

Students' Information System and Services

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Abstract— This study focuses on the development of Students' Information System and Services or simply "SISS" that provides an on-line access to students to their records, making the records accessible 24/7 and will let them be aware of their academic status. SISS will also provide downloadable forms that will minimize the printing costs on the part of the school while providing convenience to the students. To achieve the objectives of the study, several methods and techniques in developing an efficient system were employed. The study utilized development research designs to simulate and explain various conditions that may affect the achievement of the objectives of the study. In designing the system the following were taken into considerations: Analysis of the existing system, Identification of the general requirements for the system and consideration of the restrictions. The following tools were utilized in order to come with the Student Information System and Services: (1) Windows 7 Ultimate (OS), (2) Apache 2.4.4 (Web Server), (3) ODBC driver (Connection Driver), (4) MS SQL Server 2008 R2 (Database Server), (5) Notepad++ (PHP Editor), (6) CodeIgniter (Development Framework), (7) WAMP (Server OS), (8) PHP 5.4.16 (Primary Scripting Language), (9) Chrome (Browser), (10) JQuery (Query Language) and (11) JavaScript (Secondary Scripting Language). The waterfall model was employed because it is a linear-sequential life cycle model and very simple to understand and use. Several test trials were conducted on the developed system and the researcher to come up with hardware and software requirements of the system. The respondents evaluated the system as good in terms of reliability (4.34), efficiency (4.42), maintainability (4.16), portability of the system (4.23). Very good in functionality (4.64). Overall, the respondents evaluated the system good (4.64).

Keywords— Information system, online services, web services, students.

I. INTRODUCTION

COMPUTERS and computer technology have totally changed the face of the world as the twenty-first century starts. It would be hard to find one corner of the society that has not been changed dramatically by computers. Almost anything is run or made by computers like cars and jets were designed on computers, traffic signals are run by computers, most medical equipment use computers and space exploration was started with computers. Most of the jobs today require the use of computers and it would be hard if the computers are not around. The 'mechanical brains' made a huge impact on our society because they are more efficient, save time, and do things that no one could ever have imagined. No doubt, computer is an important thing to people, especially the people who runs the industry, organizations, government and

educational institutions (Aduffy, 2013). [1]

The University is mandated to provide higher professional/technical and special instruction for special purpose and to promote research and extension services, advanced studies and progressive leadership.

In traditional way, class card is being used to acknowledge the students with their grades. With the advent of technology universities are now providing student portal to view their grades.

There are times that there was discrepancy in the class card and the grades in the portal. For example, an incomplete grade even completed already, an Incomplete (INC) grade still appeared in the academic program evaluation.

With the current process involved and the mounting frustrations and complaints from students, faculty and university personnel alike, there is an urgent need to develop the university's online student information system.

The Students' Information System and Services or simply "SISS" will help the student to access their records and other transactions related to their school needs. The functionality of the SISS will create numerous internal efficiencies and process improvements that will benefit students, faculty, and staff.

II. PROJECT DESIGN

Developmental research will be employed in this study because according to Richey (1994) [2], it is a study of designing, developing and evaluating instructional programs, processes and products that must meet criteria of internal consistency and effectiveness. Developmental research also involves situations in which the product-development process is analyzed and described and the final product is evaluated. Since the proposed study is a development of Online Student Information System and Services which is a TPS, it involves designing and evaluating the said proposed study. The consistency and effectiveness of the developed system will also be done accordingly.

Descriptive design will also be utilized in this study which involves observing the behavior of the subject without influencing it in any way. It involves collections of quantitative information that can be tabulated along a continuum in numerical form, such as result of an evaluation survey. Descriptive research involves gathering of data that describe events and then organizes, tabulates, depicts, and describes the data collection (Glass & Hopkins, 1984) [3]. It often uses visual aids such as graphs and charts to aid the reader in understanding the data distribution.

A software engineering model known as waterfall [4] will

be used to create the system to achieve the objectives of the research. The Waterfall Model consisted of six phases: (1) requirements; (2) analysis; (3) design; (4) coding; (5) testing and (6) acceptance.

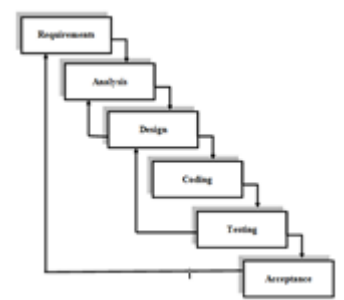


Fig. 1 Waterfall Model

III. PROJECT DEVELOPMENT

In developing the Students' Information System and Services, the author followed several steps for building the proposed system and these are the following: (1) Requirements, (2) Analysis, (3) Design, (4) Coding, (5) Testing and (6) Acceptance.

The first phase is the requirements, in which the problem was recognized and diagnosed. In this stage, the requirement which the software is going to satisfy is specified. The main purpose of this step was to gain a thorough understanding of the project as well as the clientele.

Second phase is analysis during this stage, the design of the activity diagram was created in order to analyze what was the flow of the information in the whole system. An overall view to the system was also considered and a critical analysis of the traditional system.

As used in this study, program designs are constructed using a top-down approach. Major linked of the program components and interfaces then expanded the design layouts into smaller subsystems or modules. The author finds it easy to sub divided the entire system into seven (7) different modules obtained in Fig.2.

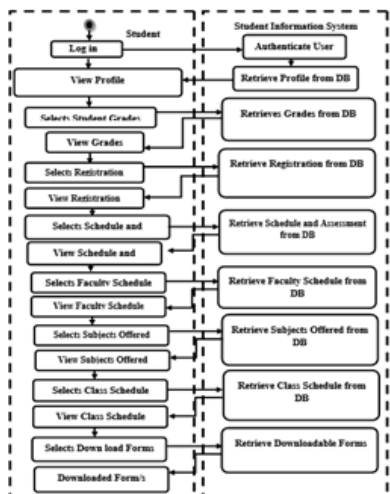


Fig. 2 Activity Diagram of Proposed Study

- Student profile – each student will have a profile in the system that will contain their personal information.
- Student Grades – this module will provide a student checklist which may serve as a guide for evaluation.
- Registration – this module will the currently enrolled schedule with the corresponding assessment fees.
- Faculty schedule – this module will provide a researchable faculty and researchable class schedule by semester or by terms.
- Subjects Offered - this module will provide the subjects offered, and searching may be done to show the section, course, time and faculty handling the subject. This will also provide searchable subject by subject title or subject code.
- Class Schedule – this module will show the schedule per class and/or the student's schedule who is logged in.
- Downloadable forms – this module will provide downloadable forms such as Student Clearance, Completion form, Application for Graduation, Request for Form 137, Permit to cross enroll and Adding/Changing form. Grades and Subjects Offered from different semester and school year are also downloadable.

Next is the design. System Design helps in specifying hardware and system requirements and also helps in defining overall system architecture. The system design specifications serve as input for the next phase which is the coding phase.

The fourth phase is the Coding. During this stage, systems are developed or acquired based on detailed design specifications that reflected on the flowcharts presented. The objective of this phase is to ensure that the system functions as expected.

After the program had been developed, it will be tested thoroughly. Debugging is the fifth phase that involves checking of errors as well as identification of erroneous steps. In this stage, there is a high probability of finding a as-yet undiscovered error. Debugging stage checks out if there are any flaws in the designed software and if the software has been designed as per the specifications.

Acceptance is the last stage of the software development, using the waterfall model. A proper execution of all the preceding stages ensures that the software developed is in accordance with the requirements.

IV. EVALUATION

After the testing has been done, the proposed system will go through evaluation using the Quality Model of ISO 9126 [5]. The system will be introduced to the respondents who are randomly picked using stratified random technique. They will be given a structured questionnaire and will be asked to evaluate the developed system. The author will present and demonstrate the developed system to the respondents and will let them use the system before evaluating it.

There are many Quality model available like The McCall Model, The Boehm Model, The FURPS Model, The ISO 9126

Model and The Dromey Model. The Mac Call Model doesn't say much about functionality. The Boehm Model emphasized on the maintainability of a software product that includes considerations involved in the evaluation of a software product with respect to the utility of the program. The FURPS Model does not take in to account the portability of a software product. The Dromey Model does not consider the efficiency of software to determine its quality. The ISO 9126 Model was chosen because it has a set the quality of product characteristics, these are:

Functionality is the set of attributes that bear on the existence of a set of functions and their specified properties. The functions are those that satisfy stated or implied needs, specifically, the evaluation of:

Suitability - This is the essential Functionality characteristic and refers to the appropriateness (to specification) of the functions of the software.

Accurateness - This refers to the correctness of the functions.

Interoperability - A given software component or system does not typically function in isolation. This sub-characteristic concerns the ability of a software component to interact with other components or systems.

Security - This sub-characteristic relates to unauthorized access to the software functions.

Reliability is a set of attributes that bear on the capability of software to maintain its level of performance under stated conditions for a stated period of time. Under this criterion is the evaluation of:

Maturity - This sub-characteristic concerns frequency of failure of the software.

Fault tolerance - The ability of software to withstand (and recover) from component, or environmental, failure.

Recoverability - Ability to bring back a failed system to full operation.

Usability is a set of attributes that bear on the effort needed for use, and on the individual assessment of such use by a stated or implied set of users. Under these criteria is the evaluation of:

Understandability - Determines the ease of which the systems functions can be understood, relates to user mental models in Human Computer Interaction methods.

Learnability - Learning effort for different users, i.e. novice, expert, casual, and others.

Operability - Ability of the software to be easily operated by a given user in a given environment.

Efficiency is the set of attributes that bear on the relationship between the level of performance of the software and the amount of resources used, under stated conditions, specifically the evaluation of:

Time behavior - Characterizes response times for a given thru put, i.e. transaction rate.

Resource behavior - Characterizes resources used, i.e. memory, CPU, and disk usage.

Portability is a set of attributes that bear on the ability of software to be transferred from on environment to another. Under these criteria is the evaluation of:

Adaptability - Characterizes the ability of the system to change to new specifications or operating environments.

Installability - Characterizes the effort required to install the software.

The system will be evaluated against functionality, reliability, efficiency, maintainability and portability. The system's acceptability will be measured using the ranking system in Table I.

TABLE I
FIVE-POINT LIKERT SCALE

Scale	Range	Descriptive Evaluation
5	4.50-5.00	Very Good
4	3.50-4.49	Good
3	2.50-3.49	Fair
2	1.50-2.49	Poor
1	1.00-1.49	Very Poor

V. FINDINGS

The main purpose of this study is to design and develop a Students' Information System and Services. In designing the system the following were taken into considerations: Analysis of the existing system, Identification of the general requirements for the system and consideration of the restrictions.

Seven (7) modules were incorporated in the system and these are: a. Student profile, b. Student Grades, c. Registration, d. Faculty schedule, e. Subjects Offered, f. Class Schedule and g. Downloadable forms.

The software development was guided by the Waterfall model because it is a linear-sequential life cycle model and very simple to understand and use.

The following were utilized during the development of the system. (1) Windows 7 Ultimate (OS), (2) Apache 2.4.4 (Web Server), (3) ODBC driver (Connection Driver), (4) MS SQL Server 2008 R2 (Database Server), (5) Notepad++ (PHP Editor), (6) CodeIgniter (Development Framework), (7) WAMP (Server OS), (8) PHP 5.4.16 (Primary Scripting Language), (9) Chrome (Browser), (10) JQuery (Query Language) and (11) JavaScript (Secondary Scripting Language).

Based from the tests conducted on the system, the author came up with the following hardware and software specifications: Terminals (client): OS: any linux or windows version, Processor : any with minimum speed of 1.4 ghz or above, Memory : 1GB for 32bit systems / 2GB for 64 bit systems, Network Controller :Fast Ethernet 10/100 Mbps LAN, Hard Drive : 16GB for 32bit systems / 20GB for 64 bit systems, and Video Graphics & Memory : Integrated 1GB.

For the server side: OS: Windows Server or Ubuntu Linux

Server, Processor: ® Xeon® E5-2609 v2 (2.5GHz/4-core/10MB/6.4GT-s QPI/80, Memory: 16GB, Network Controller: Ethernet 1GBE, Hard Drive : 1TB minimum and Video Graphics & Memory : Integrated 2GB.

For the software requirements terminals (client): Windows or Linux OS, Web browser (ie, firefox or chrome), Server: Linux or Windows OS, Apache, MS SQL or MYSQL, and PHPMyAdmin Overall, the system evaluation is good.

VI. CONCLUSION

Based on the aforementioned findings of the study, the following conclusions were drawn:

The system was successfully designed, the author considered the following in order to come up with the Student Information System and Services: a. Analysis of the existing system, b. Identification of the general requirements for the system, and c.. Examine any restrictions which may arise.

The system incorporated the following module turned into web pages: (a) Student Profile, (b) Student Grades, (c) Registration, (d) Faculty schedule, (e) Subjects Offered, (f) Class Schedule, and (g) Downloadable forms,

The following tools were utilized in order to come with the Student Information System and Services: (1) Windows 7 Ultimate (OS), (2) Apache 2.4.4 (Web Server), (3) ODBC driver (Connection Driver), (4) MS SQL Server 2008 R2 (Database Server), (5) Notepad++ (PHP Editor), (6) CodeIgniter (Development Framework), (7) WAMP (Server OS), (8) PHP 5.4.16 (Primary Scripting Language), (9) Chrome (Browser), (10) JQuery (Query Language) and (11) JavaScript (Secondary Scripting Language). The waterfall model was employed because it is a linear-sequential life cycle model and very simple to understand and use.

The author wrote a test plan that served as the guide in testing the system. Once the test plan has been established and the individual module is working correctly the system was tested as a whole. After the testing, the author came up with the hardware and software requirements of the system.

The assessment of the end-users on the SISS indicates a good acceptability level in terms of performance

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