

Design And Implementation Of Online Shop: A Case Of St. John's Collection, Calabar

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Abstract—In this Research, a general solution to the conventional shopping methods has developed. It provides a user friendly platform for viewing different items like clothes, shoes, bags, jewelries etc., placing order on a desired item and making payment using a credit card thereby reducing the level of cash kept in the store as well as paving way for a cashless economy that the globe seeks to attain soon. It will also enhance the convenience in which customers carry out their shopping. The system can send SMS to the site administrator as well as the customer who places order for goods. All bugs have been eliminated from the system. On deployment, the system would be operated at a high level of efficiency and all the customers associated with the system will understand it because of the simple Graphic User Interface implementation. The system was developed using Visual Studio 2010 with ASP.NET as a linking technology. The paper adopted the Microsoft SQL Server 2005 for the database design with Microsoft Swish 3.0 for the video flash. The actual language for the implementation was C# 3.5.

Keywords—*e-Shop, e-Commerce, Online Shopping*

1.1. Introduction

The term 'electronic shopping' hereinafter referred to as (online shopping studio, e-shopping or e-commerce or e-business) has advanced from electronic shopping, to mean all facets of business and market processes enabled by the Internet and World Wide Web technologies. In its simplest form, e-shopping is the buying and selling of products and services by businesses and consumers over the Internet. This is done in real time without an intermediary service i.e. without direct interaction of the buyer and seller. Before we continue, I will like to point out clearly that in the course of this research, the terms e-shopping or e-commerce or e-business will be used interchangeably.

Online shopping is a process whereby customers directly buy goods or services from a seller in real time without an intermediary service (without direct interaction). The concept of online shopping provides a virtual shop online where customers can purchase items online either from the comfort of their homes or

the tight schedules in their offices and have them delivered to a specified location.

According to Philip, K. (2005), e-commerce can be used as a general term for buying and selling processes that is supported by electronic means. Philip's definition of e-commerce seems to point out that e-mail, BBM chats, 2go, Facebook, WhatApps and all other social networks, if used for business conversations can be seen as e-Commerce.

Furthermore, e-Commerce, is a term used to describe all brands of businesses that are established electronically particularly over the Internet. This includes both electronic sale (internet shops) and B2B transactions (i.e. business between two companies). It is any online transaction of buying and selling where business is done via Electronic Data Interchange (EDI). E-Commerce can be defined from different perspectives: Communications perspective, business process perspective, service perspective and online perspective.

People across the globe use the term "e-shopping" to describe encrypted payments on the Internet. Before we continue, it will be imperative to point out clearly, the relationship between e-shopping and e-commerce. E-shopping is just a miniature of e-commerce. E-commerce embodies multi-facet operations and concepts.

The overall growth of e-shopping has been dramatic and will continue to be fuelled by business-to-business activity. E-shopping offers the opportunity for businesses to establish new competitive standards by expanding distribution channels, integrating external and internal processes, and offering a cost-effective method of providing products and services to clients.

E-shopping is one of the most recent developments in the operations of both large and small business enterprises, especially in the aspect of buying and selling and how payments are made as well as delivery of goods purchased and services rendered. These "online stores" enable the customer to purchase goods by making payments online. This is done through the use of either a debit or credit card instead of cash.

The Internet provides online businesses with the ability to reach a global audience and to operate with a minimal infrastructure, reducing overhead, and

providing greater economies of scale, while providing customers and businesses with a broad selection, increased pricing power, and unparalleled convenience.

Gbenga, S. (2000) in an attempt to explain the connectedness of e-commerce, business and technology as well as their related advantages in his article titled "e-Commerce in Nigeria and the Next Generation, posited thus:

*Synergy has always produced amazing results. The case of the **marriage** of the two giants of history, business and technology, is not an exception. With e-commerce, the market is brought to the consumer with the least interference between them. Organizations, business models market strategies and customer relations are all reconstructed by the technology of e-commerce, which also provides business with unprecedented ability to communicate directly with the target market on a wider scale.*

Web surfing brings each e-commerce site and its product or service into the home, office, room or palm of the clients and orders can be placed with the click of a mouse or the push of a key. Personal identification, customer preferences and a sophisticated database of consumers can be monitored to provide tailored or customized services to clients. Electronic Fund Transfer (EFT) makes it possible for transaction to be completed with payments carried out in real-time and on the web.

This research is aimed at developing an e-shop which will have an alert to notify the administrator even when he/she is not on the system database to view the orders placed for products.

1.2. Background of the Study

Our modern-day economy is brimming with millions of hiatuses. These hiatuses are ubiquitous even around the common man. Prominent among these hiatuses are human and vehicular traffics in our roads and market places, financial fraud, armed robbery and several other inconveniences. The population bulge in our society influenced by good health conditions has further compounded the problem, leaving man with superlatively high curiosity to solve these problems. The emergence of the cutting-edge technology (e-shopping) implemented on a platform of e-commerce will salvage this seeming unsolvable problem. The e-shop will reduce the human traffic in our market places; reduce financial fraud and armed robbery, since people will no longer carry cash to markets for purchase of items. This will accelerate the achievement of a 'cashless economy' which the world is hoping to become in the nearest future.

The concept of shopping has evolved over time with different shopping methods being developed and adopted for the sole aim of improving the convenience in shopping on both the part of the customer and that of shop managers, especially in payment making. The basic methods of making payments which have

existed over time are through the use of either cash or cheques. Furthermore, new developments have also brought about the introduction of credit card swift machines and now online shopping stores.

The shopping method in which cash and cheques are used in making payments has been an integral part of the shopping process, both in the past and up till date. Cash, is often used and paid on the counter of stores when the price of the item being purchased is within an average price range. On the other hand, cheques are mostly preferred as a means of payment when the price of the item or items being purchased is above an average price range. The major problem with the cash method of payment making is that there is often a huge risk both on the part of the customer who carries the cash and the seller who collects and keeps the cash. Although cheques are often considered to be safer, since they do not involve cash being carried around or kept for long periods before being taken to safe locations such as banks, it also has its own flaws which often include the forgery of signature bounced cheques etc.

As a result of all the above stated problems regarding the cash and cheque methods of shopping, the introduction of debit cards by financial institutions (banks) have brought about new technological developments which allows customers to pay with these cards instead of cash, with the use of credit card swipe machine designated at the stores. Although the introduction of these machines has reduced the level of cash carried and kept by both parties to a certain extent, customers do not really adhere to this system since direct interaction with the store keepers is still involved. The term direct interaction simply means that the customers still have to go to the store to make payments, thus making most customers reluctant to use their credit cards. Hence it is for this reason that further technological developments have been made and another method developed which is termed "**online shopping**".

2.1. Methods and Materials Used

2.1.1. Software Development Methodology Adopted

There have been a lot of dogmas in the religious wars around software development practices and methodologies. These dogmas are adopted and practiced by various originators and proponents of such methodologies just for clamor for superiority of their methodologies. But funny enough, methodologies cannot be generalized. This can be seen in the preceding paragraphs. At this point, let us borrow a leave to define methodology as it pertains to software engineering, so we can shape the direction of our readers.

Methodology in software engineering is a framework that is used to structure, plan and control the process of developing an information system. This includes the pre-definition of specific deliverables and

artifacts that are created and completed by a project team to develop or maintain an application.

Before I continue, I will like to point out clearly that, the type of project determines the methodology developers will apply. This view is upheld by Center for Medicare and Medical Service, (CMS) Office of Information Service (2008), in their publication titled **“Selecting a Development Approach”** when they posited thus:

One software methodology framework is not necessarily suitable by use for all projects. Each of the available methodology frameworks are best suited to specific kinds of project, based on various technical, organizational, project and team considerations.

Geoffrey Elliot (2004) in his work titled **“Global Information Technology: An Integrated System Approach”** argues that “Software Development Life Cycle is the oldest formalized methodology framework for building information systems”.

Though, there are several other software development lifecycle models such as Prototype Model, V-Shape Model, Spiral Model, Rapid Application Development (RAD), Dynamic Software Design Methodology (DSDM), Light Agile Development (LAD) etc, we have chosen the Waterfall Model because it best suits the development of our software. Our choice of the Waterfall model is predicated upon the fact that it maintains that *one should move to a phase only when its preceding phase is completed and perfected*, as well as the *emphasis it places on documentation (such as requirements documents and design documents)*. Our focus on documentation is for academic research purposes and further development of the software by another team of developers.

2.1.2. The Waterfall Model

The waterfall model is a sequential design process, often used in software development processes, in which progress is seen as following steadily downward (like a waterfall) through the phase of conception, initiation, analysis, design, construction, testing, production/implementation, and maintenance.

According to Scharch (1999), the waterfall model was the most popular and widely accepted methodology until the wake of 1980. He further argues that each phase is a raw material for the preceding phase. In his words, “each process transforms a product to produce a new product as output. Then the new product becomes the input for the new process”. One important feature of this model is the iteration arrow that integrates the various processes. These arrows show that the development of one product can influence the development of the previous products.

We can trace the origin of the waterfall development model to the construction and manufacturing industries; highly structured physical environment in which after-the-fact changes are prohibitively costly, if not impossible. Because no

other software development methodology existed at the time, this hardware-oriented model was simply adapted for software development.

Frontiers of the waterfall model included Herbert D. Bennington, who first presented it at a symposium on Advanced Programming Method for Digital Computers on 29th June 1956 ([United States. Navy Mathematical Computing Advisory Panel, 1956](#)). Bennington made this presentation as a prerequisite for the development of software for SAG. Further works were done by Dr. Winston Royce, in 1970 ([Royce, W. 1970](#)). Although, Royce did not use the term waterfall in his article, Royce presented this model as an example of flawed, non-working model. This, in fact, is how the term is generally used in writing about software development – to describe a critical view of a commonly used software development practice (Conard, W. 2003)

In Royce's original Waterfall Model, the following phases are followed in order: requirements specification, design, construction (a.k.a. implementation or coding), integration, testing and debugging (a.k.a. validation), installation, maintenance. Thus, the Waterfall Model maintains that ***one should move to a phase only when its preceding phase is completed and perfected***. Various modified waterfall models (including Royce's final model), however, can include slides or major variations on the process.

A further argument for the waterfall model is that ***it places emphasis on documentation (such as requirements documents and design documents) as well as source code***. In less thoroughly designed and documented methodologies, knowledge is lost if team members leave before the project is completed and it may be difficult for the project to recover from the loss. If a fully working design document is present (as is the intent of Big Design Up Front and the waterfall model), new team members or even entirely new teams should be able to familiarize themselves by reading the documents.

Some waterfall proponents prefer the waterfall model for its simple approach and argue that it is more disciplined. The waterfall model provides a structured approach; the model itself progresses linearly through discrete, easily understandable and explainable phases and thus it's easy to understand; it also provides easily identifiable milestones in the development process. It is perhaps for this reason that the waterfall model is used as a beginning example of a development model in many software engineering texts and courses.

It is argued that the waterfall model can be suited to software projects that are stable (especially those projects with unchanging requirements, such as shrink wrap software) and where it is possible and likely that designers will be able to fully predict problem areas of the system and produce a correct design before implementation is started. The waterfall model also requires that the implementers follow the well-made,

complete design accurate, ensuring that the integration of the system proceeds smoothly.

2.1.3. Microsoft Visual Studio 2010

Is a packed with new and enhanced features that simplify the entire development process from design to deployment. Customise your workspace with multiple monitor support. Create rich applications for SharePoint and the web. Target multiple versions of the .NET Framework with the same tool. Eliminate the dreaded "on repro" problem with IntelliTrace. Let us take a cursory glance at the versions:

2010 Professional: for individuals to perform basic development tasks. It is available in two versions: with MSDN Essential or with Full MSDN subscription.

2010 Premium: for individuals and teams to deliver scalable, high-quality premium applications. A complete toolset for individuals.

2010 Ultimate: ALM (Application Lifecycle Management) tools enable teams to ensure quality results, from design to successful deployment.

Test Professional 2010: Specialized toolset for QA teams to simplify test planning and manual test execution, increasing visibility to the overall project.

2.1.4. Microsoft SWiSHMax 3.0

SWiSHMax is a flash creation tool that is commonly used to create interactive and cross-platform movies, animations, and presentations. It is developed and distributed by Swishzone.com. It primarily outputs to the .swf format, which is currently under control of Adobe systems. Baker, Donna (2004).

SWiSHMax added features such as a knife drawing tool, advanced shape operations, and ActionScript 2.0 classes. It is simpler and cheaper flash creation tool in comparison with Adobe Flash, though it has some compatibility issues with Adobe flash features such as ActionScript 3.0 shape tween and bitmap drawing capabilities.

2.1.6. Microsoft SQL Server 2005

This is a relational database management system developed by Microsoft Corporation. Its main function as a database management system is to store and retrieve data as requested by other software applications, be it those of the same computer or those running on another computer across a network (including the internet). There are at least a dozen different editions of Microsoft SQL Server 2005 aimed at different audiences and for different workloads (ranging from small applications that store and retrieve data on the same computer, to millions of users and computers that access huge amounts of data from the internet at the same time).

2.1.7. C-Sharp (C#)

This is a multi-paradigm programming language encompassing strong typing, imperative, declarative,

functional, generic, object-oriented (class-based), and component-oriented programming disciplines. It was developed by Microsoft within its .NET initiative and later approved as a standard by ECMA (ECMA-334) and ISO (ISO/IEC 23270:2006). C# is one of the programming languages designed for the Common Language Infrastructure.

C# is intended to be a simple, modern, general-purpose, object-oriented programming language. Its development team is led by Anders Hejlsberg. The most recent version is C# 4.0, which was released on April 12, 2010.

3.1. System Design

System design is the process or act of defining the hardware or software architecture, components, modules, interface and data for a computer system to satisfy specified requirements.

According to Dubberly, H. (2006) in an interview conducted by Dan Saffer via email which was later published in *Designing for Interaction: Creating Smart Applications and Clever Devices*, he posited that "system design first appeared shortly before World War II as engineers grappled with complex communication and control problems. These engineers formalized their work in the new disciplines of information theory, operations research, and cybernetics". In the 1960s, members of the design methods movement such as Horst Rittel and others at Ulm and Berkeley, transferred this knowledge to the design world. System design continues to flourish at schools interested in design planning and within the world of computer Science. Among its most important legacies is a research file known as design rationale, which concerns systems for making and documenting design decisions.

The purpose of System Design is to create a technical solution that satisfies the functional requirements of the system. At this point in the project lifecycle there should be a functional specification, written primarily in business terminology, containing a complete description of the operational needs of the various organizational entities that will use the new system. The challenge is to translate all of this information into Technical Specifications that accurately describe the design of the system, and that can be used as input to system construction.

One thing worthy of note is that a system approach to design is entirely compatible with a user-centered approach. Indeed, the core of both approaches understands user goals. A systems approach looks at users in relation to a context and in terms of their interaction with devices, with each other, and with themselves.

For the system that we have designed, the various modules and components are interconnected in various stages of the architecture. This is evident in the manner in which the source codes are broken into the various modules and components to wit: Home,

Browse Fashion Catalogs, Place Order, About Us, Contact Us, Admin Only. Each of the modules is implemented using a particular ASP.Net base class libraries.

Home - Home is the first page of the application. When a customer logs into the application, it is the home page that will display first. It has a flash movie, developed with Microsoft Swish 3.0. It also has an image of a lady. It has links to other pages as well as preambles of what the site stands for.

Browse Fashion Catalogs - This module shows the various catalogs from which customers can browse. There are as follows: men, women, pregnant women, foot wear, lady of the week, etc.

Place Order - This module enables customers to place order for items there have viewed.

Contact Us - This module keeps contact information of the CEO, Administrator, and Directors as help as Help Desk Officer and Customer Care line.

Admin Only - This module allows the Administrator to add items to the catalog for customers to view. It also shows the orders that have been placed by customers.

3.2. Features of the System

As mentioned earlier, the system is an online shop. It allows customer to browse the catalog, select items and add to their shopping cart, place order and make purchases. Detailed explanation of the functionality of the system is given below:

3.2.1. Administrator to Add Items in the Database

The Administrator must logon to the website, with a valid user name and password. The proposed url for the website is www.stjohnonlineshop.com. Administrator further create the item, upload the item image, enter the item name, item price, item quantity and clicks submit. On receipt of the item, the system brings up a message **"Product Added Successfully"**. Administrator then logs out.

3.2.2. For Customer to Browse Item, Place Order and Make Purchases

The customer logs in to the website with the url provided above. On the home page of the website, there are various categories in the catalog. The customer further browse for a desired item, selects the item and the click on **"Place Order"**. Once the customer clicks on place order, the system will generate a **"RefNo"** automatically. This **RefNo** is tight to that customer as his/her ID. The system generates the price for the item so chosen by the customer. Remember that the administrator specifies prices for all items added to the database. The customer then enters the quantity and the clicks on **"Get Total Amount"**. On clicking the Get Total Amount, the system will compute the total amount and display it on screen. The customer further clicks **"Add to Cart"**.

For the customer to continue shopping, the customer clicks on **"Continue Shopping"**. If the customer clicks on Continue Shopping, the customer is redirected to choose another item(s) so desired. If for any reason, the customer is satisfied with the item, clicks on **"Make Purchase"**, to enable him/her make payment for the item(s) chosen. If the customer clicks on Make Purchase, he/she will be redirected to an electronic payment gate way (**E-Transact, PayPal, Paymate, InterSwich**). But for this system, we have used InterSwich as our payment gateway. The customer enters the following information: customer name, address, email, phone number, credit card number, name on credit card, expiration date of the credit card and the shipping address. The customer further clicks **"Place Order"**. On clicking the place order button, the system automatically sends and SMS to the Administrator, informing him/her that a customer has with details as stated in the SMS has placed order for goods as stated in the SMS. The system will also notify the customer with a message **"Your Order was Successfully Placed"**.

3.2.3. For Administrator to View Orders Placed by Customers

The Administrator must logon to the website using the proposed url shown above. The Administrator logs in to the Administrator Panel with a valid username and password. Because of the expected traffic on this system, we have decided to tire each customer with an ID called RefNo. The system is designed such that the system will search and load customers order using their RefNo(s). Once the Administrator logs into the Administrator Panel, he will see an interface displaying all the RefNo(s) of customers who have placed orders. The Administrator then copies the RefNo of the customers individually and paste in the space provided **"Load by RefNo"** and then clicks on **"Load"** Button. The system then pulls out the content of the shopping cart of the customer with that RefNo.

The Administrator at this point can now send a mail to the customer through the mail interface, using the phone number that appears in the data pulled from the shopping cart. This mail will contain delivery information of the goods to include date, time, transporters, etc.

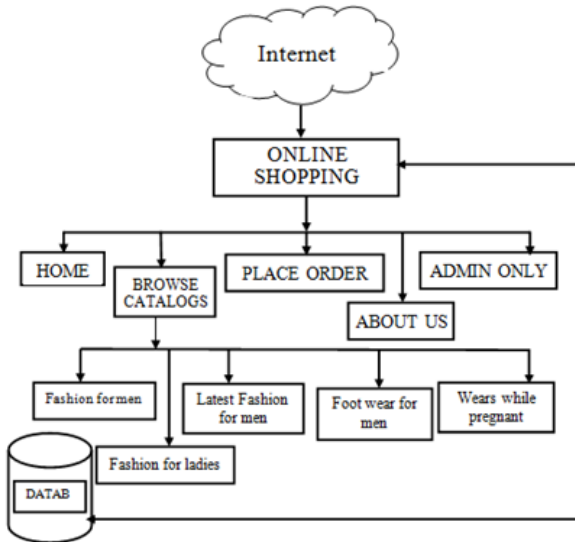


Fig. 1.1. Diagram of the New System

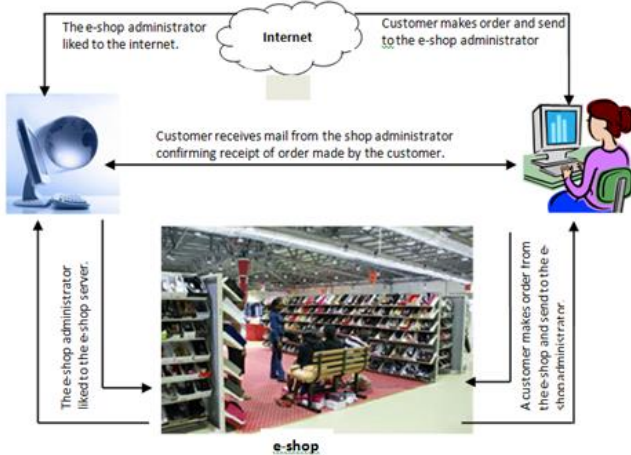


Fig. 1.2. Diagram of the Physical Functionality of the system

3.3. Database Design

The database was designed with Microsoft SQL Server 2005. It has four simply designed tables. The entities and relationships in the main codes maps directly to object classes and named relationship.

Table 1 holds login information and it is called **Login Table**. It contains two fields. They are, UserName and Password. Table 2 has information about Products and it is called **Product Table**. It has six fields. They include: Id, Name, Description, Price, Quantity, and FilePath, Table 3 keeps information about the customer, and it is called **Customer Table**. It carries seven fields. These fields include the following: Id, CustomerName, ShippingAddress, Email, Phone, CartNo, ExpirationDate. Table 4 houses information about the UserCart and it is called **UserCart Table**. It has six fields. The fields include: Id, RefNo, Price, Quantity, Date and Total. The diagram of the database design is shown below.

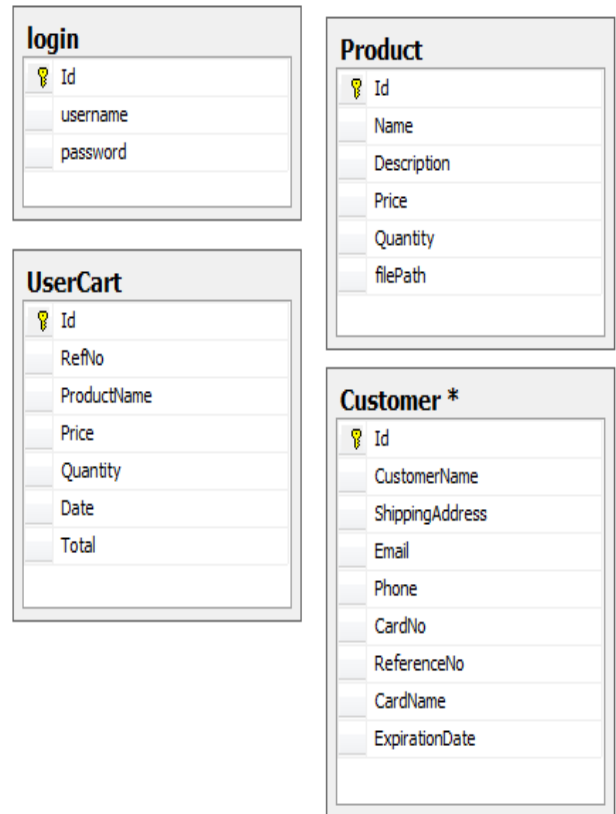
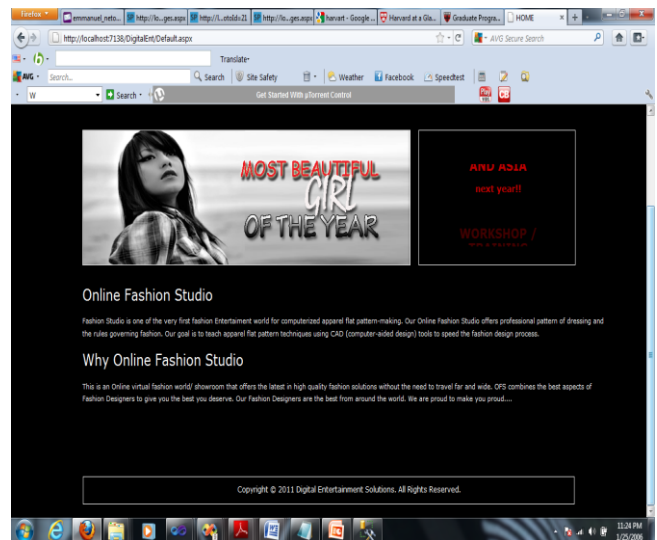


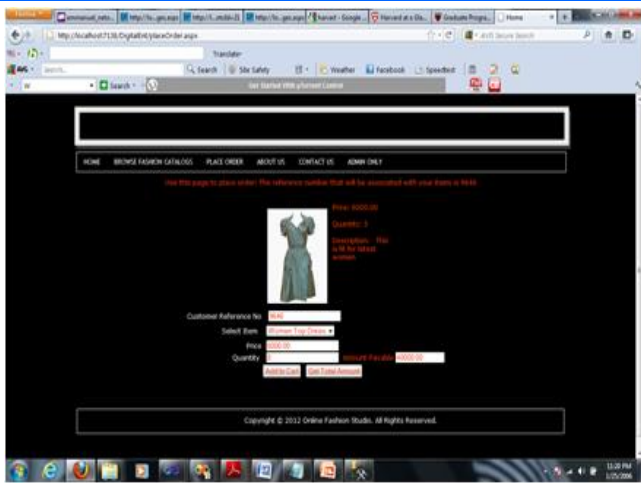
Fig. 1.3. Diagram of the Database relationship design

3.4. Results/Output

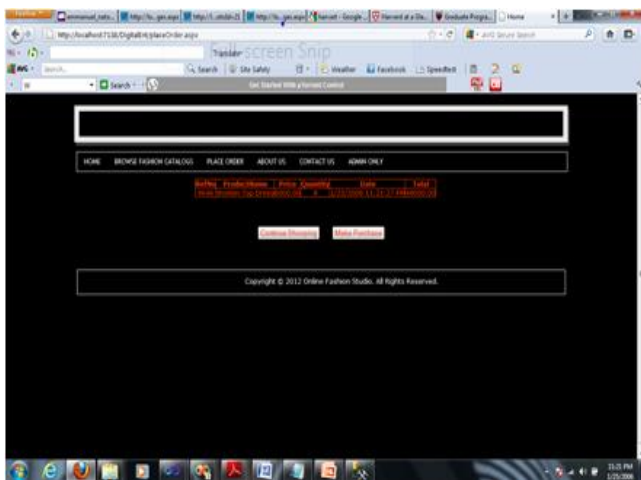
Home



Place Order Page



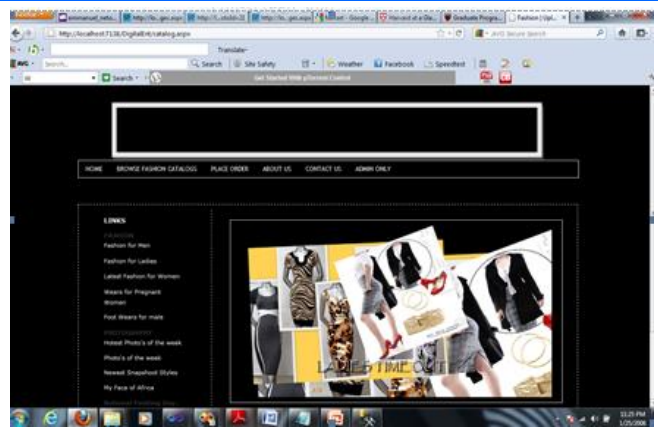
Customer's Cart Page



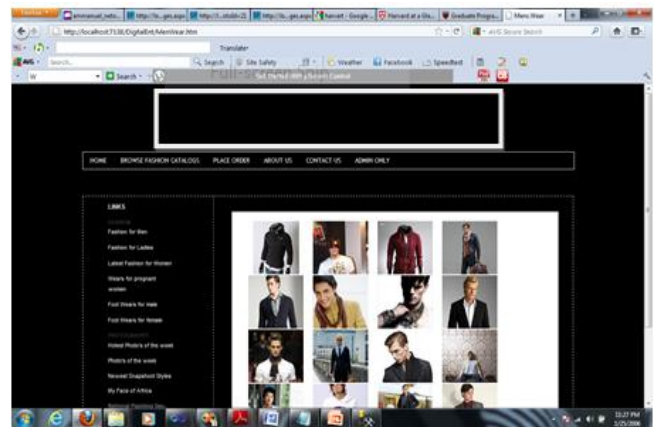
Shopping Form



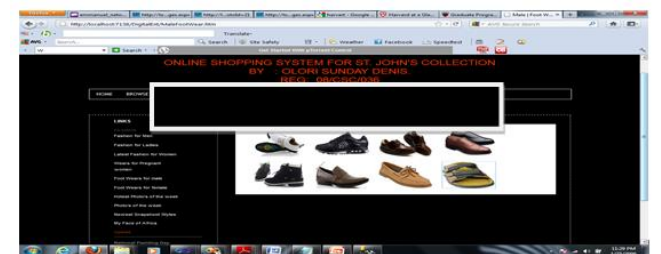
Browse Catalog Page



Men's Wear Page



Men's Foot Wear



Pregnant Women Wears



4.1. Conclusion

This system, Online Shop for ST. John's Collection has been completed developed and tested. The completed application, which is web based, is expected to be deployed for full operation to service the St. John's Collections, located in calabar, Nigeria. The system has been tested and fund reliable. Unit testing was done, all modules of the application were also tested and integrated testing was carried out. The results of the testing were great and the system was found to be efficient, reliable and robust enough for

online trading and shoppings. Stakeholders were allowed to do a pilot test for the system and the feedback was positive. The system will soon be deployed for use as soon as necessary documentations are completed.

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