Development of E-Commerce Website with Analytics

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ABSTRACT

E-commerce has been taken by many businesses and enterprises as an important means to improve the core competitiveness of enterprises. As an important component of e-commerce, online shopping system has become a hot topic of research and application. This paper discusses the basic concepts of e-commerce and online shopping system, analyzes the research status and development trends at home and abroad, and studies the implementation methods and technologies of online shopping system. On this basis, the theoretical knowledge and development technology used in the realization process of the system, completed the development of online shopping system. The development of online shopping system follows the software engineering process, which has gone through system requirement analysis, overall design, detailed design, coding, and testing. The feasibility and system demand of online shopping system are analyzed emphatically. The database architecture, system architecture model, and system functions are properly designed. From the basic contents of the database, the system developed, and the online shopping system based on JSP which includes member login and registration module, online member management module, online commodity sales module, and online backstage management module is logically thought of. Among them, the online commodity sales module is the main foundation to achieve the warehouse of commodity management, and the management of the member's shopping cart to achieve a system's series of functions. The system test shows that the system based on JSP has better speed, better security, and has a strong practicability, Thus, the system has complete functions, user-friendly interface, convenient and simple to use, save operating costs and greatly reduce the workload of operators.

Key words: E-commerce; Shopping system; Database management, WEB application

1. INTRODUCTION

In the current stage of information society, the application of high-end technologies such as computers, the Internet, and satellites has promoted the integration of information in social media, and the audience's demand for information has also changed from passive acceptance to information acceptance. The society urgently needs a form that does not only reflect the current form of information dissemination, but also adapts to the development of the new generation of social dissemination methods and the rise of the "fourth media".

The network media does not only realize truly personalized communication services, but also make communication possible. Faced with massive information, people's attention is extremely distracted. Hence, the audience's choice becomes the main concern and more valuable

E-commerce is a brand-new business transaction model that appeared in Europe and the United States in the early 1990s realized to be paperless, efficient, and automated transactions. It represents the most attractive place in the network, the rapid exchange of information and geographic boundaries. This ambiguity will undoubtedly promote the transformation of traditional business practices in the Internet era. With the development of E-commerce, especially the development of online shopping, the focus of commodity circulation infrastructure and supporting industries will have many influences on commodity circulation and overall economic development which is worthy of serious study especially under the international background of global economic integration.

Online shopping is a commercial information system with interactive functions. It provides users with static and dynamic information resources. The online shopping system has powerful interactive functions, enabling merchants and users to conveniently transmit information and complete electronic transactions or EDI transactions. This new transaction method can realize the paperless exchange of documents and funds between companies.

The value of e-commerce is that it allows consumers to shop and pay online through the Internet, saving time and space for customers and businesses, and greatly improving transaction efficiency. Especially for busy office workers, this also saves them a lot of precious time. In the 21st century, with the diversification of consumer information, consumers have

become accustomed to enjoying on-site shopping at home through online channels.

The new fashion e-commerce company was formerly known as the new fashion clothing company. In 1997, the company used to be a small clothing workshop with only 20 sewing machines and more than 40 employees. The new fashion clothing company was formally registered in August 2000 and launched its own brand. The company withdrew from the wholesale market and entered the chain operation by franchising. In July 2003, it was rated as the "apparel industry development company" in the region. From 2001 to 2003, it was awarded for 3 consecutive years. The ten most popular local leisure brands for consumers, the company has entered a new stage of development.

In 2008, with the rise of e-commerce, online shopping became the main consumption mode of people. The prevalence of online shopping platforms has had a huge impact on the company, and sales have gradually declined.

In 2012, platforms such as e-commerce have gradually been accepted by more and more traditional clothing industries, and the foreign trade clothing industry has also begun to embark on e-commerce platforms and begin their own industry's online development path. However, due to its own conditions, the new fashion e-commerce company at that time did not enter the e-commerce market, which caused considerable difficulties in business operations.

Zhao xiaoyan (2017) writes that since the 1990s, e-commerce has promoted economic globalization and gave birth to a new economy. As a new networked economic activity, e-commerce has become an effective means to gain the advantages of global resource allocation and enhance economic competitiveness, making it an important indicator for evaluating the country's economic development level and sustainable development capabilities.

The goal of this research is to develop an E-commerce website with analytical functions. The analysis functions mainly include management and analysis of orders, analysis of the order's mathematics, amount, source, and others; analysis of hot-selling products, analysis of which products are best-selling, and which are the most popular, and others. It realizes the electronic and digitization of the business process of the new fashion e-commerce company. On the one hand, it replaces physical logistics with electronic flow, which can greatly reduce manpower and material resources and reduce costs; on the other hand, it breaks through the limitations of time and space, making transaction activities possible. It can be carried out at any time and any place, which greatly improves efficiency.
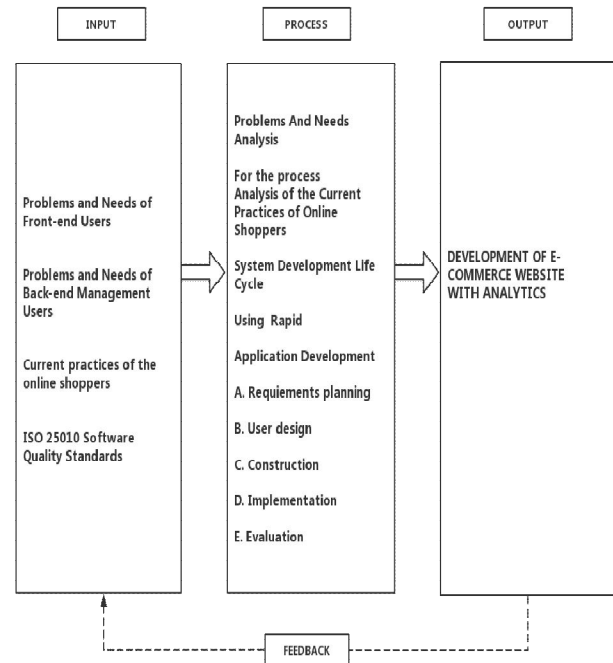
2. CONCEPTUAL FRAMEWORK

Figure 1: Paradigm of the Study

Figure 1 presents the paradigm of this research. The said paradigm illustrates the input-process-output of the study. It shows the different inputs and processes to achieve the desired output of the study.

The input to this study includes the problems and needs of the front-end users and background management, the datasets of products or items and ISO 25010 Software Quality Standards which serves as an input evaluation tool during the assessment of the system product quality satisfaction of users in terms of the following characteristics: functional suitability; performance efficiency; compatibility; usability; reliability and reliability; maintainability and portability.

The process of conducting the study consists of the following: analysis of the problems and needs of the end-users and system development using Rapid Application Development.

The output of this study is acutover and adoption of ecommerce website/ online shopping platform for small enterprise owners.

3. STATEMENT OF THE PROBLEM

This study considered online shopping malls as the research object, and based on the development trend of e-commerce, its purpose is to design, develop, and evaluate an online shopping system.

Specifically, it answered the following questions:

What are the problems and needs of front-endusers of online shopping applications in terms of:

Accessibility
Accuracy
Security

What are the current practices of online shoppers?

What e-commerce/online shopping platform can be developed to address problems and needs of front-end users?

What is the extent of compliance of the developed applications to ISO 25010 Software Quality Standards in terms of:

Functional Suitability
Performance Efficiency
Compatibility
Usability
Reliability
Security
Maintainability
Portability

What enhancement can be done to improve the developed system?

4.RESEARCH DESIGN

This research made use of rapid application development for the development of the E-commerce Website with Analytics. Descriptive method was also used for the evaluation of the developed system based on ISO standards.
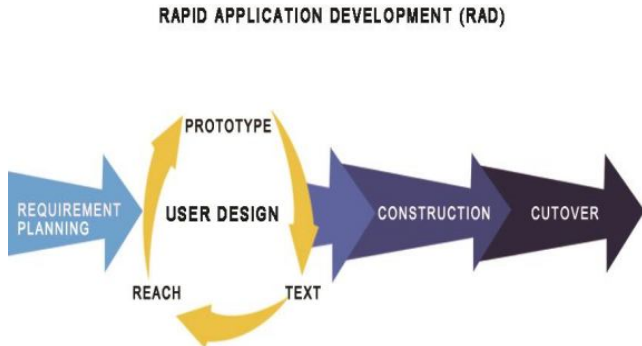

Figure 2: Rapid Application Development (RAD) Model

Figure 2 illustrates the RAD model as software development methodology that the researcher utilized. The following are phases of development:

Requirement Planning

The researcher gathered relevant data by conducting interview with the participants of the study on the problems and current practices on the use of online shopping platform. After conducting the interview, the researcher analyzed the data gathered and determined other related data, hardware, and software needed for the next phase.

User Design

The researcher used the data gathered for the design of the ecommerce website. The structure of user design was through numerous prototype iterations. During this phase, the researcher worked with the participants of the study to ensure that appropriate needs of the user and business owners were met. The participants can give comments/feedback for the improvement of the user design. They can also participate and witness the testing of numerous prototypes and monitors its progress. This phase allowed the researcher to refine the system until it has reached a satisfactory design and performance.

Construction

This phase considered the prototypes and beta programs from the previous phase that have been further developed into the working system. The researcher was expected to construct the system because most of the problems and changes would be addressed during the thorough iterative design phase.

Cutover

This is the cutover phase, where the finished product will be launched. This included system integration, testing, and changeover or parallel system cut over, as well as an end-user demonstration.
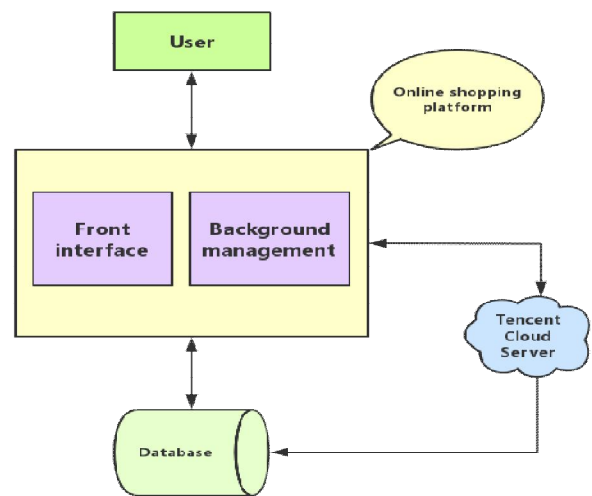
5. SYSTEM ARCHITECTURE

Figure 3: System architecture diagram

Figure 3 presents the system architecture diagram. Users can enter the front desk to browse and purchase products and participate in activities in the platform. Merchants can manage products and user data through the backend. The entire shopping platform is divided into two parts, the front desk, and the back desk.

According to the requirements of system functions, the online shopping system is divided into front-end management and

back-end management. Front end management includes functions such as browsing products, querying products, ordering products, shoppingcarts, and maintaining user information. The   E-Commerce Website includes modules such as announcement management, merchandise management, order management, complaint management, and user management.

6. PARTICIPANTS OF THE STUDY

The researcher gathered information for this research from the following officials and personnel in conducting the interview, observation, and data gathering.

Table 1： Frequency Distribution of Participants

Participants	Number of Participants	Description
Customers	10	As the proponent of program development
Business Owners	5	As the operator of the system
IT Expert	10	As the system evaluators

7. INSTRYMENTATION

This study utilized interview to gather information on the current practices and problems encountered by the business owners and customers on the traditional method of shopping and online shopping and assessed the compliance of the developed application to the ISO/IEC 25010:2011.

Questionnaire. The questionnaire was used by the IT experts to evaluate the extent compliance with ISO/IEC 25010 standards

Interview guide. The researcher interviewed the business owners and customers regarding their current practices to incident monitoring assessment, problems encountered, and the possible IT solutions that was developed to address the problems encountered.

8. DATAGATHERING PROCEDURE

In gathering the data for this study, the researcher went through the following procedures:

A.   The researcher obtained clearance from the Ethics Review Committee of St. Paul University Philippines to ensure the ethical soundness of the research.

B.   The researcher obtained endorsement from the Thesis Adviser and the Dean of the Graduate School for data gathering.

C.   The researcher conducted an interview with business owners and customers with their current practices and about the problems encountered by them.

D.   From the interview responses, the researcher developed the system suited for the business.

9. RESULTS AND DISCUSSION

10.1 Problems and Needs of the Front-end Users.

The problems encountered by the users on online shopping applications in terms of *accessibility* are as follows: Limited Internet connectivity; High-end specification of gadget; and environment restrictions users access the content of shopping website. Whereas the *needs* encountered by the users on said website in terms of *accessibility* are as follows: User Interface Aesthetics; Accessible anywhere, anytime, everywhere; The online shopping website must be easy to use and understand; Pursue a convenient consumption process; Personalized user needs; Differences in user needs; Price is still a key need for users to shop online; and User needs to choose goods.

The problem*s* encountered by the users on online shopping applications in terms of *accuracy* are the following: Reliability and accuracy of the product or item ordered; The worry of using existing ecommerce website is existing to its reliable, and trustworthy; and the payment methods are not trustworthy. On the other hand, the needs encountered by the users on online shopping applications in terms of *accuracy* are Product information disclosure; Open multiple payment methods; Open cash on delivery service; and User Error Protection.

The problems encountered by the users on online shopping applications in terms of *security*are User information data security, and Security of payment methods. While the needs encountered by the users on online shopping applications in terms of *security*are Confidentiality of data; System permissions; The non-repudiation of the system; and System accountability.

10.2 Current Practices of Online Shoppers

Users choose e-commerce sites for shopping according to their needs or expectations. The user browses the website and selects the item/product to purchase. The user creates an account on the selected e-commerce website, and after successful registration, clicks on the selected product according to his needs and submits the shopping cart and settle the cost of the shopping cart, and then waits for the merchant to deliver the goods. After receiving the goods and passing the inspection, he can return to the e-commerce website to evaluate the goods and the merchant and realize the final shopping process.

10.3 The Developed E-Commerce Online Shopping System

The developed system in this study is an online shopping system with analytical functions. The main analytical functions include order management and analysis, analysis of the order's mathematics, amount, source, etc.; analysis of hot-selling products, and analysis of which products are best-selling, and which products are most popular, etc.
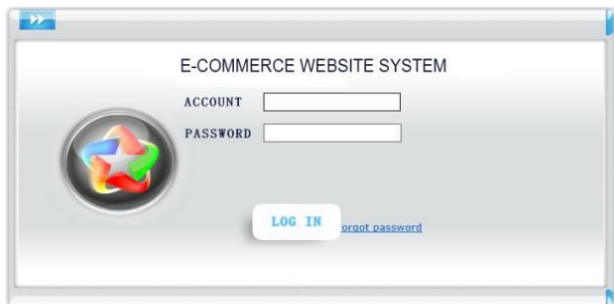
10. BACK-ENDMANAGEMENT PAGE DISPLAY

Figure 4: Administrator Login Diagram

Figure 4 displays the back-end management system which includes user management module, product category management module, product management module, store information management module, order and statistics management module, advertisement management module, message management module, etc.

Figure 5: Display of Back-End Category Management Page

Figure 5 refers to the background category management page. On the category management module page, there are three functions: the first is to add a new category ADD CATEGORY; the second is to edit and change categories; and the third is to delete categories.
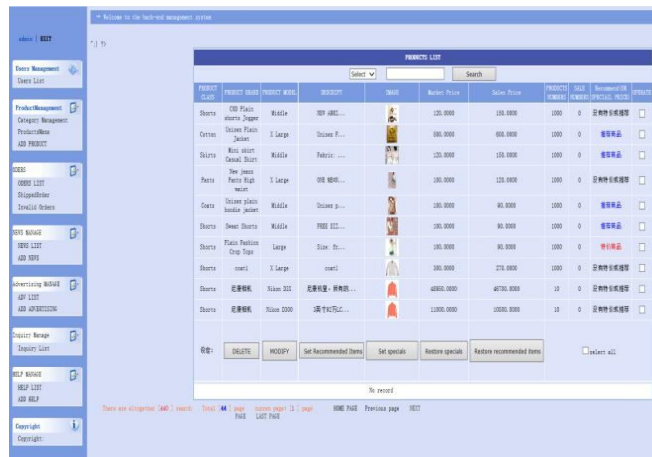

Figure 6: Background Product List Diagram

Figure 6 presents the background product list page. On the back-end product list page, users can select products for batch operations.

Figure 7: Sales Volume Analysis Function

Figure 7 shows the product sales volume analysis function. Sales statistics are mainly based on product types, product names, market prices, product unit prices, and total sales prices. Through sales statistics, it is possible to analyze the sales of a certain type of product or a certain product, ascertain the degree of sales of the product, and prepare for further product recommendation. Through the analysis of the sales volume, users can further combine the user's sales situation to judge the user's buying behavior, consumption habits, and convert the data analysis results into an operational customer management strategy to reach more customers in the best way to achieve sales revenue growth.

Figure 8: Home Page Display

Figure 8 presents the homepage display. The homepage mainly displays all kinds of clothes and information introduction to the store. The left column is the information introduction of the store which is used to introduce the advertisement of the store.

11. ONLINE SHOPPING SYSTEM EXTENT OF COMPLIANCE WITHISO/IEC25010 CRITERIA

The developed system was evaluated using the different attributes such as functional applicability, performance efficiency, compatibility, usability, reliability, safety, maintainability, and portability which were generally all assessed as compliant with ISO required standards to a "Very Great Extent".

12. ENHANCEMENTTHATCANBE DONETO IMPROVE THE DEVELOPED SYSTEM

The online shopping system developed in this research may cause information leakage during the transaction process. This is a security problem faced by many systems. It is mainly manifested in two aspects: the content of the transaction between the two parties is stolen by the third party where party provided by the transaction. The file used by the other party was used illegally by a third party. If the account number and username of the credit card are learned, they may be stolen. Hence, it is recommended to enhance business integrity level verification and consumers' awareness of personal information security.

13. CONCLUSION

Based on the results of this study, the following conclusions were drawn.
The online shopping system is an important bridge linking consumers and businesses. The development of the online shopping system is conducive to the users to purchase products and services anywhere, anytime and everyone using available technology resources. Thus, this system is worth using as thefeatures and functionalities of the developed systemm has generally complied to ISO/IEC 25010 Software Quality Standard Criteria.

14. RECOMMENDATIONS

Based on the findings and conclusions made, the researcher recommends the following:

A. The researcher may consider presenting the developed system to entrepreneurs for the possibility of implementing the system.

B. The researcher may consider giving training to users of the system.

C. The future researchers may consider expansion of the developed e-commerce website that will integrate mobile app.

D. The future researchers may consider the study as a basis for similar works to be conducted and may incorporate more advanced technology applications for online shopping.

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