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Design and Implementation of a Custom, Web-Based Cooperative Loan Application Management System

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Abstract

Cooperative societies are growing in Nigerian Educational institutions. Members of different groups within these academic settings have been coming together to support each other financially through saving and incidental access to loans. A good example of such cooperative groups is ASUP SICHST Makarfi cooperative society limited. One of the key challenges that most of these societies face in their day-to-day administration is the use of manual techniques for management of cooperative records. ASUP SICHST Markarfi cooperative society limited is used as the case study in this work. The society is registered by government of Kaduna State and is operating at Shehu Idris College of Health Sciences and Technology, Makarfi. Despite having some proposals for deploying ICT solutions to manage cooperative activities, it was observed that there is paucity of works that specifically identify the need to provide solutions to loan application management problem in a custom scenario. This study proposed a web-based loan application management system that addresses the identified problems in the current manual system. The solution was developed with focus on features that cater for loan application management function in the cooperation society, in a custom manner. MySQL, PHP, HTML, CSS and JQuery were the tools used for the implementation. The new system is found to be custom-developed and can promote the creation and management of members' loan applications in the cooperative society. It is believed that this approach is better when it comes to deploying solutions for the management of custom operations of cooperative society activities.

Keywords: Loan Management, Cooperative Society, Membership, Monthly savings

1. Introduction

Cooperatives are voluntary organizations that are open to all persons who are eligible to use their services and willing to accept the responsibilities of membership without gender, social, racial, political, religious or other forms of discrimination [1]. Any group named cooperative society is a business that is voluntarily organized, operating at cost which is owned, capitalized and controlled by member patrons as users, sharing risks and benefits that are proportional to their participation [2,3]. To establish the importance of cooperative societies in our day-to-day living, Larocque*et al.* [4] reported that members of cooperative societies use loans for financing a wide range of their daily needs that would have ordinarily appear unachievable.

In a society where loan acquisition is difficult and individuals are hardly able to meet the requirements of the financial institutions to obtain loan, a cooperative society helps its members enhance their businesses. A cooperative society provides loans tension and advisory services to the members [5,6]. Through the savings, there will be capital accumulation leading to investment, hence economic growth and ultimate enhancement of members 'business. Thus, this paper proposes a web-based loan application system so as to minimize the difficulties that

members of ASUP SICHST society face while accessing loans through the current manual system.

ASUP SICHST Makarfi Cooperative Society Limited is used as the case study in this work. The society is a registered cooperative society operating at Shehu Idris College of Health Sciences and Technology, Markarfi [7] and was approved by Kaduna State Government [8] in the year 2015. Academic members of the institution are the ones that came together to form the cooperative the society with a view to providing support on the financial needs of registered members who has enough savings for loan application. This study proposed a web-based membership and loan application management system that addresses some of the problems that are experienced with the current system. Members of ASUP SCHST cooperative society are able to achieve their financial needs through the savings that are accumulated and used as loans for interested members. Just like every Cooperative society is identified as a voluntary organization that constitutes an avenue through which cheap credit is channeled to the common people [6], ASUP SICHST operates on that basis.

The focus of this study was to design and implement a custom web-based membership and loan management

system using ASUPCOS as a case study. To achieve this aim, the specific objectives were to analyze the existing manual cooperative loan management system; design a user-friendly web-based computerized cooperative loan management system**,** implement the proposed loan management system having all the targeted features that can replace the manual processes of loan application management**.**

1.2 Problem Statement

Despite the many benefits that cooperative societies contribute to its members, it was observed that ASUP SICHST Makarfi Cooperative Society Limited is still keeping records of members and that of loan application manually. There has been little focus on the design and implementation of custom and effective ICT solutions that can be used for managing the records of cooperative members as regard loan application management.

Based on preliminary findings, it was observed that the existing system in the cooperative is manual-based. Some of the problems identified include laborious registration of members' details, errors in manual computation and inability to generate loan reports of each member for easy accountability. Furthermore, the current manual system cannot give members and management staff the ability to access or document records for loan or other facilities with ease. Thus, the need for a web-based loan management solution that is designed for custom purposes. As identified by Sizya [9], cooperatives provide opportunities for people of like minds to pool their financial resources together in order to achieve commonly their identified development needs. The current stud*y* agree with this opinion and believed that having a web-based solution for keeping financial records of the society will be a step in the right direction. The solution is being proposed so that records can be handled effectively and both members and the executive can derive more benefits in the day-to-day activities of the cooperative.

1.3 Review of Related Studies

Olorunlomerue *et al.* [10] proposed a web-based cooperative information management system for handling records of cooperative societies in Nigeria. The authors used Java as the programming language and MySQL for building the database. The approach used in the study was to develop a solution that can be used for cooperative society registration. Thus, this solution can assist the government in the collation of data on cooperative societies for planning. Onyeama *et al.* [11] developed a system that essentially manages both short-term and long-term loans, and keeps track of cash inflow and outflow of a cooperative society among others. The proposed solution made us of SQL Server database architecture at the back end with PHP, CSS and HTML at the front end. The authors argued that interactions with

operators and stakeholders and through observation of records of activities aided the gathering of the required information.

Moreover, Yusuff, *et al.* [12] carried out a study that investigated and appraised the use of ICT for managing cooperative societies. The authors used some selected tertiary institutions in Osun State for the appraisal. The work did not involve the development of a Cooperative Management Solution for the societies selected. Yebisi [13] suggested various approaches through which the legal framework of Nigerian Co-operative Societies Act, 2004 can be fully realized. The author suggested how the wheel could be reinvented in order to make the principal legislation responsive to the demands of modern co-operation.

Furthermore, Oluyombo [6] investigated how loans made by co-operative societies in rural areas meet the financial needs of their members and, by extension, the role of the co-operative lending in rural finance. The study made use of primary data from nine focus group discussions comprising seventy-two members selected randomly from twelve co-operatives in six local government areas. Data was analyzed using tables of numbers and percentages, content analysis and quotations from participants. The study did not promote the development and deployment of ICT-based solution for cooperative loan management.

Mbam *et al.* [14] developed a cooperative management system that can aid a cooperative society on loan management. The authors argued that the system essentially manages both short-term and long-term loans, and keeps track of cash inflow and outflow of a cooperative society among others. Authors used SQL Server database architecture at the back end and Visual Basic Net framework at the front end. They argued that such approach makes the proposed solution to be highly interactive. However, it was observed the work failed to identify a case study in which the proposed system can be found operational.

2. Methodology

The methodology adopted in this study involves system analysis, design and implementation. The existing system was properly analyzed, and the proposed system was carefully designed and implemented. The system analysis performed in this study helped identified the features that are needed in the application. The features are targeted at meeting the custom needs of the cooperative society. It is argued herein that this approach enabled the achievement of custom web-based Cooperative Loan Management solution. Information was elicited from members as well as selected executive members of the cooperative. Different data types used for capturing data and design are as detailed in Tables 2.1 to 2.4.The usage scenario of the loan management module

was modeled with the use of Use Case Diagram depicted in Figure 1. Based on the desired objectives, some web development tools such as XAMPP, PHP, MySQL, JQuery were used for the development. Then, the testing of the application was carried out using hypothetical cooperative records. The main modules in the application are the membership registration and loan application modules. The solution allows registered member to apply for loan and the cooperative administrator verifies the application and approve same in the online platform at much better speed compared to the existing system in ASUP SCHIST cooperative. After reviewing similar studies, it was found that most of the similar studies did not focus on custom web-based solution for loan application management.

2.1 Input Design Specification

Tables 2.1 − 2.4are used to design the format in which data can be captured into the proposed application. The tables reflect the different data types that were used in the design of the databases required for the membership registration and loan application modules.

2.2 Tables for the Input Design

Table 2.1: Cooperative Member Registration

Field Name	Data Type	Field Description
MEMBER ID**	INTEGER	Member Coop ID
MEMBER SURNAME	Character (Text)	Member Surname
MEMBER FIRST NAME	Character (Text)	Member First Name
MEMBER MIDDLE NAME	Character (Text)	Member Middle Name
PASSWORD	Character (Text)	Member Password
CONFIRM PASSWORD	Character (Text)	Member Repeated Password
EMAIL ADDRESS	Character (Text)	Member Email ID
PHONE NUMBER	INTEGER	Member Phone Number
DATEOF BIRTH	Character (Text)	Member Date of Birth
PROFILE PICTURE	Character (Text)	Member Image
GENDER	Character (Text)	Member Gender
RESIDENCIAL ADDRESS	Character (Text)	Member Residential Address

Table 2.1: *Cont.*

Field Name	Data Type	Field Description
LECTURER'S RANK	Character (Text)	Member Rank
SALARY LEVEL	Character (Text)	Member Salary Level

Table 2.2: Member Login Table

Field Name	Data Type	Field Description
MEMBER ID	Character (Text)	Member Personal subhead number
PASSWORD	Character (Text)	Member password

Table 2.3: Admin Login Table

Field Name	Data Type	Field Description
ADMIN ID	Character (Text)	Admin number
PASSWORD	Character (Text)	admin password

Table 2.4: Loan Application

Field Name	Data Type	Field Description
MEMBER ID	Character (Text)	Member personal
SAVINGSAMOUNT	Character (Text)	Amount member has in the savings
LOANAPPLIED FOR	Character (Text)	Loan applied for by the coop member
REPAYMENTAMOUNT	Character (Text)	Monthly repayment plan
MONTHOFREPAYMENT	Character (Text)	Total month of the repayment
LOAN APPLICATION STATUS	Character (Text)	Status of the application (Approved, Denied)

2.3 Use Case Diagram of the Loan Management Module

The use of case diagram captures the scenarios in which three main actors (cooperative member, IT Admin Staff and Chairman) of the cooperative society identified in the proposed system can work within the loan management module. The cooperative member has his role to play before he can enjoy the benefits of applying for a loan. Based on Figure 2.1, the secretariat admin, IT or financial secretary keeps electronic records of all members, attends to loan applications, put forward and report same to authorized persons among the executives. The cooperative chairman exercises all powers on behalf of the members and other executives of the cooperative society.
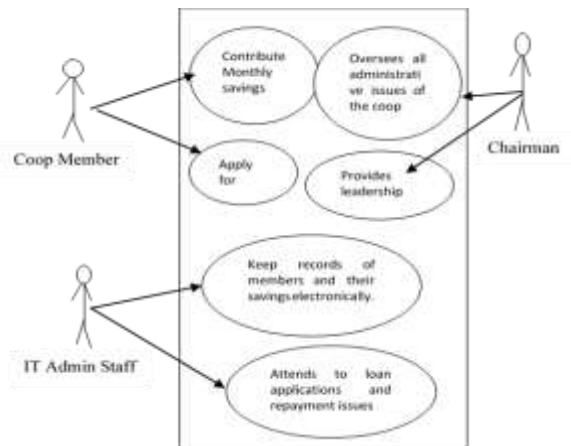
Figure 2.1: Use Case Diagram for the Loan Management

2.4 Benefits of the Proposed System
Some of the benefits of the proposed loan management system are as follows:

i. Reducing difficulties that members and executives face when in need of information on cooperative matter
ii. Accuracy of computation and record keeping.
iii. Internet-based solution that is better than desktop-based solutions in similar studies
iv. Speedy processing of loan applications of members
v. Keeps tracks of savings and loans of members.

2.5 Tools Used for Solution Development
Table 2.5: Technology Tools for the Development

Technology Tools	Purpose
PHP (Hypertext Preprocessor)	This tool is for website development
HTML and CSS	These tools are used for the web interface design.
MySQL (My Structured Query Language)	This tool is used building the database.
JQuery	This is used for animation building
XAMPP	For administration purposes.

3. Implementation/Results

This section provides brief results of the custom solution. Some pieces of information on the requirements for running the proposed solution are equally provided. Then, screenshots of the modules in the application are included. The solution was implemented based on the operational principles of ASUP SICHST. The society is operating in line with established principles of cooperative societies in Nigeria [7,15,16] and the solution was implemented using information gathered from the requirements analysis.

The solution equally ensures that a member of the society is only entitled to a regular loan up to twice of the amount he has in his savings. Moreover, the loan application allows any member to benefit from emergency loan up to a certain small amount that is predetermined by the society from time to time. The loan management system is interfaced with the membership module of the cooperative application. Each member of the cooperative and authorized executive has login interface that provides access to the loan application and approval, respectively.

3.1 System Implementation Requirements
For the proposed system to be maximally used when in operation, the hardware and software configuration are provided as below:

3.1.1 Hardware Requirements
The following are the minimum hardware requirements for the system

i. Minimum of 2GB of RAM
ii. Minimum of 250GB Hard Disk Drive
iii. Super VGA (Super video graphics array) color screen monitor.
iv. Input and output devices.
v. An uninterruptible power supply (UPS)
vi. Minimum of Dual core processor or equivalent.
vii. Standby generator that can produce alternative power supply.

3.1.2 Software Requirements
The following are the minimum software requirements for running the system:

i. Operating System: Microsoft Windows 8
ii. XAMPP server for local administration.
iii. Web browser: Opera, Google chrome, or Mozilla Firefox
iv. Anti-virus software that can be used for preventing infection.

3.2 Selected Screenshots in the Application
Some selected screenshots of the application are provided below. These screenshots are labeled Figures 3.1 – 3.9.

Figure 3.1: Application Splash Screen

Figure 3.2:Prtogram Interface

Figure 3.3: Application Navigation Screen

Figure3.4:Appliction Inteface Contd.

Figure 3.5: Main Menu Interface

Figure 3.6: Member Account Creation

Figure 3.7: Loan Application Form

Figure 3.8: Registered Member Login Form

Figure 3.9: Admin Login Form

3.3 Admin login

Figure 3.9 is the web page that gives access to executive with administrative rights. Such a user has the right to view accounts, registering member, deleting member, approving loan, setting time for duration for loan

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repayment, giving authentication to user page, release loan among others.

3.4 Loan Application Report

ASUP SICHST Makarfi Cooperative Society Limited
Loan Application Report

CoopID	MemberName	Loan Date	SavingsAmount	LoanAmount	Status of Application
20150001	Danladi Ibrahim	02/05/2019	120000	240000	Approved
20170054	Dauda Magaji Rilwan	22/03/2020	90000	180,000	Approved
20170067	Oyelade Habeebilah	18/07/2020	150000	300000	Approved
20160463	Ismaeel Gaya	26/05/2018	400000	800000	Approved
20180372	Ismaeel Gaya Shaibu	13/05/20015	210000	420000	Approved

Figure 3.10: Loan Application Report

Figure 3.10 provide the summary of a report based on the loan applied by the cooperative members used for testing the platform. The application is built based on the operational mechanisms of the cooperative. A member of the cooperative is only able to apply for a loan that is not more than twice the amount he/she is having as savings.

4. Discussion

This work developed a custom, web-based solution that is targeted at solving some of the problems encountered in the use of manual system for processing cooperative loan management. ASUP SICHST, Makarfi Cooperative Society was used as the case study. The solution was developed with focus on features that cater for Loan Application Management Function in the cooperative society in a custom manner. MySQL, PHP, HTML, CSS and JQuery were the tools used for the implementation. The developed custom web-based solution would promote the creation and management of members' loan applications. In the preliminary investigations carried out, it was discovered that the processes that members and cooperative executives of ASUP SHCIST go through while applying and processing loans through manual system were difficult. With the two main modules in the proposed application, some of these administrative bottlenecks are eliminated. Based on the testing of the proposed system, it is believed that deploying such a system can effectively manage the loan administration of the cooperative society. The approach is believed to make loans application accessible to members, easily. Some of the interfaces of the application as screenshots are provided in Figures 2 to 11.The operational mechanisms of the proposed solution are expected to ease loan processes of the society and bring about innovations of immeasurable standard.

The system has two major modules. The first module is to allow for cooperative member registration. The other module is for loan application. We used tables to denote different fields that were catered for in the database while use Case Diagram was used for modeling of the various scenarios in the Loan Management Module. The web-based solution was carefully developed as a custom type meant to satisfy the core needs of the cooperative members and the executives. The problem analysis was carefully carried out through observations and real-life experience. In this work, we have been able to demonstrate that the adoption of web-based loan management system will bring improvement to the manual system that is currently being used by the ASUP cooperative similar small-sized cooperative societies.

5. Conclusion

This paper introduced the general roles of cooperative as well as the motive of forming one by ASUP cooperative society in the institution being used as case study. Our preliminary investigation showed that the old manual system of loan management in the association has not been efficient. An effective a custom solution that can meet up with the identified operational mechanisms of the society is proposed. In the study, some of the features in the proposed application as well as the inherent benefits that the web-based solution has for the cooperative society chosen are discussed. Different level of access is given to the users of the web-based application. For instance, the cooperative society IT administrator is responsible for organizing, recording and management of various savings and other financial transactions. Other executive members are given different levels of access in the application. Registered members of the cooperative are entitled to the loan application usage. It is believed that this kind of application helps in the promotion of efficiency in loan application processing.

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