Development of an Intranet-Based Workplace Productivity Enhancing Enterprise Social Networking Tool

Ekenta Elizabeth Odokuma
Department of Computer Science,
University of Port Harcourt,
Port Harcourt, Nigeria

Ikenna Emmanuel Azorji
Department of Computer Science,
University of Port Harcourt,
Port Harcourt, Nigeria

DOI: 10.23956/ijarcsse/V7I3/01317

Abstract—We designed and implemented a Productivity Enhancing Enterprise Social Networking (ESN) System that encourages collaboration among staff and management to solve the problem of sub-optimal productivity in the workplace. Through this medium, reward for high flying staff can be announced to the whole enterprise thereby encouraging others to work harder. The Structured System Analysis and Design Methodology was adopted in this work. The new system built on HTML, CSS, JavaScript (using the JQuery library), Ajax, PHP and MySQL offers free and open source implementation options when compared to some other applications within the same category that drain finances to implement. Usability evaluation showed an average ease of use of 78% and indicated the site is efficient. An average overall satisfaction rating of 65% was obtained from usability evaluation participants. The developed system helps improve social collaboration among staff and as a result, workplace productivity in the enterprise.

Keywords—Intranet-based SNS, Enterprise SNS, Workplace Productivity, Open Source, Usability evaluation

I. INTRODUCTION

It is important that businesses stay productive and research new ways to cut cost and maximize profit, stay competitive and keep employer, employees and customers satisfied. For businesses to improve productivity and stay competitive, a more collaborative work system has to be developed. [1] In a collaborative environment, people can interact with each other, share ideas, help out others in times of need and share textual, documental, visual and vocal information easily. People in such environments will have a strong sense of community and their achievements can be duly appreciated. [2] Collaboration also allows people to learn from each other [3].

Collaboration in workplaces (especially workplaces in Nigeria) is greatly limited. This is mainly due to the fact that some of these workplaces still rely on manual, face-to-face methods to communicate and collaborate mainly within their ranks. These methods are either expensive or inefficient. The idea for the use of an enterprise social networking service to foster social collaboration within an organization was spun from the successes of social networking companies such as Facebook, Twitter, MySpace, etc. These social networking services are driving the modern internet revolution. Initially a media through which people can connect and interact, social networking services have evolved into a global advertising platform whereby enterprises can connect better with their customers [4]. Almost every major company today has a social media presence through which they connect with their customers, advertising products, providing support and getting feedback.

An online social networking service (SNS) is a platform to build social relations among people who for instance share common interest, values, activities and real-life connections [5]. Each user has a virtual representation known as his ‘profile’ and is permitted to share ideas, pictures, life events, documents, videos and so on. The major aim of social networks is to bring the physical human community into the web. People can meet new people, old friends and people they share common interests with.

An Enterprise (private) Network is a computer network built for a business outfit to interconnect its various company sites such as production sites, offices and shops in order to share computer resources. Enterprise networks are private and everything usually goes on internally. Most businesses implement enterprise networks so as to enable easier communication and sharing of business resources without such information getting to the outside world.

In this paper, we merge social networking and enterprise networks. Better social collaboration lead to better workplace productivity, hence, an enterprise social network could be a solution to sub-optimal workplace productivity. It would solve the problems of decreased productivity due to limited collaboration, it can also discover and solve several other subtle problems such as employee punctuality, employee attitude to work, teamwork and so on.

A. Statement of Problems

Despite huge efforts made by employers and employees, productivity in most workplaces (especially workplaces in Nigeria) is sub-optimal. This is due to a number of problems including:
Poor communication amongst employers and employees.
Poor inter / intra departmental communication.
Projects often suffer because resource distribution isn’t easy.
Projects often suffer because people involved really didn’t understand what was required of them, and in the end, the desired aim is not met.
Even when there’s an understanding of the job at hand, the people directly involved are sometimes unable to pass the information they have properly to the other sections of the organization.
There is usually a very great gap between staff much lower in the company hierarchy and those higher in the company hierarchy.
Employers depend majorly on mails and meetings to discover employee discontent, but employees tend to be rather conservative, leaving important details out of such discussions.
Some employees especially those lower in the company hierarchy lack a sense of belonging and find it difficult blending.

In the end, there’s a very huge gap between all the parties involved. Although solutions such as implementing social intranets and Enterprise social networks have been proposed and implemented, these services are either too expensive or generally out of reach to Nigerian companies.

There arises therefore a need to design and implement a Productivity Enhancing Enterprise Social Networking Service, that will enable social collaboration in an office environment by enabling effective communication amongst people in the company, hence increasing productivity. Each member of the social network would have a virtual identity through which he or she can be known. Previous, current and future projects can be discussed and situation reports can be prepared and shared at the click of a button. Awards and recognition can be given to deserving members of staff. In the case of shortcomings; rebuke and correction can also be made. Files and documents can be shared much more effectively and securely, as the risk of losing files to people outside the company is reduced. We believe that putting this in place will produce a more compact, more social and more productive work environment.

B. Aim and Objectives of the study

This study aims to address the problems of reduced productivity due to poor workplace collaboration by developing a tool that can be used as a social networking platform on the company’s intranet, thereby saving internet connectivity costs. The tool should also reduce deployment cost by using open source technologies.

The Objectives are as follows:
1. To design a simple, attractive and interactive user interface through which user accounts can be created, managed and verified. Users will also share files and documents through this interface.
2. To design the database for the tool
3. To implement our design on open source platform technologies and produce results
4. To perform usability test on the developed application and report how it fares

C. Significance of Study

A successful development, deployment and use of the system will ensure an increased productivity in the enterprise. As noted earlier by practitioners “happy employees mean happy customers” The employees would become more effective in performing their duties and customer’s dissatisfaction would be a thing of the past. With the aid of this tool, file exchange through manual means, What’s App and the internet (which is the current practice) will be a thing of the past. Instead of moving from office to office to share ideas staff can be in their various offices working on a given task at the same time chatting with a colleague on the platform

II. SYSTEM ANALYSIS

A. Analysis of the Existing System

Currently, offices especially in this part of the world rely on almost totally physical social collaboration methods. Interactions, information sharing and meetings are almost always on a physical basis. Although most offices these days rely on computers for document creation and storage, sharing of these documents are usually physical – either in printed formats or through physical storage media such as hard disks and flash drives. Sharing of information is either entirely physical through word of mouth or done using emails that rely on the use of costly internet services. Most offices employ the use of intercom telephones to connect various departments, and with the advent of IP phones, the concept of inter departmental connection via telephone seems likely to be the case over a long period of time. Most offices still rely on notice boards to display information on current and upcoming events, and at times, not everyone gets to see the necessary information on time. Often times, offices with separate branches all behave as very separate entities, with ‘colleagues’ on one branch only communicating with their colleagues at other branches through phone calls if at all.

B. Strengths of the existing system

- Physical communication is less expensive as communication is in its most basic forms.
- Fewer technicalities are involved as most communication is done manually.
There is a face – to – face interaction between parties who of course can communicate directly. 

The issue of network or equipment failure never arises.

C. Weakness of the existing system
- Communication is not just stressful but inefficient.
- Parties involved can only interact effectively with a small set of people.
- There is the problem of inter/intra departmental cooperation.
- File sharing entails major hassles.
- Stored physical files are vulnerable to damage, loss or being compromised.
- Important information at times is distant from the parties that need them most.
- Creativity is hampered by the lack of help and support presented to employers and employees alike.
- The system makes it difficult for employers to capture the true essence and substance of their employees.
- New employees most times find it difficult to adapt due to the communication gap between themselves and other members of staff.
- Employees find it difficult to express their discontents to their employers due to the communication gap that exists between the two parties.
- Employers find it difficult to point out members of a team that are actively or passively participating in group activities.

D. Analysis of the proposed system
The proposed system is to develop an Enterprise Social Networking service that will run within the organization’s private intranet. This service will permit social collaboration amongst users by providing a platform upon which users can make posts or topics, share files and documents, ask questions, give situation reports on on-going or completed projects, edit their profiles and view profiles of other users. Users can like and make comments on posts and files. The application will feature two parts: The admin end and the user’s end.

1) The Admin End: The admin end will feature admin operations such as user creation, viewing user’s profiles and deleting users. However, in the creation of users, the admin has a limited amount of user details he / she can input, as only necessary information such as the user’s username, password, first name and last names can be input by the admin.

2) The User End: The user on the other hand can only access the network by login. On creation of the user’s account by the admin, the user can then login to the network, make posts, comment on posts, share files and documents, start topics and communicate with other users on the network which in this case would be the user’s colleagues. The system does not feature instant messaging or any form of private messaging so as to increase user activities on the public activity stream and to keep every activity on the network open.

E. Strengths of the Proposed System
The following and more can be achieved from the new system:
- Communication becomes easier and fun while work is being done.
- Users can share ideas, offer help to other users and get help when needed easily.
- File sharing and organization is easier.
- Employee discontent can be discussed and tabled to higher authorities.
- Notifications of on-going and upcoming events can be made without the fear that certain members of staff wouldn’t get to see these notifications.
- Employees can get to know their colleagues better.
- Employers can capture the true essence and substance of their employees.
- Employee effort can be noticed and commended.
- Resentment can be made to faulting employees.
- Progress reports on completed and on-going events can be made.
- Employee profiles can be viewed easily and updated when needed.
- Workplace productivity would be positively affected.

III. SYSTEM DESIGN
Two forms of system design were performed: Logical Design and the Physical Design.

A. A Logical Design
The logical design of a system refers to an abstract representation of the data flows, inputs and outputs of the system. This is often conducted via modeling, using an over – abstract and sometimes graphical model of the actual system.

Use Case Diagram
The use case diagram is a description of a sequence of actions that a system performs to deliver an observable result to a particular actor. Figure 1 shows the Use Case diagram for the proposed system.
A flowchart is a type of diagram that represents an algorithm, workflow or process, showing the steps as boxes of various kinds, and their order by connecting them with arrows. This diagrammatic representation illustrates a solution model to a given problem. Flowcharts are used in designing, analyzing, documenting or managing a process or program in various fields. Figure 2 shows the System flowchart of the proposed system.

B. Database Design
We will use four database tables to organize the data in the application. Figure 3 shows the database tables and their interrelationships in a Relational Schema.

IV. IMPLEMENTATION
A. Programming Languages and Tools
The application development is divided into two parts: the front – end development and The back-end development. For the front end development, HTML, CSS and JavaScript were tools and languages were used. For the back end development PHP and MySQL were used.

B. Program Modules
Ten modules were developed for the implementation of application. The admin end consists of: Admin Login Page, Admin Dashboard, Create User page and View and Delete User page.

The User end consists of: User Login page, The Home Page, The Comments page, The View profile page, The Edit profile page and The buddy list page. Figures 4 to 6 show three screen shots from the implemented system.
Figure 2: System flowchart for the proposed system.

Figure 3: Relational Schema for the Database.
The enterprise social networking tool is web based and hence has to be hosted on a web server. The program is designed to run within an organization’s intranet, hence the organization has to have a set up intranet to use the system. The application will simply be hosted on the intranet’s server. Users of the service can then connect to the service through the server. However, for testing purposes, the application was hosted a personal computer with the aid of a local server. All computers connected on the same (LAN) network as the hosting computer can connect to the service by inputing the ip address of the host computer and the path where the files are stored.

C. Program Documentation

The enterprise social networking tool is web based and hence has to be hosted on a web server. The program is designed to run within an organization’s intranet, hence the organization has to have a set up intranet to use the system. The application will simply be hosted on the intranet’s server. Users of the service can then connect to the service through the server. However, for testing purposes, the application was hosted a personal computer with the aid of a local server. All computers connected on the same (LAN) network as the hosting computer can connect to the service by inputing the ip address of the host computer and the path where the files are stored.
D. Installation

To use this application, both client and server ought to be properly set up.

1) Setting Up Server

Depending on how the server is to be run (either as a local server or a hosted server), the server is to be set up in such a way that it is able to run the necessary scripts. To run the server on a local machine for testing purposes or use on a LAN network, the following steps are to be taken:

- Install a local server application. On Windows, packages like WAMP or XAMPP can be installed. On Mac OS, packages like MAMP can be installed. LAMP can be installed.
- Import the necessary project files into the web directory of the local server.
- If needed, set up the hostname of the server machine using a Domain Name Service (DNS).
- Set up MySQL server by importing necessary tables.

Minimum Server Requirements

- CPU: 2 x Intel Core 2 (2.4 GHz, 128 Cache).
- RAM: 2GB.
- Minimum database space: 10GB.
- Software packages: Apache Tomcat, MySQL, PHP 5.0.

2) Setting Up User

Users only need a working web browser to run the application.

Minimum User Requirements

- Supported Browsers: Internet Explorer 9.0+, Safari 5.1+, Google Chrome, Mozilla Firefox, Opera 12.1x.

V. USABILITY EVALUATION

Web applications today, rule the world of businesses and exchange of information. “The ease or difficulty that users experience with these Web applications determines their success or failure” [6]. It becomes necessary that we perform usability evaluation on the developed web application.

A. Usability Evaluation Method

Several Usability Evaluation Methods exist. To evaluate the user interface of the Enterprise Networking System, we recruited ten undergraduate students (4 female, 6 male) of computer science. Five of the students had previous experience with Social networking sites while the other five were new to social networking sites. Figure 7 is a depiction of this relationships. The participants were allowed to familiarize themselves with the user interface for one day. They were then given 10 random tasks to perform. Users were asked to rate the ease of each task on a scale of one to five (1-5), (where 1=very easy and 5=very difficult). The exercise was completed after they had performed all the given tasks on the site. They were then asked to perform a overall satisfaction rating of the application on another scale of one to five (1-5). Table I shows the scales used for the usability evaluation and the user satisfaction rating.

![Evaluation Participants and Experience Chart](image_url)

Table I Ease of Use and User Satisfaction Scales

<table>
<thead>
<tr>
<th>Ease of Use</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction</td>
<td>Very Easy</td>
<td>Easy</td>
<td>Average</td>
<td>Difficult</td>
<td>Very Difficult</td>
</tr>
<tr>
<td></td>
<td>Very Satisfied</td>
<td>Satisfied</td>
<td>Unsatisfied</td>
<td>Very Unsatisfied</td>
<td>Can’t Say</td>
</tr>
</tbody>
</table>
B. Usability Evaluation Results
The participants successfully completed each task with an average ease of use of 78%. They indicated the site is efficient and gave an average overall satisfaction rating of 65%. Figure 8 is a graphical representation of the rating.

![Figure 8: Ease of Use and User Satisfaction Rating](image_url)

VI. CONCLUSION, RECOMMENDATION AND FUTURE WORK

A. Conclusion
The developed application has made it possible for users to share ideas, offer help to other users and get help when needed. It has made distribution of files, notice of meetings and events easier within the enterprise. Progress reports on completed and on-going projects can be made and followed up by management as well as employees. Workplace productivity can be greatly improved by increased social collaboration. The developed system helps improve social collaboration and as a result, workplace productivity. Communication becomes easier and fun while work is being done.

B. Recommendation
Despite the immense benefits of a service such as this, some business owners especially in this part of the world are still skeptical about employing these services, mainly due to the fear that employees would neglect their jobs carried away while using the service that they wouldn’t carry out their main duties. However, the truth remains that one can’t possibly go wrong interacting with the right people as they would spur and even assist in getting goals accomplished. So if employers are confident they have employed the right hands, they should have no worries employing a service of this kind. The opportunities totally outweigh the probable downsides. We would however recommend that employees are given the right orientation about using the service, to prevent misuse of the services’ features.

C. Future Work
In the future, we hope to improve on the security of the system by applying different levels of security into the system so that users see only the aspects of the application that applies to them.

REFERENCES