A FRAMEWORK FOR AN IN-HOUSE DEVELOPMENT OF EDUCATIONAL MANAGEMENT INFORMATION SYSTEM

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ABSTRACT

A large percentage of Nigerian educational institutions use manual and paper-based system for collecting, processing, and disseminating information. This approach results in inefficient utilization of resources, low productivity and stunted growth of the educational sector. In this study the in-house users-development approach has been used to develop a computer based Educational Information Management System (EIMS) for a typical University academic department. The existing work System and the underlying Information flow pattern in a department were critically studied. The associated information needs were identified and analyzed. A broad review of the literature on Information Technology (IT) solutions were carried out to identify possible solutions frame work. Graphical User Interface (GUI) software embedded in Relational Database Management System (RDBMS), Microsoft Access, was developed using Visual Basic.Net. The software was deployed and tested using data from the department of Industrial Engineering, University of Ibadan. The GUI, compatible with the regular Windows environment, was shown to be user friendly. The capability of the EIS compares very well with the imported EIS systems.

Keywords: Information system, Relational Database, Software, Visual Basic

INTRODUCTION

A large percentage of Nigerian education organizations, from primary to tertiary level, to a very large extent, use manual and paper-based system for data collection, processing, and information dissemination (Okonigene et al, 2008). This leads to slow acquisition of information resulting in inordinate delay in taking necessary actions, loss of opportunities when the information needs are time-critical, and inability to access certain information due to the inflexible and static nature of the system.

A lack of timely information and fact to support decision is one of the logical consequences of these slow and unresponsive information systems, and the effect is an intuition-based and short-sighted decision making processes. These lead to poor organizational effectiveness and inefficient operations. While Information Systems have been shown to have the capacity to impact on the productivity of any Work System (Zurawski, 2004; Turban et al, 1996)) with the educational system of the developed nations benefiting greatly from the judicious and efficient use of Information System (IS) and Information Technology (IT) in management of data, the Nigerian education sector is still lagging behind (Oladokun and Badmus ,2008; Badejo, 2007).

The use of a well developed computer based database system will provide access to relevant and

actionable information thus making the institution more responsive and improve the quality of decision making process. Nigeria universities generally have diverse educational cultures and practices such that it is difficult to find any Educational Information Management System (EMIS) that can fit and meet all their requirements. Hence the adoption of off the shelf EMIS software in Nigeria has not been widely accepted. It has also been suggested that the high acquisition costs of many of the imported EMIS packages may be responsible for apathy of Nigerian education mangers to the use of EMIS. The use of in-house software development model has been suggested as way out (Okonigene et al, 2008, Oladokun et al. 2009). This study is thus presenting a framework for the in house system development process.

MATERIALS AND METHODS

The prototype system development methodology (Mall, 2004; MacLennan,1999) based on the in-house development approach has been adopted. The Department of Industrial and Production Engineering, Faculty of Technology, University of Ibadan, Ibadan, Nigeria was used as the prototype department. Preliminary investigations about the current manual record keeping of examinations and other academic activities in the department and its interactions with other departments, Institutes, and Directorates and units were carried out. A detailed study of the student information handbook was also carried out. The problems with the manual operations were identified and a new system was proposed. Stakeholders or users expectations of an EMIS were investigated. The proposed solution involves developing systems which are capable of validation, sorting, classifying, calculating, summarizing, storing, retrieving, reproducing and communicating. The main methodology involves data collection and Students Information Management System development. The system has been developed using Visual Basic.Net programming language and Microsoft Access and Database Management System, a relational database management system, the complete source code is contained in Arawo (2009).

Information System Model and Data Collection

The components of educational organizations considered are students, academic staff (Lecturers and Laboratory Staff), non academic staff, project files, courses and equipment. The system elements and the interrelationships considered in this solution approach can be depicted in the model of Fig. 1. Student Information is at the centre of the system and every other component interacts with it and / or with the other components to ensure education of the students.

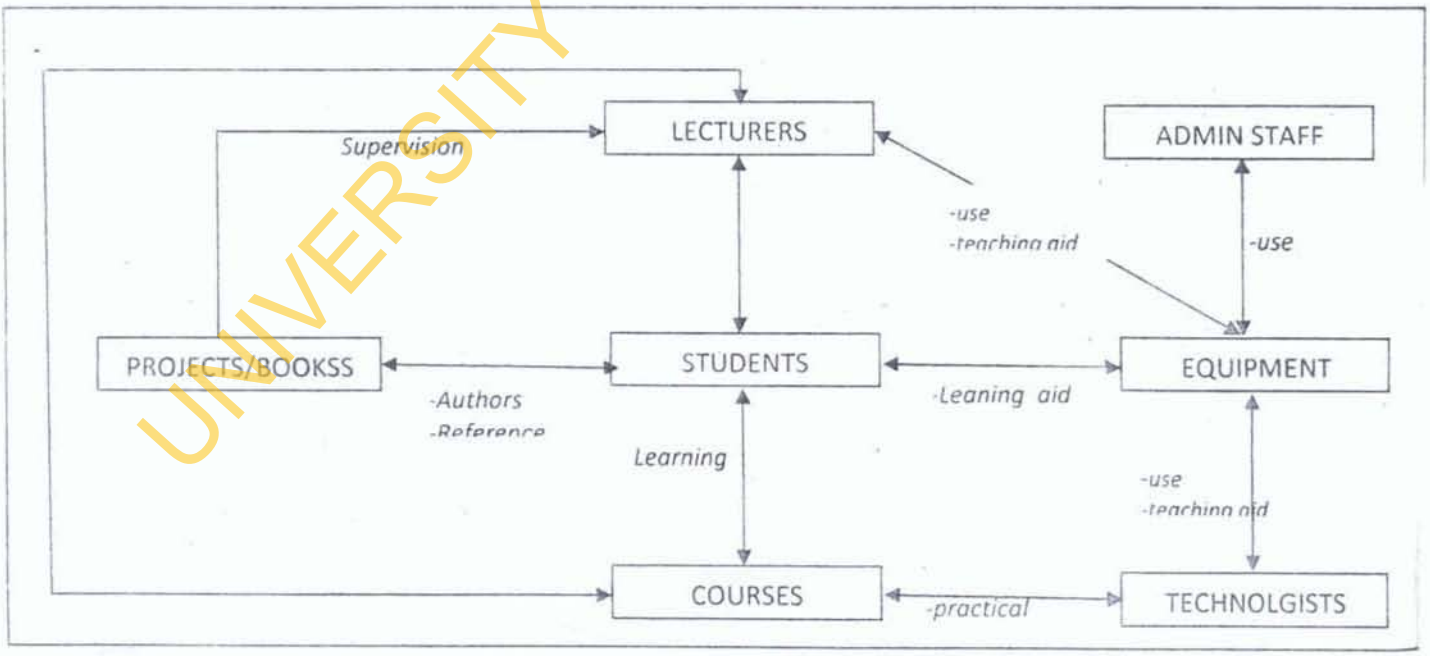

Fig. 1: Educational Management Information System

System Design and Description

The overall logic of the proposed system follows the flowchart of Fig. 2 while Fig. 3 shows the start up splash screen. The splash screen is followed by the Login/Security screen. The application users are, by design, categorized into three; general users, coordinators, and administrators. While unrestricted components are accessible by everyone, restricted components are accessible to Coordinators and the Administrator. All users require authorization for access. Authorization is granted to only Staff who provide their identification information such as User ID and password. The links to the software components are only provided on successfully signing on to the restricted area. Unauthorized users are denied access to the software. Fig. 4 shows the login screen. Tasks that can be performed by the software include database backup (by administrator), Change password (by all users), CGPA calculation and result printing (Fig. 5).

The database information include the following components; Student Information, staff Information, Departmental Library materials record, Equipment and Facilities information, and Archival Materials records. Tables 1, 2, and Fig. 6 show some elements of the database table structure and their required information sources. These information items are needed by the management, lecturers and other staff to be able to educate, access, counsel and process requests by students. An electronic form has been designed for information capturing and database storage.

System Requirement for Application

Microsoft Net framework 3.5 or later
Operating System: Microsoft Windows Server 2003 or later (Server if a network is required)
Microsoft Windows XP Professional Service Park 2 or later (for the client computers)
Database Requirements: Microsoft Access 2000 or later, and Microsoft SQL Server 2005 or later
Processor: Minimum Pentium III, 796MHz (1GB Recommended) with Random Access Memory (RAM) of 256MB (512 Recommended) and minimum Hard Disk Space of 250MB

Table 1: Student information table

Field Name	Field Type	Sources	Captured in
Names	Text	Students	Entry forms
Matric Number	Numeric	Students	Entry forms
Addresses	Alpha-Numeric	Students	Entry forms
State of Origin	Text	Students	Entry forms
Levels of study	Numeric	Management	Files
Gender	Text	Students	Entry forms
Age	Numeric	Students	Entry forms
Performance	Text	Management	Result report

Table 2: Information Required on Academic/ Non-Academic Staff

Field Name	Field Type	Sources	Captured in
Names	Text	Staff File	Documents
ID number	Numeric	Staff File	Documents
Title	Text	Management	Documents
Designation	Alpha Numeric	Management	Documents
Addresses	Alpha Numeric	Staff	Documents
Qualifications	Alpha Numeric	Staff	Documents
Specializations	Text	Staff	Documents
Staff Type	Alpha Numeric	Management	Documents
Contacts	Alpha Numeric	Management	Documents
Gender	Text	Staff	Documents

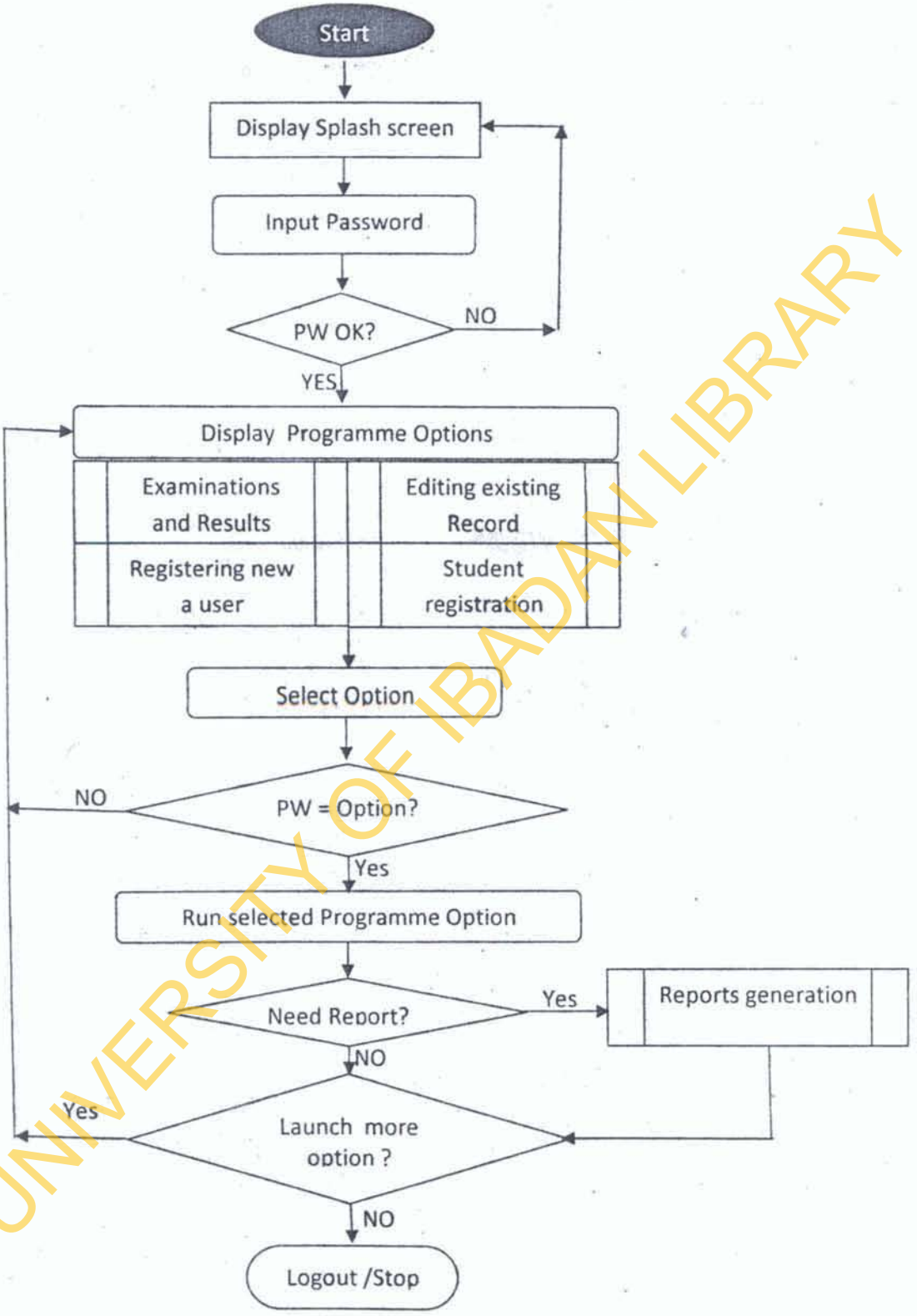

Fig. 2: Program Flowchart

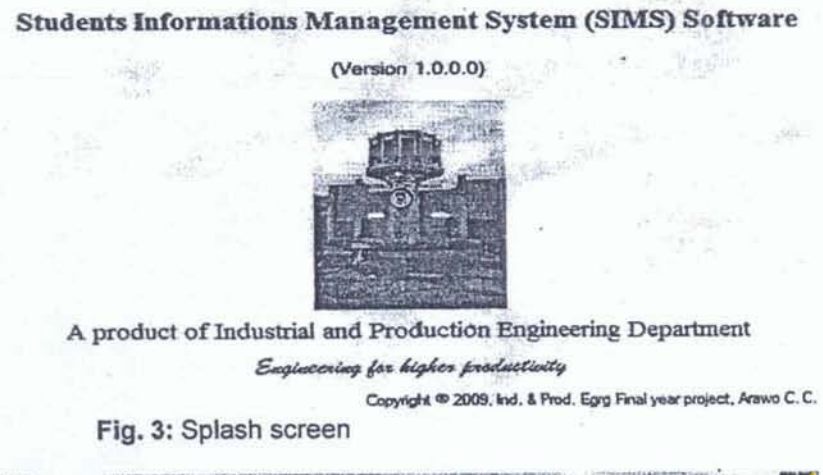

Fig. 3: Splash screen

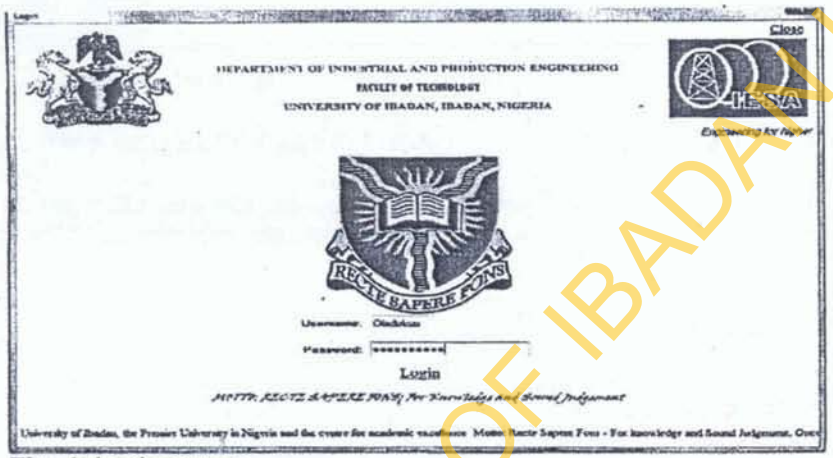

Fig. 4: Login screen

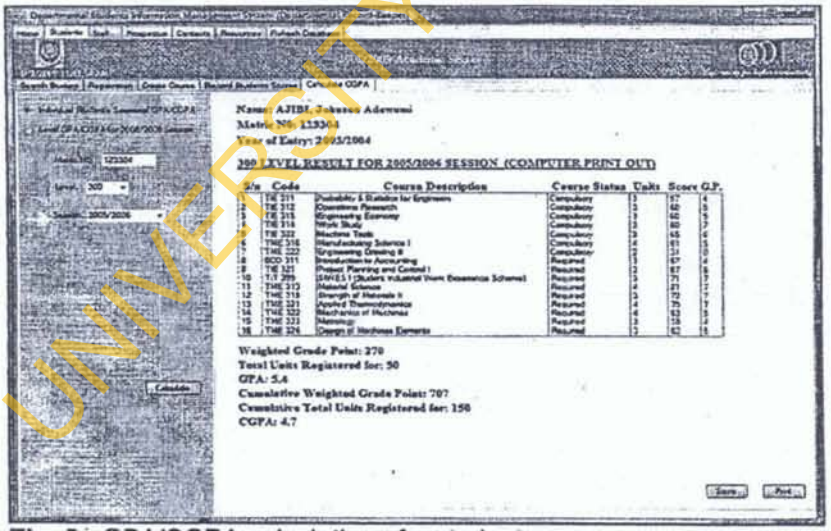

Fig. 5: GPA/CGPA calculation of a student.

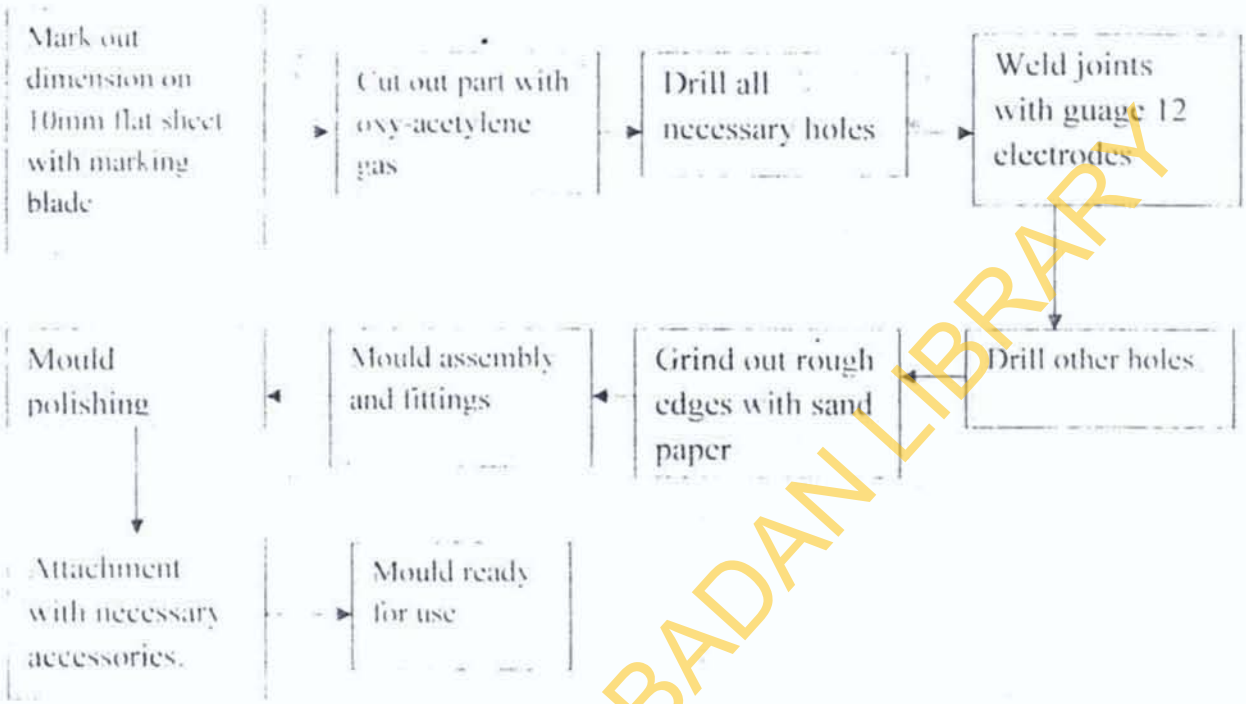

Fig. 6: Proposed Modified Process Flow for the Specific Mould

RESULTS AND CONCLUSION

Scrap medium carbon flat sheet was identified as a suitable material. Oxy acetylene welding was identified as suitable for provide cutting while arc welding was found suitable for joining. The local artisans were found to be capable to produce required product if given close supervision. The Agodi Gate multipurpose metal and machine parts market Ibadan was identified and survey of metal fabrication related skills was carried out to identify and characterize those relevant to proposed production process. A mould within the range of N70 000 and N80 000 was produced.

An exploratory evaluation of the mould system was carried out using an improvised low pressure manually operated injection mould. Tests were carried out using plastic granules of different mixes. Specifically plastic granules made from mixtures of different wastes plastic materials (heterogeneous polypropylene) and granules from single plastic type were used. Test indicated better plastic formation with a homogeneous polypropylene plastic than heterogeneous polypropylene plastic. Cracking observed due to the manual mould separation and absence of filler. It is concluded that plastic mould system is feasible for local fabrication. The injection mould system developed here was designed for small scale users using locally available engineering materials.

ACKNOWLEDGEMENT

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