

Web Based Automated Workflow System for Employees' Welfare and Loan Scheme Using Lightweight Methodology

Okonigene Robert E¹., John-Otumu M. A²., John Samuel N³., Ojieabu Clement E⁴.

^{1,4}Department of Electrical and Electronics Engineering, Ambrose Alli University, Ekpoma, Edo State, Nigeria.

²Department of Banking & Finance Ambrose Alli University, Ekpoma, Edo State, Nigeria.

³Department of Electrical and Information Engineering, Covenant University, Ota, Ogun State, Nigeria

Abstract - This paper addresses the daily challenges encountered by employees as it relates to their voluntary contributory welfare scheme in most established institutions, establishments or organizations in Nigeria. We critically examined the challenges of joining as member, amount to save, dividends sharing, assets and liabilities, and also the loan scheme using Ambrose Alli University, Ekpoma, Edo State, Nigeria as our study center. A Web Based Automated Workflow System for Employees Welfare and Loan Scheme was developed, which captured the employees' monthly contributory savings, and other parameters through an interface. Employees' can interact with the system from the comfort of their homes and from anywhere in the world via Internet connectivity. The application is web based and enables functions like online application for loan facilities, checking of total contributions, tracking of loan application status and other services rendered by the respective welfare scheme. The Web Based Automated Workflow System was developed based on light-weight methodology. Hypertext Markup Language (HTML), Hypertext Preprocessor (PHP), Javascript, Dreamweaver and MySQL were used to realize the interface and Web Based solutions for the Automated Workflow System for Employees Welfare and Loan Scheme. However, the security built into the scheme was not discussed in this paper.

Keywords: Web-Based, Automated Workflow, Service Oriented Architecture, Employees Welfare

1 Introduction

In some Nigerian Universities, employees voluntarily join any of the different workers union welfare and loan schemes or associations available based on their job classification on assumption of duty. In Ambrose Alli University, Ekpoma, specifically, there are two unions, that is, the Academic Staff Union of Universities (ASUU) which has the Teaching or Academic staff as members and the Non-Academic Staff Union (NASU) which has the Junior Non-teaching staff as

members. The university also has two Associations and a cooperative society. The Senior Staff Association of Nigerian Universities (SSANU) has the Senior Non-Teaching staff as members and the National Association of Academic Technologist (NAAT). The Ambrose Alli University (AAU) Multipurpose cooperative society has as its members all fulltime staff of the University who followed the due process to register as a member. Equally, non staff of the University can also be registered under separate conditions. These bodies have their various welfare and loan schemes, in which members saves certain amount of money monthly in any of the welfare scheme, from their monthly salaries. Each welfare scheme, through elected representatives, may use part of the money saved by members to do business of different kinds in order to realize some level of profit which is then shared as dividend to its registered members. Often, employees of the University are attracted to their union or association welfare and loan scheme or other union's welfare and loan scheme or cooperative society for financial assistance or loan facilities due to the union's or cooperative society reduced interest rates and short queue on loan applications. This is preferable rather than going to banks for such loan facilities with higher interest rates to solve their immediate needs like payment of house rent in order to avoid quarrels with landlords or caretakers; payment of children's school fees; poor dietary intake that might result to malnourishment; inaccessibility to adequate medical care; inability to meet with social clubs financial obligations, and so on. Employees' and their respective welfare and loan schemes and cooperative society are faced with different challenges on the day-to-day operations of the scheme; this is due to the manual workflow system of operations. Some of the major problems are as follows:

- i. The delay in the end-to-end processing of loan / commodity application forms submitted.
- ii. The errors sometimes made due to manual computations.
- iii. Improper records keeping due to human nature.
- iv. The inability for an employee who is a member of

welfare scheme to check the amount he or she has saved with the scheme at real time and at will.

- v. The inability for members to apply for loan or other facilities from the comfort of their homes and track the status of their application at any time and from anywhere in the world without physically going the welfare scheme office.

However, the major businesses done by these bodies are granting of loan facilities at moderate interest rate to its members and stand as surety in procuring of commodity items for their members. The daily operations of the various welfare and loan schemes are governed by set of business processes, in which there is interaction between humans and manual information system (paper based). Conventionally, these processes have been supported by the exchange of information recorded on paper. This paper work enables the sharing, computation and archival of information as work is transferred from one desk to another until the process is fully executed. These tasks are executed when the relevant office receives a request containing the relevant information to be treated in a paper trail during office hours. For example, an employee requesting for loan facility to take care of his or her pressing needs from his / her union's welfare and loan scheme will have to apply officially by filling a form. The application forms ideally involve team working collaboratively for documentation, recommendations, and approval of the applicant intent during office hours no matter the urgency of the applicant's challenges. Therefore, this mode of processing takes a longer time to complete the given task. Thus, the paper-based process is somewhat slow due to the time it takes to move information from one desk to the other. Therefore, we decided to develop a Web Based Automated Workflow System for Employees' Welfare and Loan Scheme Using Lightweight Methodology. Welfare is a corporate attitude or commitment reflected in the expressed care for employees at all levels, underpinning their work and the environment in which it is performed [1]. Employee welfare is a comprehensive term including various services benefits and facilitates offered to employees by employer. Employee welfare includes providing staff and workers' canteens, providing savings schemes; pension funds and leave grants, making loans on hardship cases; providing assistance to staff transferred to another area and providing fringe benefits [2]. Job satisfaction is generally recognized as a multifaceted construct that includes employee feelings about a variety of both intrinsic and extrinsic job elements. Welfare schemes are a means to improve the productivity and efficiency of the employees. Employee benefits are the elements of remuneration given in addition to various forms of cash pay [3]. The benefits contribute to a competitive total remuneration package that both attracts and retains high quality employees. The cost of employee benefits has been rising in developing world [4]. The various types of employee benefits includes pension schemes, personal security, financial assistance, personal needs, subsidized meals, clothing allowance, mobile phone credit, company car

and petrol allowance among others [5]. Employee benefits are provided with the understanding there is a return to the organization in terms of improved employee commitment and productivity [6]. The implementation of employee benefits requires significant amount of financial, physical and human resources [7]. The government can intervene with a policy to obligate employers to provide certain benefits to employees [8]. Workflow concept has evolved from the notion of process in manufacturing and in the office [9]. Such processes have existed since industrialization, and are product of a search to increase efficiency by concentrating on the routine aspects of work activities. They typically separate work activities into well-defined tasks, roles, and procedures which regulate most of the work in manufacturing and the office. Initially, processes were carried out entirely by humans who manipulated physical objects. With the introduction of information technology, processes in the work place are fast becoming automated by information systems, that is, computer programs performing tasks and enforcing rules which were previously implemented manually. Processes in an organization are categorized into material processes, information processes, and business processes [9]. The scope of a material process is to assemble physical components and deliver physical products. That is, material processes relate human tasks that are rooted in the physical world. Such tasks include, moving, storing, transforming, measuring, and assembling physical objects. Information processes relate to automated tasks (that is, tasks performed by programs) and partially automated tasks (that is, tasks performed by humans interacting with computers) that create, process, manage, and provide information. Typically an information process is rooted in an organization's structure and/or the existing environment of information systems. Database, transaction processing, and distributed systems technologies provide the basic infrastructure for supporting information processes. Business processes are market-centered descriptions of an organization's activities, implemented as information processes and/or material processes. That is, a business process is engineered to fulfill a business contract or satisfy a specific customer's need. Thus, the notion of a business process is conceptually at a higher level than the notion of information or material process. Business process reengineering involves explicit reconsideration and redesign of the business process. It is performed before information systems and computers are used for automating these processes. Information process reengineering is a complementary activity of business process reengineering. It involves determining how to use legacy and new information systems and computers to automate the reengineered business processes. The two activities can be performed iteratively to provide mutual feedback. While business process redesign can explicitly address the issues of customer satisfaction, the information process reengineering can address the issues of information system efficiency and cost, and take advantage of advancements in technology.

2 Using the Light Weight Methodologies

The method employed in this research work included, data collection, Engineering software development suites, light weight methodology, design and web development tools/Internet programming language. We used the sources below to collect data about the various Welfare and Loan Schemes, including the Cooperative Society available in the University.

- (i) Archival Records
- (ii) Observations
- (iii) Interviews of stake holders.

Light weight development methodologies embrace practices that allow programmers to build solutions more quickly and efficiently, with better responsiveness to changes in business requirements [10]. Light weight methodology mainly focuses on development based on short life cycles. Some popular light weight development methodologies are Agile Process Model, Extreme Programming (XP), Prototype Model, Scrum, Rapid Application Development (RAD) Model. In this research work we applied the Rapid Application Development (RAD) Model.

2.1 Rapid Application Development (RAD) Model

Rapid Application Development (RAD) is an incremental software development process model that emphasizes a very short development cycle and encourages constant feedback from customers throughout the software development life-cycle. The main objective of Rapid Application Development is to avoid extensive pre-planning, generally allowing software to be written much faster and making it easier to change environments. Figure 1 is a typical RAD Prototype Model.

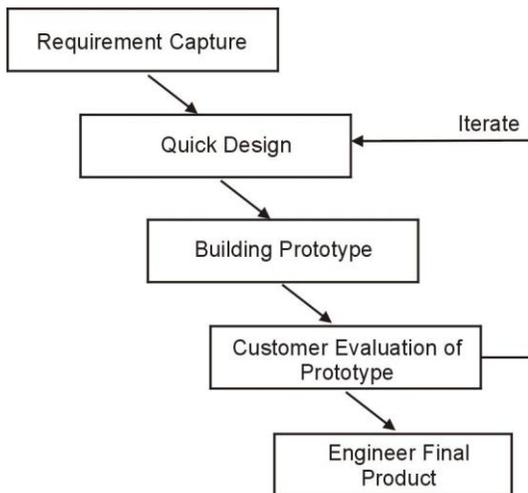


Figure 1. RAD Prototype Model adopted from [11]

The following are the advantages of RAD Model

1. Time to deliver is less
2. Quick development results in saving of time as well as cost.
3. Productivity with fewer people in short time.
4. Progress can be measured.

2.2 Software Architecture Design

Software architecture intuitively denotes the high level structures of a software system. It can be defined as the set of structures needed to reason about the software system, which comprise the software elements, the relations between them, and the properties of both elements and relations [12].

Software architecture also denotes the set of practices used to select, define or design software. Figure 2 depicts the software architecture of our developed system.

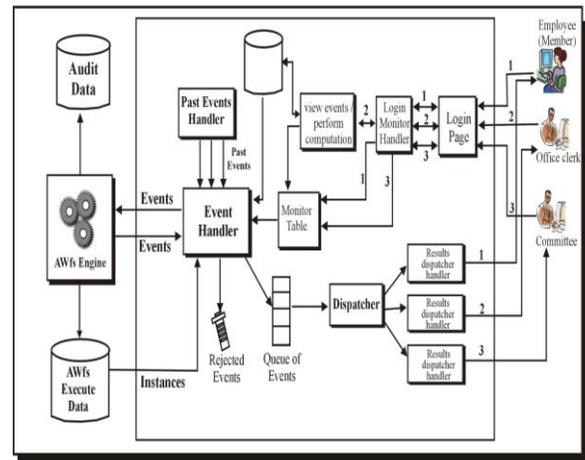


Figure 2. Software architecture of the developed system

3 Test results: Users Interaction with the proposed system

Step 1: The Office Clerk establish a connection to the Internet through an Internet Service Provider (ISP), open up a web browser and enter the web site address at the uniform resource locator (URL) to make a request for the Site's home page. The client device can be a Laptop, Smart phone, Desktop computer, PDA, or Tablet.

Step 2: The Office Clerk login through the home page.

Step 3: At this stage, the Office Clerk can now view his desktop profile or control panel, in order to perform his full function like capture old and new members, edit member records, post and view monthly contributions, view and process various forms of loan application forms, post loan repayment, generate different types of reports, etc on the developed system.

3.1 Registered Member

Step 1: The registered member establishes a connection to the Internet through an Internet Service Provider (ISP), open up a web browser and enter the web site address at the uniform resource locator (URL) and then make intended request from the Site's home page.

Step 2: The Member then login following displayed instructions.

Step 3: The Member then proceed to view his/her desktop profile, in order to perform his/her functions like changing of password, view operation procedures, view contribution details, apply for loan, track loan status, etc on the developed

system.

3.2 Use Case Diagram

A Use Case diagram is a representation of a user's interactions with the system. A Use Case diagram can portray the different types of users of a system and the various ways that they interact with the system. The Use Case diagram, shown in Figure 3, depict the Employee user and Office clerk or Office Administrator interaction with the system

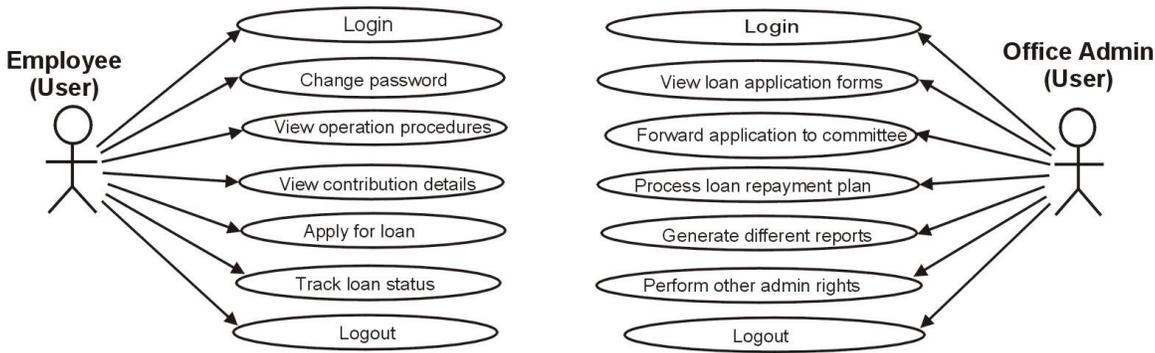


Figure 3 Use case diagram showing Employee user and Office Admin or Clerk

3.3 Automated Workflow Process between users and the developed system for Loan Application and Approval

Step 1: The Employee user(s) logs on to the developed web application, views his or her total savings with the welfare scheme online, applies for loan facility and then submit the application online. In this step, the internal process moves in this order: Login Monitor handler → Monitor table → Event handler → Automated Workflow System Engine (AWfs Engine). From the AWfs Engine, the event is committed to the database, while the system also puts the event to queue for the next action.

Step 2: The Office Clerk/Admin login in order the view the processes or events on queue waiting for attention. The events are stacked and programmed using the order of First Come, First Serve (FCFS) Algorithm. He pulls the first event from the queue and treats; after treating he submits the process. Submitting involves the event to move to the next phase i.e. the committee members. The process flow is in this order in the software architecture: Awfs engine → Event handler → Queue of Events → Dispatcher

→ Results Dispatcher Handler

Step 3: The Committee user(s) at this stage, will also view the events as they come in queue. They also process each event by approving or denying the events.

4 Conclusion

We have achieved our objective in developing the software architectural design using light weight methodology to build up a web based automated workflow system for employees welfare and loan scheme in Ambrose Alli University, Ekpoma, Nigeria to solve their local problems. The light weight software process model or methodology we used was Rapid Application Development (RAD) because of its peculiar advantages. The developed system is also client/server based. The web based automated workflow system for employees' welfare and loan scheme using light weight methodology provided new software architecture with single solution platform for any welfare and loan scheme administrators within the University system. Test results reveal that the automated workflow system carefully eradicated the delay in the end-to-end processing of loan and commodity application forms submitted. The automated workflow system also eradicated the errors made due to manual computations. The automated workflow system was able to store, retrieve,

and secure records more effectively and efficiently. The employees who are members of the welfare scheme were able to check their savings with the scheme in real time. Employees members of the welfare scheme were also able to apply for loan or other facilities from the comfort of their homes and track the status of their application online any time and from anywhere in the world without physically going the welfare scheme office. The proposed system was able to eradicate most of the challenges faced by employees and their employees' welfare and loan scheme.

5 References

- [1]. Coventry, W. F. and Barker, J. K. (1988). Management. International Edition: Heinemann Professional Publishing.
- [2]. Cowling, A. and Mailer, C. (1992). Managing Human Resources. 2nd Edition. London: Edward Arnold.
- [3]. Armstrong, M. (2010). Handbook of Human Resource Management Practice, Keagan Page, London.
- [4]. Mortocchio, J. J. (2001). Strategic Compensation, Prentice Hall, USA.
- [5]. Chung , H. (2006). Human Resource Management Theory and Practice, 3rd Edition, Palgrave MacMillan, London UK.
- [6]. Nzube S. N. (2010). Management of Human Resources, Basic Modern Management Consultants, Nairobi, Kenya.
- [7]. (Armstrong 2010). Handbook of Human Resource Management Practice, Keagan Page, London.
- [8]. Medina-Mora, R.; Winograd, T.; and Flores, R. (1993). "ActionWorkflow as the Enterprise Integration Technology," Bulletin of the Technical Committee on Data Engineering, IEEE Computer Society, Vol. 16, No.2.
- [9]. Medina-Mora, R.; Winograd, T.; and Flores, R. (1993). "ActionWorkflow as the Enterprise Integration Technology," Bulletin of the Technical Committee on Data Engineering, IEEE Computer Society, Vol. 16, No.2.
- [10]. Khan, A. I., Qurashi, R. J. and Khan, U. A. (2011). A Comprehensive Study of Commonly Practiced Heavy and Light Weight Software Methodologies. Internation Journal of Computer Science Issues, Vol. 8, Issu 4, No. 2
- [11]. Sommerville, I. (2004). Software Engineering, UK: Addison Wesley.
- [12]. Paul, C; Bachmann, F; Bass, L; Garlan, D; Ivers, J; Little, R; Merson, P; Nord, R; Stafford, J (2010). *Documenting Software Architectures: Views and Beyond, Second Edition*. Boston: Addison Wesley. ISBN 0-321-55268-7.