International Journal of
Electronic Commerce Studies
Vol.2, No.1 , pp.35-56, 2011

RELATIONSHIP BETWEEN SERVICE QUALITY, SATISFACTION, AND LOYALTY OF GOOGLE USERS

Lee Soon Liong
Universiti Teknologi Malaysia
nbliong@hotmail.com

Mohd Shoki Md Arif
Universiti Teknologi Malaysia
m-shoki@utm.my

Huam Hon Tat
Universiti Teknologi Malaysia
huam@utm.my

Amran Rasli
Universiti Teknologi Malaysia
m-amran@utm.my

Ahmad Jusoh
Universiti Teknologi Malaysia
ahmadj@utm.my

ABSTRACT

The purpose of this research is to determine the relationship between perceived electronic service quality (e-SQ), electronic satisfaction (e-satisfaction) and electronic loyalty (e-loyalty) in the usage of the Google search engine. The modification of E-SERVQUAL (efficiency, fulfilment, and reliability) and two additional two dimensions (assurance and site aesthetics) were constructed to measure perceived e-SQ. The measurement of e-satisfaction was based on Schaupp and Bélanger's study, and a cognition-affection-behaviour approach was adapted to measure e-loyalty. A total of 360 sets of questionnaires were distributed randomly to students of a Malaysian public university. The results indicated that capability, efficiency, site aesthetics, assurance, and performance were determinants of e-SQ. The high correlation and marked relationships were found between e-SQ and e-satisfaction, and between e-satisfaction and e-loyalty. Capability of the search engine had the strongest impact on e-satisfaction; in contrast,

e-satisfaction was positively influenced by e-loyalty. The practical implications of the findings in terms of improving e-SQ of search engines to ensure continuous revisit/reuse of their services were discussed.

Keywords: Electronic Service Quality (e-SQ), Electronic Satisfaction (e-Satisfaction), Electronic Loyalty (e-Loyalty), Google, Search Engine

1. INTRODUCTION

The rapid growth of the internet, globalization of markets, along with the decreasing effectiveness of offline marketing, has motivated businesses to shift their marketing plans to internet marketing. Today, electronic business (e-business) plays a major role in the world's economy. E-business is a term used to describe businesses that run on the internet, or the utilization of internet technologies to improve the productivity or profitability of a business[1]. As internet use continues to grow at a rapid pace, one of the forms of interactive marketing that has emerged as the clear winner in the customer acquisition space is search engine marketing[2]. As noted by Descy[3], there are hundreds of unique search engines in the United States and thousands of unique search engines around the world.

To date, search engines have become the central entry point for access to information on the web. In this context, Google and the other commercial search engines are increasingly powerful players in the new information ecology[4]. According to Storey[2], Google's search engine technologies are closely guarded secrets, and the exact formulas they use to calculate relevance, and how they tweak the formulas to improve quality and performance, requires a consistent effort to attain and retain a high relative ranking for important keyword phrases. Google is highly reliant on internet advertisers and users to generate revenues. In order to maximize the effectiveness of their internet advertising budget, internet advertisers are more likely to advertise on those search engines which have the highest volume of users.

From a business perspective, loyal customers are crucial to business survival, especially in an electronic commerce context[5]. In relation to search engines, since the competition is just a mouse click away, customer e-loyalty appears essential in an economic as well as a competitive sense[6]. In order to reap the benefits of having loyal online customers, a company needs to develop a thorough understanding of the antecedents of loyalty on the world wide web (e-loyalty)[7]. E-loyalty has been conceived as a consumer's intention to buy from a web site and that these same consumers

will not change to another web site[8]. As noted by Shankar et al.[9], "*Firms need to gain a better understanding of the relationship between satisfaction and loyalty in the online environment to allocate their online marketing efforts between satisfaction initiatives and loyalty programs*" (p.154).

Loyal users will intentionally revisit/reuse the search engine more frequently as compared to non-loyal users. In order to increase the number of loyal users, the level of e-SQ, e-satisfaction and e-loyalty must be highly focused. The determinants of e-SQ should be clearly defined for allocating resources more effectively. The relationship among e-SQ, e-satisfaction, and e-loyalty should also be identified in order to provide insightful information towards developing a better understanding of quality-satisfaction-loyalty. Hence, a study related to e-SQ, e-satisfaction and e-loyalty, in the context of the Google search engine, was in high demand in order to maximize the outcome with the optimization of resources.

Among search engine providers, Google is famous for their search results page, which creates an "ordered by priority rank" called a "PageRank", which is "*a well-kept industrial secret, an intellectual property that built an empire, that contributes to the satisfaction of millions of consumers each day, has inspired numerous competitors, and has even generated some memorable lawsuits*"[10] (p.471). As the "world's best search engine", Google is dedicated to improving the e-SQ of their website and to satisfying their users needs and wants. However, studies focusing on e-SQ, in the context of search engines, are limited. Besides, there is a notable lack of studies that clearly identified quality-satisfaction-loyalty in this context.

Hence, the purpose of this research is to explore the field of e-SQ and to identify the relationship between e-SQ, e-satisfaction and e-loyalty in the context of search engines, particularly the Google search engine. By reviewing the main theories and findings of previous studies in relevant areas, this research also strives to obtain a better understanding of this phenomenon. This research is conducted to (i) identify the determinants of perceived e-SQ of Google's search engine; (ii) examine the relationship between perceived e-SQ and e-satisfaction, and (iii) examine the relationship between perceived e-satisfaction and e-loyalty.

2. LITERATURE REVIEW

2.1 Electronic Service Quality (e-SQ)

Electronic service quality (e-SQ) has become increasingly important in influencing overall customer evaluations and judgments regarding the excellence and the quality of e-service delivery in the virtual marketplace [11]. It has also strongly affecting the future of the businesses because poor

services tend to weaken customer-company bonds, which can result in high turnover of customers[12].

Currently, the literature presents numerical studies related to service quality via the internet with different understandings of commonly used terms, such as website quality or online service quality. The concept of electronic service quality (e-SQ) was introduced by Parasuraman et al.[13]. The first definition of e-SQ was provided by them, and they defined e-SQ as "*the extent to which a website facilitates efficient and effective shopping, purchasing and delivery of products and services.*"

2.2 Determinants of Electronic Service Quality (e-SQ)

The concept of e-SQ was introduced and defined by Parasuraman et al. [13] as the extent to which a website facilitates efficient and effective shopping, purchasing and delivery of products and services. It is also viewed as the buyer's assessment of the extent to which it facilitates efficient and effective purchasing, and the seller facilitates responsive prompt delivery and high-quality service[14] and overall customer evaluations and judgements regarding the excellence and the quality of e-service delivered[11]. In this study, e-SQ is referred to as the quality of search engine services provided by Google when users access google.com. The proposed e-SQ dimensions were efficiency, fulfilment, reliability, assurance, and site aesthetics. The e-SQ dimensions of this study were adapted and modified based on E-SERVQUAL developed by Parasuraman et al.[13] that can be classified into two scales: E-S-QUAL or core scale, and E-RecS-QUAL or recovery scale. As the Google search engine offers free internet-based services, dimensions of E-RecS-QUAL (responsiveness, compensation, and contact), and privacy from E-S-QUAL were rejected from this study. After reviewing the previous studies, two additional dimensions (assurance and site aesthetics) were added to measure the e-SQ of search engines based on the study of Parasuraman in 2004[15].

The proposed e-SQ dimensions of this study was adopted and modified based on the studies of Parasuraman et al. [13] and Parasuraman[15]. They consisted of five dimensions; efficiency (power or capacity to produce the desired results), fulfilment (conditions or request being fulfilled), reliability (ability of a person or system to perform and maintain its functions in routine circumstances, as well as unexpected circumstances), assurance (customers confidence towards the company because of the products/services or reputation of the company), and site aesthetics (site appreciation of beauty or good taste).

2.3 Determinants of Electronic Satisfaction (e-Satisfaction)

According to Schaupp and Bélanger[16], the dimensions of e-satisfaction can be classified into three main factor categories. They are technology factors (security, privacy and usability), product factors (merchandising, product value and customization) and shopping factors (trust, convenience and delivery). However, security, privacy, trust, delivery, and merchandising were deleted when measuring e-satisfaction. Security and trust was deleted because there were no transactions involved. Delivery and merchandising was deleted because the services provided were instant and free. Privacy was deleted because of the use of the search engine does not require the user to provide any customer information.

The proposed e-satisfaction dimensions of this study was adopted and modified based on Schaupp and Bélanger's[16] study. They consisted of technology factors with usability (the ease of people employ particular tool in order to achieve a particular goal) and convenience (anything that was intended to save resources such as time and energy); and product factors with the inclusion of product value (determination of worth of using the products/services) and customization (users to make or alter to individual or personal specifications).

2.4 Determinants of Electronic Loyalty (e-loyalty)

Srinivasan et al.[17] introduced the antecedents of customer loyalty and proposed eight e-business determinant factors that appeared to impact e-loyalty. Referred to as the 8Cs, these determinants include: customization, contact interactivity, cultivation, care, community, choice, convenience, and character[17]. However, some of the proposed dimensions overlap with e-SQ and e-satisfaction dimensions, such as customization and convenience, which are used to measure e-satisfaction as stated by Schaupp and Bélanger [16] along with contact, which is considered one of the dimensions to measure e-SQ as stated by Parasuraman et al.[13].

The dimensions of e-loyalty of this study were measured from human perceptions and adopted a cognition-affection-behaviour approach. Largely based on Nacif[18] e-loyalty is measured from the point of influences of information (cognitive loyalty - preference towards a brand developed based on information available); emotional (affective loyalty - attitudinal preference developed based on cumulatively satisfying usage occasions); and habits (behavioural loyalty - transformed in the commitment to action of repurchasing).

2.5 Electronic Service Quality and Its Effects on Electronic Satisfaction

Numerical studies (e.g., [19, 20]) have shown that customer satisfaction was an important factor in the success of business systems in both traditional and modern businesses. Oliver[19] defined satisfaction as a judgment that a product or service feature, or the product or service itself, provided a pleasurable level of consumption-related fulfilment, including levels of under- or over-fulfilment. In 1994, customer satisfaction was defined by Bitner and Hubbert[21] as "*the consumer's overall dis/satisfaction with the organization based on all encounters and experiences with that particular organization*" (p. 77). According to Schaupp and Bélanger[16], the technology, shopping, and products were the main constructors of e-satisfaction.

The relationship between e-SQ and e-satisfaction was studied a long time ago. Numerical studies have indicated that there were strong positive relationships between e-SQ and e-satisfaction[22, 23, 24]. E-satisfaction was also found to be an important mediator between e-SQ and e-loyalty[22, 23, 25], meanwhile e-SQ influences e-loyalty by driving customer satisfaction[25]. Based on previous studies, e-satisfaction was an important mediator between e-SQ and e-loyalty. However, customer satisfaction toward internet-based services was difficult to identify because of limited interaction between suppliers and consumers. Hence, it was important to study e-satisfaction in internet-based services, especially search engines, which are the main mediator between suppliers and customers in the online environment.

2.6 Electronic Satisfaction and Its Effect on Electronic Loyalty

Loyal customers are undoubtedly important because they contribute to the profitability of the service providers[26]. Anderson and Srinivasan[27] defined e-loyalty as "*the customer's favourable attitude toward an electronic business, resulting in repeat purchasing behaviour.* Loyalty, or e-loyalty, has been conceived as a "consumer's intention to buy" from a website, and that consumers will not change to another website[8].

According to Lu and Lu[28], customer loyalty can be classified into three types: cognition loyalty, affection loyalty and behaviour loyalty, that were modified based on a cognition-affection-behaviour approach. Generally, behaviour loyalty refers to the repeat purchase behaviour of consumers. Affection loyalty was defined as the emotional preference to the firm/service provider. Cognitive loyalty was defined as beliefs the

customer holds about the superior quality of certain brands to other brands. The cognition-affection-behaviour approach allowed examination of e-loyalty in the context of search engines from a different prospective.

The relationship between e-satisfaction and e-loyalty has been found to be significant in numerous studies (e.g., [22, 23, 25, 29, 30]). According to Bolton et al.[31], customer satisfaction influences loyalty positively. In 1999, Reynolds and Beatty[32] further stated that customer satisfaction was an antecedent of loyalty. Satisfaction was conceptualized as a mediator of the relationship between quality and loyalty[22]. In other words, customer satisfaction will lead to the positive predisposition of long-term loyalty[33].

3. METHODOLOGY

3.1 Research Design

The determinants of e-SQ and the relationship between e-SQ, e-satisfaction and e-loyalty in the context of search engines were identified in this research. A descriptive research survey was conducted to determine e-SQ, e-satisfaction and e-loyalty in the context of search engines. This research was conducted based on the case study of the Google search engine, which is well known as the "world's best search engine". This research was conducted at one of the Malaysian public universities. The perceptions of students who experienced the Google search engine services were collected as the primary data of the research. Generally, descriptive research can be conducted on everything that can be counted and studied.

3.2 Proposed Model

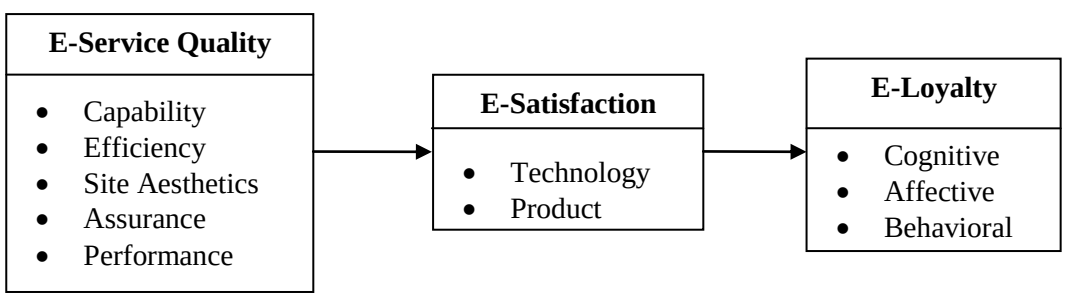

Figure 1. Proposed Model

3.3 Sampling Method and Technique

Among the sample size selection methods, the multivariate research introduced by Hill[34] was more suitable to determine the sample size for this research. According to Hill[34], in multivariate research the sample size required should be 5 to 10 times the variables for 10% and 5% margin of error respectively. Hence, a minimum of 340 questionnaires are needed for 5% margin error and 170 questionnaires are needed for 10% margin error. In this research, 360 questionnaires were distributed and 330 sets of questionnaires were collected and completed by respondents, achieving a 5.15% margin error.

The sampling technique used was convenience sampling, which has been categorized as non-probability sampling. Convenience sampling was used because it was easier to identify the research sample by reducing the percentage of students without experience with Google search engine being selected. According to Riley et al.[35], convenience sampling is most often used where research objectives are inherently qualitative in nature and focus upon the elaboration of theoretical concepts and issues in micro-social contexts, which was suitable for this study.

3.4 Data Collection Process

The questionnaires were distributed among the students randomly at a public university. Questions related to Google users or non-users were asked and those who were the non-users were removed subsequently from this research. The respondents were encouraged to answer all the questions within the questionnaire.

3.5 Analysis Methods

Factor analyses were conducted to obtain a more accurate set of e-SQ, e-satisfaction, and e-loyalty dimensions. As stated by Hair et al.[36], the purpose of factor analysis is to reduce the information contained in a number of original variables into a smaller set of new composite dimensions or factors with a minimum loss of information. In this study, factor analysis was used to identify the dimensions and items in the context of search engine e-SQ, and to abandon the unimportant dimensions and items.

Pearson Correlation was used to identify the relationship between e-SQ and e-satisfaction, and the relationship between e-satisfaction and e-loyalty. The Pearson Correlation is a statistic summarizing the strength of association between two metric (interval or ration scaled) variables. It is used to determine whether a relationship between e-SQ and e-satisfaction and a relationship between e-satisfaction and e-loyalty exists in the context

of a search engine. As noted by Sekaran[37], Pearson Correlation indicates the strength of the relationship between research variables. In contrast, regression analyses provide an idea of how much of the variance in the dependent variable is explained when several independent variables are theorized to influence it. Hence, regression analysis is conducted when a relationship exists between two variables to identify the variance in the dependent variables when several independent variables are influenced by dependent variables.

4. RESEARCH FINDINGS

4.1 Profile of Respondents

A total of 360 sets of questionnaires were distributed to the university students. However, only 330 sets were fully answered and completed by respondents. The response rate for the questionnaire was 91.67%. Out of 330 respondents, there were 198 male respondents representing 60% of the total. 132 respondents were female, which represented 40%. The majority of the respondents were between 21-23 years old (271 respondents or 82.1%). This was followed by 18-20 year olds, 24-26 year olds, and those below 18 years of age. These age groups contributed 42 respondents or 12.7%, 15 respondents or 4.5%, and 2 respondents or 0.6% respectively. In this research, the respondents over 27 years old were 0 or 0%.

Among the 330 respondents, the majority were Chinese students who contributed 157 respondents or 47.6% of the total. The Chinese were followed by Malay and Indian students, who contributed 45.2% and 4.8% of total respondents respectively. All of the respondents reported that they had experience with the Google search engine. Out of 330 respondents, 181 respondents, or 54.8%, accessed Google more than 15 times a week. This was followed by 5-10 times and 10-15 times a week, which contributed 79 or 23.9% and 42 or 12.7% respectively. Coming in last were those who accessed Google less than 5 times a week, contributing 28 respondents or 8.5%.

4.2 Validity and Reliability Tests

Factor analysis was used with principal component analysis as the extraction method and varimax as the rotation method. Kaiser normalization was used to analyze the collected data and confirm the usefulness of the theoretical model in the context of search engine. The value of Kaiser-Meyer-Olkin measure of sampling was 0.911, which was greater than 0.6. This indicated that the proportion of variance in the variables was caused by underlying factors, allowing the researcher to proceed with

factor analysis. The result was supported by the Bartlett test of sphericity value of 0.000 that was less than 0.05, thus proving the analysis was significant.

Based on the results of Total Variance Explained, five dimensions in the initial solution with eigenvalues greater than 1.0 has been extracted with the cumulative percentage of 65.941% for e-SQ. Together, they account for 65.941% of the variability in the original variables. Rotation helped to optimize the factor structure. One consequence for this data was that the relative importance of the suggested 5 dimensions was equalized. Before rotation, dimension 1 (41.944%) accounted for considerably more variance than the others. However, after rotation, it accounted for only 20.670% of variance. Dimension 1 was followed by component 2, component 3, component 4 and component 5, which contributed 14.129%, 12.273%, 9.405%, and 9.335% respectively.

Table 1. Implication of "Component 1" items

	Question	**Implication**
ESQ06	I can easily find what I need on Google search engine.	Capability of search engine to fulfill users needs.
ESQ07	Google search engine was well organized.	Capability to provide well organized website.
ESQ08	Google search engine was highly effective.	Capability of search engine to fulfill users needs.
ESQ09	The level of the Google search engine outcome (search results) fulfils my search enquires.	Capability of Google search results to meet user needs.
ESQ10	Google search engine always provides accurate search results.	Capability of Google search engine to provide quality results.
ESQ11	Google search engine makes accurate promises about the quality of services provided.	Capability of Google search engine to keep their promises.
ESQ16	Google search engine always functions properly.	Capability of Google search engine to provide consistent services.
ESQ19	I feel confident with Google search engine.	Capability of Google search engine to gain customer confidence.

Based on the results of the Rotated Component Matrix, ESQ05 and ESQ15 were neglected as all the factor loadings were less than 0.5. ESQ06 through ESQ11, along with ESQ16 and ESQ19 were grouped under dimension 1 and designated "Capability". This is because the question of each item showed a communality which was related to capability of the search engine as shown in Table 1. Four of them (ESQ01 through ESQ04)

were grouped under component 2, while one item was deleted. The remaining 3 dimensions were grouped into component 1. Component 2 was labeled "Efficiency" because all the items within component 2 were adopted from proposed Efficiency dimension from previous studies. Items of component 3 extracted were website attractiveness; website appearance; and website design which is exactly the same as proposed site aesthetics dimension. Hence, component 3 is labeled as "site aesthetics."

The proposed assurance dimension consists of ESQ17 to ESQ19. However, based on results of Total Variance Rotation, component 4 consists of two items of ESQ 17 and ESQ18. The remaining component was grouped into component 1 as discussed. The remaining items were grouped and labeled as "assurance" as the items within this component were adopted from proposed assurance dimension. Part of the items of proposed fulfillment and reliability were merged and grouped into other dimensions. The remaining items of fulfillment (ESQ12 and ESQ13) and reliability (ESQ14) were grouped to form a new dimension labeled "Performance". This is because the question of each item shows a communality that relates to performance of the search engine as shown in Table 2.

Table 2. Implication of "Component 5" items

	Question	**Implication**
ESQ12	Google search engine was truthful about its services	Performance of Google search engine services
ESQ13	Google search engine performs well all the time	Consistency of Google search engine performance
ESQ14	Less errors when using Google search engine	Google search engine perform well with less errors

For e-satisfaction, the value of Kaiser-Meyer-Olkin measure of sampling was 0.817 that was greater than 0.6. This indicates that the proportion of variance in the variables was caused by underlying factors, allowing the research to proceed with factor analysis. The result was supported by the Bartlett's test of Sphericity value of 0.000 that was less than 0.05, proving that the analysis was significant. The results of Total Variance Explained indicated that only one dimension in the initial solution with eigenvalues greater than 1.0 has been extracted with the cumulative percentage of 60.389%. All items were accepted based on the results of component matrix with factors loadings greater than 0.5. Only one component was extracted, the solution cannot be rotated. The component extracted was labelled as e-satisfaction.

The value of Kaiser-Meyer-Olkin measure of sampling of e-loyalty was 0.879, which was greater than 0.6. This indicates that the proportion of variance in the variables was caused by underlying factors, allowing the study to proceed with factor analysis. The result was supported by the Bartlett's test of sphericity value of 0.000 that was less than 0.05, proving that the analysis was significant. The results of Total Variance Explained indicated that only one dimension in the initial solution with eigenvalues greater than 1.0 has been extracted with the cumulative percentage of 63.397%. All items were accepted based on the results of component matrix with factors loadings were more than 0.5. Only one component was extracted, the solution cannot be rotated. The component extracted was labelled as e-loyalty.

The results of reliability coefficient (Cronbach's Alpha) of e-SQ for capability, efficiency, site aesthetics, assurance, and performance were .906, .839, .844, .694, and .466 respectively. Capability, efficiency, site aesthetics, and assurance have reliability coefficients of close to or more than 0.7 and are thus statistically reliable. Since reliability coefficients for performance was lower than 0.7, further analysis is needed as shown in Table 3. Based on the Table 3 when ESQ12 is excluded, the reliability coefficient for performance was 0.754, which is more than 0.7 and statistically reliable. Hence, performance was accepted by removing ESQ12 from the dimensions of performance.

Table 3. Reliability Coefficient for Items of Performance

	Performance			**Cronbach's Alpha**
	ESQ12	**ESQ13**	**ESQ14**	
Test 1	Included	Included	Excluded	.273
Test 2	Included	Excluded	Included	.281
Test 3	Excluded	Included	Included	**.754**

In addition, the results of reliability coefficient (Cronbach's Alpha) for e-satisfaction and e-loyalty were 0.867 and 0.881 respectively, which is more than 0.7 and statistically reliable.

The comparison between original proposed items and dimensions and new items and dimensions extracted from factor analysis are shown in Table 4.

Table 4. Original Proposed Items and Dimensions; and New Items and Dimensions Extracted from Factor Analysis

Original Proposed e-SQ Dimensions			**New e-SQ dimensions Extracted from Factor Analysis**		
Efficiency	Efficiency of search engine	ESQ01	**Capability**	Ease of Navigation	ESQ06
	Access	ESQ02		Website Info	ESQ07
	User-Friendly	ESQ03		Effectiveness	ESQ08
	Searching Speed	ESQ04		Fulfill	ESQ09
	Loading Speed	ESQ05		Accuracy	ESQ10
	Ease of Navigation	ESQ06		Performance	ESQ11
	Website Info	ESQ07		Stabilization	ESQ16
	Effectiveness	ESQ08		Confidence	ESQ19
Fulfillment	Fulfill	ESQ09	**Efficiency**	Efficiency of search engine	ESQ01
	Accuracy	ESQ10		Access	ESQ02
	Performance	ESQ11		User-friendly	ESQ03
	Truthfulness	ESQ12		Searching Speed	ESQ04
	Consistency	ESQ13			
Reliability	Number of errors	ESQ14	**Site Aesthetics**	Website Attractiveness	ESQ20
	Reliable	ESQ15		Website Appearance	ESQ21
	Stabilization	ESQ16		Website Design	ESQ22
Assurance	Well-known	ESQ17	**Assurance**	Well-known	ESQ17
	Reputation	ESQ18		Reputation	ESQ18
	Confidence	ESQ19			
Site Aesthetics	Website Attractiveness	ESQ20	**Performance**	Truthfulness	ESQ12
	Website Appearance	ESQ21		Consistency	ESQ13
	Website Design	ESQ22		Number of errors	ESQ14

Table 4. Original Proposed Items and Dimensions; and New Items and Dimensions Extracted from Factor Analysis (Cont.)

Original Proposed e-Satisfaction Dimensions			**New e-Satisfaction Dimensions Extracted from Factor Analysis**		
Technology	Usability	SAT01	**e-Satisfaction**	Usability	SAT01
	Convenience	SAT02		Convenience	SAT02
Product	Product Value	SAT03		Product Value	SAT03
	Customization	SAT04		Customization	SAT04
	Number of options	SAT05		Number of options	SAT05
	Quality	SAT06		Quality	SAT06
Original Proposed e-Loyalty Dimensions			**New e-Loyalty Dimensions Extracted from Factor Analysis**		
Cognitive	Recognition	LOY01	**e-Loyalty**	Recognition	LOY01
	Reputation	LOY02		Reputation	LOY02
Affective	Images	LOY03		Images	LOY03
	Word-of-mouth	LOY04		Word-of-mouth	LOY04
Behavioral	Repeat intention	LOY05		Repeat intention	LOY05
	First choice	LOY06		First choice	LOY06

4.3 Descriptive Analysis

Table 5. Descriptive Analysis

	Mean (*M*)	**Standard Deviation (*SD*)**
Capability	3.8720	0.6256
Efficiency	4.1606	0.6164
Site Aesthetics	3.7434	0.7569
Assurance	4.2500	0.6468
Performance	3.7333	0.7273
E-SQ	3.9376	0.5226
E-Satisfaction	3.9985	0.5825
E-Loyalty	4.0217	0.6259

As shown above in Table 5, the results indicated that most of the respondents were satisfied with the service quality dimensions. Assurance had a higher mean value (*M*= 4.25) than other dimensions, and site aesthetics (*SD*= 0.7569) had the greatest variation among the dimensions of e-SQ. The mean value of 3.9985 for e-satisfaction suggests that most of respondents were generally satisfied with the services, and the mean value of 4.0217 suggests that most of the respondents were generally loyal with Google search engine services. The average mean score of each e-SQ dimension were used to represent the e-SQ of Google search engine when analyzing the relationship between e-SQ and e-satisfaction.

4.4 Relationship Between Perceived e-SQ and e-Satisfaction For Google Search Engine

Based on the result of Pearson's Correlation, the significant values for all dimensions were less than 0.01. This indicated the correlation between e-SQ dimensions (capability, efficiency, site aesthetics, assurance, and performance) and e-satisfaction were significant and linearly correlated. All the e-SQ dimensions were positively correlated with e-satisfaction. Among the e-SQ dimensions, capability was highly correlated ($r = 0.728$, $p < 0.01$) with e-satisfaction and a marked relationship exists between them. The efficiency ($r = 0.501$, $p < 0.01$), site aesthetics ($r = 0.567$, $p < 0.01$), assurance ($r = 0.534$, $p < 0.01$), and performance ($r = 0.509$, $p < 0.01$) were moderately correlated with e-satisfaction.

Table 6. Multiple Regression Results : e-SQ dimensions towards e-satisfaction

e-SQ dimensions	**e-Satisfaction Beta (β) +**	**t-value**
Capability	0.457*	8.616
Efficiency	0.085	1.954
Site Aesthetics	0.185*	4.201
Assurance	0.181*	4.303
Performance	0.043	0.962
Adjusted R^2	0.593	
F-Value	96.77*	

Note: * p < .01

Since correlation exists between all e-SQ dimensions and e-satisfaction, further study identifying the impact of e-SQ dimensions on e-satisfaction was conducted by using multiple regression analysis. It was used to analyze

the relationship of e-SQ and e-satisfaction based on the combination of all e-SQ dimensions, and the contribution of each dimension towards e-satisfaction when combined was shown. Pearson's Correlation analyzes the relationship between e-SQ dimensions with e-satisfaction individually. When combined, the contribution of each dimension towards e-satisfaction was unknown.

The results of multiple regression analysis in Table 6 indicated the dimensions of efficiency and performance were insignificant. As seen from the coefficient of determination, R^2, the dimensions of e-SQ accounted for 59.3% of the variation in e-satisfaction. Capability ($\beta = 0.457$, $p < 0.01$), assurance ($\beta = 0.181$, $p < 0.01$), and site aesthetics ($\beta = 0.185$, $p < 0.01$) were the e-SQ dimensions significantly associated with e-satisfaction. The regression model to determine the impact of e-SQ dimensions on e-satisfaction in the content of search engine are stated below; where $Y_{\text{e-satisfaction}}$ represent e-satisfaction, X_1 represent capability, X_2 represent site aesthetics and X_3 represent assurance.

$$Y_{\text{e-satisfaction}} = 0.457X_1 + 0.185X_2 + 0.181X_3 + 0.661$$

4.5 Relationship Between Perceived e-Satisfaction and e-Loyalty for Google Search Engine

Based on the result of Pearson's Correlation, e-satisfaction was highly correlated with e-loyalty ($r = 0.784$, $p < 0.01$). Since high correlation and a positive relationship exist between e-satisfaction and e-loyalty, regression analysis was used to identify the impact of e-satisfaction on e-loyalty. Based on the results as summarized in Table 7, e-satisfaction ($\beta = 0.784$, $p < 0.01$) was significantly associated with e-loyalty.

Table 7. Regression Results: e-satisfaction towards e-loyalty

e-Satisfaction	**e-loyalty Beta (β) +**	**t-value**
e-satisfaction	0.784*	22.903
Adjusted R^2	0.614	
F-Value	524.57*	

Note: * p < .01

The regression model to determine the impact of e-satisfaction dimensions on e-loyalty in the content of search engine is shown below; where $Z_{\text{e-loyalty}}$ represent e-loyalty, and $Y_{\text{e-satisfaction}}$ representing e-satisfaction:

$$Z_{\text{e-loyalty}} = 0.784Y_{\text{e-satisfaction}} + 0.598$$

5. MANAGERIAL IMPLICATONS

The determinant factors of perceived e-SQ for Google search engine users in this research were capability, efficiency, site aesthetics, assurance, and performance. Among the available search engines, Google has the largest market share and the highest volume of users. However, considering the market is highly competitive, and users experience and expectations from online services are changing fast, it is necessary for the search engine provider to follow the pace of change and improve their services. Improvement should focus more on capability, efficiency, site aesthetics, assurance, and performance of the search engine in order to increase the electronic service quality. Among the extracted dimensions by factor analysis, capability had the largest impact on improving e-SQ.

Based on the findings, e-SQ of search engines can be improved by developing more user-friendly or advanced internet search technologies to increase the capability of a search engine. In addition, search engine operators, such as Google, should purchase and use servers with higher speeds and memory capacity to increase the overall efficiency of search engines, especially for high-volume search engine providers. Site aesthetics of search engines can be improved by using creative and innovative designs in the webpage, changing the overall website appearance from time to time, and adding user friendly interfaces to increase the attractiveness of the search engine. Assurance of search engines can be improved by providing consistent, quality services to their users to create positive world-of-mouth advertising. Also, involvement in charity works, and the extension of consulting services to other industries, for example, can serve to increase the reputation of Google and other well-known server companies. Furthermore, cutting down on unnecessary procedures, providing consistent services, and reducing the number of errors will serve to increase the performance of Google's search engine.

The findings of this study also proved that users' perceived e-SQ positively influenced users' e-satisfaction, and a marked relationship exists between e-SQ and e-satisfaction. In order to improve the overall e-satisfaction, the capability of search engines should be of concern as it had the largest impact on e-satisfaction. Hence, by developing remarkable internet search technology and improving overall e-SQ provided, users' e-satisfaction will positively increase as well.

The findings also indicated that a high correlation and marked relationship exists between e-satisfaction and e-loyalty. Loyal customers more intentionally revisit/reuse the website compared to non-loyal customers. High correlation exists between e-SQ and e-satisfaction, and e-satisfaction and e-loyalty. By improving e-SQ, e-satisfaction and e-loyalty were likely increase accordingly, which indicates Google should focus on all aspects rather than focusing on one of them.

Based on the findings, when e-SQ dimensions were theorized to simultaneously influence e-satisfaction, the effects of capability, site aesthetics, and assurance were more significant than efficiency and performance. In order to maximize the outcome with minimum resources, Google should be highly concerned with search engine capability, site aesthetics, and assurance rather than improving search engine efficiency and performance. In the context of search engine, quality-satisfaction-loyalty links exist. E-loyalty was positively influenced by e-satisfaction, and e-satisfaction was positively influenced by e-SQ of search engine. By focusing on improving search engine service quality, customer satisfaction and customer loyalty are likely to increase accordingly.

5.1 Recommendations for Future Research

Based on the factor analysis, the percentage of variance for the e-SQ dimensions (capability, efficiency, site aesthetics, and performance) of this study were 65.94%. Meanwhile, only 65.94% variations were explained by identified e-SQ dimensions. Further study is needed to identify the remaining 34.06% unexplained variations to obtain more representativeness of e-SQ dimensions and items in the context of search engines.

The percentage of variance of e-satisfaction and e-loyalty dimension was 60.39% and 63.40% respectively. Further study is needed to identify the remaining 39.61% (e-satisfaction) and 36.60% (e-loyalty) unexplained variations to obtain more representativeness of e-satisfaction and e-loyalty dimensions and items in the context of search engines.

This study indicated that the strength and relationship between e-SQ and e-satisfaction, in the context of search engines, is high among university students. Hence, further study can be carried out to validate this finding by studying different respondent samples such as employees, middle school students etc. Based on the results, capability explained 20.67% variance for e-SQ dimensions and had the largest impact on e-satisfaction. Hence, further research is needed to validate the influences of capability towards e-SQ and e-satisfaction in the context of search engines.

REFERENCES

[1] P. Suchánek, The fundamentals of a prosperous e-shop in connection to search engine optimization. *E+M Ekonomie a Management*, April 2, p92-103, 2010.

[2] P. L. Storey, Optimizing your website: Search engine optimization, pay per click, email marketing. *International Journal of Pharmaceutical Compounding*, 13(4), p312-313, 2009.

[3] D. E. Descy, All aborad the Internet: Grooker, and kartOO, Addict-o-matic and more: really different search engines. *TechTrends*, 53(3), p7-8, 2009.

[4] D. Elgesem, Search engines and the public use of reason. *Ethics and information Technology*, 10(4), p233-242, 2008.

[5] F. F. Reichheld, and P. Schefter, E-loyalty: your secret weapon on the web. *Harvard Business Review*, 78(4), p105-13, 2000.

[6] J. Semeijin, A. C. R. van Riel, M. J. H. van Birgelen, and S. Streukens, E-services and offline fulfilment: how e-loyalty is created. *Managing Service Quality*, 15(2), p182-194, 2005.

[7] B. Floh, and H. Treiblmaier, What keeps the e-banking customer loyal? A multigroup analysis of the moderating role of customer characteristics on e-loyalty in the financial service industry. *Journal of Electronic Commerce Research*, 7(2), p97-109, 2006.

[8] A. Flavian, M. Guinaliu, and R. Gurrea, The role played by perceived usability, satisfaction and consumer trust on web site loyalty. *Informant and Management*, 43(1), p1-14, 2006.

[9] V. Shankar, A. K. Smith, and A. Rangaswamy, Customer satisfaction and loyalty in online and offline environments. *International Journal of Research in Marketing*, 20(2), p153-175, 2003.

[10] B. White, Amy Langville, and Carl Meyer, Google's Page Rank and beyond: the science of search engine rankings. *Inf Retrieval*, 11(5), p471-472, 2008.

[11] J. Santos, E-service quality: a model of virtual service quality dimensions. *Management Service Quality*, 13(3), p233-246, 2003.

[12] R. N. Bolton, and J. H. Drew, Mitigating the effect of service encounter. *Marketing Letters*, 3(1), p57-70, 1992.

[13] A. Parasuraman, V.A. Zeithaml, and A. Malhorta, E-S-QUAL: A multiple-item scale for assessing electronic service quality. *Journal of Service Research*, 7(3), p213-233, 2005.

[14] A. Parasuraman, V. Zeithaml, and A. Malhotra, E-S-QUAL, A multiple-item scale for assessing electronic and revolution in web site functionalities. *Decision Sciences*, 35(3), p423-455, 2005.

[15] A. Parasuraman, Assessing and improving service performance for maximum impact: insights from a two-decade-long research journey. *Performance Measurement and Metrics*, 5(2), p45-52, 2004.
[16] L. Schaupp, and C. F. Bélanger, A conjoint analysis of online consumer satisfaction. *Journal of Electronic Commerce Research*, 6(2), p95-111, 2005.
[17] S.S. Srinivasan, R. Anderson, and K. Ponnavolu. Customer loyalty in e-commerce: an exploration of its antecedents and consequences. *Journal of Retailing*, 78(1), p41-50, 2002.
[18] R. C. Nacif, *Online Customer Loyalty: Forecasting the Repatronage Behavior of Online Retail Customers*. Germany: Gabler Edition Wissenschaft, 2003.
[19] R. L. Oliver, *Satisfaction, a behavioural perspective on the consumer*, McGraw-Hill, New York, 1997.
[20] J. L. Giese, and J. A. Cote, Defining Consumer Satisfaction. *Academy of Marketing Science Review*, 2000(1), p1-24, 2002.
[21] M. J. Bitner, and A. R. Hubbert, Encounter satisfaction versus overall satisfaction versus quality. In R. Rust & R. Oliver (Eds.), *Service quality: New directions in theory and practice,* p72-94, Sage, Thousand Oaks, CA, 1994.
[22] A. Caruana, Service loyalty: the effects of service quality and the mediating role of customer satisfaction. *European Journal of Marketing*, 36(7/8), p811-830, 2002.
[23] J. J. H. Chia, and M. H. Chao, The relationship between service quality and customer satisfaction in a leading Chinese web 2.0 company. *The Business Review, Cambridge*, 11(1), p84-89, 2008.
[24] H. H. Chang, and S. W. Chen, The impact of customer interface quality, satisfaction and switching costs on e-loyalty: internet experience as a moderator. *Computers in Human Behavior*, 24(6), p2927-2944, 2008.
[25] C. Ranaweera, and A. Neely, Some moderating effects on the service quality - customer retention link. *International Journal of Operations and Production Management*, 23(2), p230-248, 2003.
[26] E. W. Anderson, and V. Mittal, Strengthening the satisfaction-profit chain. *Journal of Service Research*, 3(2), p107-120, 2000.
[27] R. E. Anderson, and S.S. Srinivasan, E-satisfaction and e-loyalty: a contingency framework. *Psychology and Marketing*, 20(2), p123-138, 2003.
[28] J. Lu, and Y. Lu, Dimensions and influencing factors of customer loyalty in the intermittent service industry. *The Journal of Qualitative and Technical Economics*, 3(1), p91-101, 2007.
[29] V. A. Zeithaml, A. Parasuraman, and A. Malhotra, A conceptual framework for understanding e-service quality: implications for future

search and managerial practice. *MSI Working Paper Series, Report No. 00-115*, Cambridge, MA, 2001.

[30] S. Y. Lam, V. Shankar, M. K. Erramilli, and B. Murthy, Customer value, satisfaction, loyalty, and switching costs: an illustration from a business-to-business service context. *Journal of the Academy of Marketing Science*, 32(3), p293-311, 2004.

[31] R. N. Bolton, and J. H. Drew, Mitigating the effect of service encounter. *Marketing Letters*, 3(1), p57-70, 1992.

[32] K. Reynolds, and S. Beatty, Customer benefits and company consequences of customer-salesperson relationships in retailing. *Journal of Retailing*, 75(1), p11-32, 1999.

[33] R. Gee, G. Coates, and M. Nicholson, Understanding and profitably managing customer loyalty. *Marketing Intelligence and Planning*, 26(4), p359-374, 2008.

[34] R. R. Hill, Analytical comparison of optimization problem generation methodologies. *Proceedings of The 1998 Winter Simulation Conference*, December 13-16, Washington DC, 1998.

[35] A.W. Riley, M. Ensminger, C. B. Forrest, M. Kang, B. F. Green, B. Starfield, and S. Ryan, Validity of measures of socioeconomic status of adolescents. *Journal of Adolescent Research*, 15(3), p392-419, 2000.

[36] J. F. Hair, Jr, R. E. Anderson, R. L. Tatham, and W. C. Black, *Multivariate Data Analysis*, Prentice-Hall, USA, 1998.

[37] U. Sekaran, *Research Methods for business: A skill building approach.* John Wiley & Sons, New York, 2000.