

**WEB DESIGN ATTRIBUTES GUIDELINE TO REINFORCE USER
TRUST, SATISFACTION, AND LOYALTY FOR MALAYSIAN
UNIVERSITY STUDENTS**

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**FACULTY OF COMPUTER SCIENCE AND
INFORMATION TECHNOLOGY
UNIVERSITY OF MALAYA
KUALA LUMPUR**

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USER TRUST, SATISFACTION, AND LOYALTY FOR
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**DISSERTATION SUBMITTED IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
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**FACULTY OF COMPUTER SCIENCE AND
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WEB DESIGN ATTRIBUTES GUIDELINE TO REINFORCE USER TRUST, SATISFACTION, AND LOYALTY FOR MALAYSIAN UNIVERSITY STUDENTS

ABSTRACT

Web site design is the most crucial factor influencing the online e-commerce business. It determines the customer's trust in the products and owners, increasing sales and recognizing its brand. There is currently no reference to understanding Malaysian university students' user preference in web site design. For this study, we evaluated Malaysian university students' user preferences for website design attributes mainly comprised of (interactivity, navigation typography, colour, and content quality). The analysis of the user preferences on the website attributes, the relationship of the attributes with the Malaysian cultures, and the findings based on the three Malaysian mostly visited bookstore websites were done. The hypothesis formed based on the literature review, and analysis of the three primarily Malaysian bookstore websites for each web attributes was discussed. Based on the hypothesis, developed a prototype, an online e-commerce book store system known as Ranjen Bookstore, was designed as a guideline. Students (n=30) participated in the test by logging the time taken for each of them, starting from the login page until the end, where they have completed the purchase by adding the items to the cart. Furthermore, the collected data based on the time logged by the 30 students in the system was analyzed. All the five web site design attributes are essential to design aspects for the development of user loyalty, satisfaction, and trust for Malaysian University students; hence, an end product, an online bookstore developed focusing mainly on the user interface incorporating these five web site design attributes. This research confirmed that the user interface helped establish trust, loyalty, and satisfaction between the user and the system. Ranjen Bookstore can be used as a reference or deciding factor by the developer when planning to design the website for Malaysian University students.

Keywords: Web attributes, satisfaction, loyalty, trust

GARIS PANDUAN REKABENTUK LAMAN WEB DALAM MENGUKUHKAN KEPERCAYAAN, KEPUASAN, DAN KESETIAAN PENGGUNA PELAJAR UNIVERSITI MALAYSIA

ABSTRAK

Reka bentuk laman web adalah faktor terpenting yang mempengaruhi perniagaan e-dagang dalam talian kerana ia menentukan kepercayaan pelanggan terhadap produk dan pemilik yang membantu meningkatkan penjualan dan memberikan pengiktirafan kepada jenama produk. Pada masa ini tidak ada rujukan untuk memahami pilihan pengguna pelajar Universiti Malaysia dari segi reka bentuk laman web. Untuk kajian ini, kami telah menilai pilihan pengguna pelajar Universiti Malaysia untuk atribut reka bentuk laman web yang terdiri daripada (interaktiviti, tipografi navigasi, warna, dan kualiti kandungan). Hipotesis yang dibentuk berdasarkan tinjauan literatur dan analisis tiga laman web kedai buku yang paling banyak dikunjungi di Malaysia untuk setiap atribut web telah dibincangkan. Kemudian berdasarkan hipotesis dibentuk prototaip yang merupakan sistem kedai buku e-dagang dalam talian yang dikenali sebagai Ranjen Bookstore telah dirancang sebagai garis panduan. Pelajar ($n = 30$) telah mengambil bahagian dalam ujian dengan mencatat masa yang diperlukan untuk masing-masing bermula dari halaman log masuk sehingga akhir di mana mereka telah berjaya menyelesaikan pembelian dengan menambahkan barang ke dalam troli. Selanjutnya, data yang dikumpulkan berdasarkan masa yang dicatat oleh 30 pelajar dalam sistem dianalisis. Kesemua lima atribut web (interaktiviti, tipografi navigasi, warna, dan kualiti kandungan) adalah aspek reka bentuk yang penting untuk pengembangan kesetiaan, kepuasan dan kepercayaan pengguna untuk pelajar Universiti Malaysia.. Kedai Buku Ranjen ini boleh dijadikan rujukan atau faktor penentu oleh pembangun ketika merancang mereka bentuk laman web untuk pelajar Universiti Malaysia.

Kata kunci: Atribut laman web, kepuasan, kesetiaan, kepercayaan

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LIST OF SYMBOLS AND ABBREVIATIONS

TBE: Time-Based Efficiency

ORE: Overall Rate Efficiency

UI: User Interface

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CHAPTER 1: INTRODUCTION

1.0 Introduction

The online e-commerce website is an essential primary tool in the business world where it is a medium of a communication-consuming little budget. It helps attract various kinds of customers by promoting business products to earn extra-large profits. Along this line, to advance in online business, websites (or sites) ought to be planned to look dependable and require less psychological endeavours to utilize; else, perplexity could slant the guests to close it. A very much designed site ought to guarantee lucidity, consistency, and the course of necessary data on appropriate site zones, effectively opening in a more extensive range. Notwithstanding clearness and consistency, site ease of use in the social setting is vital, guaranteeing a site's fittingness for all clients. The web site design attributes usability is fundamental in deciding the achievement or disappointment of an organization, which mainly comprises loyalty, trust, and satisfaction (Tezza, Borna, & Andrade, 2011).

To investigate consumer loyalty, trust, and satisfaction, (Hofstede, 2001) distinguished five social measurements that are now and again received in different examinations of web-based businesses (Ganguly et al., 2010), (Cyr et al., 2013), (Cyr, 2013), (Vance et al., 2008),(Eid, 2011) and (Shiu et al., 2015). Further, these examinations based on (Ganguly et al., 2010), (Cyr et al., 2013), (Cyr, 2013), (Vance et al., 2008),(Eid, 2011), and (Shiu et al., 2015) show that clients from various nations delineated distinctive acknowledgement conduct toward configuration, incorporating security and trust concerning web-based business sites.

Web design attributes for Malaysian university students are critical because website design is the most crucial factor determining customer's trust, satisfaction, and loyalty. Website is fundamental in deciding the achievement or disappointment of an organization. The lack of web site design guideline on these important factor causes loss

to online business (Tezza, Bornia, & Andrade, 2011). We research by using a comprehensive literature review, surveys from Malaysian University students and developed a simple bookstore website prototype. The findings can be used as a guideline to help understand the Malaysian university student's web attributes user preference, which builds trust, loyalty, and satisfaction.

1.1 Statement of Problems

Website design is essential in determining customer's trust, satisfaction, and loyalty. Design affects the achievement or disappointment of an organization. The lack of web site design attributes implementation in the system can cause business loss (Tezza, Bornia, & Andrade, 2011). Based on our knowledge, there were no guidelines or research to understand user preference's web design attributes, which build trust, loyalty, and satisfaction in Malaysian University students context.

1.2 Scope of Research

Only thirty participants tested for this system, and most were students. This research was mainly focusing on the loyalty, trust, and satisfying relationships between the Malaysian University students ranging from the age of 20-24 and the system. Only five web attributes as suggested by the research community are considered (Cyr & Head, 2013), (Palmer, 2002), (Marcus & Gould, 2000), (McCracken & Wolfe, 2004), (Wang & Senecal, 2007), which are Typography, Colour, Content, Interactivity, and Navigation. The guideline proposes that this research was specifically focusing on Malaysian students as the end-users.

1.3 Objective of Research

The research aims to provide a guideline to develop an e-commerce online book system focusing on the user interface by applying five web design attributes (for example, typography, navigation, interactivity, colour, and value of the content) for Malaysian University students. Three research objectives are:

1. To identify website design's user preferences among the five attributes in determining user trust, loyalty, and satisfaction, focusing on Malaysian University students ranging from 20 to 24.
2. To propose a guideline for Malaysian University students to building one online shopping web to gain trust, loyalty, and satisfaction.
3. Evaluate the proposed guideline for Malaysian University students using literature review, case study, and survey methods.

1.4 Research Main Hypothesis

The following are the hypothesis formed for this research. More information on how this was retrieved will be elaborated further in Chapter 3.

H1: Typography of the web affects user satisfaction in Malaysian culture

H2: Typography of the web affects user trust in Malaysian culture

H3: Colour prompts more positive value on user satisfaction toward that equivalent site of Malaysian culture

H4: Colour prompts more positive value on user trust toward that equivalent site of Malaysian culture

H5: Good web contents value promote higher user satisfaction in Malaysian culture

H6: Good web contents value promote higher user trust in Malaysian culture

H7: High level of interactive website promote more user satisfaction on a similar Malaysian website.

H8: High level of interactive website promotes more user trust on a similar Malaysian website.

H9: In Malaysian culture, assisted navigation promotes more user satisfaction on the similar Malaysian website.

H10: In Malaysian culture, assisted navigation promotes more user trust on a similar Malaysian website.

H11: High level of user satisfaction promotes more user loyalty on a similar Malaysian website.

H12: High level of user trust promotes more user loyalty on a similar Malaysian website.

1.5 Research Significance

This investigation will help comprehend the deciding factor to think about when creating sites for Malaysian University students to reinforce clients' trust, loyalty, and satisfaction with the sites. The finding of this exploration may likewise be useful for website developers in structuring the data guidelines and online business sites for Malaysian University student societies. Additionally, the distinguishing proof of website architecture characteristics that fundamentally influence the trust, loyalty, and satisfaction in Malaysian University students is likewise a critical thought to start in this investigation.

1.6 Chapters Summary

This thesis consists of 7 chapters as below:

Chapter 1: Introduction – Gives general introduction about Malaysian University student's preferences in the user interface together with the problem statement, objectives, aim, and significance of this research.

Chapter 2: Literature Review – Describing all the previous research works related to Malaysian University students and user interface of web design in general and a few bookstore web design. The definitions, reviews, and discussions related to trust, loyalty, satisfaction, and Malaysian culture are described together with the comparison between 3 mostly visited Malaysian Bookstores in this chapter.

Chapter 3: Research methodology- Comprises of research questions, smart methodology, and the explanation of the research methodology, followed by the justification of the chosen development methodology discussed in this chapter.

Chapter 4: System Analysis – In this chapter, the supporting research for trust, satisfaction, and web attributes were collected and identified the web attributes that it is mostly related to that. The findings of how that particular web attribute based on the three Malaysian bookstore systems were compared and evaluated, followed by the hypothesis was formed based on the findings.

Chapter 5: System Design – This chapter provides more information on the system's functional and non-functional requirements. The drawings consist of ERD, Class Diagram, and Use Cases together with the tool and technologies, and modules involved in the development also described in this chapter.

Chapter 6: Results and Discussions – This chapter provides insight into how the usability evaluation was carried out using time-based efficiency and overall rate efficiency. It also provides the survey data analysis results and its discussions.

Chapter 7: Conclusion – This study's boundaries and strengths and the upcoming works of this research will be elaborated in this chapter.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

The Websites have turned into the foundation of business and are considered as a minimal effort wellspring of correspondence to trade the items and administrations related data. In this manner, to create income, sites advance the items or administrations and offer a better incentive than clients, accordingly, pulling in more clients.

In this way, to advance this online business system, sites should be structured to look reliable and require less psychological endeavours to utilize; else, perplexity could slant the guests to close it. Therefore, in a more extensive range, an all-around structured site ought to guarantee clearness, consistency, and the game plan of necessary data on appropriate site regions, which are effortlessly available. Notwithstanding lucidity and consistency, site ease of use in the social setting is also a critical concern, guaranteeing a site's suitability for all clients.

To investigate consumer loyalty, trust, and satisfaction, Hofstede recognized five social measurements that were much of the time embraced in different online business ponders (Ganguly et al., 2010), (Cyr et al., 2013), (Cyr, 2013), (Vance et al., 2008), (Eid, 2011) and (Shiu et al., 2015). Further, these investigations based on (Ganguly et al., 2010), (Cyr et al., 2013), (Cyr, 2013), (Vance et al., 2008), (Eid, 2011), and (Shiu et al., 2015) show that clients from various nations delineated diverse acknowledgement conduct toward configuration, incorporating security and trust as for online business web pages.

The degree to where a network maintains a strategic distance from mysterious circumstances and uncertainty is referred to as Uncertainty avoidance (UA) by one of Hofstede's social measurements (Hofstede, 2001). Uncertainty avoidance index measures uncertainty avoidance to be compared to one another. The indexing measurement is divided into low, moderate, and high scores. A low score in the uncertainty index means

the society has a high tolerance for uncertainty and ambiguity, for example, a country like Singapore and Sweden. A high score in the uncertainty index means the society has a low tolerance for uncertainty and ambiguity, for example, a country like Germany and Japan. An average score in the uncertainty index means the society between the high and the low uncertainty avoidance cultures that take some characteristics from both avoidances, such as countries like Canada and the USA. As indicated by Hofstede's social record, Malaysian societies are known as a culture with more trust value or a UA culture with moderately less and a UAI index of 36 (Hofstede, 2001). Moderately low UA cultures like Malaysia incline general rules when nations with high uncertainty avoidance show an inclination for vital necessities and directions (Boyd, 1999).

In this examination, we utilized a practical example of understudies ($n = 30$) to decide website design attributes that conceivably impact client loyalty, satisfaction, and trust in Malaysia. We choose 30 respondents, according to (Ross, 2014). When the sample size is 30, we can be sure of the normal approximation. The sample mean of a sample of size at least 30 sample size will be nearly normal, regardless of how abnormal the fundamental population distribution was. Hence, the survey's minimum of 30 respondents is sufficient for the statistical analysis. The web design attributes embraced in this examination are commonly sorted into the organizational structure, Design, and aesthetic. The aesthetic point of view was limited to colour and typography, discussed in the online shopping space to decide trust, loyalty, and satisfaction. Hence, this investigation's primary commitment is to decide typography's job in establishing user trust.

These web design attributes consolidate both aesthetic and ease of use perspectives. Be that as it may, both typography and colour are related to stylish quality, though substance, intuitiveness, and route are increasingly identified with the site's hierarchical structure and Design.

2.1 Definitions of Web attributes

Generally speaking, an attribute is a property or a function. Colour, for instance, is your hair's attribute. The attribute is an inconsistent property or representative for some segment of a program set to various qualities when utilizing or programming PCs. An attribute is a function of a page element, such as a font, in the Hypertext Mark-up Language (HTML). An HTML client can set various qualities for text style properties, for example, size and shading. For example, in some programming dialects, PowerBuilder Power Script, quality is an element property or a compartment for the item's properties. For example, the colour could be a text object attribute containing the "blue" value. Website attributes apply to a website's functionality or characteristics and significantly influence a retailer's consumer behaviours and trust feelings.

2.2 Review on Web attributes

2.2.1 Table of web attributes review

Reference	Title	Objectives/Findings	Application/Final Products	Weaknesses
(Singh & Matsuo, 2004)	"Measuring cultural adaptation on the Web."	Provide and review guideline for creating culturally adapted web sites	U.S. Websites were found to be more straightforward and less decorative.	No guidelines on which cultural categories more critical in taking cultural differences
(Palmer, 2002)	"Web Site Usability, Design, and Performance Metrics"	Identify website metrics for usability and performance constructs.	Appropriate psychometric and validity properties are required for website performance.	More usability testing methods required to be more precise
(Wang & Senecal, 2007)	"Measuring Perceived Website Usability"	Metric measurements for usability with valid, consistent, and simple ones were established.	Each dimension of the scale is easy to navigate with interactive content	Respondent's experience of all the website's interactivity features was not healthy.
(Lee & Koubek, 2010)	"The effects of usability and	Examines the usability	The organizational	The study did not consider

	web design attributes on user preference for e-commerce."	relationship and web attributes influence of on user preferences	structure had a more significant effect on user preference than graphical factors.	trust one of the main problems of e-commerce success.
(Hasan, 2016)	"Perceived irritation in online shopping: The impact of website design characteristics."	Fill gap on customer frustration by analyzing the impact of visual, navigational, information features.	Suggestions for website designers who want attractive websites that can lessen customer frustration.	Partial shopping transaction so participants not fully experience the effects of design factors.
(Lee & Kozar, 2012)	"Understanding of website usability."	Explored website usability's specific dimensions by group analysis with website usability experts.	Arguing that website usability is a significant part of the whole user involvement	Suggested methods were evaluating website usability cognitive aspects, not affective aspects.
(Benbunan-Fich, 2001)	"Using protocol analysis to evaluate the usability of a commercial web site."	Evaluate the verbal procedures of users communicating with the website	They have documented how to determine the content, navigation, and interactivity of websites.	The comparative study of websites was not included.
(Cyr & Head, 2013)	"Website design in an international context."	Determine if differences in gender are significant in countries of higher masculinity	There are more moves among people in nations with higher manliness and fitting for sexual orientation	A sole merchant website has been used, and biasing responses may occur.
(Marcus & Gould, 2000)	"Crosscurrents: Cultural dimensions and global Web user-interface design."	The effect of culture on the web-based content should be recognized by businesses wishing	This cultural aspect analysis raises many UI design issues, especially for the Internet.	Need to develop new methods when cross-cultural theory becomes an accepted design element
(Leidner & Kayworth, 2006)	"A Review of Culture in Information Systems Research"	Provide insight into their understanding of the IT-culture connections.	Develop proposals for three types of cultural conflict and the outcome of these conflicts.	Avoided the possibility of different behavioural outcomes for individual differences culturally.

(Lee et al., 2005)	"Usability Testing with Cultural Groups in Developing a Cell Phone Navigation System"	A laboratory-based usability test was performed to gather multi-social ease of use information.	Collects information about the multi-cultural usability of cell phone UI design and cultural expectations	Research from just four participants can not reflect their cultural group
(Petrie & Bevan, 2009)	"The Evaluation of Accessibility, Usability, and User Experience"	Introduces a variety of assessment approaches that help developers build interactive E-Systems	A selection of assessment methods to help developers build open and functional E-Systems	To start the evaluation should continue with more comfortable expert and user-based evaluations
(Cyr, Head, & Larios, 2010)	"Colour appeal in website design within and across cultures."	Effects of three website colour on user interest, satisfaction, and e-loyalty.	Webpage colour advance is a significant determinant of site trust and fulfilment.	The experimental setting creates a non-natural atmosphere for e-commerce
(Bilgihan & Bujisic, 2015)	"The effect of the website features in online relationship marketing."	Developing a theory-based guideline of utilitarian and hedonic website features	All dimensions of commitment are from the trust, while emotional commitment is from e-loyalty	Create a potential non-response bias as survey participants were asked to remove memories of booking

(Marcus & Gould, 2000) and (Singh & Matsuo, 2004) referenced that guided navigation is an essential website design attribute to plan higher-UA cultures sites. As far as web site design attributes, five web site design attributes recommended by researchers (Cyr & Head, 2013), (Palmer, 2002), (Marcus & Gould, 2000), (McCracken & Wolfe, 2004), (Wang & Senecal, 2007) incorporate the accompanying:

- 1) Typography is identified with appearance, engaging quality, and clarity of content to draw client consideration.
- 2) Colour offers to the clients' feelings, sentiments and causes them to comprehend the elements of catches, symbols, and boxes.
- 3) Content quality is how much the gave data is adequate and finish.

- 4) Interactivity is how data is displayed to upgrade client communication reliably.
- 5) Navigation is the degree to which navigational pieces of information and arrangement help the client get to different site areas.

These web design attributes consolidate both aesthetic and ease of use viewpoints. The aesthetic value comprises colour and typography. Organization layout comprises content, navigation, and interactivity. These web attributes design is broadly utilized in a few online business-related investigations (For example, (Cyr & Head, 2013), (Vance et al., 2008), (Eid, 2011), (Cyr, 2008), (Lee & Koubek, 2010), (Hasan, 2016), (Lee & Kozar, 2012), (Benbunan-Fich, 2001)) to survey user's inclinations. In like manner, in the social setting, (Cyr & Head, 2013) analyzed design attributes' complications (Visual Design, content, and navigation) on trust and satisfaction in manly versus female-oriented societies.

Based on the (Mohd et al., 2009) questionnaire, the creator mentioned that the website mostly focusing on its substance because it has been identified as one of the primary influences for repeated visits. For designing a useful website, the right web content choices such as content, sound, format, pictures, illustrations, movement and, possibly smell in the future are essential.

(Marcus & Gould, 2000) hypothetically clarifies UA's complications on Design in a few different ways, for example, straightforwardness against unpredictability, organized route versus less control route, and repetitive signals (typography, sound, colour, and others) to reduce the risk.

(Singh and Matsuo, 2004) mean to give Web advertisers a structure for making socially adjusted Web destinations and evaluating the proposed system by investigating the degree of social transformation spoken to in Web locales of the U.S. and Japanese organizations. The paper also attempts to recognize gaps in the portrayal of social guidelines between U.S. and Japanese websites within this general guideline. The

American websites emphasized more of a hard-selling approach using superlatives compared to Japanese websites and explicitly mentioned the company's rank and position. Overall, U.S. Websites are more straightforward, more concise, more rational, more success-oriented, more progressive, and less decorative.

(Palmer, 2002) aim to identify relevant metrics to study consumer-focused websites for usability, architecture, and performance constructs. Recommend that website design tests demonstrate appropriate psychometric and validity properties critical in explaining website performance.

(Wang & Senecal, 2007) the objective was to develop a perceived usability metric scale that is short, reliable, and valid. The primary purpose is to develop a metric measurement that will benefit all websites' organisations. Results suggested that each dimension of the scale is accurate (easiness of navigation, pace, and interactive content). Fact analysis results showed the guideline's validity. The measure also demonstrated quantitative measurements based on the Computer Acceptance Model by being positively identified with the site's members' mentality.

(Vance et al., 2008) aim to propose a paradigm of confidence in IT objects and test it empirically. To do this, they were analyzing e-commerce portals, internet-based storefronts with specifically tailored e-commerce pages for mobile devices. Confirm that the degree to which the IT artefact expresses trust (or lack of trust) is likely to affect users' desire to implement the IT artefact.

(Lee & Koubek, 2010) examines the relationships between perceived usefulness before actual usage, completion time and choice of assignments, and the impact of design attributes on user preference for e-commerce websites. Ten participants used nine online bookstore websites. Pre-usability and task completion time were related. The connection between pre-use ease of use and inclination was more noteworthy than that of errand fulfilment time and inclination. Design attribute tests were powerfully interconnected

after real use. The hierarchical structure and Design greatly affected client inclination than graphical variables, for example, typography and colour. Such outcomes can make an excellent system to comprehend client inclinations and set up proposals for creating more favoured internet business sites.

(Hasan, 2016) the objective was to fill the gap on customer frustration or its determinants in online shopping environments by analyzing the impact of visual, navigational, and information website design features on consumers' perceived annoyance in online shopping. Three website design features that are visual, navigational, and website designs have had significant adverse effects on perceived annoyance in the sense of online spending. These results have useful implications for website designers and online retailers who want to design and sustain attractive websites that can mitigate frustration expectations among current and potential customers.

(Lee & Kozar, 2012) explored website usability's specific dimensions by combining previous studies and a focus group analysis with website usability experts. Contending that site convenience is a significant part of the whole client experience, this examination makes the site easy to use to develop and estimate strategies and talks about their nomological networks that are helpful to the two analysts and professionals. Discoveries from this research are intended to effectively assess website design efficiency and be used as building blocks to develop a robust website usability theoretical guideline.

(Benbunan-Fich, 2001) documents the findings of a research project using a systematic methodological technique known as protocol analysis to analyze a commercial website's usability. To evaluate the verbal procedures of a sample of users communicating with a greeting card website, about 15 usability concepts and three measurement criteria (Content, Navigation, and interactivity) were used as a context. Documented how to determine the content, navigation, interactivity, and basic usability concepts of commercial websites.

(Cyr & Head, 2013) determine if the more excellent value of masculinity countries has a greater value of gender differences than vice versa. True to form, there are more moves among people in nations with higher manliness, and the connections in the guideline are bound to be fitting for sexual orientation. Such examination has suggestions for web design inclinations elements and grows prior Work on web composition in a multi-nation test where manliness womanliness shifts.

For (Marcus & Gould, 2000), the result of culture on the comprehension and utilization of electronic-based communication, content, and resources should be recognized by businesses wishing to do international business on the internet. By referring to a cross-cultural theory developed by Geert Hofstede, this paper adds to the investigation of this intricate and testing issue by dissecting a portion of the requirements, needs, inclinations, and desires for various societies. This cultural aspect analysis raises many UI design issues, especially for the Internet. Via sample websites addressed a range of design variations, but other, more critical issues remain.

It is hard to plan an item or site that fulfils all the global and intercultural clients (Lee et al., 2005). Consequently, it is vital to figure out the factor contributing to it as conceivable to see consumer satisfaction. Check for guideline achievement is known as satisfaction and is a generally embraced portion of different mechanical examinations. Along these lines, the more prominent the level of satisfaction with an administration, the more prominent the goal to utilize or self-control (Liaw & Huang, 2013). E-satisfaction is characterized as a user's view of a web design (Szymanski & Hise, 2000), though (Petrie & Bevan, 2009) characterizes satisfaction as an ideological frame of mind for a product.

(Petrie & Bevan, 2009) introduces various assessment approaches that help developers build interactive electronic products, facilities, and environments (E-Systems) that are

both easy and pleasant to use for the target audience. A selection of assessment methods to help developers build open and functional E-Systems.

For (Cyr, Head, & Larios, 2010), three website colour treatments are assessed for their effects on user interest, happiness, and e-steadfastness across three socially particular groups. A rich multi-strategy approach, including eye, follow, study, and meetings, is used to collect data. The website colour appeal is a significant determinant of website trust and satisfaction with culturally noted variations. The discoveries have common sense incentive for powerful usage of colours in site improvement for the web advertisers and interface creators.

(Bilgihan and Bujisic, 2015) in an online lodging reservation setting, building up a hypothesis based guideline of practical and libertine site highlights, client commitment, trust, and e-reliability. Structural equation modelling was used to test the hypotheses of the study. Discoveries attest to the estimation of website composition instruments for internet showcasing connections. All elements of duty have been discovered to be antecedents of certainty, while passionate responsibility is the forerunner of e-loyalty.

2.3 Discussion on the Web attributes Related Works

(Singh & Matsuo, 2004) the proposed structure does not provide guidelines for which cultural categories are more critical in taking cultural differences into account under each aspect. Our research has focused on Malaysian culture and provide guidelines for them. More abstract design and usability testing methods required more precise metric measurements for (Palmer, 2002), so we have used Usability Evaluation using Time Based Efficiency and Overall Rate Efficiency Results. (Wang & Senecal, 2007) was not confident for all their users tested all the interactivity functions of the web where their stimulus toward that can be ignored. Still, in our research, we have given importance to

the web's interactivity functions and confident that it was well tested to the 30 Malaysia University students. (Lee & Koubek, 2010).

The study did not consider trust one of the main obstacles to e-commerce success. Still, we have considered a trust, satisfaction, and loyalty for our research play an important role in e-commerce success. (Hasan, 2016) the study used a partial shopping transaction that was not completed entirely. Participants did not fully experience the effects of website design factors for the remaining purchasing transaction activities. Still, our users have fully experienced the effects of web design factors with complete shopping transaction for our research. (Lee & Kozar, 2012) suggested methods are specifically evaluating website usability cognitive aspects, not affective aspects. Still, in our research, we have emphasized the affective aspects like emotions and relationships by understanding the relationship between Malaysian cultures and trust, loyalty, and satisfaction. (Benbunan-Fich, 2001) comparative study of commercial websites and protocol analysis combined with other usability test methods were not included. For our research, the usability test methods were done using the comparative study of 5 mostly visited online bookstore by Malaysians. (Cyr & Head, 2013) used a sole merchant website.

The likelihood of biasing response may occur as respondents are aware of the company's name and reputation and may have expectations of the company previously established, but for our research, we did not have that problem as our prototype website does not refer to any significant or famous website merchants. When cross-cultural theory becomes an accepted user-interface design element (Marcus & Gould, 2000) must alter our current practices and develop innovative methods. Still, we have already taken account of the cross-cultural theory focusing on Malaysian culture specifically for our research. (Leidner & Kayworth, 2006) did not consider the possibility of different behavioural outcomes for individual differences within the particular cultural unit. Still,

we will not have this issue for our research as we have limited and focuses on a smaller scope, which is only within Malaysian University students' cultures. (Lee et al., 2005) Research is based on four participants that do not reflect their cultural group and are not covered for potential differences between cultural groups in usability testing. Our research focuses on only one cultural group of the 30 participants: Malaysian University students. Anyone who plans to start an evaluation should not be balanced by the complexity of the situation as (Petrie & Bevan, 2009) but should continue with some of the more straightforward expert evaluations and easy user-based evaluations, so for our research, we did the user-based evaluation based on the survey after they were using the developed web prototype in our research.

On account of the idea of data collection measure, the experimental setting of (Cyr, Head, & Larios, 2010) is necessary. Still, it creates a non-natural atmosphere for e-commerce. Our research has carried out the experimental setting by letting the user use and evaluate the prototype's web attributes. (Bilgihan & Bujisic, 2015) the study was conducted in an online setting, and consequently, participants were asked to remove memories of their prior experience of booking hotels. Unless the encounter gave participants a concrete imprint, they would not express their opinions on specific details that were questioned in the survey. This could create a potential non-response bias as well. But for our cases, the participants will not have this issue as this is the first time they will try to purchase the books online in the prototype developed. The survey was immediately given after that while the usage and experience were still fresh in their mind.

2.4 Definitions of Trust, Loyalty and Satisfaction relationship

Trust is a logical link developed between web domains to share the rights and privileges of users and devices in one domain. In terms of the website, the user should have trust that the website is safe to surf without any virus-infected in their system and

retrieve any of their personal or restricted information from their PC without their knowledge. Being loyal is portrayed as "being devoted to one's promise, loyalty, or obligation. They were dedicated to one's devotion to an administration or state, or an individual considered a commitment to implement. The definition tends to be formal and binding. I say that loyalty is not a duty enforced by external influences but internal moral characteristics and freely given decisions. Loyalty in the personal sphere, arising from affection, loyalty, dedication, and commitment to another's well-being, is acceptable. Sometimes, people are not aware of all loyalty facets in a relationship. In terms of the website, the user will be loyal to the organization services that previously provided them with discounts and coupons. The Design they are comfortable for so long as the user interface is already learned and save their time more.

Customer satisfaction is described as a measure of how happy customers are with the goods, services, and capabilities. Data on customer satisfaction, including surveys and reviews, can help a company decide how its products and services can best be enhanced or modified. The main focus of a company must be to please its customers. The following is practised by modern firms, retail and discount firms, government offices, administration firms, non-benefit associations, and any sub-bunch inside an association. In terms of the website, users will feel satisfied as long the website's Design met to save their time purchasing online easily navigated and understand the system without any complicated design or help documentation.

2.5 Review on Trust, Loyalty, and Satisfaction relationship between User and System

2.5.1 Table of Trust, Loyalty and Satisfaction relationship between User and System review

Reference	Title	Objectives/Findings	Application/Final Products	Weaknesses
(Faisal et al., 2017).	"Web Design Attributes in Building User Trust, Satisfaction, and Loyalty for High UA Culture"	Identify trust, loyalty, and satisfaction for UA culture via Web attributes user preferences evaluation	Navigation and quality of content influence user trust, while colour and interactivity typography influence user satisfaction.	Prototype only supports desktop web applications, and the usability of the prototype was not evaluated.
(Ganguly, Dash, Cyr, & Head, 2010)	"The effects of website design on purchase intention in online shopping."	Reviewing and validating website design factors that affect online store trust	Western consumers put greater emphasis on trust to produce the intention to buy.	I have used only website design considerations as a guide to trust.
(Szymanski & Hise, 2000)	"E-satisfaction: An initial examination."	Providing the initial evidence for the e-satisfaction determinants	Positive site design perceptions are necessary for evaluations of e-satisfaction.	Studies do not examine the effects on e-satisfaction of effect and equity.
(Rahimnia & Hassanzadeh, 2013)	"The impact of website content dimension and e-trust on e-marketing."	Examine the impact of dimensions of website content through e-trust.	Exhibit the direct impact of e-trust on the efficiency of e-marketing	The results of this study apply to company saffron firms only
(Kim, Hong, Min, & Lee, 2011).	"Antecedents of application service continuance"	Proposing a plan to continuously use the application service with a focus on satisfaction and trust.	ASP success plays a different role in trust and increasing satisfaction level.	The result is vulnerable to bias based solely on the cross-sectional survey data self-reported.

(Palvia, 2009)	"The role of trust in relational e-commerce exchange: A unified model."	A centralized model was developed to help understand trust in the Internet.	Trust is vital in developing loyalty and consumer to recommend the site.	Need to improve findings with a survey of general e-commerce customers.
(Mcknight, Choudhury, & Kacmar, 2002)	"Developing and Validating Trust Measures for e-Commerce."	Proposing and validating measures for an e-commerce trust model.	Trust contributes by practically validating the differences between ability, kindness, and integrity.	Trusting behaviours were not measured in this research.
(Dabholkar & Sheng, 2012)	"Consumer participation in using online recommendation agents."	Addressing how participation in RAs impacts the customer's purchasing, trust, and satisfaction	Greater consumers involvement via a RA leads to greater confidence, purchasing, and satisfaction	Effect of quality of service on customer satisfaction and trust was not assessed in this research
(Olaru, Purchase, & Peterson, 2008)	"From customer value to repurchase intentions and recommendations."	Fill a gap in the determinants of consumer interest in the R&D industry	Relationship, rewards, and service benefits significantly affected the customer's interest.	Results on organizational type show differences between private government organizations.
(Kaewkitipong, Chen, & Ractham, 2016)	"Using social media to enrich information systems field trip experiences."	Understand the reasons increase student's satisfaction using social media to enhance IS field trips	Understudies see the social media websites utilized to improve exploration to augment client satisfaction.	Not exploring to integrate social media usage to improve field trip learning performance.
(Wu, 2013)	"The antecedents of customer satisfaction and its link to complaint intentions."	To recommend a research model by the mixture of intentions complaint.	Distributive and interactional justice make a significant contribution to customer satisfaction	Recent service failure before responding to the survey was asked to recall by the participants

(Brilliant & Achyar,2013)	"The Impact of Satisfaction and Trust on Loyalty of E-Commerce Customers"	Recognize the effect of customer satisfaction and trust on e-commerce loyalty	The quality of information will lead to greater consumer trust, which leads to greater website loyalty.	There is no distinction between first-time users and regular users.
(Moriuchi & Takahashi,2015)	"Satisfaction trust and loyalty of repeat online consumer within the Japanese online trade."	Examine repeated customer loyalty factors based on expectation–confirmation theory	E-satisfaction has a more significant impact than e-trust on online shoppers' traditional loyalty.	The results are based on online consumers from Japan.
(Casaló, Flavián, & Guinaliú, 2008)	"The role of perceived usability, reputation, satisfaction and consumer familiarity on website."	Explore the principles of credibility, efficiency, satisfaction, and customer loyalty.	Proposing a strong and positive influence on loyalty through usability and satisfaction	A broader sample of consumers is required, especially in different nationalities.
(Cyr, Head, & Ivanov, 2009)	"Perceived interactivity leading to e-loyalty."	To investigate apparent intelligence in a model that fuses most generally tested psychological components	Support interactivity's utility positively affects the user's performance, efficiency, and trust.	One category of the webpage (for travel arrangement) has been picked as the basis for test controls
(Vance et al., 2008)	"Examining Trust in Information Technology Artifacts"	Propose and test a paradigm of confidence in IT objects	The degree of IT artefact expresses trust affect the user desire to implement it	The brand appeal of Amazon could have influenced the degree of trust.
(Eid, 2011)	"Determinants of E-Commerce Customer Satisfaction, Trust, and Loyalty in Saudi Arabia"	Identify factors influencing the trust of Saudi customers in e-commerce	UI and data quality on internet business sites increase consumer satisfaction.	Saudi purchasing culture has been excluded from the study.
(Cyr, 2008)	"Modelling Web Site Design Across Cultures"	Key design categories should be routinely analyzed and	Trust and satisfaction important for online vendors	The single vendor used so bias in

		mapped to website trust and satisfaction.	but different across cultures	response may occur.
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The (Mohd et al., 2009) discoveries based on the questionnaires demonstrated that trust and empathy are the most primary persuasive reasons for foreseeing the web purchasing expectation.

The business sites' structure nature is fundamental for the achievement of online business and to pull in new clients to buy aim (Dedeke, 2016). A few creators (Ganguly, Dash, Cyr, & Head, 2010), (Eid, 2011), (Cyr & Head, 2013), (Cyr, 2013), (Vance et al., 2008), (Cyr, 2008), (Cyr, Head, & Ivanov, 2009), (Cyr, Head, & Larios, 2010), (Cyr, 2014), (Lee & Koubek, 2010), (Hasan, 2016) observationally watched the ramifications of configuration qualities from both the neighbourhood and the global perspective. These suggestions give successful rules to structuring truthful interfaces to meet users' satisfaction and hold loyalty to the site. In this way, it is a settled idea that distinctions exist for plan inclinations among societies (Marcus & Gould, 2000), (Gefen, Geri, & Paravastu, 2007). The following social inclinations consume critical ramifications on satisfaction, trust, loyalty (Ganguly, Dash, Cyr, & Head, 2010), (Vance et al., 2008), (Cyr & Head, 2013), (Cyr, 2013), (Cyr, 2008), (Cyr, Head, & Larios, 2010), and success rate. In this way, site achievement is connected with culture, which is reliably examined in different human-computer interaction studies (HCI). Thus, security and trust (Ganguly, Dash, Cyr, & Head, 2010), (Leidner & Kayworth, 2006) seldom received measurement in the web-based business look into.

Like satisfaction, trust has additionally gotten significant significance in promoting research. It alludes to the profundity and confirmation of the user's inclination, dependent on uncertain evidence (Rahimnia & Hassanzadeh, 2013). Besides, dubious circumstances and risk are critical conditions that reveal an estimation of trust (Cyr, Bonanni, & Ilsever, 2004), (Kim, Hong, Min, & Lee, 2011). Hence, it tends to be characterized as an

individual's confidence and faith in someone else's dependability and trustworthiness in an exchange (Rahimnia & Hassanzadeh, 2013). Like satisfaction, trust is known as fundamental influence and is likewise connected among the associated elements to decide the achievement and good user association with dealers/site (Cyr, Bonanni, & Ilsever, 2004), (Rahimnia & Hassanzadeh, 2013). Trust is a vital factor to improve organization benefit and performance (Palvia, 2009). The term online trust likewise alludes to a client's certainty with a site and decrease in risk and vulnerability (Mcknight, Choudhury, & Kacmar, 2002). As more issues are related to online business, such as security and uncertainty, it upholds the site supplier to build up a dedicated webpage. Hence, sites' dependable appearance is critical under questionable circumstances to pull in new clients. This examination utilized trust and satisfaction as primary factors of user loyalty.

It is also not known as an unmistakable accord between researchers about the connection between trust and satisfaction. A few creators (Dabholkar & Sheng, 2012) (Olaru, Purchase, & Peterson, 2008) think that satisfaction is a factor affecting trust. The assessments regarding internet business demonstrated previous successful shopping outcomes greater user trust. In any case, different creators (Kaewkitipong, Chen, & Ractham, 2016), (Wu, 2013) announced the exact inverse: trust impacts satisfaction. The solid picture that clients have about an organization encourages them to see an abnormal state of satisfaction. However, several other applicable statistics think about (Cyr & Head, 2013), (Eid, 2011), (Cyr, 2008), (Cyr, Head, & Larios, 2010), (Brilliant & Achyar, 2013), (Moriuchi & Takahashi, 2015) speak to trust. Satisfaction is known as inconsequential influences in their research models. These examination endeavours are firmly centred around the investigation of social contrasts. It reflects the effect of various plan methods on satisfaction and trust, thus assessing these factors' connection to loyalty via the internet. Since the research questions seem to be nearer to these investigations, trust and satisfaction were prohibited from the study model. The website design attributes

emphatically impact client satisfaction and trust in a Malaysian University students culture shown by the model. Also, plan suggestions on satisfaction and trust was additionally utilized as important predecessors to decide reliability. The objective is to look at the general quality of trust and satisfaction connection to Malaysian University Students' loyalty.

Similarly, a reliable connection between user loyalty and satisfaction has been monitored (Casaló, Flavián, & Guinaliú, 2008). Nonetheless, (Bilgihan & Bujisic, 2015) and (Cyr, Head, & Ivanov, 2009) analyzed a positive connection between user loyalty and trust. Based on the (Fink & Laupase, 2000) investigation, the trust is that cultural value impacts websites' structure. As a model, they referenced that Malaysian Websites give careful consideration to atmospherics than Australian websites. It likewise expressed that Malaysians trust more in individuals than in organization and hence put more accentuation on the transaction procedure than the result. In countries with multiple cultures and ethnicities like Malaysia, people with Malay, Chinese and Indian races worth business and family rely upon devotion, compliance, and blood relationship (Kassim and Abdullah, 2010).

Regarding the structure of the UIs, just 57% of the respondents concurred that they ponder client preferences as their need, while 29% of the respondents were unbiased on this fact (Yeo et al., 2011). On the part of UI design satisfaction, 43% of the participants were uncertain if their UI designs were sufficient, besides expressing that they were unsure of their clients' dimension of satisfaction on their designs.

(Ganguly, Dash, Cyr, & Head, 2010) Review previous literature and define and empirically validate website design factors that affect online store trust. Testing the social factors in the connection between web composition and trust, just as trust and its outcomes. Testing the part of trust in the web architecture factors relationship and buy

aim. Collectivism negatively influences the relationship between intention to buy and trust, and Western consumers emphasize confidence to produce intention to buy.

(Leidner & Kayworth, 2006) aim to provide literature analysis to visualize the depth of their knowledge on IT-culture connections. They start by abstracting society and establishing the guideline for an excellent way to deal with IT and culture assessment. They create recommendations for three kinds of social clashes and the result of these contentions. Eventually, the hypothesis proposes a reorientation of qualities coming about because of these contentions' compromise. They give a structure that clarifies the characteristic worth clashes that may go with IT usage. They contend that IT unpretentiously applies pressure on the qualities characteristic in the contention by accommodating these contentions, bringing about a reorientation of qualities. Through this reorientation of qualities, IT impacts culture after some time.

(Szymanski & Hise, 2000) providing the initial evidence for the e-satisfaction determinants. Convenience has a significant impact on levels of e-satisfaction. The data also shows that positive site design perceptions are necessary for evaluations of e-satisfaction. On average, the site's design is the second most crucial element of satisfaction. In reality, website design is related to financial security expectations as the next most significant online satisfaction predictor. (Rahimnia & Hassanzadeh, 2013) will examine the impact of website content dimensions on the efficacy of e-marketing in commercial saffron companies through e-trust. The dimensions of knowledge and architecture are critical considerations for the success of e-marketing. They exhibit the direct impact of e-trust on the efficacy of e-marketing. The partial mediating effects affect the relationship between the website's content and the efficacy of e-marketing.

(Kim, Hong, Min, & Lee, 2011) proposing a plan to use the application service continuously. Our guideline's focus is on its happiness and trust. The aspect of ASP

success can play various roles in creating mutual faith, increasing satisfaction, and expressing the intention to continue using the application service.

For (Palvia, 2009), a centralized model was developed to share relationships with customers to understand trust in the Internet context. Value is vital in developing loyalty and the consumer's willingness to continue the relationship and recommend the site to others. The unified view stresses the need to establish long-lasting relationships to include technology and confidence factors.

(Mcknight, Choudhury, & Kacmar, 2002) proposing and confirming actions to the online shopping trust model multidisciplinary, multidimensional. The model includes four high-level buildings: a willingness to trust, institution-based faith, trusting beliefs, and trusting intentions- Trust has many facets, far from being unitary. It underwrites by observationally approving the qualification between the three components of ability, altruism, and uprightness, exhibiting that purchasers of web-based business gage Web merchants not in broad, clearing terms, yet as far as explicit characteristics.

(Dabholkar & Sheng, 2012) filling this study void by identifying how involvement in RAs impacts the customer's purchasing, trust, and satisfaction. Suggesting greater customer involvement via an RA leads to greater fulfilment, greater confidence, and higher buying intentions linked to the RA and its recommendations.

(Olaru, Purchase, & Peterson, 2008) fill a gap in the literature regarding consumer interest determinants in the R&D industry and word-of-mouth. The relationship rewards, service benefits, and commitment significantly affected the customer's interest.

(Kaewkitipong, Chen, and Ractham, 2016) intend to comprehend the reasons that may help increment understudy's fulfilment with utilizing web-based media to improve IS ground outings and subsequently, their expectation to keep utilizing social media in upcoming. Class instructors should guarantee that understudies see the social media

websites were visited to improve field trip research as reliable, comfortable, helpful, and grasped by their friends to amplify client satisfaction.

(Wu, 2013) aim to investigate complaint intentions and recommend a research model by the mixture of intentions complaint. Online surveys collected data based on their current practice of error in services. The findings show that customer satisfaction positively responds to complaint intentions but not for trust.

(Brilliant & Achyar, 2013) recognize the influence of trust and satisfaction for e-commerce loyalty and recognize factors affecting satisfaction. The quality of information impacts trust, and this confidence impacts loyalty. Websites for online shopping will emphasize providing trustworthy product excellence information that promotes better consumer confidence, and better confidence promotes better website loyalty. (Moriuchi & Takahashi, 2015) aim to examine the factors affecting repeated customer loyalty via the Internet-based expectation – confirmation theory (ECT). Organizations need to concentrate on their marketing, estimated costing, and customer experience to assess an online repeat shop- peer's e-satisfaction. From e-trust to e-satisfaction, e-satisfaction has a greater impact on online shoppers' enduring loyalty.

(Casaló, Flavián, & Guinalú, 2008) aim to explore the principles of credibility, efficiency, satisfaction, and customer loyalty. Satisfaction, transparency, and usability play the main factor for customer loyalty, which they proposed as they believed it had a very high value. It also checks customer familiarity's moderating impacts on the proposed associations—the presence of a healthy and vital impact on the website's loyalty.

(Cyr, Head, & Ivanov, 2009) aim to analyze a model with perceived interactivity that incorporates the utmost widely tested psychosocial components such as effectiveness and efficiency but enhances this model with a cognitive-affective confidence element and an affective enjoyment component. A model was created to validate the perceived interactivity relationship (including user control, user connectivity, and web-poll

application responsiveness) to its efficiency, effectiveness, confidence, and enjoyment. The results support interactivity's utility as it positively affects the user's performance, efficacy, enjoyment, and confidence. In effect, the development of e-loyal users.

(Eid, 2011) The objective was to identify the factors influencing Saudi customers' trust in B2C e-commerce and are happy and loyal. This study is based on previous studies to establish a theoretical model hypothesizing the connection between these three e-commerce structures and their background. The survey was conducted using a standardized self-administered questionnaire for B2C clients using e-commerce in Saudi Arabia's eastern region. A conceptual research model that theorizes the three models' crucial elements is built and statistically verified. The crucial impacts listed are quality of the user interface, quality of service information, perception of security risks, and privacy perception. It has been found that both the UI's consistency and the quality of information on e-commerce webpages have a substantial encouraging effect on client fulfilment. Although it was revealed that the quality of the graphical user interface is closely linked to customer trust, the quality of information was not. Also, it has been noticed that both anticipated safekeeping risk and expected confidentiality are closely related to community faith but are inadequately associated with client fulfilment.

(Cyr, 2008) , key design categories should be routinely analyzed, checked for validity building, and causally mapped to website confidence and website satisfaction. To achieve this goal, design categories for Information Design, Navigation Design, and Visual Design suggested by (Garrett,2003) were chosen for anticipated cultural comparison suitability. The value of design elements has been demonstrated as they affect webpage confidence, satisfaction, and e-loyalty across philosophies in a B2C environment. As described and validated, the model shows the social variety and is a fair point of departure for the upcoming study. While both confidence and satisfaction for online vendors are essential precursors to success, these constructs tend to differ across cultures. Future

website design and culture study provides numerous opportunities to improve international online shoppers' experience.

2.6 Discussion on Trust, Loyalty and Satisfaction Related Works

(Faisal et al., 2017) did not include the actual purchasing in the online ticket booking prototype used, but we let the user perform the actual purchasing process and track it via logs for our research. The prototype's usability was not evaluated as the user's activity when using the system was not tracked were. Still, for our research, we have evaluated when the user using the system itself.(Ganguly, Dash, Cyr, & Head, 2010) have used only website design considerations as a guide to trust, but we have used it as a guide for trust and satisfaction for our research.(Szymanski & Hise, 2000) studies do not examine the effects on e-satisfaction of effect and equity, but we have covered that in this research. During the data collection point, managers were used in (Rahimnia & Hassanzadeh, 2013) study. Hence, the result is not that accurate as it is always better to use end users with less experience or knowledge of the system before evaluating, which will help us get better results. This study applies to company saffron firms and cannot be applied to other firms.(Kim, Hong, Min, & Lee, 2011) the study is based solely on the cross-sectional survey data self-reported. As a result, the research results may be susceptible to common bias in the method. Still, for our research, we focused on users instead of firms, so this can be further investigated in the future for a broader audience as other country University students. (Palvia, 2009) does not use a survey of general e-commerce customers, which would have improved the findings, but we have used our research surveys. Trusting behaviours were not measured in (Mcknight, Choudhury, & Kacmar, 2002) research, but our research has measured trust, loyalty, and satisfaction. The study by (Dabholkar & Sheng, 2012) have not analyzed the impact of the quality of service on customer satisfaction and trust, provided with the same quality of service

across various experiences, customer involvement would have the expected impacts on satisfaction and trust that this research reported, but for our research, we have analyzed the impact of service on customer satisfaction trust.(Olaru, Purchase, & Peterson, 2008) organizational type's moderating effects indicate differences between government and private organizations. We focus on university students for our research, so more accurate data will be provided as focused on a certain community. (Kaewkitipong, Chen, and Ractham, 2016) the study does exclude investigating how the use of social media possible to be consolidated where it can improve the presentation of getting the hang of it, differentiating the learning yield of understudies who go to an IS ground and understudies who both go to an IS ground and utilize social media to support their study, for our study we did that too but the presentation of getting the hang of the system by the user was analyzed. Potential respondents (Wu, 2013) were asked to reminiscence a recent service failure to provide a solid foundation for completing the survey before responding to the survey. However, this may have a potential effect of care on the respondent's sense of understanding of justice and confidence in trust, as this research examines the antecedent's prior experience. Still, for our research, we can be very confident that the trust relationship between user and system was well-taken care of college graduates aged 23 to 25 years who live in Greater Jakarta are the majority of the respondents(Brilliant & Achyar,2013). Most are private staff, most of whom visit airline websites and offer gift certificates. There is no distinction between first-time users and regular users, but for our research, all our users were first-time users, and the result is accurate and not biased as all are using the system for the first time. (Moriuchi & Takahashi,2015) results are based on online consumers from Japan. The analysis must be applied to other consumer markets, so our research focuses on Malaysian University students, which can be further extended to Malaysian users to help their research. Participating persons (Casaló, Flavián, & Guinalú, 2008) were Spanish speaking. A wider sample of consumers is required,

especially in terms of different nationalities, but our research was not required as we were only focusing on Malaysian University students. One category of the webpage (for travelling arrangement) has been chosen by (Cyr, Head, & Ivanov, 2009) as the reason for trial controls to furnish the client with a controlled set of situations. We have used different web pages for our prototypes, such as contact us, the home page, book details, cart pages, and more. The degree of trust put in the e-commerce platform, and the strength of the relationships between variables in the model suggested by (Vance et al., 2008) could have been influenced by the brand appeal of Amazon but for our prototype, there is no issue as it is new and not a well-known brand for the users.(Eid, 2011) works have more influences such as Saudi client requests, Saudi acquiring tradition, and management assistance or regulation to safeguard online consumers and customer care beforehand and afterwards purchased online, omitted from this research for simplification reasons. That means the research cannot be further extended to other broader audiences as findings only suitable for Saudi cultures. (Cyr, 2008) work used a single merchant gives more remarkable consistency across various nation webpages, inclination accordingly may happen if respondents are beforehand mindful of the name and notoriety of the organization, but for our research, the user can't know the name of the organization as it was new and not exist in the market yet.

2.7 Definitions of Malaysians Culture

Malaysia is honoured with a multi-racial network that comprises Malays, Chinese, and Indians. The wide range of nationalities in Malaysia, with some overlap, have their own exceptional and unmistakable social characters. Every ethnic group has its own inborn culture recognizing it from the others, and various degrees of integration have been accomplished. Arts and music in Malaysia have a custom practice, with Malay art from Malaysia's sultanates. Modern art focused on fields like painting, silver-smiting, and

weaving. Until the mid-20th century, Islamic taboos prohibited artwork portraying humans. Shadow puppet shows and art execution are typical and often show Indian influences. Architecture, individual cultures in Malaysia and other countries can see various influences. Cooking is often divided along cultural lines, but some dishes have mixed foods from different backgrounds.

2.8 Review on Malaysians Culture

2.8.1 Table of Malaysian Culture in web design review

Reference	Title	Objectives/Findings	Application/Final Products	Weaknesses
(Mohd et al., 2009)	"Website Quality and Consumer Online Purchase Intention of Air Ticket"	<ul style="list-style-type: none"> To analyze six website quality factors as a backdrop to online air ticket purchasing intention. 	<ul style="list-style-type: none"> For online purchase intention, empathy and trust are the most important influencing factors. 	<ul style="list-style-type: none"> Examines only six factors. Other factors can produce different outcomes.
(Boyd, 1999)	"National culture and high commitment management."	<ul style="list-style-type: none"> A model is developed that links national culture and HCM 	<ul style="list-style-type: none"> National culture plays a deciding role in adopting HCM practices, making it necessary to pursue HCM practices. 	<ul style="list-style-type: none"> The overall incidence of HCM procedures in other countries not very common (Wood, 1995).
(Litvin, Crotts, & Hefner, 2004)	"Cross-cultural tourist behaviour."	<ul style="list-style-type: none"> Replicates and expands the five cross-cultural dimensions of Hofstede's study 	<ul style="list-style-type: none"> They discovered that high UA societies showed practices reliable with those of the Japanese. 	<ul style="list-style-type: none"> This study's variables will influence power distance and individualism/collectivism.
(Cyr, Bonanni, & ...)	"Design and e-loyalty across"	<ul style="list-style-type: none"> Assess if web design features, 	<ul style="list-style-type: none"> The entire hypothesis got uphold 	<ul style="list-style-type: none"> Samsung pages are the only websites used in

(Ilsever, 2004)	cultures in electronic commerce.”	trust, satisfaction, and loyalty differences exist across countries.	for multifaceted contrasts for the local site, yet not for the worldwide site	the study, so bias in response may occur
(Yoon, 2009)	“The effects of national culture values on consumer acceptance of e-commerce.”	<ul style="list-style-type: none"> • Explore market adoption of e-commerce in China by analyzing the adapted research model 	<ul style="list-style-type: none"> • The results showed that the ideals of national culture influence the adoption of e-commerce by customers. 	<ul style="list-style-type: none"> • Most of the data collection was collected from university students in China.
(Fink & Laupase, 2000)	“Perceptions of Web site design characteristics.”	<ul style="list-style-type: none"> • Assess whether variations between East and West are apparent in the web design 	<ul style="list-style-type: none"> • Support the hypothesis that design is related to the country of origin. 	<ul style="list-style-type: none"> • Do not indicate that this result was due to predominant culture or other factors.
(Ahmed, Mouratidis, & Preston, 2008)	“Website Design and Localisation”	<ul style="list-style-type: none"> • Discover local cultural values chosen from different sectors on Malaysian and British websites. 	<ul style="list-style-type: none"> • Necessary to adapt effective website designs based on its marketing communication tradition. 	<ul style="list-style-type: none"> • The result validity needs to be further enhanced by involving more other websites.
(Singh and Baack, 2004)	“Website adaptation: A cross-cultural comparison of U.S and Mexican websites.”	<ul style="list-style-type: none"> • Discussing how country-specific websites represent cultural values specific to the region. 	<ul style="list-style-type: none"> • Developed cultural guideline allows web designers to customize foreign websites and avoid encoding and decoding errors 	<ul style="list-style-type: none"> • The study centred on cultures often varied using words, colours, logos, and symbols.
(Khalili, 2014)	“Effects of Cultural Dimensions on Glocal	<ul style="list-style-type: none"> • Identifying the impact of cultural dimensions 	<ul style="list-style-type: none"> • It provides companies with useful information 	<ul style="list-style-type: none"> • The number of webpages analyzed may not be sufficient

	Marketing in Malaysia”	on conducting foreign corporations’ method in Malaysia	to familiarize their advertising practices to the Malaysian market to increase their benefits.	to draw overall assumptions
(Gould, Zalcaria, & Yusof, 2000)	“Applying culture to Web site design: a comparison of Malaysian and US Web sites.”	<ul style="list-style-type: none"> • Reviewing the cross-cultural theories of (Hofstede, 2009) and (Trompenaars, 1994, 1998) 	<ul style="list-style-type: none"> • Cross-cultural theory of communication that provide guidelines for technical and business communication internationally 	<ul style="list-style-type: none"> • The findings only compare and do not focus on the website user interface for Malaysian users.
(Callahan, 2005).	“Cultural Similarities and Differences in the Design of University Web sites.”	<ul style="list-style-type: none"> • Explore cultural differences of web design using Hofstede's cultural dimensions model. 	<ul style="list-style-type: none"> • PC relationships between Hofstede's scores and interface component recurrence checks were more vulnerable than anticipated. 	<ul style="list-style-type: none"> • Only graphical elements were evaluated. Cultural differences in language are also required.
(Yee & Faziharudean, 2010)	“Factors Affecting Customer Loyalty of Using Internet Banking in Malaysia”	<ul style="list-style-type: none"> • Create a guideline by examining factors that affect customer satisfaction with Internet Banking. 	<ul style="list-style-type: none"> • Customer loyalty to individual websites in Malaysia for Internet banking has a strong influence on trust, routine, and credibility. 	<ul style="list-style-type: none"> • Not provide all possible variables that influence customer loyalty.

(Kassim & Abdullah, 2010).	“The effect of perceived service quality dimensions on in e-commerce settings.”	<ul style="list-style-type: none"> Investigate the relationship between service quality, satisfaction, trust, and loyalty. 	<ul style="list-style-type: none"> No critical distinction between the impacts of apparent assistance quality on trust on loyalty and satisfaction on loyalty 	<ul style="list-style-type: none"> Malaysia and Qatar have difficulty obtaining a completely matched profile of respondents.
(Leidner & Kayworth, 2006)	“A Review of Culture in Information Systems Research”	<ul style="list-style-type: none"> Provide insight into their understanding of the IT-culture connections. 	<ul style="list-style-type: none"> Develop proposals for three types of cultural conflict and the outcome of these conflicts. 	<ul style="list-style-type: none"> Avoided the possibility of different behavioural outcomes for individual differences culturally.
(Lee et al., 2005)	“Usability Testing with Cultural Groups in Developing a Cell Phone Navigation System”	<ul style="list-style-type: none"> A laboratory-based usability test was performed to gather multi-social ease of use information. 	<ul style="list-style-type: none"> Collects information about the multi-cultural usability of cell phone UI design and cultural expectations 	<ul style="list-style-type: none"> Research from just four participants can not reflect their cultural group
(Yeo et al., 2011).	“Usability in Malaysia. Global Usability Human-Computer Interaction Series”	<ul style="list-style-type: none"> Provide insight into usability in Malaysia through surveys and literature reviews in Malaysia. 	<ul style="list-style-type: none"> Some ideas to encourage and actively promote and develop usability. 	<ul style="list-style-type: none"> Only suggestions, but no program was displaying all the suggested points being enforced as an example.

There was significantly less research explicitly done for Malaysian University students, so we gathered and reviewed previous research papers related to Malaysia, considered moderately-low-UA cultures. This would help us understand Malaysian culture and behaviour and identify their bookstore web design perspective preferences.

A questionnaire was utilized, and 208 usable reactions were gathered in Klang Valley, Malaysia territories by Mohd Fazli and Tahir, Mohd Sam, and Md Nor Hayati (Mohd et al., 2009). Relationships and relapses were utilized to break down the information.

Another model is that users from the High UA partition will undoubtedly get information from associates, state, family members, and city travel work environments and visit overseers compared to Low UA users, that undoubtedly use travel helpers. Information got from exhibiting overpowered sources, for instance, promotions on TV and radio (Litvin, Crotts, and Hefner, 2004). Henceforth, the guided route is an imperative structure credit to plan the sites for moderate low UA societies like Malaysia. (Mohd, Noor, & Mehad, 2009) watched the encouraging influence of Uncertainty Avoidance towards user preference and performance. (Cyr, Bonanni, & Ilsever, 2004) referenced that user characteristics, web design preferences, and social contrasts are essential contemplations for people's multicultural gatherings. UA is a vital social esteem that altogether impacts customer web-based business acknowledgement. Consequently, unique culture bunches utilize distinctive improvement and use conduct for site interfaces due to symbols, aesthetics, language, and social contexts. (Yoon, 2009).

Uncertainty avoiding cultures societies attempt to decrease the possibility of such circumstances by strict laws and principles, wellbeing and safety efforts, and on the philosophical and religious dimension by confidence in outright Truth. Malaysia displays a moderately-low index, proposing that the general public has the resistance to uncertainty and ambiguity. The general public may be moderately agreeable in unstructured circumstances that are unknown, surprising, novel, and not quite the same as usual (Hofstede, 2009).

The investigation revealed that Malaysians usually underline the atmospherics to sign incorporation (acceptance, non-aggressiveness) by looking at simulated incidence (Fink

& Laupase, 2000). Asian (For example, Malaysian) individuals are in a high setting, which stresses certain nonverbal correspondence. They give careful consideration to content (e.g., ambience or apparel, physical location) and surrounding details. It likewise expressed that Malaysians trust more in individuals than in organization and hence put more accentuation on the transaction procedure than the result. For Malaysians, 'signs' are imperative, and it is in this way, they will give more prominent acknowledgement to the logos of the web than Australians. Correspondingly, Malaysians are depended upon to be progressively excited about reports on sites than Australians considering their reality and significance on 'arrangement' when they take the same number of data as they can take. It expressed that web designers should observe that Malaysians have all the earmarks of being less comfortable utilizing the Web to find items, administrations, or data than Australians. They are not as recognizable as figuring out how to utilize their Internet trade capacities. The trust is that cultural value impact the structure of Websites, and as a model, they referenced that Malaysian Websites give careful consideration to atmospherics than Australian websites.

In general, Malaysians will have a high worry for other people, remember other individuals, advance a feeling of unity with other individuals, and consider the gathering a fundamental unit of survival (Ahmed, Mouratidis, & Preston, 2008). The "we" introduction impacts a person to need to be in a situation where he feels "had a place" and "incorporated". For the most part, Malaysians like to do things together in the soul of a "happy family". This "we" awareness is extended into the Malaysian work environment paying little heed to ethnicity. In this manner, Malaysians acknowledge bunch work and get their character from being an aspect of a collectivist'. Hofstede (1980) further raises that, in Malaysia's communist society, there is a passionate reliance by entities on associations and culture; these individuals require clubs, spots, or discussions. This would able them to portion their concerns, points of view, and sentiments (Singh and Baack,

2004). Decisively, the following measurement inside the setting of web design portrays public chat rooms, families, societies, loyalty programs, symbols, and pictures of national identity and family themes. In the Malaysian culture, there is a necessity to build associations before getting to the business. It is hard to isolate business from private lives as they are frequently significantly much incorporated in the social texture of ethnic-based connections (Khalili,2014).

Malaysian culture is very collectivist (Gould, Zalcaria, & Yusof, 2000). Individuals want to work in a group and have solid bonds with every individual from the gathering. This group decides their job and (due to the significance of supremacy distance) constrains their opportunity to act. Therefore, a Website must:

- i. Emphasis not on assignments and only organizations
- ii. Show numerous connections to different organizations to exhibit the gathering's system's quality.
- iii. Emphasize social and also organizational objectives. Individual objectives are minimum essential.
- iv. However, being written in an aberrant, unoriginal style gives broad help to claims.

Likewise, Malaysians want to feel happy and fulfilled with goods or services before committing any decisions. Individuals set aside a long opportunity to build up a relationship and esteem security exceptionally. Personal humility and "face" are imperative, and problems are avoided. Subsequently, to speak to users, a Website should:

- i. Focus on the idea of the relationship and not on the items.
- ii. Supply structural data (individual in control and location of the organization.
- iii. What different services and products are accessible, what social capacities are served) that builds up the reason for a relationship.

- iv. Structure data in an all-purpose to explicit (specific) design.
- v. Usage of the official and exceptionally courteous style of discourse.
- vi. Admit the need for Winding nor indirect proclamations.

In high PD nations like Malaysia, more generations who are older, like parents and teachers, are worshipped, educators request compliance and respect from kids. In contrast, in low PD countries, kids are treated as reciprocals and are instructed to be autonomous since their beginning stage of life (Callahan, 2005).

To urge users to utilize a similar Internet banking site repeatedly, Providers of Internet banking sites ought to draw in users to their Internet banking site through coupons, promotions, and contests (Yee & Faziharudean, 2010). When users start utilizing the site and getting comfortable with it, they may utilize it on the off chance that it has turned into practice. The following will impact lessen changing behaviour of the competing sites and create user loyalty. Lastly, the effect on user loyalty on online banking sites depends on the provider's status or online banking site. Reputation is the most significant critical influence in Malaysia to hold users from using the Internet banking site, with a more prominent significance than habit factors and trust. Besides promoting by featuring the positive element of both website and website provider, persistent efforts to shape, update or sustain the site or provider status is an absolute necessity to guarantee user loyalty, which can be done by having campaigns.

Malaysians are considered vital in decision making for the community. Malaysian culture will, in general, lean toward autocratic leadership. Malaysian societies appreciate selflessness (low manliness and high gentility) and relationships (Kassim & Abdullah, 2010).

Vishwanath referenced that Individuals in societies low in UAI will be progressively receptive in exploring for data and in the choice of recent turns of events, so activities

requiring progression and including a lot of equivocalness are practised even more regularly in low UAI countries (Vishwanath, 2003). He referenced that individuals in lower uncertainty avoidance nations acknowledge well-known and new dangers and show a higher limit for ambiguity. As per Hofstede, individuals in low uncertainty avoidance societies, for example, Great Britain and America, are bound to enjoy diversions of shot and are bound to take dangerous choices given a higher partiality toward ambiguity than individuals in higher uncertainty-avoidance societies, for example, Greece and Japan (Hofstede, 2001).

As per (Marcus & Gould, 2000), low UA societies will generally consume higher caffeine utilization, higher coronary illness death rates, lesser calorie consumption, and more complex obsession (Aaron & Emilie, 2000). Industries potentially logically easy-going and base more on long-run key issues than ordinary undertakings. The following community will be less sensitive and less nervous, like people continue quiet without indicating hostility or strong emotions. Anyway, their caffeine usage may be relied upon to fight discouragement from their feebleness to communicate their assessments. Individuals appear to be agreeable, even more stress-free. The teachers may not know appropriate answers, run increasingly flexible classes, and are relied upon to talk in an understandable dialect. Among these societies, the distinctive might be seen as just curious, or maybe ridiculous. In light of this definition, the author believes uncertainty avoidance may impact opposite aspects of UI and Web design structure.

Low UA societies would focus on the below:

- i. Complexity together, utmost decisions, and content.
- ii. Risk and wandering exception, with a disgrace on "over-security."
- iii. Fewer governor of the route; for instance, links might expose new windows shows far from the real location.

- iv. Coding of sound, typography, and colour to increase information (multiple links without repetitive signs).

Individuals from low-UAI societies might be ready to risk-taking, changing employers, and tolerate organizational uncertainty and change (Offermann & Peta, 1997). Consequently, Malaysia, a moderately-low UAI society, can be viewed as open to every new change and enhancement in the website UI design.

(Mohd et al., 2009) aim to analyze six webpage quality aspects: accessibility, website design, quality of information, perceived risk, confidence, and compassion as a backdrop to online air ticket purchasing intention. The findings showed that empathy and confidence are the most important influencing factors in predicting online purchase intention. To increase the intention of buying online products, service providers should offer empathy for service and improve customers' trust.

(Boyd, 1999) The connection between nationwide values and high engagement organizations should be investigated. A model is developed that links national culture and HCM, and hypotheses are derived from the relationship between national culture and the adoption of specific HCM practices. The research infers that public culture assumes a growing part in HCM rehearses' reception, making it necessary to pursue with sensitivity the globalization of HCM practices.

(Litvin, Crotts, and Hefner, 2004) recreates and grows the five diverse components of Hofstede's investigation over an agent test of first-time guests to the United States speaking to 58 countries. Found that clients from high UA societies demonstrated practices solid with those of the Japanese in Money and Crotts research, while clients from societies with low UA society acted likewise with their German topics.

(Cyr, Bonanni, & Ilsever, 2004) aim to assess if website design features, website confidence, website satisfaction, and website loyalty discrepancies exist across countries. T-tests are directed on the individual factors distinguished inside every one of the four

nations' variables to evaluate contrasts. Entire hypothesis got uphold for multifaceted contrasts for the local site, yet not for the worldwide site.

(Yoon, 2009) aim to explore market adoption of e-commerce in China by analyzing the adapted research model (Gefen et al., 2003) and integrating the cultural aspects of Hofstede as moderators in the process. The results showed that the ideals of national culture influence the adoption of e-commerce by customers. In particular, avoidance of ambiguity and long-term focus played significant roles. Such findings suggest that consumers are reluctant to engage in online shopping in high-ranking UAI countries because they typically view e-commerce as having unpredictable outcomes.

(Fink & Laupase, 2000) aim to assess whether or not the variations between East and West are apparent in the design and interpretation of websites used for marketing. Specifically, we chose websites located in Malaysia and Australia and analyzed them as representations of two different cultures than Australian and Malaysian website users. Hypothesized that it would not generalize the prevalent culture to another country. The differences between Malaysia and Australia of the Tropez's websites reflected the outdoor, cafe lifestyle of the European region, commonly in Australia, which cannot be seen frequently in Malaysia. Such results support the hypothesis that beliefs are related to the country of origin.

(Ahmed, Mouratidis, & Preston, 2008) discover local cultural values chosen from different sectors on Malaysian and British websites. There are more impactful cultural values between the British and Malaysian web. It is necessary to adopt effective website designs based on its marketing communication tradition.

(Singh and Baack, 2004) adding to the discussion of standardization versus adaptation by discussing how country-specific websites represent cultural values specific to the region. We conduct a cultural analysis of the U.S. Mexican and American Web pages for this reason. Fortune500 firms in both countries with a web presence and local

Mexican firms' websites. By offering this cultural guideline for online communication research, advertisers and web designers can customize foreign websites and avoid encoding and decoding errors common in intercultural communication.

(Khalili, 2014) identifying the impact of these dimensions on foreign corporations' methods of conducting web-based advertising in Malaysia and demonstrating how these dimensions influence their publicity events and advertising types. It provides companies with useful information to adapt their marketing practices to Malaysian society to expand their market share and increase their profits.

(Gould, Zalcara, & Yusof, 2000) reviewing the cross-cultural theories of (Hofstede, 2009) and (Trompenaars, 1994, 1998), defining design elements from these theories identified with three cultural dimensions and proposing recommendations for both countries' cultural position. Cross-cultural communication theory will also provide guidelines for specialized and business correspondence globally. Its utilization has been examined in this investigation of Malaysian and American webpages. Social intangibles must be added to web composition to improve online posts' impact on different public crowd individuals.

(Callahan, 2005) aim to explore cultural differences and similarities in the design of websites of universities using the cultural dimensions model of Hofstede. Using content analysis methods, graphical elements are compared on a trial of an institution's homepages from Malaysia, Japan, Denmark, Ecuador, Austria, Sweden, Greece, and the United States. Website design similarities and differences can be brought out through the social model of Hofstede. PC connections between Hofstede's scores and interface component recurrence tallies were more fragile than anticipated; however, they happened the guessed way by and large.

(Yee & Faziharudean, 2010) create a guideline to examine factors that affect online banking websites' customer satisfaction based on the software system's use. They

recognize the most important aspects among the researchers: quality of delivery, actual value, belief, routine, and credibility of the bank. It is found that customer retention to individual websites in Malaysia for Internet banking has a strong influence on confidence, routine, and credibility. Reputation is the most significant variable relative to trust or habit variables. Quality of service and trust does not have a good connection with customers' satisfaction.

(Kassim & Abdullah, 2010) aim to investigate the association between apparent quality of service, satisfaction, confidence, and loyalty in two cultures e-commerce settings that are Malaysian and Qatari at the level of construction dimensions. Except for the effect of satisfaction on trust, we found. No essential qualification between the effects of evident help quality on trust on loyalty and satisfaction on dedication among Qatari and Malaysian clients recommending that the connections in the model didn't have a comparative social setting between the two social gatherings.

(Lee et al., 2005) incorporates a contextual investigation where a lab-based convenience assessment performed through four social gatherings consist of European, African, and American of North and South to gather multi-social ease of useful information in a mobile phone navigation system's iterative development process. This methodology collects information about the multi-cultural usability of cell phone UI design and cultural expectations. It is a simple approach that can be used in product development.

(Yeo et al., 2011) aim to provide an insight into the HCI sector and, specifically, usability in Malaysia through surveys, interviews, literature reviews, and websites of higher learning institutions in Malaysia. Some ideas to encourage usability awareness, such as:

- i. Stronger cooperation between academia, the local field, and the government would form a maintainable force at the national level to actively encourage and develop usability.
- ii. Develop proper HCI courses on usability engineering, methods at the undergraduate and postgraduate levels with sound content.
- iii. Organize lectures on usability by experts and design practitioners
- iv. Organize activities that judge goods on software usability

2.9 Discussion on Malaysians Culture

Samsung pages are all websites used (Cyr, Bonanni, & Ilsever, 2004). While this option would be expected to give more noteworthy consistency in web design and area purpose, prejudice in response may occur due to the company's participant awareness and reputation. Our research will not face that issue as it a not known brand in the market. Most of the data collection for university students in China was performed (Yoon, 2009). This may have affected the empirical results ' external validity, but we have collected the data for university students in Malaysia for our research. (Fink & Laupase, 2000) research results do not indicate that this was due to the non-generalization of the predominant culture to another culture (as we had hypothesized) or the possibility that the findings were due to other factors. Still, our research will not have that issue as we focused only on Malaysian University students.

(Ahmed, Mouratidis, & Preston, 2008) the result was no longer comprehensive. The validity needs to be further enhanced by involving Malaysian and British participants besides other division web choices so our research might improve and support their findings on Malaysians. (Singh and Baack, 2004) the study centred on cultural differences that were restricted to meaning orientations and the cultures often varied in the use of words, colours, logos, signs, and symbols. Still, for our research, we have focused only

on Malaysian culture but covered other web attributes like fonts, navigations, and content quality. (Khalili,2014) the research looks at and uses the websites of different international organizations. The number of websites analyzed may not be sufficient to draw overall assumptions. Still, we have not focused on any international organizations for our research prototype as it is new. (Gould, Zalcaria, & Yusof, 2000) findings were based on a comparison between Malaysia and US websites. They did not focus on the website user interface for Malaysian users, but we have cared for our research. Only graphical elements were evaluated by the (Callahan, 2005) report, but we evaluated other than graphical elements such as content quality and navigation for our research. (Marcus & Gould, 2000; Rajkumar, 2003).



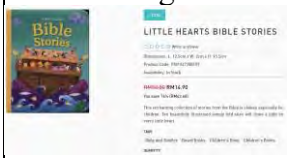
The literature recommends that social variances in language and discourse styles are also evident, so our research will help us understand more about Malaysian cultures. (Yee & Faziharudean, 2010) did not provide all possible variables, such as customer satisfaction, accessibility, and participation, that influence customer retention to Online banking websites. Still, we have covered the satisfaction and trust for online purchasing. (Kassim & Abdullah, 2010) convenience sampling was not random, and Malaysia and Qatar have difficulty obtaining a completely matched respondents profile. We have still analyzed and matched the 30 respondents' profile and survey perfectly as each username was linked to each user for our research. There were only suggestions for encouraging usability, but no program displaying all the suggested points being enforced by (Yeo et al., 2011) as an example, but for our research, we have carried out the usability evaluation using Time Based Efficiency and Overall Rate Efficiency Results


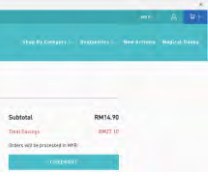
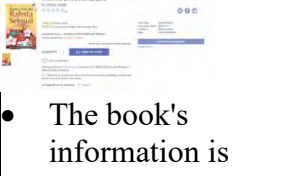


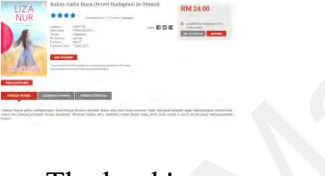


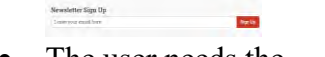


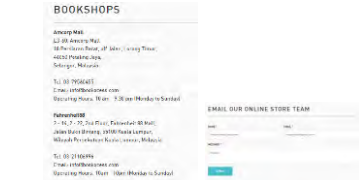

2.10 Review of 3 mostly visited Malaysian Bookstore Websites


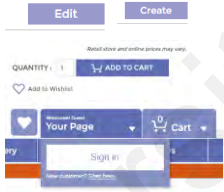

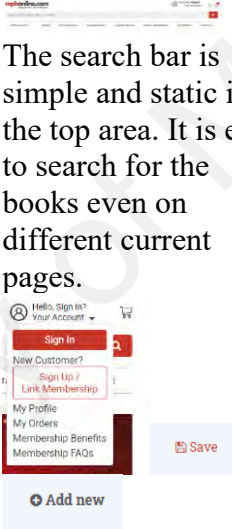
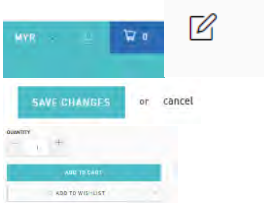





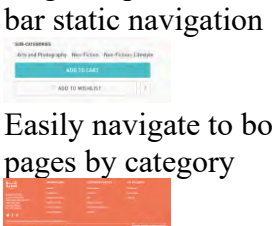
Since there was very little information regarding Malaysian user's web preferences on the bookstore, also the supporting research above, we have viewed and analyzed how the five web attributes used in the three most visited Malaysian bookstore websites (Staff, 2018), which are:



1. Kinokuniya Malaysia - <https://malaysia.kinokuniya.com>
2. MPH Online - <https://www.mphonline.com>
3. Book Xcess Online - <https://www.bookxcessonline.com>

2.10.1 Comparison Table of 3 mostly visited Malaysian Bookstore Websites

Web Attributes	Kinokuniya	MPH	Book XcessOnline
Typography	<ul style="list-style-type: none"> • Typeface: Montserrat, Helvetica, Arial, Sans-serif • Font: 14pt for descriptions text and 20pt Bold for heading title text • Line height: 1.5 	<ul style="list-style-type: none"> • Typeface: Roboto Slab, serif • Font: 16pt for descriptions text and 24pt for heading title text • Line height: 1.5 	<ul style="list-style-type: none"> • Typeface: Sans-serif • Font: 15pt for descriptions text and 30pt Bold for heading title text • Line height: 1.6 
Colour	<ul style="list-style-type: none"> • The monochrome scheme consists of various shades of light navy and a light greyish navy of a single base colour navy. • Colour warmth consists of cold colour which contains a higher amount of blue. 	<ul style="list-style-type: none"> • The complementary scheme of two opposite sides of the colour wheel is red and blue. • The monochrome scheme consists of various shades of a single base colour. Strong red and bright red for the red base colour and light 	<ul style="list-style-type: none"> • The complementary scheme of two opposite sides of the colour wheel is dark grey and light red to be noticeable. • The monochrome scheme consists of various shades of light cyan, soft cyan, and the bright blue of a single base colour blue.

		<p>greyish blue and grey for the grey base colour.</p> <ul style="list-style-type: none"> Colour warmth consists of both cold colours containing a higher amount of blue and warm colour containing a higher red amount. 	<ul style="list-style-type: none"> Colour warmth consists of both cold colours containing a higher amount of blue and warm colour containing a higher red amount. 
<p>Content Quality</p>	<ul style="list-style-type: none"> The book's information is described page in detail in a single page with stock availability, zoom on the image picture when clicked, and updated quantity of book added to the cart.   	<ul style="list-style-type: none"> The book's information is described page in detail on a single page with customer reviews and the author's other collections, and the ability to add to the cart. The discounted books were highlighted to differentiate them from other books. The actual and discounted price was shown. The user needs the store location and newsletter sign-up form provided in case of help.    	<ul style="list-style-type: none"> The book's information is described page in detail in a single page about the page's number, dimensions, and ability to add to the cart. The discounted books were highlighted to differentiate them from other books. The actual and discounted price was shown. The store location and email form provided the user's case help needed.    

	<p>are provided if needed by the user.</p>		
<p>Interactivity</p>	 <ul style="list-style-type: none"> • Attractive moving slider banner in the homepage showing the highlights and easy for the user to navigate to that section by clicking on that. • The search bar is simple and static in the top area. It is easy to search for the books even on different current pages. • The content is neat without appearing too overwhelming, yet giving the message passed. The icons also simple and helpful for those who don't understand the language. 	 <ul style="list-style-type: none"> • Attractive moving slider banner in the homepage showing the highlights and easy for the user to navigate to that section by clicking on that. • The search bar is simple and static in the top area. It is easy to search for the books even on different current pages. • The content is neat without appearing too overwhelming, yet giving the message passed. The icons also simple and helpful for those who don't understand the language. 	<ul style="list-style-type: none"> • Attractive moving slider banner in the homepage showing the highlights and easy for the user to navigate to that section by clicking on that. • The search bar is simple and static in the top area. It is easy to search for the books even on different current pages. • The content is neat without appearing too overwhelming, yet giving the message passed. The icons also simple and helpful for those who don't understand the language. 
<p>Navigation</p>	 <ul style="list-style-type: none"> • Huge drop downs and top bar static navigation 	 <ul style="list-style-type: none"> • Huge drop downs and top bar static navigation 	 <ul style="list-style-type: none"> • Huge drop downs and top bar static navigation • Easily navigate to book pages by category 

	<ul style="list-style-type: none"> • Easily navigate to book pages by category • Footer navigation 	<ul style="list-style-type: none"> • Easily navigate to book pages by category • Footer navigation 	<ul style="list-style-type: none"> • Footer navigation
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2.11 Discussion on web attributes used in 3 mostly visited Malaysian Bookstore Websites

We have identified and evaluated the typeface, font, and line-height between the three most visited Malaysian Bookstore websites in terms of typography web attributes. Kinokuniya has used multiple fonts which and it is always better to use one or two standard fonts to avoid confusion on important text to be focused on among users. They have still used the right amount of font size 14pt for description and 20pt Bold for heading title text, which is not very big and very small compared to MPH and BookXcessOnline. The line-height of 1.5 used by MPH and Kinokuniya should be sufficient as the gap between one another sentence is neat and sufficient to add more text than the 1.6 line-height used by BookXcessOnline.

In terms of colour web attributes, we have identified and evaluated the colour scheme and colour warmth between the three most visited Malaysian Bookstore websites. The monochrome scheme was used in all their bookstores, but Kinokuniya and BookXcessOnline were very pleasant as they used only one single blue base colour and navy, respectively. Meanwhile, MPH used two single base colours of red and grey that are not pleasant as red normally will have more focus and attention than other

colours. However, the complementary scheme used by MPH and BookXcessOnline is good as it makes the important text area different from others and noticeable.

In terms of content quality web attributes, we have identified and evaluated the information of book content, highlighted content, for example, the book discount, and the contact content between the three most visited Malaysian Bookstore websites. The information on the book content of Kinokuniya is better compared to the other two as it can zoom the image, where users can view the cover of the page and book images. Also, stock availability is stated with a good interface to quickly update the amount of book to be added into the cart on the same page. All three bookstores implement highlighted the book discount properly. Still, in term of contact content Kinokuniya go one step further by providing contact form for the user to submit, and the request will be automatically sent to their email.

In terms of interactivity web attributes, we have identified and evaluated the banner, search bar, and how well the content was presented between the three most visited Malaysian Bookstore websites. The attractive moving top slider banner for all three was good as it redirects to the page directly once clicked on it. The same goes for the simple and static search bar at the top area, easy for the user to search for that search bar and search for the books. The icons used by all three bookstores also very simple and neat, where they convey the message and purpose of the icon to the user directly just by looking at the picture.

We have identified and evaluated the top-bar, pages, and footer navigation between the three most visited Malaysian Bookstore websites in navigation web attributes. All three were using the huge drop down and top bar static navigation, but the Kinokuniya interface was not that good as it had more content, and the user needed to drag down the arrow to view more book categories in the list form. The categories' content is short and simple, with all the contents compact on a single page. All three bookstore can easily navigate to the book pages by category when selecting on it and also there is footer navigation provided by all three in case they want to navigate to other pages after completed reading at the bottom of the page, where they don't have to go back to the top page and look for the pages in the top bar navigation again.

2.12 Summary

To summarize the literature review above, we have reviewed the findings, final products, and weaknesses of all the research papers related to the web attributes. We have then analyzed findings, final products, and weaknesses of research papers related to the trust, loyalty, and satisfaction relationship between user and system. Following that, we have reviewed the findings, final products, and weaknesses of research papers related to Malaysian Culture. Finally, we have compared and analyzed all these research papers' findings and their weaknesses with our research papers.

CHAPTER 3: RESEARCH METHODOLOGY

3.0 Introduction

This project's development to be completed on time with minimal risks is very important. Hence, selecting the right development methodology plays a vital role here. Many different guidelines have been developed and used widely for the past few years, with advantages and disadvantages (CMS of the United States,2008). This chapter will elaborate more on the research methodology used for this research. The research of (Sommerville,2004) and (CMS of the United States,2008) helped a lot in the reference and explanation of this chapter.

3.1 Research Questions

Following are the research questions extracted from the research objectives explored in this research work. The research questions are denoted as “RQ.”

RQ1: What is the Malaysian University student’s preference, and which web design attributes (navigation, typography, interactivity, colour, and quality of content) play strong factors in determining user trust and satisfaction with the website among Malaysian University students?

RQ2: How can a suitable design pattern of a software development guideline be implemented to support Malaysian university students' case study?

RQ3: How effective the relationship of loyalty on trust and satisfaction of websites among Malaysian University students?

3.2 SMART Methodology

For this research, we have followed and implemented the SMART Methodology, which is one very useful way to help us define the goals and make them meaningful.

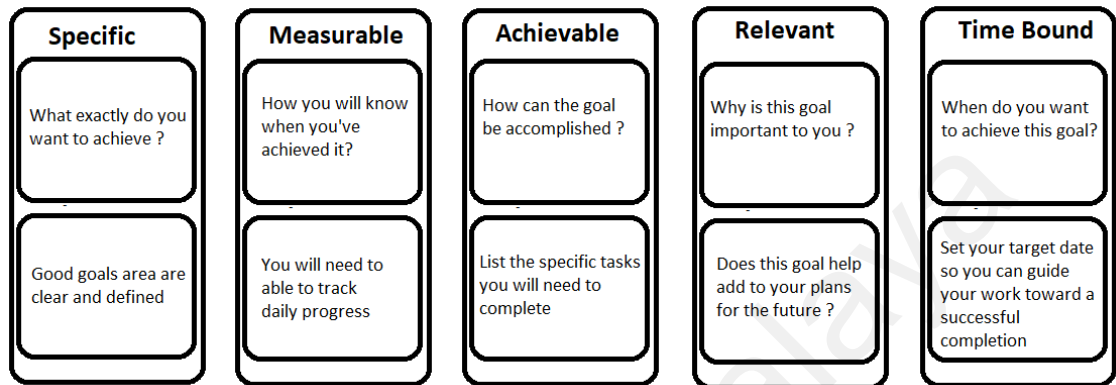


Figure 3.2.1: SMART Methodology by Proctor,2019

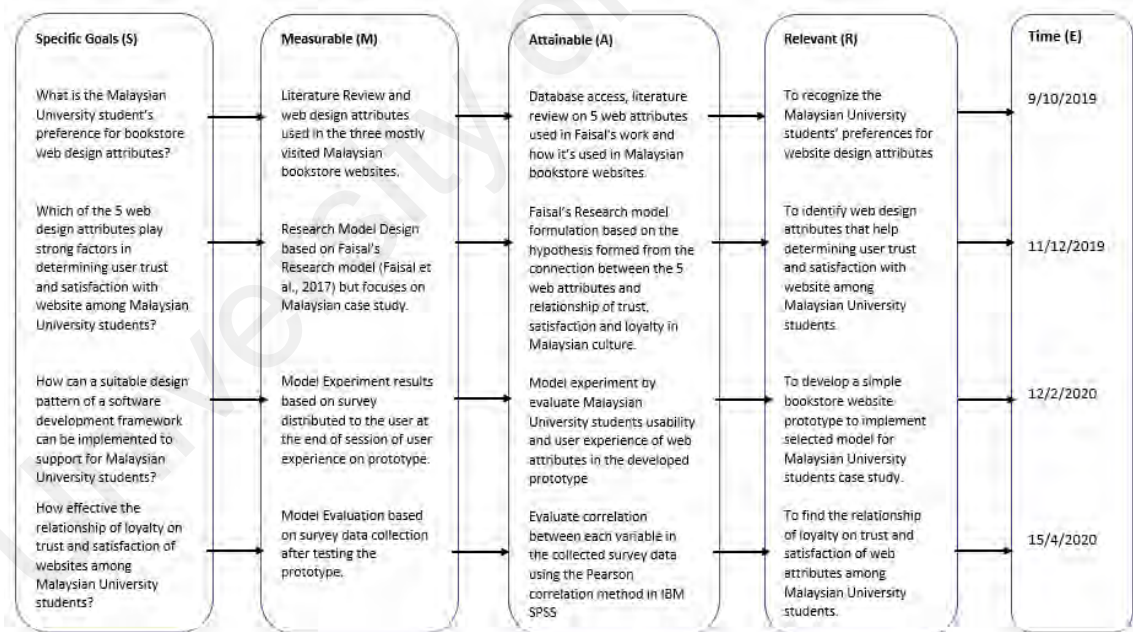


Figure 3.2.2: Research Methodology using SMART

The following are the mapping among the Research Objectives, Questions, and Methodology.

3.2.1 Table of Mapping between Research Objectives, Questions, and Methodology

Research Objectives	Research Questions	Research Methodology
To identify the user preferences and attributes of website design in determining user trust, loyalty, and satisfaction, focusing on Malaysian University students	<p>RQ1: What is the Malaysian University student's preference, and which web design attributes play strong factors in determining user trust and satisfaction with the website among Malaysian University students?</p> <p>SRQ1: What are web attributes?</p> <p>SRQ2: What are Trust, Satisfaction, and loyalty in the context of a web-based system?</p> <p>SRQ3: What is the behaviour and preferences of Malaysian culture in the context of a web-based system?</p> <p>SRQ4: Which of the five web attributes used in the three most visited Malaysian bookstore websites?</p> <p>SRQ5: What is the hypothesis formed based on the literature review and analysis between the three most visited Malaysian bookstore websites?</p> <p>SRQ6: What is the connection between the five web attributes and the relationship of loyalty, trust, and satisfaction in Malaysian values.</p>	<ul style="list-style-type: none"> • Comprehensive literature review • Comparative evaluation • Model design • Experiment setup
To propose a guideline to building one online shopping web to gain trust, loyalty, and satisfaction.	<p>RQ2: How can a suitable design pattern of a software development guideline be implemented to</p>	<ul style="list-style-type: none"> • Experiment implementation • Data Collection

	<p>support Malaysian university students' case study?</p> <p>SRQ7: What is the connection between the hypothesis, web attributes, and examples of attributes applied in the prototype system?</p>	
<p>Evaluate the proposed guideline using literature review, case study, and survey methods.</p>	<p>RQ3: How effective the relationship of loyalty on trust and satisfaction of websites among Malaysian University students?</p> <p>SRQ8: How the usability of the prototype system has been tested and evaluated?</p> <p>SRQ9: How the user experience of the prototype system has been tested and evaluated?</p> <p>SRQ10: What is the connection between the survey questions with the web attributes and trust, satisfaction, and loyalty relationship?</p> <p>SRQ11: What are the correlations between each of the data variable in the survey?</p>	<ul style="list-style-type: none"> • Model evaluation • Data Analysis

3.3 Conceptual Research Methodology Explanation

Firstly, all research articles about Malaysian and Low UAI Cultures were collected and analyzed. The research Model developed concerning the Malaysians in the online bookstore domain based on conceptual and hypothetical studies.

Based on the literature review above, in terms of web design to be used in this study, we will follow the same web design attributes/features used in Faisal's work. In addition to that, the reason we selected these five web attributes as there was more research with proven data suggested by the research community (Cyr & Head, 2013), (Palmer, 2002), (Marcus & Gould, 2000), (McCracken & Wolfe, 2004), (Wang & Senecal, 2007) which is Typography, Colour, Content, Interactivity, and Navigation. The five design attributes also have been referenced in few online shopping research (Cyr, 2008), (Lee & Koubek, 2010), (Hasan, 2016), (Lee & Kozar, 2012) and (Benbunan-Fich, 2001) to access user's preferences. These five attributes include usability and aesthetic features. Colour and Typography were categorized as aesthetic quality. Navigation, Web content, and Interactivity were categorized as the web's structural layout. For this study, we have reviewed the literature review of the five web attributes, trust, and satisfaction but focuses on Malaysian culture.

3.4 Justification for Chosen Software Development Methodology

The incremental model is the chosen model for this study. The incremental model consists of multiple small waterfalls achieved, which comprises the following phases, such as design, testing, requirements, implementation, and analysis of the Waterfall development model are performed for a mini portion of the system before the subsequent addition. The total necessities are characterized before going on to mini waterfall model improvement of individual additions of the guideline. The underlying programming recognition, necessities investigation, and plan of design and guideline essential are

characterized by utilizing the cascade approach, trailed by iterative perspective methodology on the last model, including guideline operation, testing, and maintenance.

To ensure this thesis project is on track, and the objective is achieved as planned, the Incremental model was selected as the development model. For the incremental model, four phases of the waterfall development model were completed before the next increment. Firstly, the scope of research and restrictions were acknowledged for requirement definition. Secondly, the web attributes specifically for Malaysian University students were identified based on the system's requirement and comparisons and analysis and software design data. Thirdly, the ranjen bookstore was developed for the implementation phase based on the design confirmed and selected mentioned in most research papers. For the last phase, system testing, the final product's effectiveness, the ranjen bookstore system, is deployed in the cloud environment and made available for users to test. The usability was recorded based on the timing of each user's activity logged in the system.

3.5 Summary

To summarize the research methodology above, three research questions about Malaysia University students' preference for website design attributes determine user satisfaction, trust, and loyalty. The mapping between research objectives, research questions, and research methodology was linked and described using the SMART Methodology implementation. Finally, the research methodology was explained conceptually with the justification of the chosen methodology.

CHAPTER 4: SYSTEM ANALYSIS

4.0 Introduction

These chapters present the user preferences' analysis on the website attributes, the relationship of the attributes with the Malaysian cultures, and the findings based on the three Malaysian mostly visited bookstore websites. Hypothesis formed based on the literature review and analysis of the three Malaysian mostly visited bookstore websites as tabulated in 4.1.1. Each table shows each hypothesis derived based on the following. First, all the supporting research for trust, satisfaction, and web attributes were collected and identified; the web attributes that it mostly related. The findings of how that particular web attribute based on the three Malaysian bookstore systems were compared and evaluated. Hence the hypothesis was formed based on the relationship among these. Later the Ranjen web prototype was developed based on how the web attributes' majority features were implemented between the three Malaysia bookstore systems and the supporting research related to the trust, satisfaction, and web attributes for Malaysians. There was no current work for the past few years related to this research. The latest work related to this research was from Brilliant & Achyar,2013.

4.1 System Analysis

4.1.1 Table of System Analysis

Web attributes	Supporting research for trust	Supporting research for satisfaction	Supporting research for web attributes	Findings based on three Malaysian bookstore system	Hypothesis
Typography	Malaysia displays a moderately-low index, which advocates the society may be moderately agreeable in unstructured circumstances that are novel, obscure, astounding, and not quite the same. (Hofstede, 2009)	Asian (For example, Malaysian) individuals give more consideration to encompassing subtleties and substance (for example, physical area, setting, or apparel). For Malaysians, 'signs' are significant and it is along these lines anticipated that they would give more prominent acknowledgement to webpage icons, banners, and responsive graphics than Australians will. (Fink & Laupase, 2000)	The organizational structure had a greater effect on user preference than graphical factors. (Lee & Koubek, 2010)	Typeface: Serif and Sans-serif Font :14-16pt for descriptions text and 20-30pt for heading title text Line height: 1.5	H1: Typography of web effects user satisfaction in Malaysian culture H2: Typography of the web affects user trust in Malaysian culture

Colour	Work re-accentuated on the significance of a decent UI plan as a compelling procedure for expanding the client's trust and purchase intention. (Kamoun & Halaweh, 2012)	Positive site design perceptions are important for evaluations of e-satisfaction. (Szymanski & Hise, 2000)	Website colour appeal is a major determinant of website trust and satisfaction. (Cyr, Head, & Larios, 2010)	<ul style="list-style-type: none"> • The complementary scheme of two opposite sides of the colour wheel is red and blue. • The monochrome scheme consists of various shades of a single base colour. Strong red and bright red for the red base colour and light greyish blue and grey for the grey base colour. • Colour warmth consists of both cold colours containing a higher amount of blue and warm colour containing a higher red amount. 	<p>H3: Colour prompts more positive value on user satisfaction toward that equivalent site of Malaysian culture</p> <p>H4: Colour prompts more positive value on user trust toward that equivalent site of Malaysian culture</p>
Content quality	The quality of information will lead to greater consumer trust, leading to greater website loyalty. (Brilliant & Achyar, 2013)	More focussed analysis in consumer loyalty and the Internet demonstrates that item data content on the book shop website composition and design are main considerations that influence consumer loyalty and satisfaction. (Sohail & Shanmugham, 2003)	<p>The webs should also concentrate on its content as it has been distinguished as one of the primary elements adding to repeated visits (Mohd et al., 2009)</p> <p>(Eid, 2011) UI and data quality of online business sites increase consumer satisfaction.</p>	<ul style="list-style-type: none"> • The book's information is described page in detail in a single page with stock availability, zoom on the image picture when clicked, and updated quantity of book added to the cart. • The discounted books were highlighted to differentiate them from other books. The actual and discounted price was shown. 	<p>H5: Good web contents value promote higher user satisfaction in Malaysian culture</p> <p>H6: Good web contents value promote higher user trust in Malaysian culture</p>

				<ul style="list-style-type: none"> The store location and contact form are provided if needed by the user. 	
Interactivity	Support interactivity's utility positively affects the user's performance, efficiency, and trust. (Cyr, Head, & Ivanov, 2009)	Relationship, rewards, and service benefits significantly affected the customer's interest. (Olaru, Purchase, & Peterson, 2008)	<p>Online retailers need to guarantee that internet shopping measure through their site is planned and made as simple, basic, and helpful as could reasonably be expected (Haque, Sadeghzadeh, & Khatibi, 2011).</p> <p>For users to request, a website must highlight the excellence of the bond and not the items and supply administrative details that help lay the foundation for a relationship. (Gould, Zalcaria, & Yusof, 2000).</p>	<ul style="list-style-type: none"> Attractive moving slider banner in the homepage showing the highlights and easy for the user to navigate to that section by clicking on that. The search bar is simple and static in the top area. It is easy to search for the books even on different current pages. The content is neat without appearing too overwhelming, yet giving the message passed. The icons also simple and helpful for those who don't understand the language 	<p>H7: High level of interactive website promote more user satisfaction on a similar Malaysian website.</p> <p>H8: High level of interactive website promotes more user trust on a similar Malaysian website.</p>
Navigation	Web designers should observe that Malaysians seem, by all accounts, to be less acquainted with utilizing the Web to find items, administrations, or data than Australians.	Low UA users were bound to have utilized travel aides and data from showcasing ruled sources, such as commercials on TV and radio. (Litvin, Crotts, and Hefner, 2004).	Moderately low UA cultures like Malaysia have priority for comprehensive guidelines. (Boyd, 1999)	<ul style="list-style-type: none"> Huge drop downs and top bar static navigation Easily navigate to book pages by category Footer navigation 	H9: In Malaysian culture, assisted navigation promotes more user satisfaction on the similar

	They are not as familiar and yet figuring out how to utilize its capacities for Internet business (Fink & Laupase, 2000)				Malaysian website. H10: In Malaysian culture, assisted navigation promotes more user trust on a similar Malaysian website.
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University of Malaya

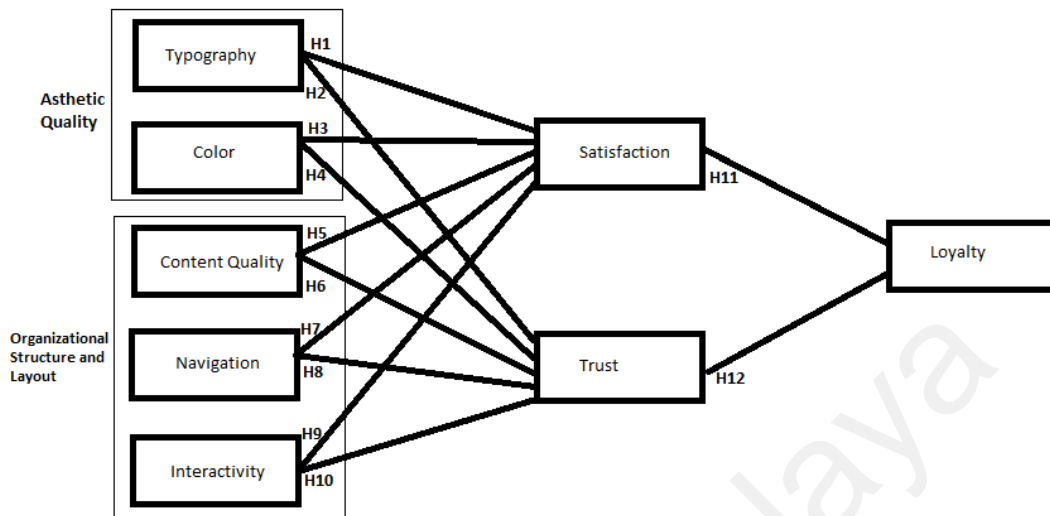


Figure 4.1.1: Research Model and Hypothesized Methodology (Faisal et al., 2017).

As Faisal's, the same Research model was created from the hypothesis. We chose Faisal's research model because a proven model shows the relationship between the five web attributes and users' relationships. But the relationship between the model entity was based on the case study of Malaysian culture and three mostly visited Malaysian bookstore websites. The model shows that the website designs' attributes highly affect user satisfaction and trust in Malaysian culture.

A. Aesthetic quality

1. Typography

The web's ability to attract users by readability, attractiveness, and appearance is known as typography. Uncertainty avoiding cultures reduces such situations by strict laws and rules, safety and security measures, and the philosophical and religious level by believing in absolute Truth. Malaysia displays a respectably low index, which recommends that the general public bear vulnerability and vagueness. The general public

may be moderately agreeable in unstructured circumstances, which are novel, obscure, astonishing, and not the same, not surprisingly (Hofstede, 2009). So, surprising and different font text size, but readable one was used in the Ranjen bookstore system. Members of low-UAI cultures may be more willing to take risks, change employers, and tolerate organizational ambiguity and change (Offermann & Peta, 1997). Hence, Malaysia's moderately-low UAI culture can be considered open to all new changes and improvements in the website User Interface design. Hence in the Ranjen bookstore system, users' attention is attracted by displaying the books as per categories. Its response very fast once clicked on the categories and search books based on keyword from the search bar was also implemented.

Malaysia exhibits a moderately-low index, suggesting that society has a tolerance for uncertainty and ambiguity (Hofstede, 2009). Society might be relatively comfortable in unstructured, novel, unknown, surprising, and different situations. Malaysians will accept any different or unique changes in the website and continue to use the system. Loyalty to the system can be achieved as long as more new ideas and innovations are continuously added to the user interface designs. This research was done based on the general web domain and gave importance to the loyalty relationship.

As indicated by Hofstede's social record, Malaysian societies are known as a culture with more trust value or a UA culture with moderately less and a UAI index of 36 (Hofstede, 2001). The following are the characteristics of people with Low UAI, as stated in this research, which can relate to Malaysians. This research fully focuses on the general web domain and its trust and satisfaction. Feelings of happiness shared, relationship orientation, most people can be trusted, Preference for smaller organizations, and more subjective well-being are related to the trust relationship. Admit dissatisfaction with the employer, higher satisfaction with home life, fear and sad face expressions can be

recognized by others easily, less resistance to changes, and openness to change and innovation are related to the satisfaction relationship.

Low uncertainty avoidance society is less expressive and less nervous like people continue quiet without indicating hostility or strong emotions. Anyway, their caffeine usage may be relied upon to fight discouragement from their feebleness to communicate their assessments. (Aaron & Emilie, 2000). People seem easy-going, even relaxed. Hence, Malaysians will be more open and engage with the organization as long as the trust is there. This research was done based on the General website domain and gave importance to the trust relationship.

People in societies low in UAI will be more receptive to looking for data and the decision of new advancements. An activity that needs development and significant vagueness levels is practised regularly in low UAI nations (Vishwanath, 2003). Hence, Malaysians will be looking for innovative and creative websites to satisfy the customers. This research was done based on the General website domain and gave importance to the satisfaction relationship.

2. Colour

Colour helps them recognize the purposes of boxes, icons, and buttons connected to the user's sentiments and moods. The study from Fink and Laupase, discovered that Malaysian would stress the atmospherics for acquiring a sign of reconciliation (acceptance, non-competitiveness) by analyzing simulated presence (Fink & Laupase, 2000). Asian (For instance, Malaysian) individuals are in a high setting, which stresses understood nonverbal correspondence. They give more consideration to encompassing subtleties and substance (physical area, setting, or apparel).

It also mentioned that Malaysian webpages give more noteworthy consideration to atmospherics than equivalent Australian web sites. It likewise expressed that Malaysians

have faith more in individuals than association and subsequently room for more accentuation on the arrangement cycle than on the result. For Malaysians, 'signs' are significant, and it is in this way, they will give more prominent acknowledgement to webpage icons, banners, and responsive graphics than Australians will. So, attractive icons, banners, and responsive graphics for the bookstore were added to the Ranjen bookstore system. Ahmed, Mouratidis, and Preston argue that “Malaysians tend to have a deep concern for others, keep other people in mind, promote a sense of oneness with other people and consider the group as a basic unit of survival” (Ahmed, Mouratidis, & Preston, 2008). By and large, Malaysians want to work together in the soul of a "cheerful family". This "we" awareness is persisted in a Malaysian work environment paying little heed to nationality. Hofstede (1980) further calls attention to that, in collectivist social orders, Malaysia, there is people's passionate reliance on associations and society.

Consequently, individuals require gatherings, clubs, or places to show their interests, perspectives, and feelings (Singh and Baack, 2004). Indisputably, this measurement inside the setting of web architecture portrays network relations, clubs and talk rooms, bulletins, family topics, pictures and images of a public character, and faithfulness programs. There is a necessity to build associations in Malaysian culture before getting too serious business. It has been revealed that it is hard to isolate business from private lives as they are regularly coordinated in the social texture of ethnic-based connections (Khalili,2014). It stated that Malaysians have emotional dependence and require spaces to show their feelings and opinions. Contact Us page added with more information on how to communicate further. There are links to the Support page, Instagram, Facebook, and the user who can send an email or call to the Ranjen Bookstore system's phone contacts.

Malaysian society tends to prefer autocratic leadership. Malaysian societies esteem connections and selflessness, for example, low manliness and high womanliness.

This research was done based on the E-commerce and General website domain and gave importance to the loyalty relationship.

In high PD nations like Malaysia, more generations who are older, like parents and teachers, are worshipped, educators request compliance and respect from kids. In contrast, in low PD countries, kids are treated as reciprocals and are instructed to be autonomous since their beginning stage of life (Callahan, 2005). Hence, trust and loyalty play an important part here. This research was done based on the university website domain and gave importance to trust and loyalty.

Vouchers, deals, and competitions made people use the particular provider's websites. This enables the visitor to visit the same website multiple times. Nonetheless, credibility is Malaysia's most important element in maintaining consumer Online banking's web use, with greater significance than trust and routine factors. Continuous efforts to build, improve, or preserve the website or supplier's credibility are a must to ensure customer retention. This can be achieved by promotions or ads that emphasize both the web and the supplier's positive elements. This research was done based on the Internet banking website domain and emphasized trust loyalty and satisfaction.

Malaysian society is quite collectivist. Individuals like to work in gatherings and have solid bonds with every individual from their gathering. The gathering decides one's job and (due to the significance of intensity separation) restricts one's activity opportunity. Also, Malaysians want to feel happy and fulfilled with goods or services before committing any decisions (Gould, Zalcara, & Yusof, 2000). This research was done based on the general web domain and gave importance to trust and satisfaction.

B. The layout of Website and Organizational Structure

1. Content Quality

If the information is given in a broad and adequate form, the content must have met the quality purpose. A self-administered questionnaire was used, and 208 usable responses were collected in Klang Valley, Malaysia areas (Mohd et al., 2009). The author mentioned that the websites should also emphasize their content as it has been recognized as one of the main factors contributing to repeat visits. Content on the web includes text, pictures, graphics, layout, sound, motion, and, someday, even smell; making the right web content decisions are critical to effective bookstore web design. The pictures were displayed in the correct size and ensure the content is short with the Ranjen bookstore system's right layout. Users can click on the image button to view more information on particular books. For example, when the user clicks on the book's image or title on the index page. Kassim and Abdullah mentioned that in multiple cultures and ethnicities like Malaysia, individuals with Malay, Indian, and Chinese races' foundations esteem family and business dependent on connection, reliability, and surrender. They aggregately settle on choices for the network. In Ranjen Bookstore, the top bar's announcement was added by mentioning that each purchase's money will contribute to charity events.

According to a study from PayPal's "Online and Mobile Shopping Insights", the extent of Malaysia internet spending was RM1.8 billion in 2010, predicted to be RM5 billion by 2014 (Liat, 2014). Hence, they suggest that applying a great UI configuration could give a better client experience and increase trust and client fulfilment towards the webpage. UI of PC applications influences how individuals interface with the site and their insight.

A huge scope overview was then completed in the Hong Kong International Airport's limited flight region on October 3-22, 2005. (Law and Bai, 2008). A group of nine questioners was enlisted to direct interviews with guests from seven significant basis

markets, including Malaysia, China, and Singapore. Purchasers were essentially more certain about consumer satisfaction and buy goal than browsers. This research was done based on the tourism travel website domain and gave importance to the satisfaction relationship.

More focussed analysis in the region of consumer loyalty and the Internet demonstrate that item data content on the book shop website composition and design are the main considerations that influence consumer loyalty and satisfaction (Sohail & Shanmugham, 2003). This examination demonstrated that Internet availability, mindfulness, the mentality to transformation, charges of Internet and PC, faith in banks, security fears, usability, and accommodation are the main considerations influencing the selection of Internet bank administrations in Malaysia. This research was done based on the Internet banking website domain and gave importance to satisfaction and security.

2. Interactivity

Interactivity is the way data is introduced to improve client communication reliably. Vishwanath mentioned that people in societies low in UAI would be more receptive to looking for data and the decision of new advancements. An activity that needs development and consistent vagueness levels is practised regularly in low UAI nations (Vishwanath, 2003). In the Ranjen bookstore system, entering address/credit card information is designed differently and interestingly but not hard for the user to understand. For example, different tabs have been added to one page, not to go to the next pages to enter other section details. This is designed in my account page, and the page redirected after the user performed checkout when adding the credit card or shipping address information. Vouchers, deals, and competitions made people use the particular provider's websites. This enables the visitor to visit the same website multiple times(Callahan, 2005).

Nonetheless, credibility is Malaysia's most important element in maintaining consumer Online banking's web use, with greater significance than trust and routine factors. Continuous efforts to build, improve, or preserve the website or supplier's credibility are a must to ensure customer retention. This can be achieved by promotions or ads that emphasize both the web and the supplier's positive elements. The Ranjen bookstore system, whenever to display the price tag for certain books, shows that it is discounted by showing the old price with a cross out on top of it. Announcement added at the top bar that the prices are currently under promotion and limited for a certain period. Gould, Zalcaria, and Yusof mentioned that Malaysians want to feel happy and fulfilled with goods or services before committing any decisions (Gould, Zalcaria, & Yusof, 2000). It takes much longer for people to develop a bond and truly value confidentiality. The key thing is private integrity and "face," and confrontation is sidestepped. Hence, for users to request, a web must :

- i. Highlight the bond's excellence and not the items and supply administrative details that help lay the foundation for a relationship.
- ii. Give organizational details (person responsible, location of the company, what other items and administrations are accessible, what network jobs are served) that aids in laying the foundation for a partnership.

The page of Ranjen bookstore system, mission, and Story was added to understand better the organization, maps with directions added in the contact page help establish a basis for a relationship between the user and the seller.

(Marcus & Gould, 2000) found that the web design features in one country will suit its cultural aspects and is dependent on whether it is in the lower and higher categories (Marcus & Gould, 2000). For instance, Malaysia's website as a high-power distance country has axial symmetry, emphasis, and details on the institution's authorized closure,

information, and pictures of the university's top leader, pictures and milestones of monumental building. The web specifications are similar to those of high-power distance, where ordinary people understand that leaders have the strongest social status (Nasrul, Nor, Masrom & Syarief, 2012). The leaders' instructions and guidelines must be followed, and they are the decision-makers, and there is a disparity between the top and the regular people. This research was done based on the university website domain and gave importance to trust and loyalty.

3. Navigation

The website's ability to help users view other pages and the degree of guidance is known as navigation. The study from Fink and Laupase stated that web developers should observe that Malaysians seem, by all accounts, to be less acquainted with utilizing the web to find items, administrations, or data than Australians. They are not as familiar and yet figuring out how to utilize Internet business capacities (Fink & Laupase, 2000). The Ranjen bookstore system provides a straight and simple meaning where the user understands each button and icons' function. For example, the checkout, add to cart, and next button on the order submission page.

Online retailers need to guarantee that internet shopping measure through their site is planned and made as simple, basic, and helpful as could reasonably be expected (Haque, Sadeghzadeh, & Khatibi, 2011). Likewise, the site ought to be planned not to befuddle possible Malaysian purchasers, the individuals who are commonly inexperienced with this new type of purchasing. They ought to guarantee that they give a productive service administration to their customers. This research was done based on E-commerce online shopping website domain and gave importance to the satisfaction relationship.

Moderately low UA cultures like Malaysia, where they have priority for comprehensive guiding principle, where high uncertainty avoidance nations consume a

priority for strong directions and requirements (Boyd, 1999). Hence, Malaysians will be satisfied when correct and adequate guidelines are provided for the website. This research was done based on the general web domain and gave importance to the satisfaction relationship.

Malaysians trust more in individuals than in association. Hence these lines place more importance on the negotiation cycle than the result (Fink & Laupase, 2000). So, the bookstore web design satisfaction is very important here. Trust is that social value influences the web page designs, and as an example, they mentioned that Malaysian webpages might give more prominent consideration to atmospherics compared to Australian webs. This research was done based on the general web domain and gave importance to trust and satisfaction.

Investigations were carried out by collecting 208 pieces of feedback from a questionnaire around Klang Valley, Malaysia. Based on the research, the important factors influencing online purchase intention prediction are trust and empathy (Mohd et al., 2009). According to the Online Air Ticketing system, this research was based on trust.

SMEs from local demonstrate that the web isn't sufficiently protected, and they are not prepared to set up their sites as they might suspect the issues related to securities may prompt issues to both their clients and themselves (Narayanasamy, Santhapparaj, and Eze, 2008). It was expressed that over 67% of their sites' clients are worried more about security issues (Feher and Towell, 1997). This research was done based on SMEs in the manufacturing and service centre website domain and gave importance to satisfaction and security.

To gauge each plan's viability, web correspondence adequacy assessment guidelines are distinguished, incorporating learnability, effectiveness, negligible mistakes, fulfilment, understanding, and desirability (Hsieh, Holland, & Young, 2009). Satisfaction: Is it pleasant to use? A client's view of satisfaction can be affected by visual

designs, format, typography, and other visual interface components, so clients' satisfaction is a blend of these guidelines. This research was done based on the General website domain and gave importance to the satisfaction relationship.

Users from the High UA were bound to have detailed obtaining data from companions, family members, state and city travel workplaces, and visit administrators than had Low UA users, that were bound to have utilized travel aides and data got from showcasing ruled sources, for example, commercials on TV and radio. (Litvin, Crotts, and Hefner, 2004). Hence, Malaysians prefer to be satisfied by exploring the design on their own rather than depending on other people's feedback or advice. This research was done based on the tourism web domain and gave importance to the satisfaction relationship.

C. Loyalty

(Eid, 2011) have identified factors influencing Saudi customers' trust in e-commerce and found out that it is a key factor in measuring loyalty. (Cyr, 2008) found that trust and satisfaction important for online vendors but different across cultures, and it is important to measure loyalty. (Casaló, Flavián, & Guinalú, 2008) proposing a strong and positive influence on loyalty through usability and satisfaction. (Brilliant & Achyar, 2013) study shows that the quality of information will lead to greater consumer trust, leading to greater website loyalty. (Moriuchi & Takahashi, 2015) proved that e-satisfaction has a greater impact than e-trust on online shoppers' regular loyalty. Hence, according to (Eid, 2011), (Cyr, 2008), (Casaló, Flavián, & Guinalú, 2008), (Brilliant & Achyar, 2013), (Moriuchi & Takahashi, 2015), both trust and satisfaction are known as important influences to evaluate user's loyalty on the web.

4.2 Summary

To conclude this chapter, the analysis of the user preferences on the website attributes, the relationship of the attributes with the Malaysian cultures, and the findings based on the three Malaysian mostly visited bookstore websites were done. The hypothesis formed based on the literature review and analysis of the three Malaysian mostly visited bookstore websites for each web attributes were discussed.

University of Malaya

CHAPTER 5: SYSTEM DESIGN

5.0 Introduction

This chapter explains the system functional requirements and non-functional requirements on the established system. The functional requirements were depicted using use cases to explain the requirements and conceptual system modules in depth. This chapter also lists all the technologies and tools used for development. The user interface design concepts are designed to improve user interface design consistency. Advancement ought to purposely sort out the UI, insignificant and valuable ways, given clear, steady layouts that are obvious and recognizable to clients, uniting related things and isolating disconnected things, separating unique things, and making comparable things like one another. The concept of form concerns the overall design of the user interface. A system design or system architecture is the conceptual model that describes a system's structure, behaviour, and more views. An architecture description is a structured system definition and representation, arranged in a way that supports the system's structure and behaviour. The graphical UI is a type of UI that empowers clients to cooperate with electronic gadgets through graphical symbols and sound indicators, such as essential documentation instead of message-based UIs, composed text navigation, or typed command. This chapter will discuss the system design principle, system architecture, use case diagram, entity-relationship diagram, system class diagram, graphical user interface design with the Ranjen Bookstore's screenshot based on the use-case. The model performs data and business logic handling. For data handling such as insertion, updating, and removing the records via repository Java code, while for business logic handling is performed via the service and service implementation Java code, the action requested from the controller layer is redirected to the repository layer. View layers code consists of HTML, CSS, and JavaScript language. It enables users to send the HTTP request to the controller layer to process and retrieve responses from the controller based on the Model layer response

retrieved from records in the database. The Controller Layer provides the interface for the interaction between the View layer's request and the Model layer's response.

5.1 System Functional Requirements

The web-based bookstore system focuses on the user interface by designing the system based on five attributes of website design (i.e., navigation, typography, interactivity, colour, and value of the content) to ensure trust and loyalty, and satisfaction are fulfilled. The end users are Malaysian University students ranging from 19 to 23 years old. The web-based system is available at <http://www.ranjenappstore.com/>. This project will help the developers develop an online store for Malaysian students who plan to purchase the books in the system with a satisfactory web interface design.

5.1.1 System Information

The online bookstore stores the following information using a database.

- User – This includes the user information to log in, such as username, password, email address.
- Book – This includes the book details and images for purchasing with the prices and number of books available in the stocks.
- Shopping Cart – This includes the books selected and added into the cart to check out the confirmed books to purchase.
- User Shipping Information – This includes the user's shipping address information to deliver the books purchased.
- User Billing Information includes the billing information, which consists of the user's credit/debit card information used for purchasing.
- User Payment Information includes the users' payment information with the order, shipping, and billing information linked together.

- User Order Information – This includes the order information of the quantity of the books selected by the users for purchasing.

5.1.2 Operating Environment

The operating environment for Ranjen bookstore is as listed below:

- i. Client/Server system
- ii. Operating system: Windows.
- iii. Database: MySQL Database
- iv. Platform: Java and Amazon Web Services Cloud Computing

5.1.3 System Features

- Description and Priority- The Ranjen bookstore online system is an online e-commerce book purchasing system which will be a great reference for future developers/designer to develop a website focusing on Malaysian University students usability at the same time give importance to their interests and expectations.
- Stimulus/Response sequences-
 1. User login and logout to purchasing books and store books, shipping, billing, and order information for that specific user.
 2. User view profile with information of the shipping, billing, and user information saved by them.
 3. User view book details that can manage orders by the view, update, add, and remove the books from the shopping cart.
 4. User search book by keywords or by filtering saves time and increases its usability.
 5. The user adds, updates, and deletes credit card information.

6. The user adds, updates, and deletes shipping information.

- Other System Features include:

1. AWS RDS Database-

Amazon Relational Database Service (Amazon RDS) allows the setup, operation, and scale of a cloud relational database. This provides cost-effective and resizable efficiency while automating time-consuming administration activities such as hardware distribution, database configuration, patching, and backups. This helps you concentrate on your applications to provide them with the good performance, high availability, protection, and reliability they need. Amazon RDS offers you six popular database engines to choose from, including Amazon Aurora, PostgreSQL, MySQL, MariaDB, Oracle Database, and SQL Server, which are tailored for memory, efficiency, or I / O. You can securely move or clone the current databases to Amazon RDS using the AWS Server Migration Program.

2. Client/Server Cloud computing system-

Execution is the essential distinction between distributed computing and regular systems administration or facilitating. One term known as virtualization permits complete versatility, giving practically boundless customers' ability. The server is settled in hardware in a conventional networking configuration. If you want to scale up to more users than the existing hardware would accommodate, you'd have to spend more resources on improvements, and there'd still be a boundary. But with cloud computing technology, several servers are already in place initially. Then they use virtualization to render only the resources needed by a specific user that offer it great scalability to heavy corporate resource needs from the small needs of

personal business resources. Without entanglements, a cloud supplier will scale assets, and the client will need to pay for what they are utilizing. All in guidelines organization consist of the gear, foundation, upkeep, or even rent need to be paid at a fixed month to month cost, whether or not you need a little mechanical assembly. In outline, distributed computing is or might be simply one more type of client/server engineering where the client/server components of its execution are shrewdly isolated from the client. Expect all client/server architectures to look more like the cloud soon than old networks, but it's still pretty much the same thing.

5.1.4 External Interface Requirements

- Hardware Interfaces

Microsoft Window Operating System, A browser that supports HTML and JavaScript, Amazon Web Services to deploy the application.

- Software Interfaces

1. Front-end software: HTML, CSS, JavaScript for the user interface in frontend accessible via web browsers.
2. Back-end software: Java for business logic and backend processing and MySQL to save records.

- Communication Interfaces

This project supports all types of web browsers on desktop and mobile. We are using Bootstrap, a CSS and JavaScript-based design templates that are very compatible with web browsers from different platforms and environments.

5.2 System Non-Functional Requirements

Two main non-functional requirements for the developed web-based are usability and availability. Both are chosen because it suits the project's main aim: to get trust, loyalty, and satisfaction from the end-users.

5.2.1 Usability

The user interface's design and reliability characteristics can be identified from the usability. The visual and artistic quality refers to the design, while the user interface devices' continuous usage is reliable. The usability is related to the interfaces and can be related to any system, tool, or device. It is defined as how easy the users can make the system function and use that correctly. This brings us to the usability, understandability, and learnability of the users. For the user interface to be instinctual, limited, access granted to various users, and overall user experience achieved, it must be developed by keeping the user's expectation as a priority, which can be done by giving importance to the two attributes. One of the attributes was the guidelines of look and felt: the flow, layouts, and colours. Another attribute is the Internationalization or localization necessities such as spellings, languages, and keyboards.

5.2.2 Availability

Availability is the time frame in which the system normally operates without failure. Accessibility is expressed as the percentage of total downtime of the request over a specific time scale. Failures, anomalies, infrastructure problems, malicious attacks, and upkeep and exaltations impact availability. It is the operating time or the period the system is available for usage. This is defined for server updates and backups, and certain systems are architecture with planned downtime. Availability additionally passes on the number of hours or days a week or weeks a year. The application will be accessible to its end clients and how rapidly it can recuperate from defaults. This requirement extends to all of them as the architecture establishes software, hardware, and networking entities. Definitions of hardware availability, recovery, and reliability measure the system's uptime. There are few availability attributes such as recoverability, which is the system's time to resume operation in case of failure, an offline requirement, which is the time

between the system's underlying failures during service and resilience: unit and sub-component performance characteristics.

5.3 Tools

Eclipse IDE – It is a modern Integrated Development Environment to develop and package a Java-based application. This project will develop the back-end code of the Ranjen bookstore.

MYSQL Workbench – Technology for the MYSQL database modelling, administration, and development tools. This project will be used to access database records required to store user and book information of the Ranjen bookstore.

Amazon AWS Elastic Beanstalk is an essential tool to deploy, scale the web services, and develop Java on Apache servers. This project will be used to deploy the Ranjen bookstore prototype system to be available online once it has been developed.

Amazon CloudWatch – It is a technology to log user's activities. This project will track all the user login information and track the duration taken to perform each activity by the Ranjen bookstore.

5.4 Technologies

HTML – It is a mark-up language that helps build web pages and applications. This project will code the user interface of the web page's front end view in the browser.

CSS – It is known as Cascading Style Sheets, which is a style sheet language used to provide the meaning for the document's presentation that is written in HTML. For this project, it is critical to use CSS to change the web attributes of colours, font, and sizing.

JavaScript – It is an interpreted programming language that is implemented client part of the web browser, enabling interactive web pages to be created. This project will create interactive elements once clicked or mouseover on the HTML elements.

Bootstrap is an HTML, JavaScript, and CSS framework to develop responsive mobile projects on the web. This project will display the tables and alignment of the contents and header in the standard padding and border for all the pages.

Java – It is an object-oriented and class-based programming language that enables developers to run on all platforms by writing the code once without recompilation. For this project, it will be used to develop heavy backend processing on reading retrieving records from the database so that users able to view it in the browser.

Thymeleaf is an open basis Java HTML template engine normally integrated with the Spring framework that normally works in web-based environments. This project will simplify and eliminate repeated code for the same style templates of different pages.

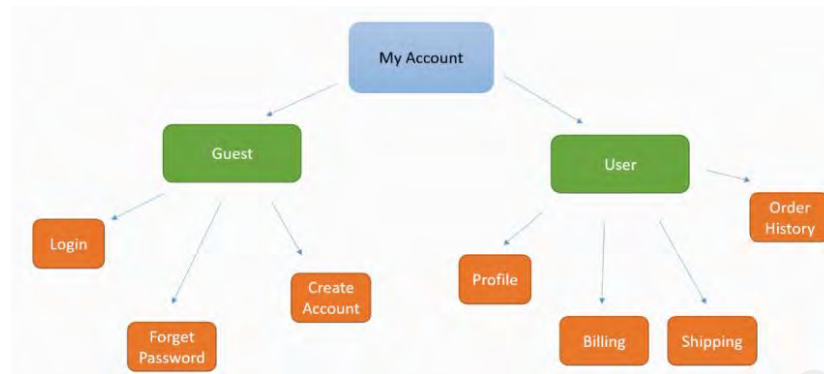
Spring Boot – An open-source Java-based framework that helps create microservices and webpages. For this project, it will be used to easily create the backend processing code as a service so that it can be easily integrated without affecting the frontend views and databases

Maven – It is a Java build automation tool that package all the Java-based project with all the related dependencies described in the XML file. This project will package and build all the related dependencies of the libraries required to execute the back end codes.

5.5 System Modules

For the website development of the Ranjen bookstore, it was based on three main modules: My Account, Booklist, and Shopping Cart module.

5.5.1 My Account Module



My Account module has two submodules; Guest and User. The guest module is for users who have not yet logged in to the system. They should view the main page displaying the book's pictures. The users can perform three actions: login, forget the password, and create an account. The user module is for logged in users. It has four submodules: viewing and managing profile, managing shipping details, managing shipping details, and viewing order history.

5.5.2 Book List Module



The Book List module has two submodules; Search and View Book Detail Info. The search module allows the user to perform a search on the books. It has three functionalities: search by selecting the category, search by entering a certain keyword in the book title, and fuzzy search, which helps find strings that match a pattern exactly.

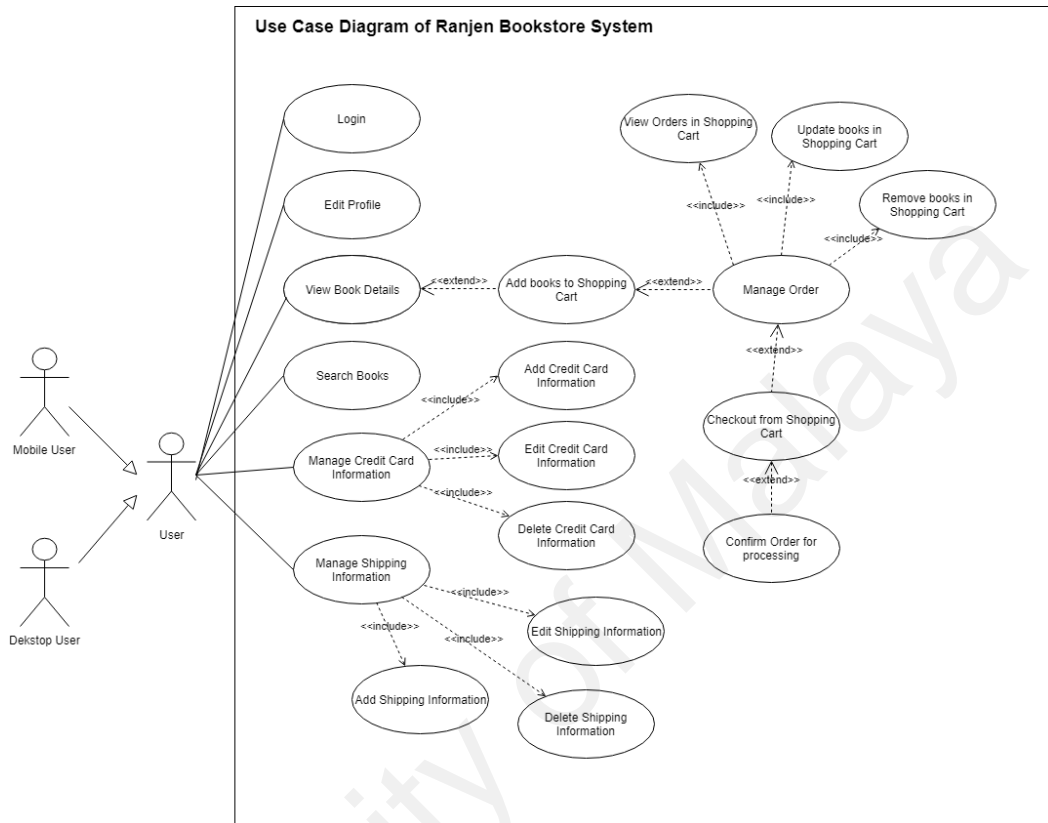
View Book Detail Info module is for the user to view book information. It has two features: add the book to the shopping cart and show book availability based on the value that will be retrieved and updated from the database based on each purchase.

5.5.3 Shopping Cart Module



The Shopping Cart module has two submodules; Cart Item and Checkout. Cart Item is for users to add, update and remove books from the cart. The checkout module allows the user to perform the checkout once confirmed. It has four submodules, which will have detailed information of the books added into the cart, such as shipping, billing, payment, and order confirmation before the payment.

5.6 System Use Case Diagram



Use Case: Login	
Scenario: User login using username and password provided separately by the admin.	
Pre-condition: User clicks on the login button on the home page	
Post-condition: The user successfully redirected back to the homepage with a logged-in account.	
Typical Course of Events	
Actor	System
<ol style="list-style-type: none"> 1. User view the home page 2. User click on the login button. 3. User key in provided username and password and login form submitted. 	

	<ol style="list-style-type: none"> 4. The system is forwarded to the login page, asking the user to input the username and password. 5. System forwarded to the homepage with the logged-in account.
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Use Case: Edit Profile	
Scenario: User edit account information after logging in	
Pre-condition: User clicks on the MyAccount link on the homepage after logged in.	
Post-condition: User click save once changed the details on the page	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. The user clicks on the MyAccount link on the homepage after logging in. 3. User edit required Profile Information and click Save. 	System <ol style="list-style-type: none"> 2. The system redirects to the MyAccount Profile page. 4. System will save all the information and will show acknowledgement message for success and failure.

Use Case: View Book Details	
Scenario: User view the correspondence book details by clicking on the particular book image.	
Pre-condition: User views books on the homepage after logged in.	
Post-condition: Users can update the quantity and add the book to the cart if interested in purchasing it.	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. Users view books on the homepage after logged in. 2. User clicks on the particular book image. 	System <ol style="list-style-type: none"> 3. The system redirects to the particular book's details page based on the id passed in the parameter.

4. User view the correspondence book details and more information like pricing, quantity, and pictures.	
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Use Case: Search Books	
Scenario: User can search for the books by type keyword of the book title, author, or description in the search box.	
Pre-condition: Search button clicked by the user on the homepage	
Post-condition: Booklist with the image is filtered on the homepage based on the search result.	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. User type keyword and click search in the Search box. 3. User view book image in the the homepage is filtered and displayed based on the search result. 	System <ol style="list-style-type: none"> 2. The system searches for the books based on the keyword and returns the search result.

Use Case: Manage Credit Card Information	
Scenario: User click on Billing tab on MyAccount page	
Pre-condition: MyAccount page clicked by the user	
Post-condition: All the credit card details viewed by the user in the billing tab of the MyAccount page	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. User click on the MyAccount page 2. User click on the Billing tab of the MyAccount page 	System <ol style="list-style-type: none"> 3. System will show the billing information content on that MyAccount page.

Use Case: Add Credit Card Information
Scenario: User add credit card information by clicking on the Add Credit Card link under the Billing tab on the MyAccount page

Pre-condition: User click on the Billing tab on the MyAccount page	
Post-condition: User click save once fill all the credit card details in the billing tab of the MyAccount page	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. User click on the Billing tab on the MyAccount page 3. User click on the Add (Update) Credit Card link 4. User enter all the required credit card Information and click Save. 	System <ol style="list-style-type: none"> 2. System will redirect to the billing information page. 5. The system will save all the credit card information and show an acknowledgement message for success and failure.

Use Case: Edit Credit Card Information	
Scenario: User edit credit card information by clicking on the edit icon under List of credit card section once clicked on the Billing tab on the MyAccount page	
Pre-condition: User click on the Billing tab on the MyAccount page	
Post-condition: User click save once updated the existing credit card details in the billing tab of the MyAccount page	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. User click on the Billing tab on the MyAccount page 3. The user can view all the existing credit card list that was saved earlier under the credit card section list. 4. The user clicks on the edit icon from one of the credit card lists. 5. User will update the existing credit card Information and click Save. 	System <ol style="list-style-type: none"> 2. System will redirect to that corresponding credit card information page. 6. The system will save all the newly updated credit card information and show an acknowledgement message for success and failure.

Use Case: Delete Credit Card Information	
Scenario: User delete credit card information by clicking on the delete icon under the List of credit card section once clicked on the Billing tab on the MyAccount page	
Pre-condition: User click on the Billing tab on the MyAccount page	
Post-condition: User click Yes to confirm once the dialogue box for the credit card deletion pop up in the billing tab of the MyAccount page	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. User click on the Billing tab on the MyAccount page 2. The user can view all the existing credit card list that was saved earlier under The credit card section list. 3. Users click on the delete button from one of the credit card lists. 5. User clicks “YES” to confirm the current credit card information's deletion. 	System <ol style="list-style-type: none"> 4. System will send a deletion confirmation dialogue box for that corresponding deleted credit card. 6. The system will remove the confirmed credit card information from the system and show an acknowledgement message for success and failure.
Use Case: Manage Shipping Information	
Scenario: User click on Shipping tab on MyAccount page	
Pre-condition: MyAccount page clicked by the user	
Post-condition: All the shipping details viewed by the user in the shipping tab of the MyAccount page	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. User click on the MyAccount page 2. User click on the Shipping tab of the MyAccount page 	System <ol style="list-style-type: none"> 3. System will show the shipping information content on that MyAccount page.

Use Case: Add Shipping Information	
Scenario: User add shipping address information by clicking on the Add (Update) Shipping Address link under the Shipping tab on the MyAccount page	
Pre-condition: User click on the Shipping tab on the MyAccount page	
Post-condition: User click save once fill all the shipping address details in the billing tab of the MyAccount page	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. User click on the Shipping tab on the MyAccount page 3. User click on the Add (Update) Shipping Address link 4. User enter all the required shipping Information and click Save. 	System <ol style="list-style-type: none"> 2. System will redirect to the shipping address information page. 5. The system will save all the shipping information and show an acknowledgement message for success and failure.

Use Case: Edit Shipping Information	
Scenario: User edit shipping address information by clicking on the edit icon under the List of Shipping Addresses section once clicked on the Shipping tab on the MyAccount page.	
Pre-condition: User click on the Shipping tab on the MyAccount page	
Post-condition: User click save once updated the existing shipping details in the shipping tab of the MyAccount page	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. User click on the Shipping tab on the MyAccount page 3. User can view all the existing shipping address list that was saved earlier under the List of Shipping Addresses section. 4. User clicks on the edit icon from one of the shipping address lists. 	System <ol style="list-style-type: none"> 2. System will redirect to that corresponding shipping address information page.

5. The user will update the existing shipping Information and click Save.	6. The system will save all the newly updated shipping information and show an acknowledgement message for success and failure.
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Use Case: Delete Shipping Information	
Scenario: User delete shipping address information by clicking on the delete icon under List of Shipping Addresses section once clicked on the Shipping tab on MyAccount page	
Pre-condition: User click on the Shipping tab on the MyAccount page	
Post-condition: User click Yes to confirm once the dialogue box for the shipping information deletion pop up in the Shipping tab of the MyAccount page	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. User click on the Shipping tab on the MyAccount page 2. User can view all the existing shipping information list that was saved earlier under the List of Shipping Addresses section. 3. Users click on the delete button from one of the shipping information lists. 5. User clicks “YES” to confirm the current shipping address's deletion. 	System <ol style="list-style-type: none"> 4. System will send a deletion confirmation dialogue box for that corresponding deleted shipping address. 6. The system will remove the confirmed shipping information from the system and show the acknowledgement message for success and failure.

Use Case: Add books to Shopping Cart
Scenario: User click Add to Cart button and books added by the user to the Shopping Cart in the book detail page.
Pre-condition: User view the selected book details after a click on the View button of the particular book from the home page
Post-condition: The user can view the added books to the Shopping Cart by click on the Shopping Cart link from the top menu.

Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. User view the book detail page. 2. The user updates the quantity and clicks Add to Cart button on the book detail page. 4. Users click on Shopping Cart link from the menu to view the cart's added books. 	System <ol style="list-style-type: none"> 3. The system redirects to the same page by showing success or failure to book addition to the cart.

Use Case: Update books in Shopping Cart	
Scenario: User update books quantity from Shopping Cart in the Shopping Cart page.	
Pre-condition: User click on the Shopping Cart line from the top menu.	
Post-condition: The user will be redirected to the Shopping Cart page again with updated quantity.	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. The user enters the number of books on the Shopping Cart page. 3. User click on the Update button 5. Users view the updated quantity on the Shopping Cart page. 	System <ol style="list-style-type: none"> 2. The system shows the Update button once the existing quantity value is changed. 4. System redirects to Shopping Cart page

Use Case: Remove books in Shopping Cart	
Scenario: User removes books from Shopping Cart in the Shopping Cart page.	
Pre-condition: User click on the Shopping Cart line from the top menu.	
Post-condition: The user will be redirected to the Shopping Cart page again with the removed book, not in the Shopping Cart.	
Typical Course of Events	
Actor	System

<ol style="list-style-type: none"> 1. User click on the Delete icon in the book to be removed from the booklist in the Shopping Cart 3. The removed book user view does not exist on the Shopping Cart page. 	<ol style="list-style-type: none"> 2. System redirects to Shopping Cart page
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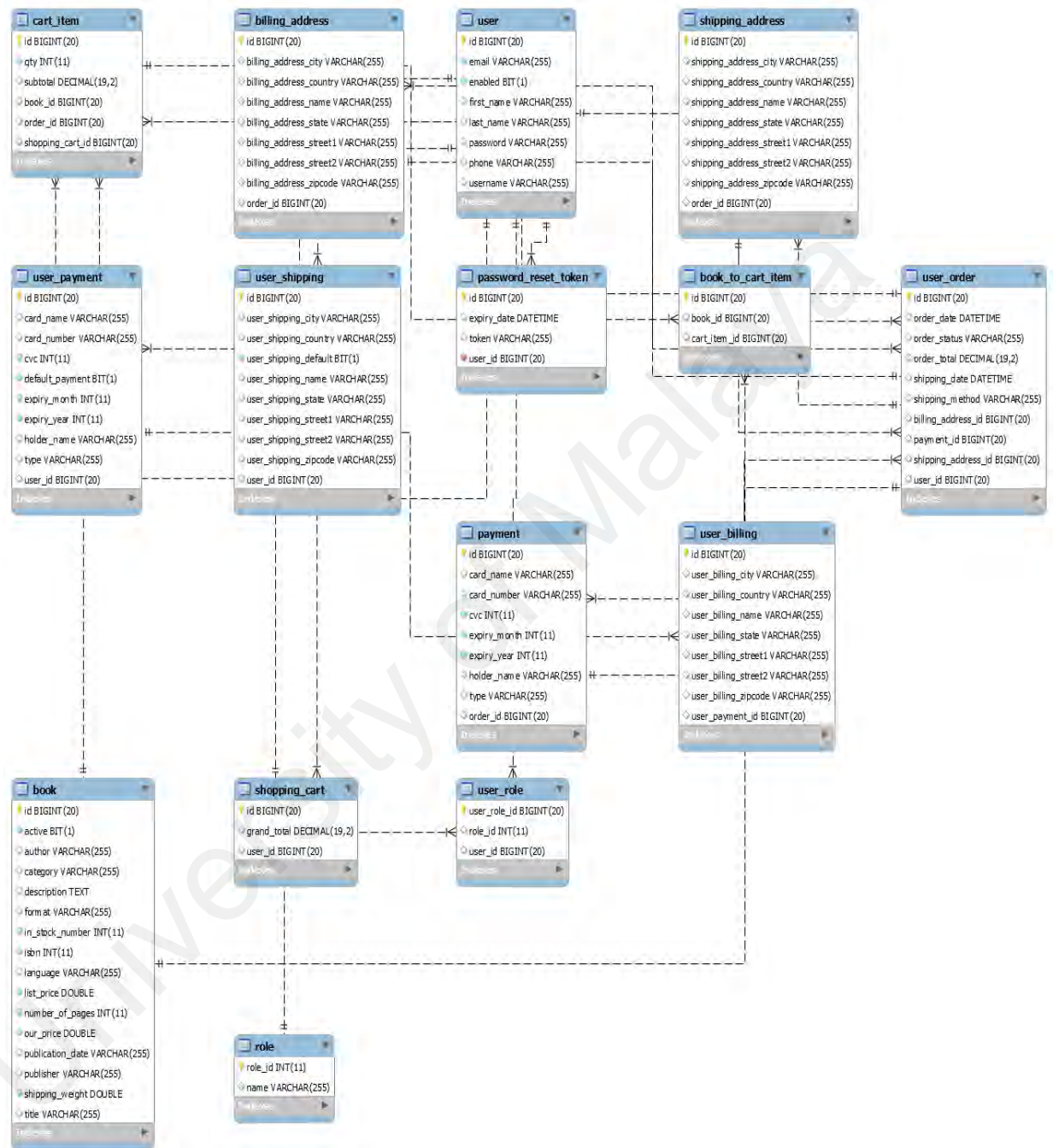
Use Case: Manage Order	
Scenario: User click on Orders tab on MyAccount page	
Pre-condition: MyAccount page clicked by the user	
Post-condition: All the order details viewed by the user in the shipping tab of the MyAccount page	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. User click on the MyAccount page 2. User click on the Orders tab of the MyAccount page 	System <ol style="list-style-type: none"> 3. System will show the orders information content on that MyAccount page.

Use Case: View Orders in Shopping Cart	
Scenario: User views books in Shopping Cart by click on Shopping Cart Link from the top menu.	
Pre-condition: User adds books to Shopping Cart by click Add to Cart button on the book detail page.	
Post-condition: User can update books quantity from Shopping Cart in the Shopping Cart page	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. User clicks on Shopping Cart Link from the top menu. 3. User view all the books added in Shopping Cart 	System <ol style="list-style-type: none"> 2. System redirect user to the Shopping Cart page

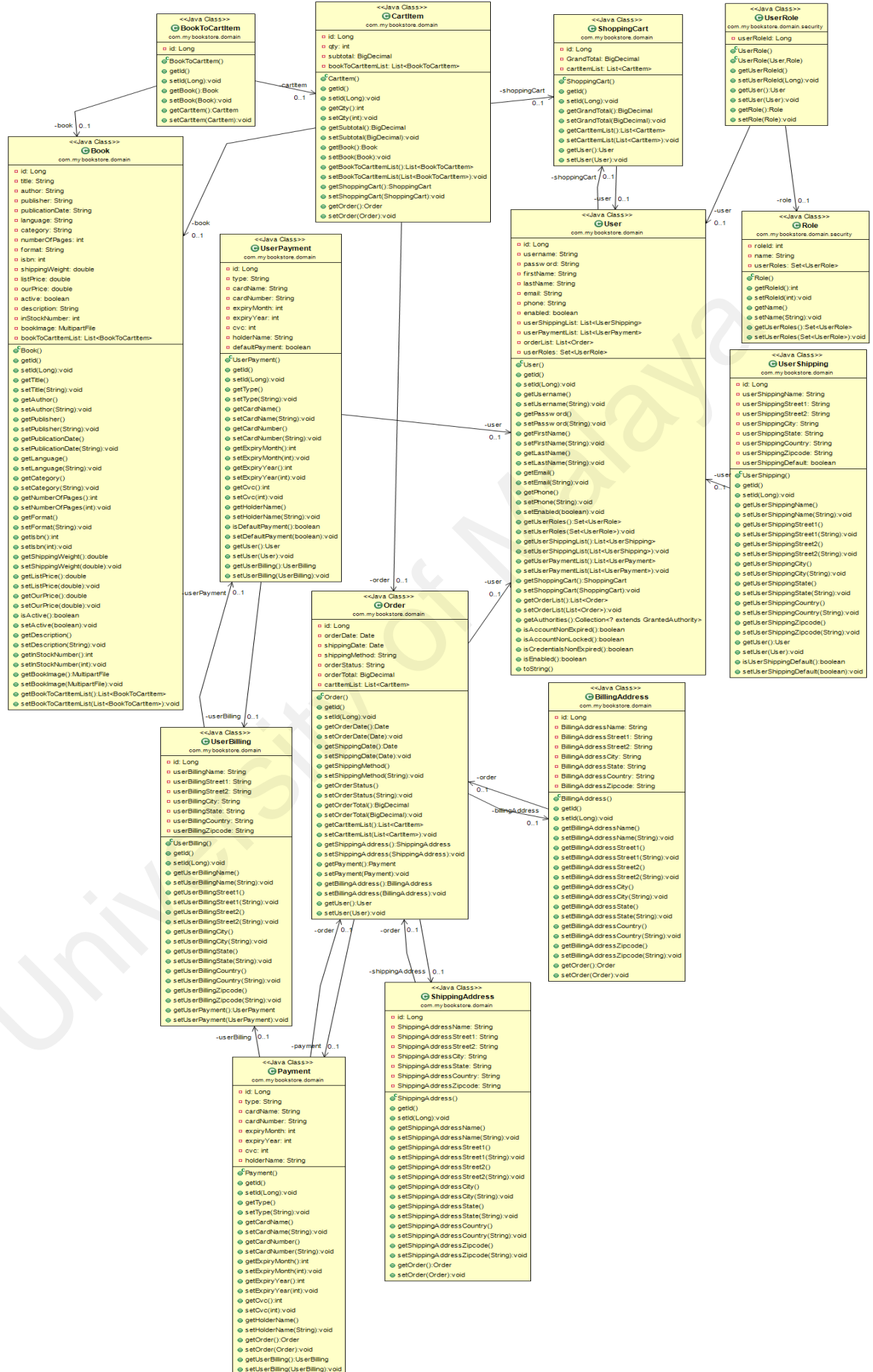
Use Case: Checkout from Shopping Cart	
Scenario: User checkout from Shopping Cart once all the Shopping Cart page items.	
Pre-condition: User update and remove book items in the Shopping Cart page	
Post-condition: User reviews the items, payment, and shipping address to confirm the order processing.	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. User click on checkout button from the Shopping Cart page 3. User review and verify the item added together with payment and shipping information on the checkout page before clicking on the Place Your Order button to confirm order processing. 	System <ol style="list-style-type: none"> 2. System redirect user to the checkout page

Use Case: Confirm order for processing.	
Scenario: User confirms order for processing on the checkout page by clicking on the Place your Order button	
Pre-condition: User checkout from Shopping Cart once all the Shopping Cart page items.	
Post-condition: User view the Delivery Page with information of the estimated delivery time, book quantity, and prices confirmed on the checkout page.	
Typical Course of Events	
Actor <ol style="list-style-type: none"> 1. User clicks on the Place Your Order button to confirm order processing on the Shopping Cart page. 3. Users view the Delivery Page with information of the estimated delivery time, book quantity, and prices confirmed on the checkout page. Your Order button to confirm order processing. 	System <ol style="list-style-type: none"> 2. The system redirects to the delivery page.

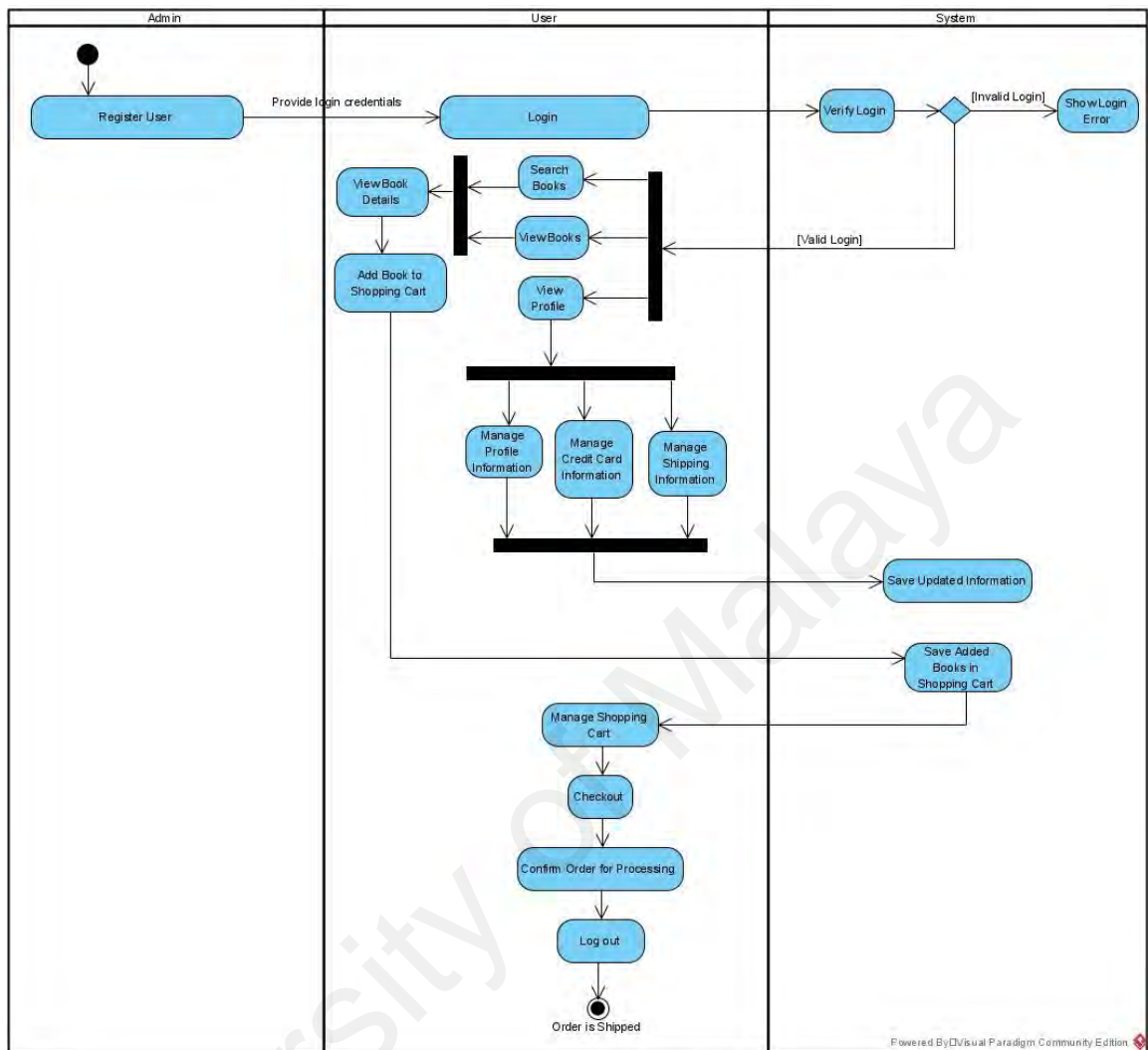
5.7 System Entity Relationship Diagram



5.8 System Class Diagram



5.9 Mapping of Interfaces with System Activities



5.10 Summary

We have discussed the system functional and non-functional requirements to conclude this chapter. In terms of functional requirements, we have elaborated more on this research's purpose, intended audience, project scope, product perspective, and operating system to develop and system features with the Ranjan bookstore system's external interface. In terms of non-functional requirements, we have discussed the usability, reliability, performance, availability, and scalability of the Ranjen bookstore. We have then discussed the tools, technologies, and modules to develop the Ranjen bookstore. According to the use cases, the Ranjen Bookstore graphical user interface

was developed for cross-platform between mobile and desktop websites. The background colour and font of the page templates were not very complicated. It was simple but attractive to avoid confusion among users, which contributed to usability and navigation without any problem.

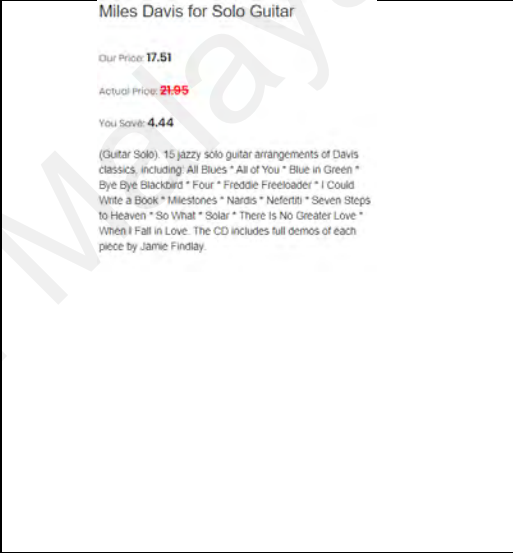
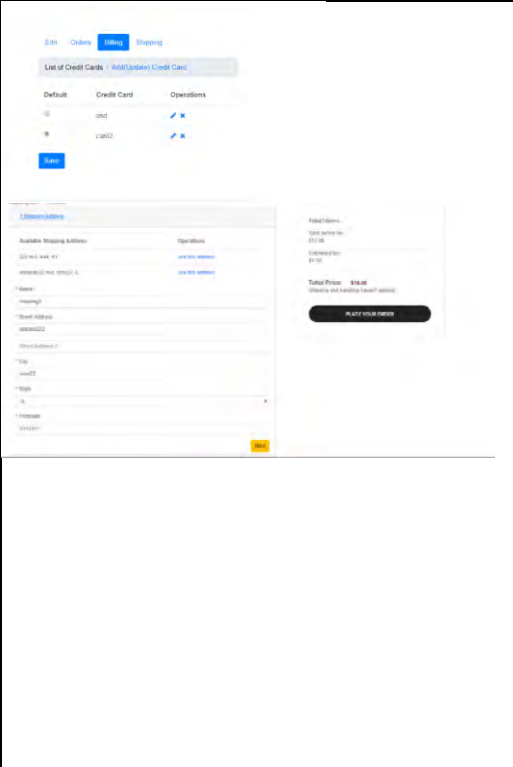
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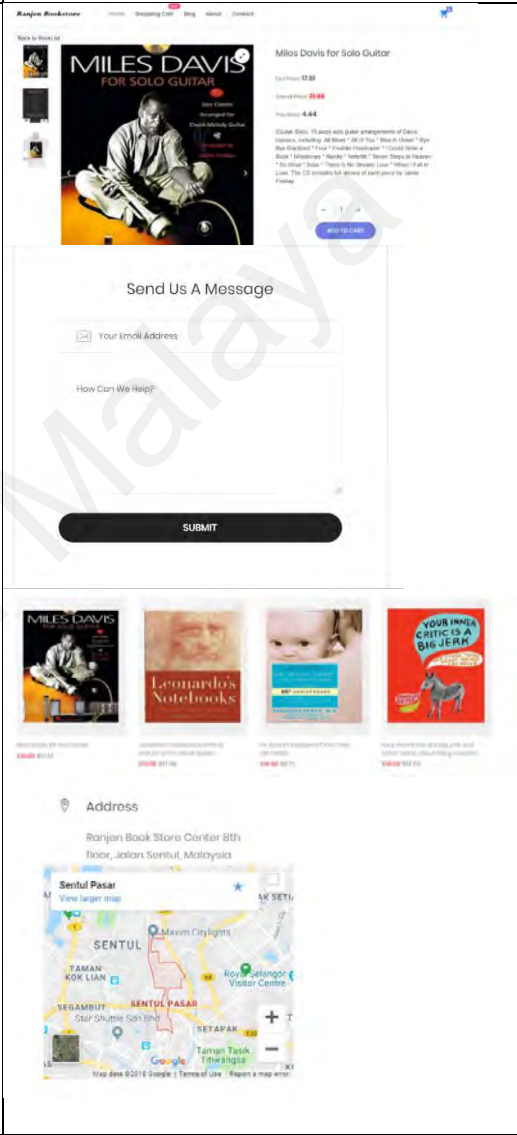
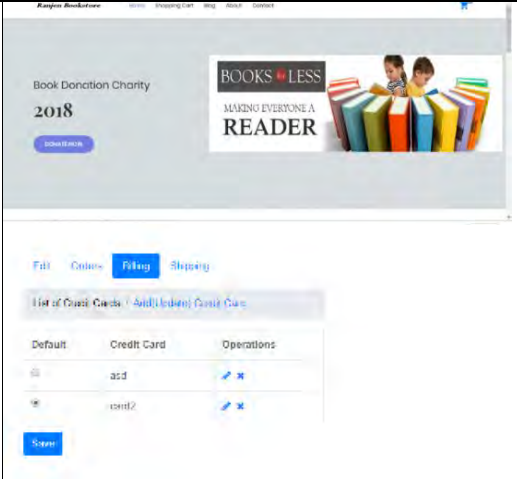
CHAPTER 6: RESULTS AND DISCUSSION

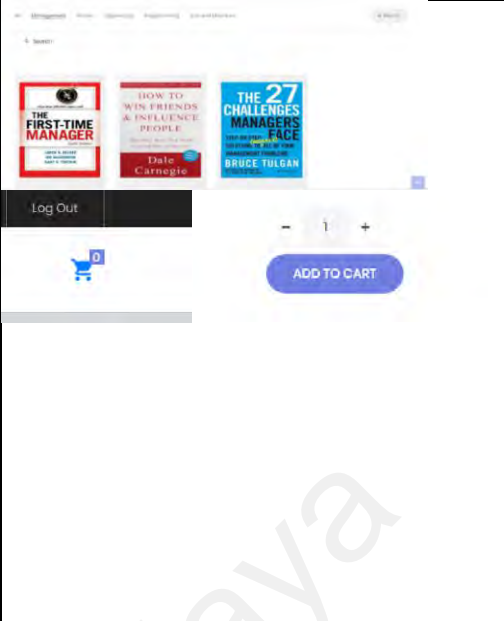
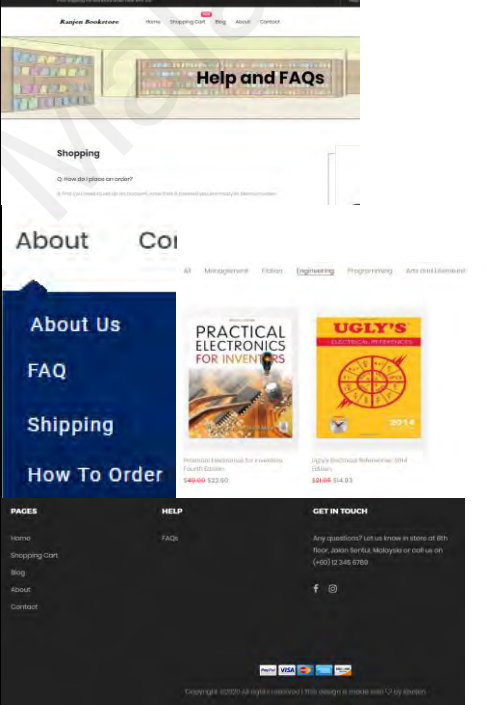
6.0 Usability Evaluation using Time Based Efficiency and Overall Rate Efficiency Results

To implement the selected model for experimental study, a minimal features online web prototype has been developed according to the hypothesis and research model

6.0.1 Table of Features Applied in prototype according to Web Attributes and Hypothesis

Web attributes	Hypothesis	Features applied in prototype	Examples
Typography	<p>H1: Typography of web effects user satisfaction in Malaysian culture</p> <p>H2: Typography of the web affects user trust in Malaysian culture</p>	<ul style="list-style-type: none"> Typeface: Serif and Sans-serif Font :14-16pt for descriptions text and 20-30pt for heading title text Line height: 1.5 	
Colour	<p>H3: Colour prompts more positive value on user satisfaction toward that equivalent site of Malaysian culture</p> <p>H4: Colour prompts more positive value on user trust toward that equivalent site of</p>	<ul style="list-style-type: none"> A complementary scheme of red and blue to be noticeable. The monochrome scheme consists of various shades of a single blue base colour. Colour warmth consists of both cold colours containing a higher amount of blue and warm colour containing a higher red amount. 	

	Malaysian culture		
Content quality	<p>H5: Good web contents value promote higher user satisfaction in Malaysian culture</p> <p>H6: Good web contents value promote higher user trust in Malaysian culture</p>	<ul style="list-style-type: none"> The book's information is described page in detail in a single page with stock availability, zoom on the image picture when clicked, and updated quantity of book added to the cart. The discounted books were highlighted to differentiate them with other books. The actual and discounted price was shown. The store location and contact form are provided if needed by the user. 	 <p>The screenshot shows a product page for 'Miles Davis for Solo Guitar'. It includes a book cover image, a 'Send Us A Message' form with fields for email address and a 'SUBMIT' button. Below the form, there are four book thumbnails: 'Miles Davis for Solo Guitar', 'Leonardo's Notebooks', 'The Book of Endangered Children', and 'Your Inner Critic is a Big Jerk'. At the bottom, there is a map showing the store location at 'Ranjen Book Store Center 8th floor, Jalan Sentul, Malaysia' and a Google Maps link.</p>
Interactivity	<p>H7: High level of interactive website promote more user satisfaction on a similar Malaysian website.</p> <p>H8: High level of interactive</p>	<ul style="list-style-type: none"> Attractive moving slider banner in the homepage showing the highlights and easy for the user to navigate to that section by clicking on that. The search bar is simple and static in the top area. It 	 <p>The screenshot shows a homepage with a 'Book Donation Charity 2018' banner. The banner includes the text 'BOOKS LESS MAKING EVERYONE A READER' and an image of children with books. Below the banner, there is a search bar with a 'Search' button and a table of search results. The table has columns for 'Default', 'Credit Card', and 'Operations'. The search results include 'acc' and 'cont2'.</p>

	<p>website promotes more user trust on a similar Malaysian website.</p>	<p>is easy to search for the books even on different current pages.</p> <ul style="list-style-type: none"> The content is neat without appearing too overwhelming, yet giving the message passed. The icons also simple and helpful for those who don't understand the language 	
<p>Navigation</p>	<p>H9: In Malaysian culture, assisted navigation promotes more user satisfaction on the similar Malaysian website. H10: In Malaysian culture, assisted navigation with promoting more user trust on the similar Malaysian website</p>	<ul style="list-style-type: none"> Huge drop downs and top bar static navigation Easily navigate to book pages by category Footer navigation 	

Once the prototype was established, a user assessment sequence was carried out to ensure good usability of its fundamentals. The pre-test research aims to ensure the developed prototype functions as expected. The design was simple because, according to Lee [75], it is mentioned that Interface easiness is the main prerequisite for improved practice in interaction and usability.

The Ranjen Online Bookstore was developed, and the website link with each unique user name and password has been sent separately to each of the 30 participants of student's email and WhatsApp.

For the first session, to evaluate the prototype's usability, each of their activities and time was taken to perform each task was tracked using the Amazon Cloud Watch as the application already deployed in the Amazon Cloud Server using the Amazon Beanstalk. To evaluate the prototype's usability, we need to calculate the ranjenbookstore web site user interface's efficiency. It is measured in seconds/minutes of the user's time to complete a task successfully.

Then for the second session, they were given time to play around with the prototype to understand the user interfaces and web attributes implemented in the prototype. The questionnaire was distributed to them at the end of the second session to understand the user experience. To evaluate usability during the first session, the time of task is defined as below:

Task Time = End Time – Start Time

The efficiency of usability can be calculated in two ways as below (Mifsud, 2015):

Time-Based Efficiency

$$TBE = \frac{\sum_{j=1}^R \sum_{i=1}^N \frac{n_{ij}}{t_{ij}}}{NR} \quad (\text{eq.1})$$

If we defined the function of eq.1 would be like:

N = Task total number

R = Participants number

n_{ij} = Task result from i of user j, $N_{ij} = 1$ if the user completed the task successfully, else

$N_{ij} = 0$

t_{ij} = Task i completion time by user j. The time will be calculated until the user exist the task if it is not completed successfully.

To demonstrate this, if we assume one similar task performed by the 4 participants, the first three users performed it in 1,2,3 seconds, followed by the 4th user who did not complete the task and took 6 seconds.

According to eq.1:

N = Task total number = 1

R = Participants number = 4

User 1: $N_{ij} = 1$ and $T_{ij} = 1$

User 2: $N_{ij} = 1$ and $T_{ij} = 2$

User 3: $N_{ij} = 1$ and $T_{ij} = 3$

User 4: $N_{ij} = 0$ and $T_{ij} = 6$

If we substitute the value above in the equation, the result will be as below:

$$\text{Time Based Efficiency} = \frac{\left(\frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{0}{6}\right)}{1 \times 4} = 0.46 \text{ goals/sec}$$

Overall Relative Efficiency

The formula for the OVR is based on the proportion of the participant's duration to complete the task versus the total duration of all participants to perform the same task.

$$ORE = \frac{\sum_{j=1}^R \sum_{i=1}^N n_{ij} t_{ij}}{\sum_{j=1}^R \sum_{i=1}^N t_{ij}} \times 100\% \quad (\text{eq.2})$$

To demonstrate this, if we assume one similar task performed by the 4 participants, the first three users performed it in 1,2,3 seconds, followed by the 4th user who did not complete the task and took 6 seconds.

According to the equation above:

N = Task total number = 1

R = Participants number = 4

User 1: $N_{ij} = 1$ and $T_{ij} = 1$

User 2: $N_{ij} = 1$ and $T_{ij} = 2$

User 3: $N_{ij} = 1$ and $T_{ij} = 3$

User 4: $N_{ij} = 0$ and $T_{ij} = 6$

If we substitute the value above in the equation, the result will be as below:

$$\text{Overall Relative Efficiency} = \left(\frac{((1 \times 1) + (1 \times 2) + (1 \times 3) + (0 \times 6))}{(1 + 2 + 3 + 6)} \right) \times 100 = 50\%$$

For this research, we have used the two-formula described above to evaluate users' usability in terms of the efficient user interface for Malaysian University students. For that first, we have divided and categorized each of the task or goal to be performed by the Ranjen Online Bookstore as below:

Task 1:	Selecting and adding Books to the Cart
Task 2:	Updating User Information
Task 3:	Updating Order Information in Cart
Task 4:	Updating Shipping Information
Task 5:	Updating Payment/Billing Information

There were 30 students of participants involved in this test, so for each user, the time was tracked in seconds(s) for each task as below:

Username/Task	Task	Task	Task	Task	Task
	1	2	3	4	5
User1	43s	24s	39s	54s	66s
User2	52s	45s	50s	62s	83s
User3	45s	34s	32s	61s	69s
User4	62s	27s	42s	45s	82s
User5	40s	55s	33s	44s	85s
User6	72s	33s	35s	47s	76s
User7	70s	25s	43s	51s	72s

User8	56s	26s	33s	56s	65s
User9	54s	40s	40s	43s	75s
User10	52s	34s	52s	66s	77s
User11	39s	23s	33s	52s	65s
User12	82s	37s	50s	59s	87s
User13	35s	32s	36s	47s	89s
User14	55s	52s	47s	43s	66s
User15	67s	30s	39s	62s	72s
User16	72s	27s	37s	53s	71s
User17	63s	42s	48s	63s	67s
User18	40s	33s	41s	44s	87s
User19	62s	28s	53s	62s	63s
User20	41s	42s	30s	44s	84s
User21	73s	24s	37s	57s	67s
User22	68s	25s	45s	59s	87s
User23	57s	39s	53s	49s	65s
User24	43s	37s	36s	51s	66s
User25	62s	44s	34s	41s	87s
User26	44s	27s	44s	47s	62s
User27	32s	52s	42s	62s	82s
User28	42s	41s	31s	66s	93s
User29	65s	29s	50s	49s	76s
User30	72s	21s	35s	52s	87s

The time-based efficiency based on the results above is:

$N = \text{Task total number} = 5$

$R = \text{Participants number} = 30$

$NR = 150$

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The calculation for Task 1

Username/Notation	N_{ij}	T_{ij}	N_{ij} / T_{ij}	$N_{ij} * T_{ij}$
User1	1	43	0.023255814	43
User2	1	52	0.019230769	52
User3	1	45	0.022222222	45
User4	1	62	0.016129032	62
User5	1	40	0.025	40
User6	1	72	0.013888889	72
User7	1	70	0.014285714	70
User8	1	56	0.017857143	56
User9	1	54	0.018518519	54
User10	1	52	0.019230769	52
User11	1	39	0.025641026	39
User12	1	82	0.012195122	82
User13	1	35	0.028571429	35
User14	1	55	0.018181818	55
User15	1	67	0.014925373	67
User16	1	72	0.013888889	72
User17	1	63	0.015873016	63
User18	1	40	0.025	40
User19	1	62	0.016129032	62

User20	1	41	0.024390244	41
User21	1	73	0.01369863	73
User22	1	68	0.014705882	68
User23	1	57	0.01754386	57
User24	1	43	0.023255814	43
User25	1	62	0.016129032	62
User26	1	44	0.022727273	44
User27	1	32	0.03125	32
User28	1	42	0.023809524	42
User29	1	65	0.015384615	65
User30	1	72	0.013888889	72

(T1) Total of (N_{ij} / T_{ij}) for Task 1 = 0.576808339

Hence Time-Based Efficiency (TBE) for Task 1 = $T1/NR$

$$= 0.576808339 / 150$$

$$= 0.003845 \text{ goals/sec}$$

Overall Rate Efficiency ORE for Task 1 = $[\text{SUM}(N_{ij} * T_{ij}) / \text{SUM}(T_{ij})] * 100$

$$= (1660/1660) * 100 = 100\%$$

Calculation for Task 2

Username/Notation	N_{ij}	T_{ij}	N_{ij} / T_{ij}	$N_{ij} * T_{ij}$
User1	1	24	0.041666667	24
User2	1	45	0.022222222	45
User3	1	34	0.029411765	34
User4	1	27	0.037037037	27
User5	1	55	0.018181818	55
User6	1	33	0.03030303	33
User7	1	25	0.04	25
User8	1	26	0.038461538	26
User9	1	40	0.025	40
User10	1	34	0.029411765	34
User11	1	23	0.043478261	23
User12	1	37	0.027027027	37
User13	1	32	0.03125	32
User14	1	52	0.019230769	52
User15	1	30	0.033333333	30
User16	1	27	0.037037037	27
User17	1	42	0.023809524	42
User18	1	33	0.03030303	33
User19	1	28	0.035714286	28

User20	1	42	0.023809524	42
User21	1	24	0.041666667	24
User22	1	25	0.04	25
User23	1	39	0.025641026	39
User24	1	37	0.027027027	37
User25	1	44	0.022727273	44
User26	1	27	0.037037037	27
User27	1	52	0.019230769	52
User28	1	41	0.024390244	41
User29	1	29	0.034482759	29
User30	1	21	0.047619048	21

(T2) Total of (N_{ij} / T_{ij}) for Task 2 = 0.936510482

Hence Time-Based Efficiency (TBE) for Task 2 = $T2/NR$

$$= 0.936510482 / 150$$

$$= 0.006243 \text{ goals/sec}$$

Overall Rate Efficiency ORE for Task 2 = $[\text{SUM}(N_{ij} * T_{ij}) / \text{SUM}(T_{ij})] * 100$

$$= (1028/1028) * 100 = 100\%$$

Calculation for Task 3

Username/Notation	N_{ij}	T_{ij}	N_{ij} / T_{ij}	$N_{ij} * T_{ij}$
User1	1	39	0.025641026	39
User2	1	50	0.02	50
User3	1	32	0.03125	32
User4	1	42	0.023809524	42
User5	1	33	0.03030303	33
User6	1	35	0.028571429	35
User7	1	43	0.023255814	43
User8	1	33	0.03030303	33
User9	1	40	0.025	40
User10	1	52	0.019230769	52
User11	1	33	0.03030303	33
User12	1	50	0.02	50
User13	1	36	0.027777778	36
User14	1	47	0.021276596	47
User15	1	39	0.025641026	39
User16	1	37	0.027027027	37
User17	1	48	0.020833333	48
User18	1	41	0.024390244	41
User19	1	53	0.018867925	53

User20	1	30	0.0333333333	30
User21	1	37	0.027027027	37
User22	1	45	0.022222222	45
User23	1	53	0.018867925	53
User24	1	36	0.027777778	36
User25	1	34	0.029411765	34
User26	1	44	0.022727273	44
User27	1	42	0.023809524	42
User28	1	31	0.032258065	31
User29	1	50	0.02	50
User30	1	35	0.028571429	35

(T3) Total of (N_{ij} / T_{ij}) for Task 3 = 0.759487919

Hence Time-Based Efficiency (TBE) for Task 3 = $T3/NR$

$$= 0.759487919 / 150$$

$$= 0.005063 \text{ goals/sec}$$

Overall Rate Efficiency ORE for Task 3 = $[\text{SUM}(N_{ij} * T_{ij}) / \text{SUM}(T_{ij})] * 100$

$$= (1220/1220) * 100 = 100\%$$

Calculation for Task 4

Username/Notation	N_{ij}	T_{ij}	N_{ij} / T_{ij}	$N_{ij} * T_{ij}$
User1	1	54	0.018518519	54
User2	1	62	0.016129032	62
User3	1	61	0.016393443	61
User4	1	45	0.022222222	45
User5	1	44	0.022727273	44
User6	1	47	0.021276596	47
User7	1	51	0.019607843	51
User8	1	56	0.017857143	56
User9	1	43	0.023255814	43
User10	1	66	0.015151515	66
User11	1	52	0.019230769	52
User12	1	59	0.016949153	59
User13	1	47	0.021276596	47
User14	1	43	0.023255814	43
User15	1	62	0.016129032	62
User16	1	53	0.018867925	53
User17	1	63	0.015873016	63
User18	1	44	0.022727273	44
User19	1	62	0.016129032	62

User20	1	44	0.022727273	44
User21	1	57	0.01754386	57
User22	1	59	0.016949153	59
User23	1	49	0.020408163	49
User24	1	51	0.019607843	51
User25	1	41	0.024390244	41
User26	1	47	0.021276596	47
User27	1	62	0.016129032	62
User28	1	66	0.015151515	66
User29	1	49	0.020408163	49
User30	1	52	0.019230769	52

(T4) Total of (N_{ij} / T_{ij}) for Task 4 = 0.577400619

Hence Time-Based Efficiency (TBE) for Task 4 = $T4/NR$

$$= 0.577400619 / 150$$

$$= 0.003849 \text{ goals/sec}$$

Overall Rate Efficiency ORE for Task 4 = $[\text{SUM}(N_{ij} * T_{ij}) / \text{SUM}(T_{ij})] * 100$

$$= (1591/1591) * 100 = 100\%$$

The calculation for Task 5

Username/Notation	N_{ij}	T_{ij}	N_{ij} / T_{ij}	$N_{ij} * T_{ij}$
User1	1	66	0.015151515	66
User2	1	83	0.012048193	83
User3	1	69	0.014492754	69
User4	1	82	0.012195122	82
User5	1	85	0.011764706	85
User6	1	76	0.013157895	76
User7	1	72	0.013888889	72
User8	1	65	0.015384615	65
User9	1	75	0.013333333	75
User10	1	77	0.012987013	77
User11	1	65	0.015384615	65
User12	1	87	0.011494253	87
User13	1	89	0.011235955	89
User14	1	66	0.015151515	66
User15	1	72	0.013888889	72
User16	1	71	0.014084507	71
User17	1	67	0.014925373	67
User18	1	87	0.011494253	87
User19	1	63	0.015873016	63

User20	1	84	0.011904762	84
User21	1	67	0.014925373	67
User22	1	87	0.011494253	87
User23	1	65	0.015384615	65
User24	1	66	0.015151515	66
User25	1	87	0.011494253	87
User26	1	62	0.016129032	62
User27	1	82	0.012195122	82
User28	1	93	0.010752688	93
User29	1	76	0.013157895	76
User30	1	87	0.011494253	87

(T5) Total of (N_{ij} / T_{ij}) for Task 5 = 0.402020172

Hence Time-Based Efficiency (TBE) for Task 5 = $T5/NR$

$$= 0.402020172 / 150$$

$$= 0.002680 \text{ goals/sec}$$

Overall Rate Efficiency ORE for Task 5 = $[\text{SUM} (N_{ij} * T_{ij}) / \text{SUM}(T_{ij})] * 100$

$$= (2273/2273) * 100 = 100\%$$

6.1 Discussions on the Usability Evaluation

Before starting the calculation, we need to know the NR value. N stands for total task numbers, which is 5, and R stands for participants number, 30. So, the NR value will be 5×30 , 150.

Time-Based Efficiency (TBE) is defined as time on task. This metric helps measure the user's time to complete the task or work speed.

The efficiency is the user effectiveness divided by the user time spent.

To get the time-based efficiency value, we must first find the total sum of (N_{ij} / T_{ij}) for that particular task by all 30 users. N_{ij} represents the result of the task by the user. If the user completes the task, then $N_{ij} = 1$; if not, then $N_{ij} = 0$. T_{ij} represents the time spent by the user to complete the task. If the task is not completed, time is measured until the user quits it. We need to divide that value with the NR value we found above 150.

The Overall Rate Efficiency(ORE) was measured through users who completed the task concerning all users' total time. The ORE for that task will be the sum of $(N_{ij} * T_{ij})$ divided by the sum of T_{ij} . Then it will be multiplied by 100.

For Task 1 to select and add books to the cart, the total sum of (N_{ij} / T_{ij}) is 0.576808339 divided by an NR value of 150. Hence the time based efficiency(TBE) value for task 1 is 0.003845 goals/sec. The Overall Rate Efficiency(ORE) is the sum of $(N_{ij} * T_{ij})$, which is 1660 divided by the sum of T_{ij} , which is 1660, then multiplied by 100 that gives a total of 100%.

For Task 2 of updating user information, the total sum of (N_{ij} / T_{ij}) is 0.936510482 divided by an NR value of 150. Hence the time based efficiency(TBE) value for task 2 is 0.006243 goals/sec. The Overall Rate Efficiency(ORE) is the sum of $(N_{ij} * T_{ij})$, which is 1028 divided by the sum of T_{ij} , which is 1028, then multiplied by 100 that gives 100%.

For Task 3 of order information in the car, the total sum of (N_{ij} / T_{ij}) is 0.759487919 divided by an NR value of 150. Hence the time based efficiency(TBE) value for task 3 is 0.005063 goals/sec. The Overall Rate Efficiency(ORE) is the sum of $(N_{ij} * T_{ij})$, which is 1220 divided by the sum of T_{ij} , 1220, then multiplied by 100 that gives a total of 100%.

For Task 4 of updating shipping information, the total sum of (N_{ij} / T_{ij}) is 0.577400619 divided by an NR value of 150. Hence the time based efficiency(TBE) value for task 4 is 0.003849 goals/sec. The Overall Rate Efficiency(ORE) is the sum of $(N_{ij} * T_{ij})$, which is 1591 divided by the sum of T_{ij} , 1591, then multiplied by 100 that gives a total of 100%.

For Task 5 of updating payment and billing information, the total sum of (N_{ij} / T_{ij}) is 0.402020172 divided by an NR value of 150. Hence the time based efficiency(TBE) value for task 5 is 0.002680 goals/sec. The Overall Rate Efficiency(ORE) is the sum of $(N_{ij} * T_{ij})$, which is 1591 divided by the sum of T_{ij} , 1591, then multiplied by 100 that gives a total of 100%.

6.2 Survey Data Analysis Result

A. Survey

To assess user experience by projected hypothesis, survey measures were planned and combined with a web prototype to get particular statistics. The concluding survey questionnaire comprised of 26 substances was distributed at the end of the second session to assess the influence of website design attributes on the user's trust and satisfaction with the established online bookstore prototype. The survey questions were based in English, and the scale measurement of the survey was like a seven-point Likert scale from 1 to 7. 1 referring to disagree strongly and seven referring to agree strongly.

B. Participant and Data Collection

For this study, data were collected from 30 Malaysian University undergraduate students aged 20-23 from Universiti Kebangsaan Malaysia (UKM). There are 17 male and 13 female students. They come from the Faculty of Information Technology. They have experience using Malaysian Online Bookstores such as MPH Online Bookstore and Kinokuniya Bookstore.

Each question in the questionnaire provided is related to the web attributes and relationship as follows:

Web Attributes	Question No	Construct and Items
Typography	Q1-Q3	TYP1-TYP3
Colour	Q4-Q5	CLR1-CLR2
Content Quality	Q6-Q8	CNT1-CNT3

Interactivity	Q9-Q13	INT1-INT5
Navigation	Q14-Q18	NAG1-NAG5
Satisfaction	Q19-Q22	SAT1-SAT4
Trust	Q23-Q24	TST1-TST2
Loyalty	Q25-Q26	LYL1-LYL2

C. Data Analysis

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded ^a	0	.0
	Total	30	100.0

Web attribute Item Statistics

	Mean	Std. Deviation	N
TYP1	6.5667	.67891	30
TYP2	6.6333	.66868	30
TYP3	6.8000	.40684	30
CLR1	6.9000	.40258	30
CLR2	6.8000	.55086	30
CNT1	6.7000	.59596	30
CNT2	6.8333	.37905	30
CNT3	6.7333	.58329	30
INT1	6.6667	.47946	30
INT2	6.4667	.57135	30
INT3	6.5000	.57235	30
INT4	6.5333	.62881	30
INT5	6.6667	.47946	30
NAG1	6.5667	.62606	30
NAG2	6.6333	.55605	30
NAG3	6.4333	1.00630	30
NAG4	6.4000	.62146	30
NAG5	6.8000	.40684	30
SAT1	6.7000	.53498	30
SAT2	6.7000	.59596	30
SAT3	6.8000	.40684	30

SAT4	6.5000	.68229	30
TST1	6.8000	.48423	30
TST2	6.6000	.56324	30
LYL1	6.5667	.56832	30
LYL2	6.7000	.53498	30

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	6.654	6.400	6.900	.500	1.078	.018	26

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
173.0000	9.862	3.14039	26

H1: Typography->Satisfaction Correlations

		TYP1	TYP2	TYP3	SAT1	SAT2	SAT3	SAT4
TYP1	Pearson Correlation	1	-.058	.175	.104	.094	.050	-.037
	Sig. (2-tailed)		.760	.356	.583	.622	.793	.845
	N	30	30	30	30	30	30	30
TYP2	Pearson Correlation	-.058	1	-.025	.067	-.026	-.025	.189
	Sig. (2-tailed)	.760		.894	.723	.892	.894	.317
	N	30	30	30	30	30	30	30
TYP3	Pearson Correlation	.175	-.025	1	.032	.313	-.250	-.248
	Sig. (2-tailed)	.356	.894		.868	.092	.183	.186
	N	30	30	30	30	30	30	30
SAT1	Pearson Correlation	.104	.067	.032	1	.249	.190	-.047
	Sig. (2-tailed)	.583	.723	.868		.185	.314	.804
	N	30	30	30	30	30	30	30
SAT2	Pearson Correlation	.094	-.026	.313	.249	1	.171	-.212
	Sig. (2-tailed)	.622	.892	.092	.185		.367	.261
	N	30	30	30	30	30	30	30
SAT3	Pearson Correlation	.050	-.025	-.250	.190	.171	1	.000
	Sig. (2-tailed)	.793	.894	.183	.314	.367		1.000
	N	30	30	30	30	30	30	30
SAT4	Pearson Correlation	-.037	.189	-.248	-.047	-.212	.000	1
	Sig. (2-tailed)	.845	.317	.186	.804	.261	1.000	
	N	30	30	30	30	30	30	30

H2: Typography->Trust Correlations

		TYP1	TYP2	TYP3	TST1	TST2
TYP1	Pearson Correlation	1	-.058	.175	-.168	.072
	Sig. (2-tailed)		.760	.356	.375	.705
	N	30	30	30	30	30
TYP2	Pearson Correlation	-.058	1	-.025	.085	-.220
	Sig. (2-tailed)	.760		.894	.654	.243
	N	30	30	30	30	30
TYP3	Pearson Correlation	.175	-.025	1	.315	.241
	Sig. (2-tailed)	.356	.894		.090	.200
	N	30	30	30	30	30
TST1	Pearson Correlation	-.168	.085	.315	1	.076
	Sig. (2-tailed)	.375	.654	.090		.690
	N	30	30	30	30	30
TST2	Pearson Correlation	.072	-.220	.241	.076	1
	Sig. (2-tailed)	.705	.243	.200	.690	
	N	30	30	30	30	30

H3: Colour->Satisfaction Correlations

		CLR1	CLR2	SAT1	SAT2	SAT3	SAT4
CLR1	Pearson Correlation	1	-.093	.496**	-.129	-.126	-.188
	Sig. (2-tailed)		.624	.005	.496	.506	.319
	N	30	30	30	30	30	30
CLR2	Pearson Correlation	-.093	1	-.094	.021	-.185	.000
	Sig. (2-tailed)	.624		.623	.912	.329	1.000
	N	30	30	30	30	30	30
SAT1	Pearson Correlation	.496**	-.094	1	.249	.190	-.047
	Sig. (2-tailed)	.005	.623		.185	.314	.804
	N	30	30	30	30	30	30
SAT2	Pearson Correlation	-.129	.021	.249	1	.171	-.212
	Sig. (2-tailed)	.496	.912	.185		.367	.261
	N	30	30	30	30	30	30
SAT3	Pearson Correlation	-.126	-.185	.190	.171	1	.000
	Sig. (2-tailed)	.506	.329	.314	.367		1.000
	N	30	30	30	30	30	30
SAT4	Pearson Correlation	-.188	.000	-.047	-.212	.000	1
	Sig. (2-tailed)	.319	1.000	.804	.261	1.000	
	N	30	30	30	30	30	30

H4: Colour ->Trust Correlations

		CLR1	CLR2	TST1	TST2
CLR1	Pearson Correlation	1	-.093	-.106	.122
	Sig. (2-tailed)		.624	.577	.522
	N	30	30	30	30
CLR2	Pearson Correlation	-.093	1	.103	.067
	Sig. (2-tailed)	.624		.587	.726
	N	30	30	30	30
TST1	Pearson Correlation	-.106	.103	1	.076
	Sig. (2-tailed)	.577	.587		.690
	N	30	30	30	30
TST2	Pearson Correlation	.122	.067	.076	1
	Sig. (2-tailed)	.522	.726	.690	
	N	30	30	30	30

H5: Content Quality->Satisfaction Correlations

		CNT1	CNT2	CNT3	SAT1	SAT2	SAT3	SAT4
CNT1	Pearson Correlation	1	.382*	-.139	-.184	-.068	-.114	-.042
	Sig. (2-tailed)		.037	.464	.331	.721	.549	.824
	N	30	30	30	30	30	30	30
CNT2	Pearson Correlation	.382*	1	.104	-.255	-.076	-.224	.067
	Sig. (2-tailed)	.037		.585	.174	.689	.235	.726
	N	30	30	30	30	30	30	30
CNT3	Pearson Correlation	-.139	.104	1	.066	-.040	-.087	.520**
	Sig. (2-tailed)	.464	.585		.728	.835	.647	.003
	N	30	30	30	30	30	30	30
SAT1	Pearson Correlation	-.184	-.255	.066	1	.249	.190	-.047
	Sig. (2-tailed)	.331	.174	.728		.185	.314	.804
	N	30	30	30	30	30	30	30
SAT2	Pearson Correlation	-.068	-.076	-.040	.249	1	.171	-.212
	Sig. (2-tailed)	.721	.689	.835	.185		.367	.261
	N	30	30	30	30	30	30	30
SAT3	Pearson Correlation	-.114	-.224	-.087	.190	.171	1	.000
	Sig. (2-tailed)	.549	.235	.647	.314	.367		1.000
	N	30	30	30	30	30	30	30
SAT4	Pearson Correlation	-.042	.067	.520**	-.047	-.212	.000	1
	Sig. (2-tailed)	.824	.726	.003	.804	.261	1.000	
	N	30	30	30	30	30	30	30

H6: Content Quality ->Trust Correlations

		CNT1	CNT2	CNT3	TST1	TST2
CNT1	Pearson Correlation	1	.382*	-.139	.024	.349
	Sig. (2-tailed)		.037	.464	.900	.059
	N	30	30	30	30	30
CNT2	Pearson Correlation	.382*	1	.104	.376*	.162
	Sig. (2-tailed)	.037		.585	.041	.394
	N	30	30	30	30	30
CNT3	Pearson Correlation	-.139	.104	1	.415*	.189
	Sig. (2-tailed)	.464	.585		.023	.317
	N	30	30	30	30	30
TST1	Pearson Correlation	.024	.376*	.415*	1	.076
	Sig. (2-tailed)	.900	.041	.023		.690
	N	30	30	30	30	30
TST2	Pearson Correlation	.349	.162	.189	.076	1
	Sig. (2-tailed)	.059	.394	.317	.690	
	N	30	30	30	30	30

H7: Interactivity->Satisfaction Correlations

		INT1	INT2	INT3	INT4	INT5	SAT1	SAT2	SAT3	SAT4
INT1	Pearson Correlation	1	-.294	.000	.152	.100	.000	-.121	.177	.000
	Sig. (2-tailed)		.115	1.000	.421	.599	1.000	.525	.350	1.000
	N	30	30	30	30	30	30	30	30	30
INT2	Pearson Correlation	-.294	1	.211	-.045	-.042	-.316	.223	-.178	-.088
	Sig. (2-tailed)	.115		.263	.814	.826	.089	.237	.347	.642
	N	30	30	30	30	30	30	30	30	30
INT3	Pearson Correlation	.000	.211	1	-.192	-.251	-.394*	-.152	-.148	.132
	Sig. (2-tailed)	1.000	.263		.310	.180	.031	.424	.435	.485
	N	30	30	30	30	30	30	30	30	30
INT4	Pearson Correlation	.152	-.045	-.192	1	-.191	-.123	.074	-.243	.080
	Sig. (2-tailed)	.421	.814	.310		.313	.517	.699	.196	.673
	N	30	30	30	30	30	30	30	30	30
INT5	Pearson Correlation	.100	-.042	-.251	-.191	1	.403*	.362*	.177	-.316
	Sig. (2-tailed)	.599	.826	.180	.313		.027	.049	.350	.089
	N	30	30	30	30	30	30	30	30	30
SAT1	Pearson Correlation	.000	-.316	-.394*	-.123	.403*	1	.249	.190	-.047
	Sig. (2-tailed)	1.000	.089	.031	.517	.027		.185	.314	.804

N		30	30	30	30	30	30	30	30	30
SAT2	Pearson Correlation	-.121	.223	-.152	.074	.362*	.249	1	.171	-.212
	Sig. (2-tailed)	.525	.237	.424	.699	.049	.185		.367	.261
N		30	30	30	30	30	30	30	30	30
SAT3	Pearson Correlation	.177	-.178	-.148	-.243	.177	.190	.171	1	.000
	Sig. (2-tailed)	.350	.347	.435	.196	.350	.314	.367		1.000
N		30	30	30	30	30	30	30	30	30
SAT4	Pearson Correlation	.000	-.088	.132	.080	-.316	-.047	-.212	.000	1
	Sig. (2-tailed)	1.000	.642	.485	.673	.089	.804	.261	1.000	
N		30	30	30	30	30	30	30	30	30

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H8: Interactivity ->Trust Correlations

		INT1	INT2	INT3	INT4	INT5	TST1	TST2
INT1	Pearson Correlation	1	-.294	.000	.152	.100	-.297	-.128
	Sig. (2-tailed)		.115	1.000	.421	.599	.111	.501
	N	30	30	30	30	30	30	30
INT2	Pearson Correlation	-.294	1	.211	-.045	-.042	.100	-.043
	Sig. (2-tailed)	.115		.263	.814	.826	.600	.822
	N	30	30	30	30	30	30	30
INT3	Pearson Correlation	.000	.211	1	-.192	-.251	-.124	-.107
	Sig. (2-tailed)	1.000	.263		.310	.180	.512	.574
	N	30	30	30	30	30	30	30
INT4	Pearson Correlation	.152	-.045	-.192	1	-.191	.249	.428*
	Sig. (2-tailed)	.421	.814	.310		.313	.184	.018
	N	30	30	30	30	30	30	30
INT5	Pearson Correlation	.100	-.042	-.251	-.191	1	-.149	.000
	Sig. (2-tailed)	.599	.826	.180	.313		.433	1.000
	N	30	30	30	30	30	30	30
TST1	Pearson Correlation	-.297	.100	-.124	.249	-.149	1	.076
	Sig. (2-tailed)	.111	.600	.512	.184	.433		.690
	N	30	30	30	30	30	30	30
TST2	Pearson Correlation	-.128	-.043	-.107	.428*	.000	.076	1
	Sig. (2-tailed)	.501	.822	.574	.018	1.000	.690	
	N	30	30	30	30	30	30	30

H9: Navigation->Satisfaction Correlations

		NAG1	NAG2	NAG3	NAG4	NAG5	SAT1	SAT2	SAT3	SAT4
NAG1	Pearson Correlation	1	.320	-.020	-.160	.190	.113	-.268	-.217	.202
	Sig. (2-tailed)		.084	.916	.400	.316	.551	.152	.250	.285
	N	30	30	30	30	30	30	30	30	30
NAG2	Pearson Correlation	.320	1	-.261	-.060	.427*	.197	.177	.274	-.045
	Sig. (2-tailed)	.084		.164	.753	.019	.297	.350	.142	.812
	N	30	30	30	30	30	30	30	30	30
NAG3	Pearson Correlation	-.020	-.261	1	-.232	-.034	.186	-.121	.303	-.025
	Sig. (2-tailed)	.916	.164		.218	.860	.326	.525	.103	.895
	N	30	30	30	30	30	30	30	30	30
NAG4	Pearson Correlation	-.160	-.060	-.232	1	.055	-.041	.335	-.082	-.244
	Sig. (2-tailed)	.400	.753	.218		.775	.828	.070	.667	.194
	N	30	30	30	30	30	30	30	30	30
NAG5	Pearson Correlation	.190	.427*	-.034	.055	1	.507**	.313	-.042	.000
	Sig. (2-tailed)	.316	.019	.860	.775		.004	.092	.827	1.000
	N	30	30	30	30	30	30	30	30	30
SAT1	Pearson Correlation	.113	.197	.186	-.041	.507**	1	.249	.190	-.047
	Sig. (2-tailed)	.551	.297	.326	.828	.004		.185	.314	.804
	N	30	30	30	30	30	30	30	30	30
SAT2	Pearson Correlation	-.268	.177	-.121	.335	.313	.249	1	.171	-.212
	Sig. (2-tailed)	.152	.350	.525	.070	.092	.185		.367	.261
	N	30	30	30	30	30	30	30	30	30
SAT3	Pearson Correlation	-.217	.274	.303	-.082	-.042	.190	.171	1	.000
	Sig. (2-tailed)	.250	.142	.103	.667	.827	.314	.367		1.000
	N	30	30	30	30	30	30	30	30	30
SAT4	Pearson Correlation	.202	-.045	-.025	-.244	.000	-.047	-.212	.000	1
	Sig. (2-tailed)	.285	.812	.895	.194	1.000	.804	.261	1.000	
	N	30	30	30	30	30	30	30	30	30

H10: Navigation ->Trust Correlations

		NAG1	NAG2	NAG3	NAG4	NAG5	TST1	TST2
NAG1	Pearson Correlation	1	.320	-.020	-.160	.190	.273	.176
	Sig. (2-tailed)		.084	.916	.400	.316	.144	.352
	N	30	30	30	30	30	30	30
NAG2	Pearson Correlation	.320	1	-.261	-.060	.427*	.102	-.044
	Sig. (2-tailed)	.084		.164	.753	.019	.590	.817
	N	30	30	30	30	30	30	30
NAG3	Pearson Correlation	-.020	-.261	1	-.232	-.034	-.099	.012
	Sig. (2-tailed)	.916	.164		.218	.860	.602	.949
	N	30	30	30	30	30	30	30
NAG4	Pearson Correlation	-.160	-.060	-.232	1	.055	-.069	-.118
	Sig. (2-tailed)	.400	.753	.218		.775	.718	.534
	N	30	30	30	30	30	30	30
NAG5	Pearson Correlation	.190	.427*	-.034	.055	1	.315	.241
	Sig. (2-tailed)	.316	.019	.860	.775		.090	.200
	N	30	30	30	30	30	30	30
TST1	Pearson Correlation	.273	.102	-.099	-.069	.315	1	.076
	Sig. (2-tailed)	.144	.590	.602	.718	.090		.690
	N	30	30	30	30	30	30	30
TST2	Pearson Correlation	.176	-.044	.012	-.118	.241	.076	1
	Sig. (2-tailed)	.352	.817	.949	.534	.200	.690	
	N	30	30	30	30	30	30	30

H11: Satisfaction->Loyalty Correlations

		SAT1	SAT2	SAT3	SAT4	LYL1	LYL2
SAT1	Pearson Correlation	1	.249	.190	-.047	.011	.036
	Sig. (2-tailed)		.185	.314	.804	.953	.850
	N	30	30	30	30	30	30
SAT2	Pearson Correlation	.249	1	.171	-.212	.214	-.076
	Sig. (2-tailed)	.185		.367	.261	.257	.691
	N	30	30	30	30	30	30
SAT3	Pearson Correlation	.190	.171	1	.000	.209	-.285
	Sig. (2-tailed)	.314	.367		1.000	.268	.127
	N	30	30	30	30	30	30
SAT4	Pearson Correlation	-.047	-.212	.000	1	-.044	.047
	Sig. (2-tailed)	.804	.261	1.000		.816	.804
	N	30	30	30	30	30	30
LYL1	Pearson Correlation	.011	.214	.209	-.044	1	.011
	Sig. (2-tailed)	.953	.257	.268	.816		.953
	N	30	30	30	30	30	30
LYL2	Pearson Correlation	.036	-.076	-.285	.047	.011	1
	Sig. (2-tailed)	.850	.691	.127	.804	.953	
	N	30	30	30	30	30	30

H12: Trust->Loyalty Correlations

		TST1	TST2	LYL1	LYL2
TST1	Pearson Correlation	1	.076	-.075	-.240
	Sig. (2-tailed)		.690	.693	.202
	N	30	30	30	30
TST2	Pearson Correlation	.076	1	-.022	-.069
	Sig. (2-tailed)	.690		.910	.718
	N	30	30	30	30
LYL1	Pearson Correlation	-.075	-.022	1	.011
	Sig. (2-tailed)	.693	.910		.953
	N	30	30	30	30
LYL2	Pearson Correlation	-.240	-.069	.011	1
	Sig. (2-tailed)	.202	.718	.953	
	N	30	30	30	30

6.3 Discussions on Survey Data Analysis Result

The correlations of the above can be summarized as below:

Path	Pearson Correlation Sig. maximum value
H1: Typography->Satisfaction	0.892
H2: Typography->Trust	0.705
H3: Colour->Satisfaction	1.000
H4: Colour ->Trust	0.726
H5: Content Quality->Satisfaction	0.835
H6: Content Quality ->Trust	0.900
H7: Interactivity->Satisfaction	1.000
H8: Interactivity ->Trust	1.000
H9: Navigation->Satisfaction	1.000
H10: Navigation ->Trust	0.949
H11: Satisfaction->Loyalty	0.953
H12: Trust->Loyalty	0.910

Pearson's correlation coefficient is the test statistics that calculate the statistical relationship between two continuous variables, or association. Since it is based on the covariance principle, it is the best method of calculating the relation between interest variables. It provides data on the extent of the relationship's interaction, correlation, and direction. We have calculated the statistical relationship between two variables from each hypothesis formed for our research. If the value is near ± 1 , then it said to be a perfect correlation, as one variable increases, the other variable tends to increase (if positive) or decrease (if negative). As we can see, all of the value is near +1, so we need to find which two variable of hypothesis have a stronger relationship than others. The result provides

backing for the study guideline (Figure 1). The result exposed user satisfaction, and trust is highly influenced by website design attributes, promoting Malaysian university students' loyalty. Nevertheless, both satisfaction and trust in this research impact loyalty and loyalty and satisfaction greater than loyalty and trust. Therefore, the designs' data arrangements and features should be satisfying when considering designing for Malaysian University students. The current research's implemented design attributes show a supportive connection with satisfaction and trust.

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CHAPTER 7: CONCLUSION

7.0 Introduction

All the previous research related to web site designs and Malaysians' preferences on the website was collected, analyzed, and evaluated for this work. Based on the data collection, (Faisal et al., 2017) have extracted and categorized according to the main relationship related to the studies: trust, loyalty, and satisfaction. We then try to filter our and analyze according to Malaysian culture research. As per the evaluation, we found that trust, satisfaction, and loyalty had most Malaysians' dependencies. Hence, we followed the same way (Faisal et al., 2017) related those relationships with the five features of web design attributes but focus on Malaysian cultures. Faisal selected the five attributes as it was recommended by research municipal (For example, (Cyr & Head, 2013), (Palmer, 2002), (Marcus & Gould, 2000), (McCracken & Wolfe, 2004), (Wang & Senecal, 2007)) which is Typography, Colour, Content, Interactivity, and Navigation. As the end product of this research, we have developed an online book store (Ranjen Online Bookstore), which builds trust, satisfaction, and loyalty for Malaysian University students based on their user interface preferences based on the five design attributes mentioned above. The system was tested with 30 students, with results evaluated above by calculating each user's five major tasks' duration. The following research questions shown earlier has been answered with the result provided as following:

1. All the five web design attributes (typography, colour, interactivity, navigation, and content quality) were detected at a convincing measure for Malaysian University student's preference
2. Interactivity, navigation, and content quality are a high influence in creating user trust with the web. In Colour, Interactivity and navigation were known to influence Malaysian university students' satisfaction.

3. The simple bookstore website prototype developed in this study can be used as a guideline for Malaysian university students' web preferences.
4. Influence of satisfaction on loyalty having greater importance than the influence of trust on loyalty for web attributes among Malaysian University students

The result proved that the developed system would fit this research's purpose to identify website design attributes to establish satisfaction, loyalty, and trust for Malaysian University students.

7.1 Research Strength

As the strengths of this research can be used as a reference for bookstore web design preferences of Malaysian University students because there is currently very little researches about Malaysian University students. It is hard to identify their cultural values and build relationships with them via design. This Ranjen Bookstore system also does not have any platform compatibility issues as the user interface caters to both mobile and desktop applications. Hence, the system can be easily tested from the user's hand. This system has also been deployed in the Amazon cloud server, which will not have any problem with availability and scalability. The system can adapt the size regardless of the workload and will not face any performance issues when tested.

7.2 Research Constraints

Very few research articles that can be found for Malaysian University students in term of bookstore web design or user interface perspective. Most of the bookstore web design research does not focus on Malaysia's country or culture specifically, where most of it was for very general participants.

7.3 Research Limitations

There are a few limitations to this research. There were only a few user interfaces, and only five main web attributes were discussed in this research. The sample study used for this research was around 30 University students. It is limited within the age range of 20-24; more the survey results were based on only University students and did not account for students of other ages. This research's results were mainly based on trust, satisfaction, and loyalty relationships between the users and the web attributes.

7.4 Future work

Future work would be beneficial if more research were carried out to understand Malaysian University students' preferences on web site structure or design in depth by providing more examples. This research should also be tested with a wider audience by increasing the participant's number and different age groups. It will also help if more research is carried out for different relationships than above for Malaysian University students, such as empathy, security, etc. More research should be carried out for other attributes than the five attributes tested in this research.

7.5 Summary

To summarize, this study has helped identify the purpose of the bookstore web design attributes in meeting the satisfaction, loyalty, and trust relationship among website and Malaysian University students. The web site design attributes of the Malaysian University student's user preferences have been identified. The Importance of the website designs' attributes to establish user loyalty, satisfaction, and trust of Malaysian University students has been evaluated and analyzed.

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