy into analytical strategy and browsing strategy. Analytical strategy is formal and batch-oriented, while browsing strategy is informal, opportunistic and interactive. Jul and Furnas [3] describe searching as information seeking task to look for a known object, while browsing is to see what is available. Inline with the above definition, Choo et al. [4] stated that fact-finding mission is classified as formal search, signified by deliberate or planned efforts to find specific items.

2.1 Cost and Benefit of Information Search

Information search activity relies on the availability of the source of information provided by the information providers. However, not all information on the Internet is trustworthy although some of them are very useful to certain people. Considering that information seekers may found the unwanted information, in both good and bad sense, the information seekers are subject to cost/benefit analysis.

The incurred costs during an information-seeking episode include risk of accepting poor information and the assumption of subordinate position. In the Internet, data was neither designed for integration nor to be presented as coherent information [5]. Extracting and combining relevant information is pushed to the Internet users. Besides, information provided on the Internet is not always trustworthy and often outdated. Seekers need to exercise their discretion in digesting any information they get from the Internet. In other words, seekers must understand the risk of accepting inaccurate and outdated information.

For information seekers, information value and relief from decision anxiety are the benefits the seekers can get from receiving information. As stated earlier, information search is the seeker's constructive activity of finding meaning from information in order to extend his state of knowledge on a particular problem or topic. When seekers have to make decision about a particular problem, they may need to collect information about problems before making decisions. Whether or not the collected information relevant to the decision making process depends on how seekers value the collected information. The collected information may not directly provide solution to the problem at hand, but it may still useful to give enough clue to other information that can be used to solve the problem [6]. With enough relevant information in hand, seekers are getting more confidence in their decision-making process.

2.2 Cost-Benefit Analysis Related to Web Design

Website mediates a communication within the Internet. As such, a cost/benefit analysis related to a Website need to be assessed. The rationale is that when users visit a Website, they may or may not get the information they intend to find, but surely they will incur cost.

The two-factor model of Web design and evaluation comprises two groups of factors called motivators and hygiene factors [7] [8]. In the context of Web design, motivators are those Web design elements that lead to user satisfaction, and hygiene factors are those design elements that lead to user dissatisfaction. Thus, motivators are also called satisfiers and hygiene factors are also called dissatisfiers. They differentiated satisfaction from dissatisfaction because when a user is not satisfied with a particular Web design, it does not mean he is dissatisfied with it, and vise versa.

2.2.1 Benefit of Information Search

Benefit can be defined in many ways, e.g. related to activity, product, or service. In relation with activity, benefit is defined as "inclusive terms used to quantify the positive expected results or outputs of a proposed activity". Benefits are perceived, not necessarily real.

A Website can be viewed as a service. It is owned by individuals or companies for the purpose of offering their products and/or services to their customers. The products and/or services are shown using Web design elements, e.g. images, information contents, as well as links and other navigation means. As such, the benefits that a Website offers to its users can be perceived from its design elements.

In the two-factor model [7], [8], the term "motivators" is used to group Web design elements that have strong supportive motivational features, i.e. enjoyment, cognitive outcome, credibility, and visual appearance. According to this model, these features could bring users to state of satisfaction. Thus, it is argued that these design elements are the benefits the users perceive during their Web visit.

Enjoyment. In Zhang and von Dran [7], enjoyment is described as design factors that make the Website enjoyable and entertaining to use. Enjoyment is an "act of receiving pleasure from something". Empirical results have shown that enjoyment "explained additional variance in usage intentions" [9]. When users enjoy their visit to a Website or felt entertained by what they see on, or hear from, that Website, they get the benefits as an exchange for their time visiting it.

Cognitive outcome is related to learning while using a Website [7]. Learning (or training) is related to the formation of a mental model [10] of a particular system, e.g. Website. With better mental models, users may perform better on certain tasks. With this evidence, it is argued that cognitive outcome is a benefit for those who engage in an exchange transaction through the use of Website.

Credibility is related to identity, recognition [7] and reputation [11]. Credibility "involves the degree to which consumers trust the information provided by an online retailer is one important element of online retail service quality" [12]. Company credibility is "the extent to which consumers feel that the firm has the knowledge or ability to fulfill its claims and whether the firm can be trusted to tell the truth or not" [13]. This to imply that accepting credible information would be a benefit to seekers.

Visual appearance relates to the look of a website [7]. This includes color combination, typeface, font size, screen layout, and the appropriate use of graphics. Consistent visual appearance affects the development of a mental model that facilitates learning, and affects user performance.

2.2.2 Cost of Information Search

Users who visit a new website may experience difficulties in navigating that website. They may encounter slow downloading, need to reveal personal particulars in order to be able to download materials and need to spare their time to do the surfing. All these difficulties and hassles can be considered as the cost that seekers have to pay while accessing a website. As a result, seekers may turn their back from that Website because they think that their visit is not worthwhile, i.e. the incurred costs are greater than the benefits.

Cost is defined as something valuable that has been given up in exchange for goods or services. In this definition, "something valuable" can be in the form of monetary means, time, or other valuables. As with "motivators", the term "hygiene factors" is used to group Web design elements that make the Website function properly and usable. In the two-factor model, three categories were clearly identified hygiene factors, i.e. technical aspects, navigation, and privacy and security. It is argued that these categories are the cost that must be bourn by users when they visit a Website. The arguments are as follow.

Technical aspects relate to the basic functions of a website [7]. Often, when users surf a particular Website, they see "Under construction" messages, come across broken links, wrong links, and pages that link to themselves. Users may leave the website, and probably may not want to revisit that website. Users may perceive this situation as wasting their time, without getting any gain or benefit. It is a cost.

Another cost related to the technical aspects is download delay. A slow download speed may cause frustration. Several studies have identified download speed as one of important design criteria for the Web success [14]. A lack of Internet standard is also problematic. For example, there are several browsers available on the market. However, they do not have the same capabilities and features when it comes to certain plug-ins, e.g. a browser may not be able to run Java applets, or not able to show certain type of characters. Also, different operating systems often cause incompatibility problems.

Navigation. The foundation of Websites is based on hypertext that is "a database composed of a collection of nodes of data items and where relations between nodes are represented by explicit links" [15, p. 239]. The non-linear structure of hypertext enables individuals to jump from one part to another quite easily. However, as the volume of data increases that navigation becomes more complex, users may found hard to position themselves that it's hard to determine 'where am I?', 'where have I been?', and 'where can I go?' [16] [17]. This problem is known as disorientation [18]. Because of such a condition, MacKenzie and Cockburn [19] argue that the length of the navigation period impacts the revisitation, and the visited information space [17]. Thus, it is argued that when users navigate a Website and becomes disoriented, they may have lost what they already collected. In this case, they suffer from the lost of their time and perhaps the precious information they previously discovered but had forgotten.

Privacy and Security. Privacy is "the protection of sensitive and personal information from unintentional and intentional attacks and disclosure". When conducting an online transaction, customers are asked to reveal their personal information that will be kept in the company's database. This is the trade-off the consumers get from conveniently doing online transaction. Many studies have been conducted to investigate the effect of privacy toward online behavior. Koyuncu and Lien [20] showed that privacy has negative impacts on online orders. Privacy concerns also influence customer's trust [21], perceived risk [22], and purchase intention [22] [23].

Perceived Web security is the extent to which one believes that the Web is secure for transmitting sensitive information. In the case of purchasing products on the Web, it is possible that potential adopters may perceive that their credit card information may be at risk, and that they have no control over this [24]. The lack of security, reliability and accountability make the Internet transactions too risky for many users. The issue of privacy and security relates to company's trustworthiness [25]. Security concerns hinder customers from buying things online [26], affecting customer trust [27], purchase intention [22], information satisfaction and benefit [28], and increase reluctance in giving sensitive personal information [23]. Security is also playing an important role toward perceived usefulness [29]. The above evidences show that privacy and security can be considered as incurred cost.

3. Research Method
3.1 Hypotheses Development

As explained by Marchionini [2], seekers who employ analytical strategy make a careful plan before searching. This strategy starts with index entry points and follows the links until the information is found or all entry points are exhausted. On the other hand, seekers who employ browsing strategy rely on their ability to recognize relevant information heuristically and opportunistically. This strategy allows the seekers to move across or within screens, windows, records, and databases. Following these definitions, for the purpose of this study, a derivation of analytical strategy and browsing strategy is proposed, and it is called planned strategy and unplanned strategy, respectively.

The planned strategy is defined as a search strategy where the seekers deliberately plan their action before searching and follow strictly their plan to complete their information seeking tasks. With this restriction, the seekers will have no or very little chance to wander around the screen or across windows. The unplanned strategy is defined as a search strategy in

which no plan is necessary for the seekers to start searching, thus the seekers can move freely on their will.

According to the above definition, seekers who employ the planned strategy have to strictly follow their search plan. As such, it is argued that this type of seekers will have fewer chances to wander around the Website compared to those who employ the unplanned strategy. In other words, seekers who employ the unplanned strategy will have more chance to navigate the Website, and to move across screen and windows more freely. As a result, the unplanned seekers are able to perceive more Web design elements.

To have a better understanding about the difference of these two strategies, take a tourist who visits a downtown area to find a building named "Building A" as a metaphor of a user who surfs a Website to find information about certain product. User with planned strategy is like a tourist with exact route to find the intended building. In this situation, the tourist may not notice the "not relevant" buildings, although he actually passes through those buildings. The opposite situation happens when the tourist is on the free and easy program. When he passes through the downtown area slowly, even small and less popular buildings may attract him to stop for a while. This is like a user with unplanned strategy.

Bilal and Kirby [30] examined Web search behavior of the seventh-grader students and graduate students. They found that seventh-grader students and graduate students have differences and similarities in their search strategies. The differences were due to the difference in their navigational style and their ability to focus on the given tasks.

As explained in the previous subsection, this study adopts the two-factor model of Website design elements of Zhang and von Dran (2000) in which Web design elements that fall into motivators category are considered as the manifestation of the perceived Web search benefits, and those that fall into hygiene factors category are the manifestation of the perceived Web search costs. The more the seekers perceived the existence of motivators, the more Web search benefits they get. The more the seekers perceive the existence of hygiene factors, the less Web search costs they incur. As such, it is argued that seekers with different strategies will perceive both search benefit and search cost differently. Therefore, the following hypotheses are stated:

H1:   *Seekers who do not follow any search plan will perceive more Web search benefit compared to those who strictly follow a search plan*

H2:   *Seekers who do not follow any search plan will perceive less Web search cost compared to those who strictly follow a search plan*

H3:   *Seekers who do not follow any search plan will perceive more net-benefit compared to those who those who strictly follow a search plan*

3.2 Laboratory Experiment
3.2.1 Participants Gathering and Grouping

Laboratory experiment was employed in this study. The respodents were participated voluntarily after they were informed via email. Total of 235 respondents were gathered, and all of them were undergraduate students. When they registered to participate, they chose one of the six available experiment time slots, across 3-day experiment period, each comprises maximum of 49 seats (the maximum number of seats in the laboratory used for the experiment). When respondents were registering to participate in this study, they were not told to which group they would be assigned. They only had to choose their preferred time slot. Only after the registration was closed, participants in each time slot then were assigned either as the plan-group (PG group) or the unplan-group (UPG group) randomly without their prior knowledge. As such, there were three time-slot-based groups were assigned as the PG groups and the other three were assigned as the UPG groups. This strategy was adopted to avoid instruction confusion that happened in the pilot study, and to make sure that all participants receive the same information and experiment instructions.

3.2.2 The Website

For the purpose of this experiment, a commercial Website, i.e. amazon.com, was used. Amazon.com was chosen for this experiment because of several reasons including:
1. Amazon.com is a B2C Website that sells various products. These products are grouped into several categories. Along with its design, it mimics a retail store as stated by [31]. For

example, the shopping cart mimics a checkout cashier, screen layout mimics a retail store atmosphere, products grouping mimics different aisles or department on a retail store.

2. Amazon.com also provides a search engine that mimics sales clerk services.
3. It has simple navigation structure that allow its customers to move around easily, just like in store signage that allow customers to move from one aisle to another or to move from one level to another quite easily.
4. It has a multi lingual feature (but this study only use the English version).It also provides its customers with privacy notice.
5. Several famous company logos are also displayed. These logos can boost customers' confident in buying products from this amazon.com.
6. Amazon.com also provides space to its users who want to sell their unwanted products.

3.2.3 The Experiment
In general, each of the experiment session went on as follows:
1. Participants were admitted to the laboratory and be seated anywhere they like. The introduction was given to explain the purpose of the experiment and how the experiment would be ran.
2. After the introduction, participants were given a practice, the same as the real experiment about to come. This was also to give them a chance to familiarize themselves with www.amazon.com, if they never use it before. Although amazon.com might be a very well-known Website, not all of the participants may have been using this Website. In this practice session, participants were given a task to find information about one product from www.amazon.com. For the PG group, participants were asked to write down clearly their search plan before start searching. For the UPG group, participants were allowed to start searching right away.
3. Following the practice and familiarization, the experiment commenced. In this experiment, participants were given task to find three different products, in which two of them were predetermined products, and the third was a product of their own interest. Again, as in the practice session, participants in the PG group had to write down their search plan before they were allowed to start searching. While participants in the UPG group were allowed to search soon after they received the task instruction. An example of a task reads:

> *For your relaxation, you want to have a new hammock that you can put on your porch. This hammock must have cotton fabrics, its overall length is not exceeding 15 foot, and its body length is not exceeding 8 foot. Write down the hammock name, its price, and from which company this hammock is offered.*

4. After all participants have finished their tasks, participants were asked to complete a post-experiment survey asking about their experience during the experiment. After which, they were dismissed after being rewarded with a token of appreciation.

3.2.4 Measurement
As stated in the previous section, after respondents have finished the experiment, they wera asked to complete a post experiment survey. The questionnairs were used to measure the perceived search benefit and cost of information search that were manifested as the Web design elements they encountered during the experiment session.

Section 2.1 explains that overall perceived search benefit was measured by 4 different parts, i.e. enjoyment, cognitive outcome, credibility, and visual appearance. Each of these parts was measured using 2, 3, 2, and 2 items, respectively. Overall perceived search cost was measured by 3 different parts, i.e. technical aspect, navigation, and privacy and security. Each of these parts was measured using 3, 3, and 4 items, respectively. All of the items were measured using 7-point Likert scale, from strongly disagree (1) to strongly agree (7). Appendix presents the questionnaires.

4. Data Analysis and Discussion
4.1 Manipulation Check and Normality Check

In order to check whether the manipulation to separate the PG group from UPG group, single item was used. This single item reads: "I …… used a trial and error approach to find information on this Website." Respondents were asked to complete the above sentence by using 7-point Likert scale, where "1" means "Very seldom," and "7" means "Very frequently."

The descriptive statistic presented in Table 1 shows that the mean for PG group is 3.77 (standard deviation=2.01), and the mean for the UPG group is 4.56 (standard deviation=1.865). The t-test then needs to be conducted to check whether these two means were different.

Weinberg and Abramowitz [32] stated that in order to have a valid t-test to compare the means of two groups, two conditions must be met: 1) both groups are normally distributed, and 2) both groups have equal variances or they have homogeneity of variances. The first condition can be evaluated by checking their kurtosis and skewness as a measure of normality in which their values can be obtained from descriptive statistics obtained from SPPS. The second condition can be evaluated with Levene's test of equality of variances that can be obtained directly from running t-test on SPSS.

One way to examine normality is by assessing their kurtosis and skewness [33]. Kurtosis is a measure of the "peakedness" or "flatness" of a distribution. A kurtosis value of ±1.0 is considered excellent, but a value of ±2.0 is also considered acceptable. Skewness is a measure of the extent a distribution of values deviates from symmetry around its mean.

Table 1. Descriptive statistics for the manipulation-check data.

Group	N	Mean	Std. Dev.	Test	Normality Statistics	Std. Error
PG	117	3.77	2.010	Skewness	0.375	0.224
				Kurtosis	-1.133	0.444
UPG	118	4.56	1.865	Skewness	-0.324	0.223
				Kurtosis	-0.979	0.442

Table 2. The result of t-test for manipulation check item.

	Levine's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	0.806	0.370	-3.123	233	0.002	-0.790	0.253
Equal variances not assumed			-3.122	231.397	0.002	-0.790	0.253

Table 3. The result of normality test on benefit and cost.

Variable	Group	N	Mean Statistics	Std. Dev.	Test	Normality Statistics	Std. Error
Benefit	PG	117	4.407	0.839	Skewness	-0.202	0.224
					Kurtosis	-0.237	0.444
	UPG	118	4.621	0.881	Skewness	-0.609	0.223
					Kurtosis	0.217	0.442
Cost	PG	117	3.692	0.765	Skewness	0.037	0.224
					Kurtosis	-0.559	0.444
	UPG	118	3.498	0.709	Skewness	0.112	0.223
					Kurtosis	-0.248	0.442
Net-Benefit	PG	117	0.711	1.372			
	UPG	118	1.122	1.357			

The Levine's test (see Table 2) shows that no homogeneity problem was found in the manipulation check data (F=0.806, Sig.=0.370). After confirming that no normality and no homogeneity problems were found, the t-test was conducted. The result of the t-test (see Table 4.6) shows that the mean of the manipulation check item in the PG group and in the UPG group was significantly different with t=-3.123 and p=0.002 (2-tailed). The above results show that the manipulation check item was able to separate the PG group from the UPG group. As such, the data obtained from the experiment were useful for the subsequent analyses.

As there is enough evidence that the PG group and UPG group were statisticaly well separated, the subsequent analysis follows. The important anaysis is to check the normality of data for variable benefit and cost for both groups. Table 3 shows that there is no normality problem for variable benfit and cost for both groups (see column Test for both Skewness and Kurtosis).

As stated earlier, benefit was measured by 4 different parts (enjoyment, cognitive outcome, credibility, and visual appearance), and cost was measured by 3 parts (technical aspect, navigation, and privacy and security). Table 4 shows the mean and standard deviation for different parts for both benefit and cost for overall respondents.

Tabel 4. Descriptive statistics for the benefit and cost and its parts, respetively.

	Mean	Standard Deviation
Benefit:		
- Enjoyment	4.221	1.250
- Cognitive outcome	4.338	1.279
- Credibility	5.283	1.107
- Visual appearance	4.296	1.353
- Overall benefit	4.513	0.865
Cost:		
- Technical aspect	3.061	0.871
- Navigation	3.482	1.119
- Privacy & security	4.080	1.153
- Overall cost	3.595	0.742

4.2 Net Benefit

One hypothesis stated for this study is whether there is a difference in net benefit between the two groups. As such, it is needed to calculate the net benefit. Net benefit is defined is the difference between benefit and cost that can be expressed as:

$$Net\_Benefit = Benefit - Cost \qquad (1)$$

in which

$$Benefit = \frac{\sum_{i=1}^{n}\sum_{j=1}^{9} b_{ij}}{n*9} \qquad (2)$$

$$Cost = \frac{\sum_{i=1}^{n}\sum_{j=1}^{10} c_{ij}}{n*10} \qquad (3)$$

where n: the number of respondents
         b_{ij}: value for individual benefit item
         c_{ij}: value for individual cost item

Constant 9 in *Benefit* and 10 in *Cost* informs that *Benefit* was measured by 9 items, and *Cost* was measured by 10 items as mentioned in section 2.3.4.

4.3 Result of Hypothesis Test

Table 3 confirms that there is no normality problem within the data for benefit and cost for both groups. The next step is to check whether homogeneity problems exist for the above data sets. The Levene's test provided in Table 5 confirms that no homogeneity problems for the above data sets. As such, the difference between the two groups can be assessed.

For the perceived search benefit, as presented in Table 3, the mean benefit for PG group and UPG group was 4.407 and 4.621, respectively. According to Table 5, it is confirmed that seekers who do not follow any search plan perceived more Web search benefit compared to those who strictly follow a search plan, i.e. t=-1.933, α=0.027 (one-tailed).

For the perceived search cost, as presented in Table 3, the mean cost for PG group and UPG group was 3.692 and 3.498, respectively. According to Table 5, it is confirmed that seekers who do not follow any search plan perceived less Web search cost compared to those who strictly follow a search plan, i.e. t=2.017, α=0.023 (one-tailed). By using the same strategy, hypothesis about net-benefit can be assessed as follow. Table 3 shows that the mean net-benefit for PG group and UPG group was 0.711 and 1.122, respectively. According to Table 5, it is confirmed that seekers who do not follow any search plan perceived more net-benefit to those who strictly follow a search plan, i.e. t=-2.308, α=0.011 (one-tailed).

Based on the above data analysis, it is concluded that the 3 hypotheses were all supported by the data. In short, respondents who moved freely within a Website perceived more net-benefit compared to those who moved with certain constraints.

Table 5. The result of t-test on benefit and cost (equal variances assumed)

Variable	Levine's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Benefit	0.329	0.567	-1.933	233	0.054	-0.217	0.112
Cost	1.210	0.272	2.017	233	0.045	0.194	0.096
Net-Benefit	0.10	0.922	-2.308	233	0.022	-0.411	0.178

4.4 Discussion

In this study, the planned strategy and the unplanned strategy was derived from the analytical strategy and the browsing strategy [2], respectively. According to [3], browsing is to see what is available. The word "what" could mean the Web content, its appearance. It was argued that seekers who employ the unplanned strategy were able to move around the Website they visited freely. As such, they were able to perceive more Website design elements. The above findings support this argument that seekers who have more chances to wander around would perceive more motivators and hygiene factors, thus more benefit and less cost.

A study by Nah [34] revealed that the tolerable waiting time was about 2-3 seconds before seekers abandon and leave the visited website. However, she also stated that the waiting time tolerance was also influenced by user experience with less experience users being more tolerant. Although tolerable waiting time was not measured in this study, one item of the post-experiment questionnaire items asked the subjects to perceive whether "This Website gives a very fast response/loading time" on 7-point Likert scale. The data shows that the mean for this item was 2.43 (standard deviation=1.197). For the perceived search cost, smaller value means lower cost. This shows that response/loading time did not cause a big problem to the subjects.

On the navigation part, "effective navigation aids" has a mean of 3.29 (standard deviation=1.301), and "clear direction" has a mean of 3.58 (standard deviation=1.428). Thus, subjects did not feel any objection in dealing with the response/loading time and navigation. However, subjects did not seem to be happy with the handling of privacy and security issues. The mean for "how user's information is collected", "how collected information will be used", "whether the information is transmitted security" and "access requirement" is 4.05 (standard deviation=1.532), 4.36 (standard deviation=1.505), 3.86 (standard deviation=1.585), and 4.05 (standard deviation=1.868), respectively.

The overall Web search benefit has its mean of 4.512 (standard deviation=0.865), which is slightly above the average, i.e. 4, and the mean for the overall Web search cost is 3.6 (standard deviation=0.742), which is slightly below the average, i.e. 4. This shows that compared to the incurred cost, most subjects considered their information-seeking activity to be worth something, e.g. awareness of new products being released on the market, and come across with interesting bargains.

The above findings were based on the fact that this study used a commercial Website, i.e. www.amazon.com. The overall design of this Website should have been followed certain guidance as well as it has been tested many times. However, there were several concerns regarding how this Website handled privacy and security, as well as the not so clear navigation aids due to variety of the presented information.

The above findings suggest a practical implication as follow. Designer(s), and owner(s) of a Website need to exercise their caution and must give a clear hint on how users' data will be handled as well as some indication that the data will be sent security over the Internet. For navigation, the designer(s) must be very careful in organizing relevant (information architecture) and the way they want user find those information (visual organization) as well as navigation structure.

5. Conclusion

This study tries to understand cost and benefit of information search that were manifested as motivators and hygiene factors of Web design elements, and to learn whether users who employed different information search strategies perceived cost and benefit differently. The main result of this study stated that users who were allowed to move freely in a Website when they search for information of interest perceived more net-benefit, i.e. the difference between benefit and cost. Users who moved freely during information serach period were able to perceive more net benefit compared to those who moved under certain plain.

This study, however, did not observe whether the perceived net search benefit during information search would influence further users' behaviour. Thus, the future study should be directed to study whehter the perceived net search benefit has impact on certain users' behavior, like Website revisit, lengthening of their stay within the same Website, increasing user trust to certain extend, and other related behaviour.

Another limitation of this study includes the fact that it did not specifically taking into account the interactifity of the Website used. It was assumed, however, that interactifity was included in the technical aspect. Thus, for future study, it would be worthwhile to treat interactivity as a separate factor.

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Appendix

No.	Motivators and Hygiene Factors
1.	I have learned new knowledge from this Website
2.	I have learned new skills from this Website
3.	It was fun exploring this Website
4.	I enjoyed exploring this Website
5.	This Website features a multimedia presentation
6.	This Website is owned by a reputable person/company
7.	This Website has achieved external recognition (e.g. visitor counter, awards)
8.	This Website has an attractive appearance
9.	This Website is visually appealing
10.	This Website gives a very fast response/loading time
11.	This Website supports different browsers
12.	This Website has a loading/processing indicator
13.	This Website provides an effective navigation aids
14.	This Website provides a clear direction for navigating the Website
15.	This Website gives a clear indication of user location for navigating the Website
16.	This Website provides information on how user's information is collected
17.	This Website provides information on how collected user's information will be used
18.	This Website gives assurance that user's information will be transmitted securely
19.	This Website provides an access requirement (e.g. password) to allow user to access sensitive information.