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Web Development and Its Interaction with the Social Media

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The study assesses the factors associated with designing a trading website that functions and operates through social media channels as well as through its own independent web infrastructure for optimized performance and self-sufficient marketing.

The aim of the study is to highlight the significance of social media integration in the website development process. An additional objective is to draft a database design for the application development of the trading site.

In order to implement this project, the back-end application was built in PHP using eclipse IDE and the front-end was written using HTML5, CSS and JavaScript.

This study transformed the traditional goods exchange trend to an enhanced way of transaction method by providing online availability for users. The study found out that social media interaction with the web facilitates the reach of potential customers through channels where they usually spend much of their time, such as Facebook, Google+ and Twitter. In addition, interaction of the web with the social media makes accessibility easier for customers or users.

| Keywords | Social media, API, Web 2.0, SEO, ER diagram, Database design |

Contents

Acronyms and Abbreviations

AJAX	Asynchronous JavaScript and XML
API	Application Program Interface
ARMV6	Version 6 Instruction set architectures for computer processors
ARMV7	Version 7 Instruction set architectures for computer processors
CPM	Cost per impression
CSS	Cascading Style Sheets
CTR	Click through rate
ER	Entity Relationship
HTML	Hypertext Markup Language is the standardized language used for tagging text files, graphic, color, and font on Web pages World Wide.
HTML5	W3C specification which works as the fifth revision to Hyper-Text Markup Language.
IDE	Integrated Development Environment
iOS	The operating system used for Apple Inc.'s for its mobile devices.
i386	A suffix to binary packages, such as RPM packages, primarily for installation on Linux systems.
JSON	JavaScript Object Notation
LAMP	A short for Linux, Apache, MySQL and PHP, an open-source Web development platform
Mac OS	Macintosh operating systems
MySQL	A popular open sources relational database management system; also a central database used within the LAMP open source web software stack.
PHP	An interpreter and script language mostly used on Linux web servers; freely available. The abbreviation originated from Personal Home Page Tools, but currently is understood to mean Hypertext Processor.
RDMS	Relational Database Management System
RPM	Red Hat Package Manager
RSS	Rich Site Summary
SDK	Software development kit
SEM	Search Engine Management
SEO	Search Engine Optimization
SIM	Subscriber Identification Module

SMS	Short Message Service
SQL	Structured Query Language
UIF	Universal Mobile Framework
W3C	World Wide Web Consortium
XML	Extensible Markup Language
XCode	Apple's Integrated Development Environment (IDE) that developers utilize to build applications for Apple products.

1 Introduction

The reason I am motivated to write this thesis is the fact that nowadays there is a huge usage of online shopping in society; this far a large number of people prefer to purchase online rather than going to the market. The number of customers has been increasing dramatically in recent years and the proclivity of this circumstance is growing up each moment as researchers come up with modern and advanced technologies.

This thesis aims to assess the factors involved in designing and implementing a trading website inherently connected with social media as an aspect of its functionality. The current information explains the core infrastructure of the website as it works simultaneously as a social network where users can trade items between one another and as an integral part of the social media culture.

This web service was developed using HTML5 and Java Script technologies for front-end, MySQL relational database and PHP as the back-end scripting language. In addition to this, it has recently become a habit for every website to be integrated with social media outlets for web-based advertisements and international accessibility. Facebook, twitter and Google+ represent the most widely used social media networks to date; for this purpose, features of Application Program Interface (API) of respective social media networks and ways they assist in the social network to the website interface processes are assessed through the use of distinct applications.

Overall, the following thesis aims to assess the factors associated with designing a trading website that functions and operates through social media channels, as well as through its own independent web infrastructure for optimized performance and self-sufficient marketing.

2   Social Media and Marketing

2.1   Web 2.0 Applications and Social Media

Berthon et al (2012) assess the pivotal point where marketing meets Web 2.0, social media, and creative consumers. They note that this evolving trend in web dynamics marks many significant implications for the international marketing strategy in business [3, 271].This forces all managers to devise business models for the 21st century that take into account the threats and opportunities presented by the prominence of Web 2.0, creative consumers, and social media, as these contributing dynamics have created a shift in value and power within most markets of industry. The study identifies five key axioms they consider to be essential for success in the web-based business: (1) social media must be a key function of the culture, technology, and government of a particular country; (2) local events must be globally shared online; (3) global events must be exposed to, and (re)interpreted, based on local perspectives; (4) actions of creative consumers rely on government, technology and culture; and (5) technological development is historically dependent on the contribution of creative consumers [3, 271]. They point out that the core theme that sustains throughout all of these axioms is that for businesses to remain successful they must remain up to date on changes in social media, consumers and advancing trends, technologies and their applications.
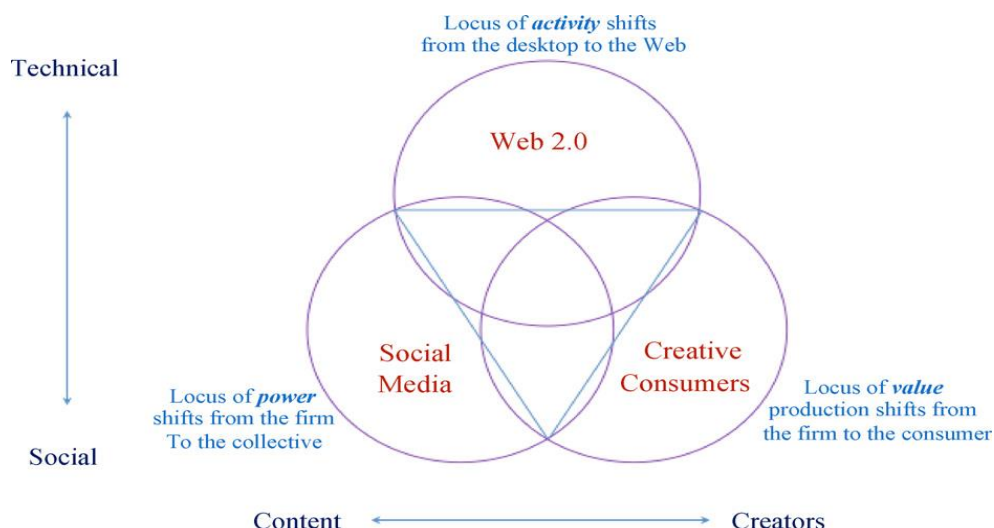

Figure 1. Web 2.0 and social media. Reproduced from Web 2.0, Social Media, and Creative Consumers [3, 272]

Figure 1 demonstrates the three aspects of successful business in e-commerce today as Web 2.0, social media and creative consumers. These aspects are presented based on their relation to one another within a context of a locus of value, locus of activity and locus of power. In order for the above managerial recommendation to work, marketers must engage customers, reduce bureaucratic influence, embrace technology, invest in training employees to be web savvy, and senior managers must be informed about the importance of their presence on social media platforms [3, 272]. For the trading site to be effective at providing its intended service, while also remaining self-sustainable within a modern Web 2.0 environment that relies heavily on brand recognition within social media and social capital, managers and developers want the site to sit within the middle point of the three. The central point of the diagram, specifically right in the middle of the triangle, represents a place where there is a perfect balance between technical aspects, social aspects, content, and creation.

It is also interesting to note that the authors identify the innovation of Web 2.0 to be an evolution in business online where activity shifts from the desktop to the web. This concept can be seen with how a user and businesses are migrating their data to the Cloud, how many services for daily operations are moving online (such as the conversion of files from one format to another, faxing documents by way of e-mail, text messaging using mobile devices), and in how data hosting services are allowing businesses to be more lean with their data storage and sharing activities. All of this plays a pivotal role in shaping the environment in which web businesses operate and it influences how they approach issues like database design, and entity relational management.

A key aspect of Web 2.0 is its compatibility with HTML5 and JavaScript, which play a significant role in the front-end and back-end dynamics of the trading site's operations. Prior to the use of HTML5 and the integration of mobile devices with web dynamics, it was impractical for developers to focus too much on the front-end interfaces of their websites. This was primarily due to the fact that there were a wide range of proprietary plugins and hacks that overwhelmed the system. HTML5 improved aspect of web development through incorporating JavaScript and W3C specifications that are supported widely across almost all browsers and devices [19, 12]. HTML5 helps programmers better confront the challenge of moving more code to the front end using CSS, JavaScript, and HTML [19, 12]. It also provides loosely coupled backend infrastructure that is more supportive of offline clients [19, 12]. The use of HTML5 and JavaScript enables the trading website to use the internet browser as a platform within itself. Gradually, the web

browser became utilized as an inherent part of the website infrastructure for web developers.

Another key aspect of the site's use of HTML5 is its capacity to function on mobile devices. This is beneficial to businesses using HTML5 because 150 million people use mobile devices as their main resource to access the internet [19, 13]. The popularity of mobile device usage for internet activities contributes to why developers are starting to favor HTML5 applications over native ones [19, 13]. It can also be credited for why mobile development is taking priority over traditional PC application development [19, 13]. Mobile browser statistics are becoming a significant factor in the enterprise environment. The ability of the trading website to be adaptable to mobile devices is a critical factor in both its web infrastructure and marketability.

2.2   Social Media Marketing

Social media marketing plays an invaluable role in the success and sustainability of small to medium enterprises and online startups in today's predominantly web-based market. For many small businesses, social media marketing offers a low cost entry point into competitive markets. Traditional media is recognized as television, newspapers, magazines, radio, newsletters, tax press and a variety of other print publications. Social media on the other hand, has emerged as a new alternative form of telecommunication technology, which is composed of network information mediums that are digital and computer based. Social media serves the public through a range of differing mediums such as podcasts, wikis, internet forums, pictures, blogs, music and video-sharing, all of which are most commonly shared and exchanged through social networking sites like YouTube, Facebook, Google+, LinkedIn, Instagram and Twitter.

The use of social media has rapidly changed daily lives and this change can be attributed to the power social media gives the public to interact with one another [3, 264]. One of the main differences between social media marketing and traditional marketing is that social media marketing is cheaper. A social media marketing campaign can reach 1,000 people for a fraction of what it would cost to run a television advertisement or an advertisement in a newspaper. Social media marketing advertisements are also cheaper than e-mail Ads [3, 264]. Social media is the only platform that lets businesses, politicians running for office, or even individuals promoting their own pet projects, the ability to in-

teract with fans, constituents or consumers. This interaction establishes a two-way relationship that in many ways can be hugely lucrative for corporations or rewarding for anyone looking to promote an idea or concept. The most significant benefit of social media marketing is the minimal cost and the fact that it can be developed from a grassroots level. Another advantage that social media marketing offers over traditional media is that the results are easier to measure [2, 17].

There are some disadvantages to social media marketing campaigns in that they are time-consuming and the impact of the promotions can decline rapidly due to the frequent flow of the content online [2, 17]. Due to many of these factors, businesses recognize that internet marketing both as a tool for promotion as well as a profession is a very lucrative and effective alternative to traditional advertising, but they are also aware of pitfalls.

Internet marketing represents a significant aspect of e-commerce and social media. It is substantially cheaper than traditional marketing as it allows for unique targeted advertising based on demographic data. In this respect, small-to-medium enterprises can compete on a much larger scale with big brands in a particular market as they can reach broader audiences for less and more efficiently targeting their ideal consumers. Another standard aspect of internet marketing is information management as a wide range of social network marketing API tools like Google Analytics can provide extensive data tracking tools to assist businesses in monitoring their online advertisement campaigns [30, 2].

The trade website business model differs from traditional e-commerce sites in that there is no real need for financial transactions. All revenue earned by the site is generated primarily through advertising or fees applied to users seeking to trade items. On the topic of online bartering businesses and how they rank in vertical search engines, a recent study found that the online barter business is still underexplored due the lack of relevant information within aggregate services on bartering or trade exchange sites [21, 1357]. The study implements and designs a vertical search engine called ExSearch [21, 1357]. The system aggregates online barter information for developing the barter market. Different from classical general purpose web search engines, ExSearch utilizes a focused crawler capable of gathering related information from various websites. It extracts barter information from free-text web pages in such a way that unstructured information is presented in structured databases. Data mining techniques, like regression, are also used

to fulfill missing information, which cannot be extracted from the web pages. The search results are ranked and validated based on the popularity of user queries. Experimental results show that each component module in the ExSearch system is efficient and effective [21, 1357]. The primary finding of the study indicates that the success of online bartering sites, where trade is the primary function of the site, is limited by word of mouth [21, 1357]. The users of the sites are the main source of this word of mouth marketing, which means bartering sites have limited ways of expanding beyond their own registered users or frequent users [21, 1357]. Barter information is traditionally exchanged or distributed through newsgroups, commercials or online forums. By integrating the trading site as an inherent aspect of social network sites, it expands the reach of the site as a whole with minimal costs.

An effective online marketing campaign will incorporate search engine optimization (SEO), paid advertisement campaigns often referred to as search engine management (SEM) [18, 212]. Search engine optimization involves a distinct set of activities utilized to enhance a site's exposure while monitoring the results of the campaign. The primary objective of search engine optimization is to increase the traffic to a website, but through advanced and uniquely honed targeted campaigns based on relevant queries (key words), the traffic can be molded in a way that is most optimal for the site to resonate with its visitors. This is understood as drawing a targeted audience.

The ideal internet marketing campaign is structured to attract a targeted audience through the use of contextual advertising, social media marketing, back-link building, in the form of text links, articles, banners, and ad placement. There is also a wide range of advertising support in the form of analytics that provide users with information like conversion data. This conversion data can be in reference to how many people click on a particular ad and then visit parts of the site, or for those who make a purchase. Conversion, as it relates to the trading site, is based on how many people register. Conversion data is related to click through rate (CTR), which follows that based on the effectiveness of a particular online marketing strategy, there is a certain number impressions that an advertisement can have that will results in clicks leading to the end site. The common abbreviation for impression is (CPM), which stands for cost per impression. This refers to the amount of money it costs, or the amount of money that can be expected for a publisher to earn, from having a particular advertisement viewed by 1000 people [30, 2]. The CTR is often relative to a distinct CPM, which is usually based on the quality of the

advertisement, the collective appeal of a group of online ad methods such as social media content, paid ads, and article and blog promotion establishes the effectiveness of an advertisement campaign [30, 2]. The primary advantage this advertisement method has over traditional television, radio or billboard advertisement is that much more individuals can be reached online using these outlets versus the aforementioned traditional methods [30, 2]. The most distinct difference between online marketing and traditional marketing is that the advertiser is provided more control over the reach, and targeting of their campaign. There are also more tools available to monitor performance.

3   Social Media Channel Connection

Web-based businesses are becoming more integrated with social media platforms, such as Facebook, Instagram, Twitter, Snapchat, LinkedIn , Google+ and YouTube due to the extensive access to potential users these sites present. While the trading site on which this thesis is based, serves both as a functioning platform for trade online, the site is also modeled as a social network where users can interact with one another. Similar to the way many forums work, in addition to being able to exchange items, users will also be able to exchange ideas, market their products to one another and gather information on other interests. The exchange of items without the use of currency places the site within the barter market. This is very different from sites such as Amazon, Ebay or Gumbtree, and puts the site in direct completion with other bartering sites such as PawnGo, ThredUp, Swap.com, U-Exchange, and Freecycle.

3.1   Facebook API Interaction with Website

Facebook API enables businesses to establish a connection between their website and the Facebook social media network platform to benefit from its massive user base. The prominence of Facebook within the Web 2.0 business climate makes it a valuable resource for any business trying reach people on the internet, and the most effective way to market on Facebook is through Facebook API. In the U.S., Facebook is recognized as the second most watched video content site behind YouTube [31, 41]. The success of Facebook and the apps the site hosts can be attributed to "portalization" [10, 13]. This is a strategy utilized by developers when designing Web 2.0 application in such a way that incorporates every possible feature onto their site. Once the user signs in, there is no need to leave the application [10, 13]. The way Facebook incorporates portaization

into its operations is that the site enables users to access weather, news, sports and a variety of other information all from the main page of the site. Facebook API allows developers to take advantage of this feature by doing the same with their applications. Web applications can be integrated in a way where they are an integral part of the site without leaving Facebook, but while simultaneously promoting the brand of the application.

Facebook Marketing API

Understanding the Facebook platform and the many resources it provides users is an essential aspect of implementing a successful Facebook marketing campaign. One distinct aspect of the Facebook platform is that the site provides a wide array of application development tools and allows users to develop their own applications to put on the social network. As there are a substantial number of users on Facebook, developing an application that works in tandem with the web-presence of a particular brand or company provides that company with extensively more exposure. Facebook offers advanced API for users to develop their own applications capable of interfacing with the social network [12, 69].   These tools support the seamless integration of applications developed by an outside engineer or brand with the Facebook website platform, and if done effectively registered Facebook users will be able to use a particular services or website without leaving the network. Applications developed to use the basic API provided by Facebook focus more on leading registered Facebook users to the sponsored website of the company responsible for the application [8, 893].

Through the use of marketing API, site developers are able to access the advertising platform of Facebook through the use of their own advertising tools. The Facebook Marketing API allows developers to utilize all the same functionality as Facebook tools within a custom solution. With the Marketing API, developers can, delegate audience management activities, which entail managing their audience data for custom audience targeting, manage advertisements by creating campaigns ads and ad sets, and they can build a custom dashboard to run and manage analytics. The final aspect of Facebook Marketing API is that it allows for business managers to manage Facebook assets, such are their ad accounts pages, ad, and supplemental apps. One of the more significant aspects of Facebook API is the demographic targeting it provides business managers. Advertisements on the site can be honed to target audiences that will most likely respond to the campaigns. For example, a specific post on the website's fan page that shares information about the site can be promoted to reach a specific demography while an entirely different post can be pumped to reach a separate demography.

3.2   Twitter API Interaction with Website

A recent study on Twitter API evaluated how applications were developed through Twitter API tools. Twitter's application programming interface (API) allows data based applications to share their data with the rest of the world through the social media platform. In essence, Twitter's API works like a no frills website, where data is accessed through URL requests but it returns structured information instead displaying it in a browser [25, 8].

The data returned by Twitter API is no different than Facebook's or Google's in that it is also structures data in a specific format ideal for developers to create applications that can interface with its structured in a thread format. Twitter API is a distinctly resourceful tool that enables developers to connect website infrastructure seamlessly with Twitter for advertising and operational purposes. For example, the trading site interacts with Twitter API, through the use of GET and POST. Methods accessed through API are requested using GET, which represents a set of parameters that can be exchanged as a string of URL query. POST is similar to GET, in that it accomplishes the same objective, but it acquires the results differently. Currently, Twitter API accommodates four distinct forms of formatted data, specifically, JSON, RSS, Atom, and XML. From the perspective of the consumer, Twitter API is utilized by the trading site to distribute traceable banners throughout Twitter for ad promotions both on and off the site. Twitter API also allows developers to integrate Twitter data within the structure of their personal website. On the front end, this is in the form of trending tweets displayed directly on the site.

3.3   Google+ API Interaction with Website

While Google+ is no longer considered to be a prominent social network due to the company's recent announcement that it would be shutting down as a social network, there are a variety of tools provided by Google+ API that empower developers to launch effective marketing campaigns. The most significant resource can be seen with Google Analytics, which enables users to track and monitor the reach and traffic of marketing strategies. For example, developers can target key demographics for their websites through keyword campaigns on Google AdWords.

Google API essentially provides users with extensive access to supplementary features of Google. Google+ API provides developers with access to public data and it supports

Android, iOS, CSS, JavaScript, Python, PHP, and Ruby [29, 131]. The fundamental resource Google+ API provides developers is the ability to use specialized programming interfaces that are compatible with AJAX technology and JavaScript [12, 69]. Providing developers with access to Google+ subsystems enables the trading site to incorporate features like Hangouts-API, Google+ JavaScript API, Google+ Play SDK and Google+ iOS SDK.

Google+ Hangouts represents a video call system that works through JavaScript. Once a developer has access to this feature, they are able to exchange data between other hangout users and the API supports the needed software components for the chat to function. This serves as a valued resource for customer services management as the trading site can incorporate Hangout chats into the "contact support" segment of the site. While users can always contact administrators of a site by phone or e-mail, having a live chat interface tool creates a more engaging element to the website infrastructure that helps a brand gain trust and repose with its consumers.

An additional aspect of Google+ API is the multilingualism it offers users with integrated tools for translation of page content. The API also supports valued security features in regards to authentication for logins, which oversee design and privacy features [29, 131]. The box is an addition plugin resource, which allows Google+ profiles to be displayed directly onto a developer's website or mobile application and the Google+ - login can be used within a developer's site for authorization and the authentication purposes. Integrating Google+ API authentication adds an extra layer of security.

Overall, the features provided by Google+ API enhance the user experience while at the same time consolidating the resources necessary for a website to function at a high level. One of the more progressive advantages Google offers web developers is resources associated with expanding their sites into the mobile sector. Through Google+ Play SDK/ Google+ iOS SDK, which supports the development of iOS and Android applications, developers are able to utilize SDK to integrate UI-elements. The value Google+ API enables developers to incorporate a wide range of technical infrastructure that would otherwise be too costly to develop in house. The tools offered by Google through their API empower small to medium enterprises to function on the same level as much larger-scale corporations, and these tools are invaluable resources for the trading site to implement [29, 131].

4   System Specification

4.1   System Description

The primary way the site makes money is through advertisement revenue. The trading site can benefit from placing online advertisement through three distinct methods: (1) unique advertisement layouts provided by commercial online entities such as Facebook, LinkedIn, or Twitter; (2) free content marketing in the form of social media posts, articles, or video; (3) paid online textual advertisements which are based on search criteria, primarily through Google AdWords. These distinct ad specifications shape how the site's infrastructure works to make the trading site self-sustaining. For example, in addition to producing free content posts in the form of article, video, and images on sites like YouTube and on blogs, the content can also be monetized through Google AdSense. This opens up the brand to an alternative stream of revenue that can in turn be reinvested back into the site's own paid ad promotions [4, 30]. Despite widespread reach of all online ad methods, the CTR of these methods tend to be 1%, which means they must have substantial reach to garner intended results [4, 30]. Having website architecture in place that is appealing to the user, with shareable content, and that integrates well with the API of social media sites becomes a valued necessity to establish an edge in this market; the ability to mitigate the cost of operating the site through monetizing marketing efforts only further supports this goal. To benefit from this trend, the trading site will incorporate the use of a forum, a market place, mobile API and some other features.

Forums represent discussion groups that are hosted by commercial entities. The forum on the trading site is utilized as a resource to encourage users to engage with one another, it can also serves as a directory of the site where users can access information about the site faster than id they were to contact support. The most beneficial aspects of forums is that they expand the reach of the site by making it larger and increasing the overall content. This content is in turn crawled by search engines and extends the query (keyword) reach of the site in search. In this respect, the sites, forum serves an integral part of its web infrastructure. A fiscal benefit of having an active forum with a lot of users is that as the reach of the forum expands through publishing new topics and pages, it provides more exposure for advertisers, which earns more revenue for the site.

The mobile specifications of the site are both relevant for the site to connect with users through mobile devices while also sustaining account management features. The system sends the notification message to the client's account to the website and to their mobile

phone in the form of SMS. In this way personal information can be gathered from users based on the items trade between clients. The processed data is stored in the database. This web service is developed using HTML5 and Java Script as front end and MySQL relational database and PHP as backend languages [12, 69]. The primary consumer base of this trading site is composed of individuals seeking to trade goods.

There is room to expand the brand into a sector of providing a platform for individuals to barter services as well. In this since the site also serves as a web community and depending on the potential size of the site, there is the possibility of its user base evolving into a trading marketplace. Intangible site features can emerge out of expanding the site's user base. While certain items will trade based on market value, the site itself could eventually serve as a primary source or barometer to access information on market value of popular items. For example, users will be able to identify how many iPhone 6s they can get for a particular car or another item of traditionally cyclical value. In respect to the exchange of services, the site will have to expand before venturing into providing this feature; the main premise is that users will be able to offer their services for a particular item, or they can offer services in exchange for services. There will have to be some form of monitoring put in place to track whether services are rendered which would be a challenging barrier to this form of expansion.

The market place serves as one of the primary features of the site and for optimum exposure to potential users it is integrated with Facebook, Twitter, and Google+ API. Registers users, and non-users alike can access the marketplace through their social media accounts to view available items up for trade. E-mail is represents the final valued feature specification of the site as the trading site's newsletter is distributed through e-mail, as well as standard communication with users. As previously stated, the site has the potential to grow into a resource for market information as well as a tool for individuals to trade their items. Within the newsletter, product reviews and exchange rates can be provided to potential traders. This also opens up a new platform for advertising, both for external stakeholders as well as for the site itself.

Application

A web application, or web app, represents a program that is stored on a remote server. The application program is used to deliver system protocols over the internet through a browser interface. The application interface works simultaneously with the server and the site user. The back end of the application is structured through the intelligent design

of SEO for optimal ad performance and user Account Management [4, 30]. In addition to having a significant impact on the application's layout and presentation as it is delivered to the user, SEO entails all of the links, code, content, and other aspects of the website structure that influences the site's traffic. Applications that implement effective SEO are structured in a way that is conscious of search engine algorithms, while at the same time not sacrificing the user's experience on the site.

Mobile UIF

The advantage to expanding a website's presence to mobile devices is invaluable on many levels. Specifically as it relates to reaching more consumers, before going through the steps necessary to building a universal mobile framework, it is important to evaluate what a framework is and why it is significant and useful for this development project. Building a universal framework for iOS or Android can entail a variety of factors that relate to the fundamental functioning of the site and its marketability and reach within the mobile sector. Universal information framework (UIF) involves a hierarchical directory composed of shared resources [25, 9]. For example, a UIF might have a dynamic shared library, image files, header files, reference documentation organized in one single location, or nib files [25, 9]. Instead of having header files and binaries in disproportionate locations a framework connects all components together in one finite package. It places components in one known structured directory, like a library, that can enable developers readapt website structure to a mobile platform. Packaging a library as a framework simplifies things for developers because it not only provides a binary to link against, but it includes all of the necessary header files to reference as well.

The mobile universal framework utilized for this trading site can be defined as a framework that encompasses a binary built specifically for use with architectures like armv6, armv7, and i386, which is useful in iOS development. This is due to the fact that a mobile application can be built for the simulator (i386) and the device armv6, armv7 which enables developer to statically link a library resolves symbols at compile time and embeds the library into the application. Currently, it is not possible to create a dynamic iOS framework, but iOS Universal Framework is a project that simplifies the process [25, 9]. iOS Universal Framework helps by providing an XCode template which helps developers get through the process of developing for iOS [25, 9]. The use of MySQL on the trading site also makes it more adaptable to mobile UIF as Apple and Android manufacturers and developers have invested a lot of attention to making the infrastructure of mobile devices more compatible with basic web architecture as Makice notes this through the use of an

XCode template. For the trading site's mobile application presence on social media sites, an XCode template will be utilized as well, specifically for compiling a library into its armv6, armv7, and i386 variants.

Verification

Verification entails advancements in software architecture, specifically those related to emerging internet security platforms have expanded technology and web services market to a much larger range of possibilities that were not available prior to their implementation. A prime example of this can be seen with the advent of Virtual iD online security protocol, or computer forensic tools like Scapel. These innovations make the internet a safer place to handle business, but more importantly a safer place for individuals to share their live with the world.

4.2   Functional Requirements

Key functional requirements of the site all stem from its necessity to provide its intended service to the user. This means the effective mediation and assisted transaction of bartering agreements, which is the core functional requirement of the website. Essentially the resource the site is providing the end user is a database of information that can best enable them to trade items for the ideal item they have in mind. The functional requirements entail all of the key functions that the website and underlying software of the site must carryout in order to meet its objectives of operation. This means in order for the core operations of the site to work, operations like trading about the core operations. Because the "functions" are established before development, functional requirements must be written in the future tense.

In developing the web application for the trading site, some of the functional requirements are as follows. The web application shall allow users to upload images of items, as well as a distinct image for personal identification to be used as the avatar on their profile. The web application shall be able to hold certain items during set periods to keep them out of the view of the public while bartering negotiations are underway. The web application shall produce a digital receipt of exchange detailing trade history between users, which includes name of customer, items traded, the estimated monetary of each item and time of the transaction. The web application shall have SIM communication capabilities to message clients when necessary. The web application shall be able to produce weekly, monthly and yearly reports about trades. The web application shall provide a

front-end database for users to search through to identify available items for trade on the site. It is important to note that all of the above mentioned requirements are directly related to the site's ability to operate and provide its key function of supporting the trade of items between site users [6, 10].

4.2.1 Use Case Diagrams

A use case diagram represents a unified modeling language (UML). It is utilized as a form of behavioral diagram. A use case diagram in the Unified Modeling Language (UML) is most commonly understood as a behavioral diagram which is structured and defined through the use of Use-case analysis. Use cases are developed during the analysis process of a particular project to pinpoint partition system functions and how they operate. During a used case analysis the partition systems are broken down into actors and use cases. A use case details a sequence of actions that provide some form of measurable value to an actor. An actor represents an organization, person, or external system that plays a role in one or more interactions with the system. ER Diagram breaks down the nature of an entity-relationship (ER). It is a specialized diagram that illustrates the interrelationships shared between entities in a database.

As the main use of the trading site is for users to barter items, the actors in the use case diagram below are broken down into two respective traders making an exchange on the site.
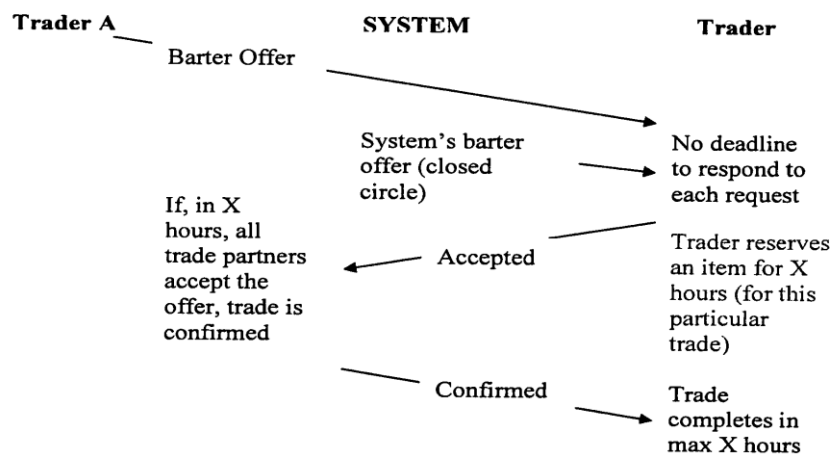

Figure 2. Use Case Diagram

Figure 2 shows that time plays a significant role in the bartering process as its critical users have the ability to trade their items based on supply and demand, the necessary need for a particular item can substantially influence within the marketplace of the website as a whole. This means the amount of time a particular trader has to make a decision about whether or not to execute a particular transaction becomes critical to the sites function as an effective trading site. This is also a factor that distinguishes this site from competitors, as there is no standard policy for the timeframe between trades within the bartering market.

4.2.2   Entity Relationship Diagrams

A critical aspect of software engineering is the development of entity relationship models. ER models are data models utilized to describe the data information aspects of a business domain and its operation requirements. ER models are drafted to present an abstract representation of how the data information are organized and related with each other prior to their implementation in a database such as a relational database. The Entity relationship model is the figure which is the graphical representation of the firms with each other. This is used in connection with the different database systems and computing the data organizing. It is the place of linking the data with that of the information system and storing data. The relationship can be one to one, one to many and many to many. In the case of online shopping web development, the relation is many to many.
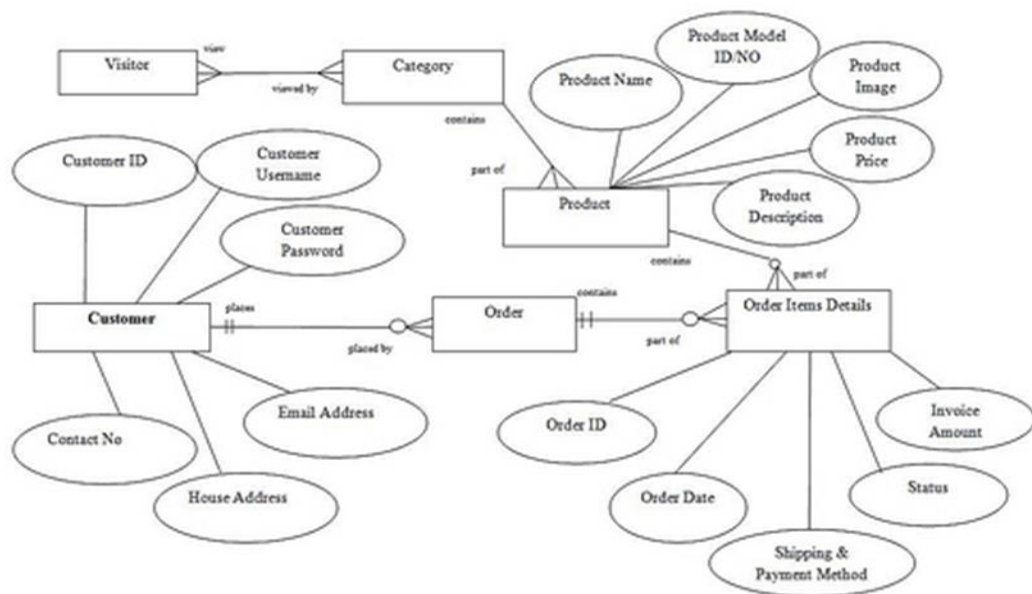

Figure 3. Entity Relationship Diagram

As can be seen in figure 3, many relations exist with the information system for an online shopping website. An entity means an object which is shown in the boxes to store information and data. The key attribute or the unique features of each entity shows the distinguishing characteristics of the company or the website. The relationship explains how each attribute shares the data and the information from the database using the information system. In brief, the Entity relationship diagram illustrates the database logical structure as shown in figure 4.
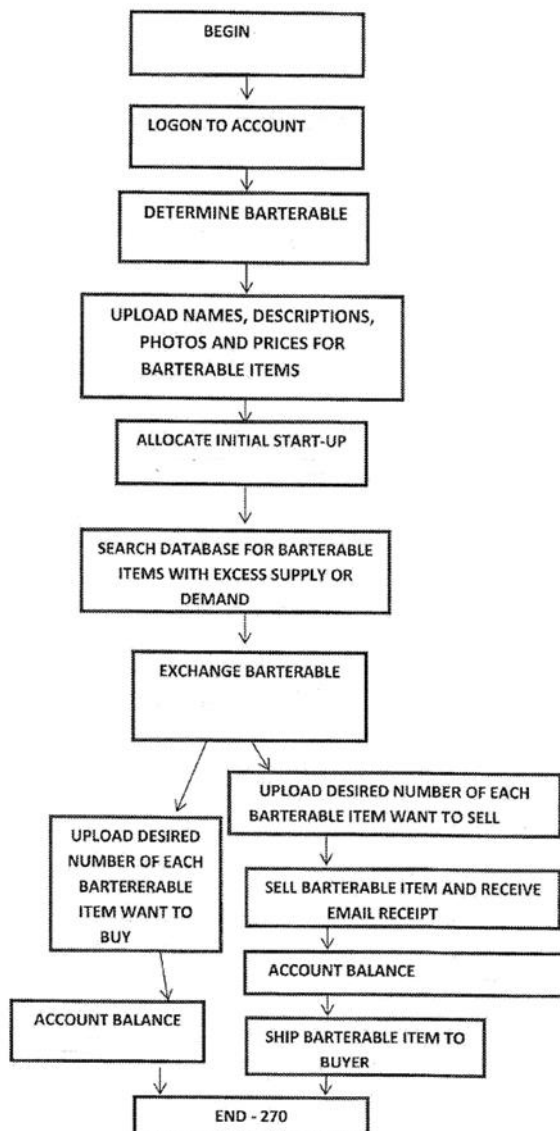

Figure 4. Entity Relationship Diagram

An essential aspect of mapping out an effective entity relationship model for the trading site, is having a clear understanding of the relational database management and how data management must function within a Web 2.0 landscape. Figure 4 demonstrates that the primary focus of all data on the site is to serve barter agreements/ trades, and to supplement these transactions. Activity in regard to the exchange and transfer of information stems primarily from this objective. There are tables for the storage of personal profile info and tables for the item exchanges, but in the end the core function of the site is to oversee, and supplement, the interaction between two specific individuals as they carry out a trade.

4.3   Non-Functional Requirements

In additional to functional requirements, there are also non-functional requirements that the site is expected to support. In addition to executing core operational functions, there are also aspects of the sites functionality and intended objectives that may require it to conform to certain unsaid criteria that have nothing to do with the primary functions for it to operate but that could still impede the site overall effectiveness. For example, some of these non-functional requirements include aspects of the site's operations like the reliability of the site, the response time, customer support, database security, and response time and reliability.

Non-functional requirements are less focused on the actual site functions than the outside features that could influence user satisfaction. Some non-functional requirements for the trading site include the web application being intuitive in its use making it convenient to use by all employees including admin support representatives and managers, the web application being available in multiple languages, and for the web application allowing several trades to be made simultaneously without negatively impacting performance. It should be noted that each requirement is not related to an operation, how the application functions. Instead, the main focus in this case is the ease of use and performance.

5   Developing the Application

The aim of the study is to highlight the significance of the social media in the development of websites. The other goal is to build a database design to develop the website application. The study also aims to define the concepts of social media and web 2.0 in more

detail with the help of written resources and articles. The process of application development plays a key role in forming a website that satisfies its core objectives, specifically to supplement the trade of items across the platform between users. This entails effective application development on the front end of the site, intuitive database design, and user account management features that make the site appealing to the end user.

5.1   Front-end Implementation

Home page

The home page, in addition to being the core piece of web real-estate and infrastructure for the company's brand and operations, houses the key front-end resources and tools through which users will first engage with the site. The home page houses all tabs leading to supplementing pages of the site such as the login tab, the about us tab, site logo and search engine boxes that enable users to search the site's database for available items. Banner and contextual advertising is also present on the home page for revenue and marketing purposes. Contextual advertising is also located on the site in necessary locations for ideal SEO purposes, as it can enhance the ability of the site to reach its target audience [14, 151]. The banners utilized for self-promotion are affiliated with the actual trademark of the site [26, 289]. The main banner at the top of the home page represents the trademark of the site and can be utilized as a distinct promotional resource both on and off the site for advertising purposes. The banner itself can be placed throughout social network outlets to enhance the exposure audiences have to the brand as a whole [33, 529].
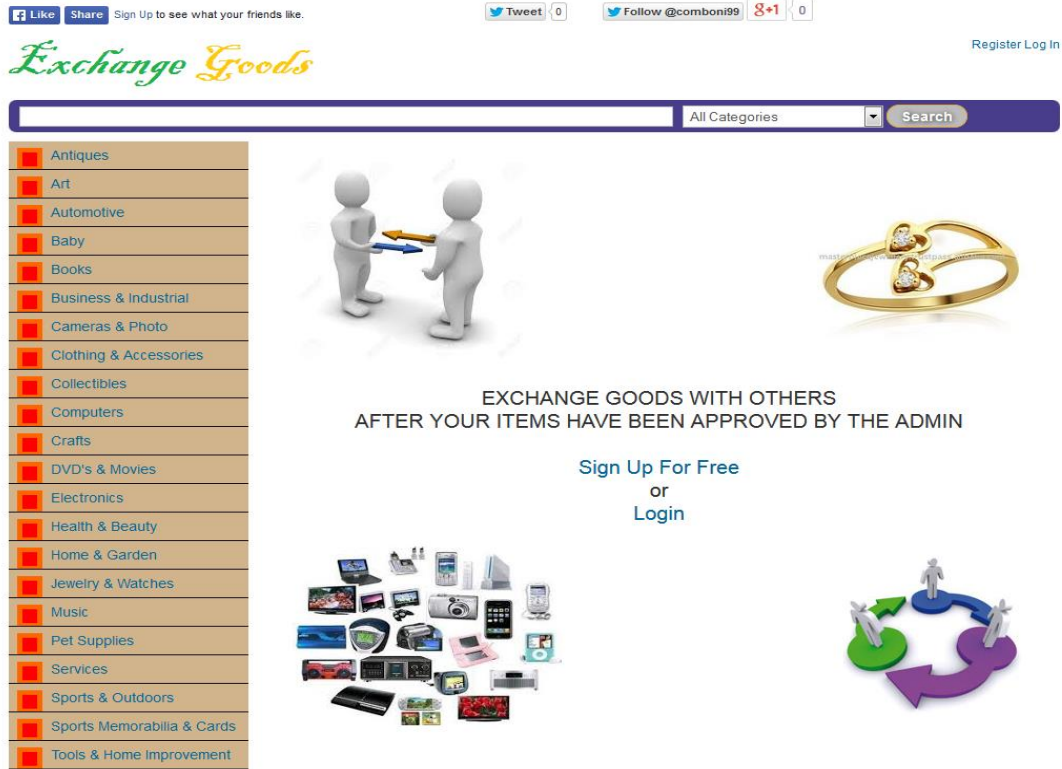
Figure 5. Home Page

Figure 5 shows the home page that every visitors will see when they come to the site.

Login page

The login page is where existing users log in to their account, which they have previously established with the website. The login page is an essential aspect of the front-end portion of the website as it provides users with access to the main site and its core functions. Due this fact special emphasis is placed on security in the form of added ant-phishing applications and authentication to ensure that private data of users is not corrupted. The Login page utilized for the site will be similar to the one below, where there will be a prompt visible for the user encouraging them to register and "create an account," in the case that they have not already registered with the site and accessed the login page by mistake. There is also a visible table making it possible for the user to recover their password or login details in the case that they are forgotten. All recovery procedures are handled by e-mail.

A key aspect of the login page that must be noted is its seamless integration with social media network API. Through the use of Application Program Interface (API) tools provided by social network sites like Google+, Twitter, and Facebook, users have the option of creating an account using their accounts on any of these respective sites by simply logging into the social network. The added marketing advantage presented when users choose to log in using their social network website account profiles is that upon registering they will be prompted to inform their friends or followers that they have just registered on the trading app. While they have the option to opt out of alerting their friends or followers, the process still provides an invaluable form of free advertising for the site.
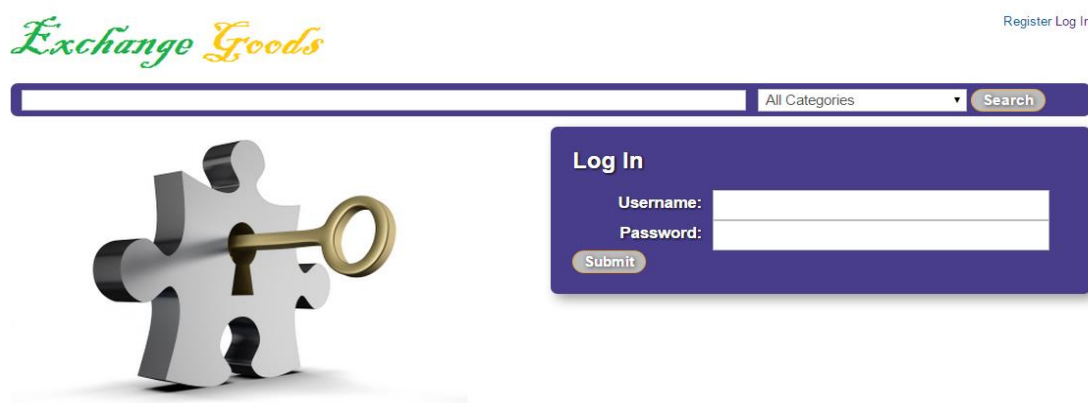

Figure 6. Login Page

Figure 6 shows what the existing users need to insert in the fields in order to sign to their account.

Registration page

The registration page of the site is formulated in such a way that users can either register through their social network accounts or by the standard process of signing up through their e-mails, upon registration the users is provided with a new account on the site but must confirm with their e-mail address through a message sent to them automatically from administration. The system's database formulates a profile, inbox, and other standard account features where they can put in their personal information. The user is also prompted to create a password for later logins.
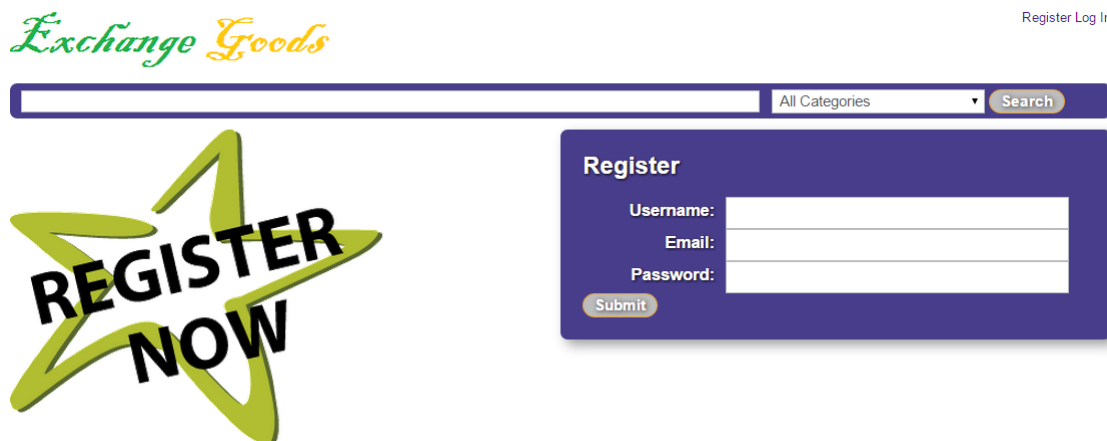
Figure 7. Registration Page

As can be seen in figure 7, new users are required to provide a valid e-mail address and password to successfully register in the system.

5.2   Database Design

The database design for the trading site is constructed using MySQL, which is recognized as the second most commonly used relational database management system (RDBMS) and the most commonly used open source system in the world. MySQL was chose as the primary database design language do to its convenient accessibility, as the MySQL source code is available as an open source language through the GNU General Public License and provided by the Oracle Corporation. The database is constructed through a model driven schema design where model and scheme validation are supported through MySQL-specific physical standards of design. The actual work of designing the database for the trading site is executed utilizing MySQL workbench, a unified visual tool for developers, database architects and programmers. MySQL was chosen specifically as the tool to implement the database design needs for this project because it offers SQL development resources for data modeling, user administration support, data backup capabilities, and the comprehensive administration resources necessary for server configuration. MySQL is also conveniently compatible with Linux, Mac OS and Windows. An example of the work desk is shown below:

When going through the database designing process, MySQL Workbench allows data architects and developers to design a visual model and manage databases simultaneously. One of the most essential aspects of the database designing process is to develop

a system that has the capacity to keep data secure while also being able to adapt to relevant trends. This entails the act of database migration which could pose potential problems in the future. Database migrations through the use of MySQL Workbench, provides for the migration from Microsoft Access, the Microsoft SQL Server, SQLite, PostgreSQL, Sybase ASE, Sybase SQL Anywhere, and many more programs [23, 1480].

In the development process of this trading website, data migration will play an essential role in designing the databases effectively to service the user's ideal needs. There will be a need for adaption, changes and shifting the project in different directions in regard to website architecture. MySQL Workbench enables the developers for the project to source and target specific selections as they design which lets the user define specific data sources and to assess source data prior of the migration process, enabling object migration allows users to select objects to migrate, assign sources to target mappings where needed, and edit migration scripts and create the target schema in the form of tables and a database table structure.

The tables of the site are organized through MySQL, and they represent the base from which the website architecture is constructed. For example, table 1 stores all the added items through a 16 row organizational structure. This section shows users what items have been added to the site for trade. On the front-end, the registered user only sees their personal items. On the back-end, admin sees all of the collective items that have been added to the site. Table 2 stores all the trades items, specifically the data related to the items that have already been traded. Table 3 serves as a resource for the data related to offers given for items. Each table stores respective data related to the fluid functioning of the site. The efficiency with which this data is managed, interpreted, and exchanged across tables can significantly impact the response the site gets from its users. All SQL code, through the use of MySQL Workbench, is automated and does not need to be manually written. The system is capable of forward and reverse engineering of the construction of each table and all rows [27].

Table 1	Stores all the added items and has 16 rows
Table 2	Stores all the traded items and has 16 rows
Table 3	Stores the statistics of the items that means it holds the number of offers given for a single item and has 2 rows.
Table 4	Stores information about the messages and has 7 rows.
Table 5	Holds information about the opened offers and has 7 rows.
Table 6	Holds information about the accepted offers and has 9 rows
Table 7	Stores information about the declined offers and has 8 rows.
Table 8	Stores information about shipping info and has 8 rows
Table 9	Stores information about user and has 6 rows
Table 10	Stores information about user statistics and has 2 rows
Table 11	Stores information about temporary users and has 5 rows
Table 12	Stores information about feedback and has 6 rows

Table 1. Database table description

Table 1 shows the database tables and the type of data they contain.

5.3   User account management

After the users have logged into their account, they will be directed to the following menu page:

Items menu

The items menu breaks down the list of items currently on the site by category. For example, certain items might fall under the category of active items, which entails items approved by the admin, while pending items, refers to items awaiting approval from the admin and the add item tab allows registered users to add new items. The key aspect of the items menu is that it is accessible as a front-end portion of the home page as well as a back-end portion of the main site where non-registered visitors to the site are able to view items prior to becoming registered members. However, they have no access to detailed criteria involved in the trading of a particular item until they register. Non-registered members are provided with social network API tabs that enable them to share a particular item to their preferred social network, such as Facebook or Twitter. This creates and added avenue for organic promotion which extends to the social network marketing landscape. When a non-registered, or registered user, shares a particular item with their friends or followers, it will create a backlink to the site and will serve as a form of unpaid advertisement. The intended result of this entity relationship is that it makes the site more accessible as well as more sharable within the social media community.

Trade menu

The trades menu breaks down information associated with the trades of a particular user. This is primarily a back end feature that is provided solely to registered users where they are able to review their trade history for personal record. The trades menu provides the information to registered users like, offers received, offers made, offers declined, and completed trades. It should be noted that an extension of the trades menu that plays a pivotal role in the functionality of the site is the sites rating system. While the number of trade offers received, made, or declined, of a particular user is not made public to other users the number of completed trade is visibly placed next to each individual user's avatar along with a five star rating system based on user feedback. This five star-rating system is a community-based representation of consumer feedback and is a natural self-

sustaining system of the review within the site, which helps the site maintain integrity and establish trustworthiness among users.

Messages menu

The sites database allows for a mailing system that is directly connected to the e-mail address provided to administration during the user's initial registration through API. The in-site mailing system is composed of the standard features of traditional e-mail such as an inbox, a sent mail folder, a trash folder, and a word processing feature for users to compose messages. The mail menu is the primary resource through which admin and users can communicate and users can interact with one another.

Inbox

The inbox of the trading site is where users can receive important messages from administration, as well as messages from fellow users regarding trades. Similar to most sites that rely on e-mail systems, managing multiple e-mail accounts requires substantia use of data which in turn requires substantial maintenance. Depending on the level of site activity it may be deemed necessary to purge inbox accounts of messages older than 90 days. It may also be necessary to keep archived documentation of messages to resolve potential conflicts related to trades.

Sent

The sent message section of the messages menu keeps track of all messages sent by the user. This is an equally important feature provided by the site because as both parties engage in bartering over particular items, the back and forth interactions between users could serve as legally binding contracts in scenarios where the completion or legality of a trade is put into question. For this reason the message exchanged between the parties can be used as an evidence to handle trade disagreement.

Trash

The trash folder of the message menu serves as a data consolidation tool, with zip folder capabilities, to enable users to organize their inbox, while also enabling the site as a whole to function more efficiently through reduced data hosting obligations. This folder

is where users place messages that they are comfortable with having removed from the site's database within 30 days, but still have the option to retrieve them if they change their minds.

Compose

The compose section of the message menu serves both as a word processor as well as an essential resource for documenting correspondence between users. When a user starts composing a message, the message will be automatically saved as a draft every five seconds, or when the user stops typing. The compose portion of the message menu comes equipped with industry-standard word processor features such as a variety of fonts, italics, bold type, spell check, and text size options.

My Account menu

The "My Account" menu provides the user with a variety of features through which they can setup their level of engagement with the website and the site's community. Within the "My Account" menu, users provide important personal information that will assist them in engaging the site community and building trust, while also providing information that supplements the execution of effective trades. This includes users' profiles and their shipping information.

Profile

The profile page is an important feature of the site because it plays a pivotal role in how individuals interact on the network. Through the use of social network API, users can setup their accounts on the site using their Facebook, Twitter, or Google+ accounts automatically transferring their social network profile information over to the site itself. This includes the use of their primary Facebook, Twitter, or Google + profile image as their main avatar for the trading site. Users also have the choice of uploading a photograph from their personal computer, or not using an image and leaving the Avatar blank. Users are encouraged to provide some form of visible identification to enhance the credibility and trustworthiness of their profile and the integrity of the site as a whole.

Shipping info

The shipping info section of the "My Account" menu is where users provide the address to which they want their traded items sent. In addition to the above menus there is one more menu that the admin could access.

Figure 8. User account page

Figure 8 shows the users page when they logged into their accounts .In this page users are able to manage their active items, trades, messages, profiles and shipping info.

Admin menu

The final menu that assists in allowing the site to function is the Admin menu, which entails the user, pending items and reports, as shown below in table 2.

Table 2. Admin menu description

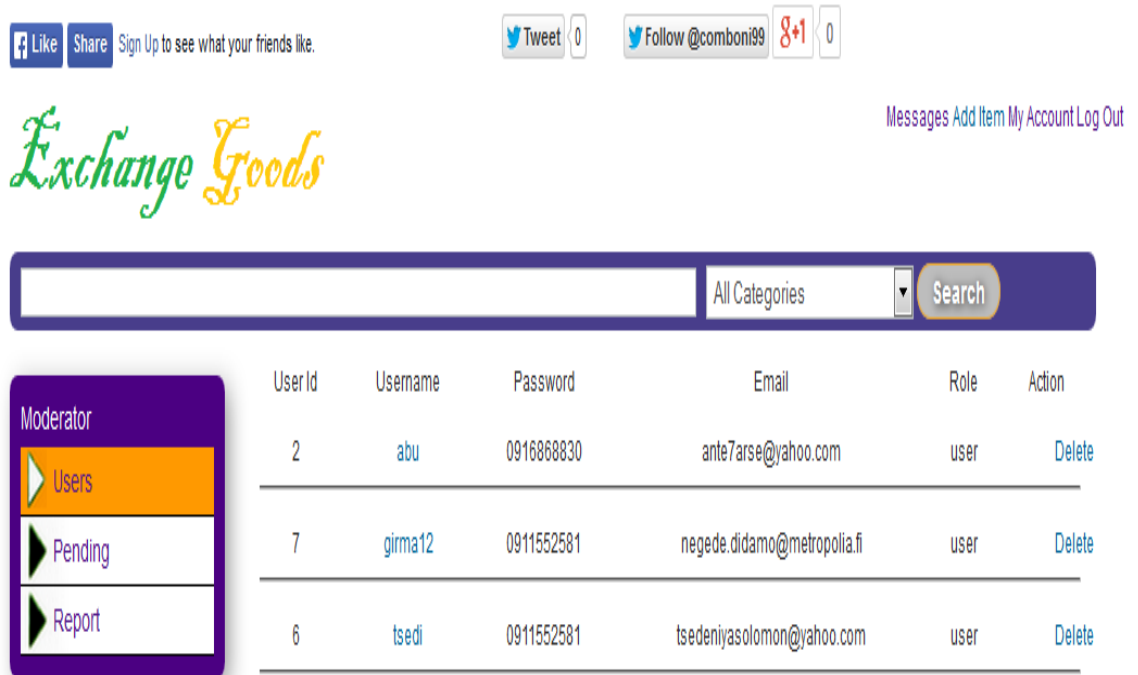| Users	The registered users.
Pending	The items added by the users and wait-ing the admin approval.
Report	The reported items by the users to be banned by the admin.

Figure 9. Admin page.

As can be seen in figure 9, the administrator controls the site users, the uploaded items and the reported items that violate the rule and the regulation of the website.

6   Discussion

The data in this report has clearly demonstrated how internet has been an important tool of modern business, and how it has become one of the main channels of communication, and sales of various products or services. Many industries have shifted to the internet, such as real estate, automobile business, trade appliances and clothing, home delivery of books, food and other goods. The trading site proposed for this social media and web development project involves the creation of a site that provides trading services within the bartering sector. This entails a keen understanding of consumer needs in respect to trading. As the study demonstrates, due to the fact social media plays such a substantial role in the effectiveness of businesses today to reach their consumer base, it is critical that the site proposed in this project incorporate social media as an inherent part of its marketing strategy. This can be done through the use of social media network API to enable the site to seamlessly connect to Twitter, Facebook and sites such as Google+. By ensuring that the processed data is stored in a secure and efficiently managed data-base. The site can sustain the non-functional requirements necessary for success within its market in addition to its core objective.

Integrating trade operations with the aspects of social media can provide the site with an advantage over other bartering sites within its market. Preparing the site for this level of expansion is not easy and require some level of development and restructuring. The previously mentioned study revealed many of the advantages and disadvantages associated with incorporating systems which utilize social media API as integral parts of their operations. One distinct disadvantage that has yet to be addressed deals with the integrity and sustainability of social media platforms. It is possible that these third-party sites can lose their influence and reach over time, reducing their value for marketing purposes.

There are also some concerns in regard to design that will greatly influence how traffic visiting from social network sites to the trading responds to the site content. Some important design features include, the way the site is structured, the ease and uniqueness of the design, and the convenience of transactions. It is also important that the site be able to host high-speed downloading, have the right choice model to maintain a solid understanding of its consumer base [4, 30], and that all interface functions are correctly developed [4, 30], The final important design issue that is of concern relates to the sites key operation of trade and the possibility of running out of items to trade. This is why the constant renewal of items on the site must be sustained [4, 30].

Due to the fact that this trading site is developed using HTML5 and Java Script at the front end and MySQL relational database and PHP as back-end languages, it makes it more conveniently adaptable to social media site usage. As the study shows this is incredibly invaluable for the sites ability to assist users in trading items across the platform. In addition to this, it has recently become a standard for every website to be integrated with social media outlets for web-based advertisements and for international accessibility. Facebook, Twitter and Google+ represent the most widely used social media networks to date; for this purpose, features of Application Program Interface (API) of respective social media networks are the primary resource that will assist the trading site in reaching new users. API is valuable for its ability to assist in the social network to the website interface process, but also in diverse unique ways these interfaces are formed across different platforms. Overall, the above research assessed the factors associated with designing a trading website that functions and operates through social media channels as well as through its own independent web infrastructure for optimized performance and self-sufficient marketing. The goal initially set in the opening analysis of this project has been met in respect to establishing an effective relational data model that incorporates social media network API to expand, reach and secure data.

7   Conclusion

To sum up, the goal of the above study was designed to assess factors involved in designing and implementing a trading website inherently connected with social media as an aspect of its functionality. The data revealed that social media has influenced the e-commerce and development landscape so significantly that developers and managers alike must reconsider how they will approach issues such as database design and relational data management. The current information explains the core infrastructure of the website as it works simultaneously as a social network where users can trade items between one another and as an integral part of the social media culture.

The system provides a registration page for new users and a login functionality for the existing users. Upon successfully logging in, users are able to add items to the website and then trade those items for other ones. In addition, clients can place an offer for other people's items and receive a notification message when an offer is placed for the item. The system sends a notification message to the client's account to the website and to his or her mobile phone in the form of an SMS. The system is able to gather personal

information and items from the client and it handles the data on the server side. The processed data is stored in the database.

Overall, the above study assessed factors associated with designing a trading website that functions and operates through social media channels as well as through its own independent web infrastructure for optimized performance and self-sufficient marketing. It was found that through establishing an entity relationship, API can assist developers to seamlessly integrate social media network functions to the site's operations. This creates a climate where there is a higher probability of reaching more potential users for the site, while at the same time cutting costs associated with advertising. The study presented in this social media and web development project provides results that support the effectiveness of social media use as a competitive resource for the operations of the proposed trading site.

References

1   Adams, Carol A., and Geoffrey R. Frost. Accessibility and functionality of the corporate web site: implications for sustainability reporting. Business Strategy and the Environment 15, no. 4 (2006): 275-287.

2   Bennett, W. Lance. New media power. Contesting media power (2003): 17-37.

3   Berthon, Pierre R., Leyland F. Pitt, Kirk Plangger, and Daniel Shapiro. Marketing meets Web 2.0, social media, and creative consumers: Implications for international marketing strategy. Business Horizons 55, no. 3 (2012): 261-271.

4   Bertot, John Carlo, Paul T. Jaeger, and Derek Hansen. The impact of polices on government social media usage: Issues, challenges, and recommendations. Government Information Quarterly 29, no. 1 (2012): 30-40.

5   Bonsón, Enrique, et al. Local e-government 2.0: Social media and corporate transparency in municipalities. Government information quarterly 29.2 (2012): 123-132.

6   Capra, Eugenio, Chiara Francalanci, and Sandra A. Slaughter. Is software green Application development environments and energy efficiency in open source applications." Information and Software Technology 54.1 (2012): 60-71.

7   Carlo Bertot, John, Paul T. Jaeger, and Justin M. Grimes. Promoting transparency and accountability through ICTs, social media, and collaborative e-government. Transforming Government: People, Process and Policy 6.1 (2012): 78-91.

8   Cheston, Christine C., Tabor E. Flickinger, and Margaret S. Chisolm. Social media use in medical education: a systematic review. Academic Medicine 88.6 (2013): 893-901.

9   Constantinides, Efthymios, and Stefan J. Fountain. Web 2.0: Conceptual foundations and marketing issues. Journal of Direct, Data and Digital Marketing Practice 9.3 (2008): 231-244.

10   Cormode, Graham, and Balachander Krishnamurthy. Key differences between Web 1.0 and Web 2.0. First Monday 13.6 (2008).

11   Dabbagh, Nada, and Anastasia Kitsantas. Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. The Internet and higher education 15.1 (2012): 3-8.

12   Dabner, Nicki. Breaking Ground'in the use of social media: A case study of a university earthquake response to inform educational design with Facebook. The Internet and Higher Education 15.1 (2012): 69-78.

13   DeAndrea, David C., et al. Serious social media: On the use of social media for improving students adjustment to college. The Internet and Higher Education 15.1 (2012): 15-23.

14 Ellison, Nicole B., and Danah Boyd. Sociality through social network sites. Oxford: Oxford University Press, 2013.

15 Erdoğmuş, İrem Eren, and Mesut Cicek. The impact of social media marketing on brand loyalty. Procedia-Social and Behavioral Sciences 58 (2012): 1353-1360.

16 Evans, Dave. Social Media Marketing: An Hour a Day. John Wiley & Sons, (2008).

17 Gerlitz, C., and A. Helmond. The like economy: social buttons and the data-intensive web.New Media & Society 15.8 (2013): 1348-1365.

18 Hays, Stephanie, Stephen John Page, and Dimitrios Buhalis. Social media as a destination marketing tool: its use by national tourism organisations. Current issues in Tourism 16.3 (2013): 211-239.

19 Hales, Wesley. *HTML5 and JavaScript Web Apps.* O'Reilly Media, Inc., 2012.

20 Holzinger, Andreas, Peter Treitler, and Wolfgang Slany. Making apps useable on multiple different mobile platforms: On interoperability for business application development on smartphones. Multidisciplinary research and practice for information systems. Springer Berlin Heidelberg, 2012. 176-189.

21 Ji, Lei, Jun Yan, Ning Liu, Wen Zhang, Weiguo Fan, and Zheng Chen. Exsearch: a novel vertical search engine for online barter business. In Proceedings of the 18th ACM conference on Information and knowledge management, pp. 1357-1366. ACM, 2009.

22 Kietzmann, Jan H., et al. Social media Get serious! Understanding the functional building blocks of social media.Business horizons 54.3 (2011): 241-251.

23 Kroenke, David, and David J. Auer. *Database concepts.* Prentice Hall, 1480-1486. 2010.

24 Mangold, W. Glynn, and David J. Faulds. Social media: The new hybrid element of the promotion mix. Business horizons 52.4 (2009): 357-365.

25 Makice, Kevin. Twitter API: Up and running: Learn how to build applications with the Twitter API. O'Reilly Media, Inc., 2009.

26 Merchant, Raina M., Stacy Elmer, and Nicole Lurie. Integrating social media into emergency-preparedness efforts. New England Journal of Medicine 365.4 (2011): 289-291.

27 MySQL, A. B. MySQL. (2015). MySQL, A. B. (2001). MySQL.

28 Neiger, Brad L., et al. Use of social media in health promotion purposes, key performance indicators, and evaluation metrics. Health promotion practice 13.2 (2012): 159-164.

29 Reuter, Christian, and Simon Scholl. Technical Limitations for Designing Applications for Social Media. Mensch & Computer 2014–Workshopband: 14. Fachübergreifende Konferenz für Interaktive und Kooperative Medien–Interaktiv unterwegs-Freiräume gestalten. Walter de Gruyter GmbH & Co KG, 2014.

30   Russell, Matthew A. Mining the Social Web: Data Mining Facebook, Twitter, LinkedIn, Google+, GitHub, and More. O'Reilly Media, Inc., 2013.

31   Stelzner, Michael A. Social media marketing industry report. Social Media Examiner 41 (2011).

32   Stephen, Andrew T., and Jeff Galak. The effects of traditional and social earned media on sales: A study of a microlending marketplace. Journal of Marketing Research 49.5 (2012): 624-639.

33   Sykes, Julie M., Ana Oskoz, and Steven L. Thorne. Web 2.0, synthetic immersive environments, and mobile resources for language education. Calico Journal 25.3 (2013): 528-546.

34   Tuten, Tracy L. Advertising 2.0: social media marketing in a web 2.0 world. Greenwood Publishing Group, 2008.

35   Weinberg, Tamar. The new community rules: Marketing on the social web. Sebastopol, CA: O'Reilly, 2009.

36   Zappavigna, Michele. Discourse of Twitter and social media: How we use language to create affiliation on the web. A&C Black, 2012.

Code Files.

index.php

```php
<?php
session_start();
include("includes/connect.php");
include("includes/html_codes.php");
include("functions/index_menu.php");
?>
<!DOCTYPE html>
<html lang="en">
<head>
        <title>Index</title>
        <link rel="stylesheet" href="css/main.css">
        <link rel="stylesheet" href="css/index.css">
</head>
<body>


<div id="wrapper">
        <?php headerAndSearchCode(); ?>
                <aside id="main_aside">
                <ul>
                <?php index_Links(); ?>
                </ul>
                </aside>
                <section id="main_section">

                <?php echo $activetext ?>

                </section>
        </div>
        <?php footerCode(); ?>
        <script type="text/javascript" src="functions/fun_in-
dex_menu.js"></script>



</body>
</html>
```

login.php

```php
<?php
session_start();
include("includes/connect.php");
include("includes/html_codes.php");

if(isset($_SESSION["user_id"])){ /*checks if the user is logged
in*/
```

```php
header('Location:account.php');
}
if(isset($_POST["submit"])){// checks if the submit button is
clicked
        $error = array();

        //validate the username
        if(empty($_POST["username"])){
        $error[] ='Please enter a username.';
        }else if (ctype_alnum($_POST["username"])){
        $username = $_POST["username"];
        }else{
        $error[]='Username must consist letters and numbers
only. ';
        }

        //validate the password
        if(empty($_POST["password"])){
        $error[] ='Please enter a password.';
        }else{
        $password = mysql_real_escape_string($_POST['pass-
word']);
        }

        if(empty($error)){ // if no error
                //log in code
                $result = mysql_query("SELECT * from users WHERE
username='$username' AND password='$password'") or die();
                if(mysql_num_rows($result)==1){ // if the number
of the row from the above query is 1
                while($row=mysql_fetch_array($result))
                        {
                        if($row["role"]!="deleted"){
                        $_SESSION["user_id"]=$row["user_id"];//
assigns  a session variable to the user
                        echo"<META http-equiv='refresh' con-
tent='0;URL=http:account.php'>"; // directs the user to the my-
acount page
                        }else{
                        $error_message='<span class="error">User
is deleted by admin</span><br/><br/>';}
                        }
                        }else{

                $error_message='<span class="error">Username or
password is incorrect</span><br/><br/>';
                }
        }else{// if there is error
        $error_message='<span class="error">';
        foreach($error as $key=>$values) // loping through each
of the errors in the array and store them in the variable $val-
ues
        {
        $error_message.="$values";// each of the error seen on
the screen
        }
        $error_message.='</span><br/><br/>';
        }
}

?>
```

```
<!DOCTYPE html>
<html lang="en">
<head>
        <title>Login</title>
        <link rel="stylesheet" href="css/main.css">
        <link rel="stylesheet" href="css/forms.css">
        <link rel="stylesheet" href="css/login.css">
</head>
<body>
        <div id="wrapper">
        <?php headerAndSearchCode(); ?>
                <aside id="left_side">
                <img src="images/login.png"/>
                </aside>

                <section id="right_side">
                <form id="generalform" class="container"
method="post" action="">
                <h3>Log In</h3>
                <?php echo $error_message; ?>
                <div class="field">
                <label for="username">Username:</label>
                <input type="text" class="input" id="username"
name="username" maxlength="10" />
                </div>
                <div class="field">
                <label for="password">Password:</label>
                <input type="password" class="input" id="pass-
word" name="password" maxlength="10" />
                </div>
                <input type="submit" id="submit" name="submit"
class="button" value="Submit" />
                </form>
                <section>
        </div>

</body>
</html>
```

Register .php

```php
<?php
/* A session is a way to store information (in variables) to be
used across multiple pages.
Unlike a cookie, the information is not stored on the users com-
puter.
Session variables hold information about one single user, and
are available to all pages in one application.
A session is started with the session_start() function
Session variables are set with the PHP global variable: $_SES-
SION.
*/

session_start();
include("includes/connect.php");
include("includes/html_codes.php");/*all the html codes that can
be use in multiple pages*/

if(isset($_POST["submit"])){
        $error = array();/*store all of the errors in the ar-
ray*/

        //username
        if(empty($_POST["username"])){
        $error[] ='Please enter a username.';
        }else if (ctype_alnum($_POST["username"])){
        $username = mysql_real_es-
cape_string($_POST["username"]);
        }else{
        $error[]='Username must consist letters and numbers
only. ';
        }
        //email
        $regex = '/^[_a-z0-9-]+(\.[_a-z0-9-]+)*@[a-z0-9-]+(\.[a-
z0-9-]+)*(\.[a-z]{2,3})$/'; /*to check the string is in email
format*/
        if(empty($_POST["email"])){
        $error[] ='Please enter an email.';
        }else if(preg_match($regex, $_POST['email'])){
        $email = mysql_real_escape_string($_POST['email']);
        }else {
        $error[] = 'Your email adress is invalid. ';
        }
        //password
        if(empty($_POST["password"])){
        $error[] ='Please enter a password.';
        }else{
        $password = mysql_real_escape_string($_POST['pass-
word']);
        }

        if(empty($error)){
        $result = mysql_query("SELECT * FROM users WHERE
email='$email' OR username='$username'") or die();
        if(mysql_num_rows($result)==0){/*counts the number of
rows in the database table*/
        //that's good
```

```
        $activation = md5(uniqid(rand(),true));/*to generate the
random file*/
        $result2 = mysql_query("INSERT INTO tempusers
(user_id,username,email,password,activation) VALUES
('','$username','$email','$password','$activation')") or die();
        if(!result2){
        die('Could not write into database:').mysql_error();
        }else{
        $message = "To activate your account please click on
this link: <br/><br/>";
        $message .= "<a href='http://users.metropo-
lia.fi"'/~negeded/finalyearproject/activate.php?email='.urlen-
code($email)."&key=$activation'>http://users.metropo-
lia.fi"'/~negeded/activate.php?email='.urlen-
code($email)."&key=$activation</a>";


        require_once('class/class.phpmailer.php');
        $mail = new PHPMailer();

        $mail->SetFrom('email', 'negeded ');

$mail->AddReplyTo("email","Name");

$address = $email;
$mail->AddAddress($address, $username);

$mail->Subject     = "Registration Confirmation";
        $mail->MsgHTML($message);
        if($mail->Send())
        {
        //sent to confirmation site
        header("Location:prompt.php?x=1");
        }else{echo"<META http-equiv='refresh' con-
tent='0;URL=http:prompt.php?x=10'>"; }
        }
        }else{
        // tell that username or email is in use
        echo"<META http-equiv='refresh' con-
tent='0;URL=http:prompt.php?x=2'>";
        }
        }else{
        $error_message='<span class="error">';
        foreach($error as $key=>$values)
        {
        $error_message.="$values";
        }
        $error_message.='</span><br/><br/>';/*ending span*/
        }
}?>

<!DOCTYPE html>
<html lang="en">
<head>
        <title>Register</title>
        <link rel="stylesheet" href="css/main.css">
        <link rel="stylesheet" href="css/forms.css">
        <link rel="stylesheet" href="css/register.css">
</head>
<body>
        <div id="wrapper">
```

```
        <?php headerAndSearchCode(); /*add the logo the  links
and the category */?>
                <aside id="left_side">
                <img src="images/registerbanner.png"/>
                </aside>

                <section id="right_side">
                <form id="generalform" class="container"
method="post" action="">
                <h3>Register</h3>
                <?php echo $error_message; ?>
                <div class="field">
                <label for="username">Username:</label>
                <input type="text" class="input" id="username"
name="username" maxlength="20" />
                <p class="hint">10 characters maximum (letter and
numbers only)</p>
                </div>
                <div class="field">
                <label for="email">Email:</label>
                <input type="text" class="input" id="email"
name="email" maxlength="80" />
                </div>
                <div class="field">
                <label for="password">Password:</label>
                <input type="password" class="input" id="pass-
word" name="password" maxlength="20" />
                <p class="hint">10 characters maximum</p>
                </div>
                <input type="submit" id="submit" name="submit"
class="button" value="Submit" />
                </form>
                <section>
        </div>

</body>
</html>
```

profile.php

```php
<?php
session_start();
include("includes/connect.php");
include("includes/html_codes.php");
include("functions/fun_userstats.php");

?>
<!DOCTYPE html>
<html lang="en">
<head>
        <title>Register</title>
        <link rel="stylesheet" href="css/main.css">
        <link rel="stylesheet" href="css/profile.css">
</head>
<body>
        <div id="wrapper">
        <?php headerAndSearchCode(); ?>
                <aside id="left_side">
                <img src="images/profile.jpg"/>
                </aside>

                <section id="right_side">
                <div class="box"><?Php echo profile($_GET["pro-
file_id"])?></div>
                <section>
        </div>
        <?php footerCode(); ?>
</body>
</html>
```