

Dynamic Alumni Monitoring with Decision Support System

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Abstract: *The present study focuses on gathering a real-time data on the employability of graduates. The web-based Dynamic Alumni Monitoring with Decision Support System is developed and linked to the institution's website to gather alumni information. To realize the objective of this study, the agile method research design process is utilized. The agile methodology is a project management technique in software development process. The system has the capacity to monitor the graduates. It provides alumni verifications and confirmation after the pre-registration. The system has a platform in maintaining alumni data and notifications to periodically update the graduates' profiles anytime and anywhere. The system has the capacity to make updates concerning alumni activities of the University. These are sent through their registered email addresses. Likewise, the system generates important reports needed by the school and its administrators.*

Keywords: *Alumni, Alumni Monitoring System, Employability Skills, Decision Support System, Graduate Employability*

I. INTRODUCTION

The availability of a reliable national pool of skilled professionals is critical in the building of sustainable industries and companies. The need to explore the market needs and quantify and analyze the supply and demand for the skills and competencies of graduates is of great value. In any educational institution, a tracer study is a potent way of maintaining curriculum relevance and providing advantages to graduates to improve their marketability and employability. In a study conducted by Boden & Nevada (2009) have given important consideration to the performative function of universities in terms of employability. They have further indicated that it is shaped and directed by the state, which is seeking to supplant labor markets. Graduates of any course are required to manifest a sense of competence in their chosen field and develop confidence to investigate new possibilities and latest employment especially in an increasing competition among rivals. At present, competition in the corporate or industry is so rigid due to the increasing demands in the market. The steadily increasing number of graduates of colleges and universities indicates that employment opportunities for students have become very rigid, slim and competitive.

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The study conducted by Dabalen et.al (2001) in Nigeria reveals that the share of graduates obtaining employment in the public sector has fallen drastically. Nowadays, colleges and universities are required to more systematic follow-up and documentation of alumni as recommended by Philippine Accrediting Association of Schools, Colleges and Universities (PAASCU) and Philippine Association of Colleges and Universities Commission on Accreditation (PACUCOA). Thus, any accredited school needs to strengthen existing links and create new bridges with the world of work especially among its graduates. It was mentioned in a study conducted by Dabalen et. al. (2001) that labor statistics and employer surveys indicate that the unemployment rate for university graduates and that their prospects for employment have worsened over time. They said in addition that the share of graduates obtaining employment in the public sector has fallen drastically. The study resulted that the messages of managers of surveyed firms are clear: (a) university graduates are poorly trained and unproductive on the job; (b) graduate skills have steadily deteriorated over the past decade; and (c) shortcomings are particularly severe in oral and written communication, and in applied technical skills. Employers frequently compensate for insufficient academic preparation by organizing remedial courses for new employees. This increases the firms' operating costs and reduces their profitability and competitiveness. The finding is alarming such that every college or institution should monitor their graduates to identify areas where graduates are strong in terms of their skills and competencies and more importantly the weaknesses of the graduates. By spotting the graduates weakness in terms of their skills and competencies is an opportunity for the college/university to advance in terms of its curriculum, instructions and a strong faculty line up. As graduates of different fields, there is a need to demonstrate to the world the skills and competencies in order to fit themselves for the job. The important questions to ask: "How can the university determine the employability of their graduates? Are they gainfully employed? How can one measure the acquired skills and competencies of the graduates? How quickly can these be monitored to acquire immediate results?" Tracer studies give important information about skills matching the combination of objective and subjective data from the graduates. The study conducted by Aquino et.al. (2015) stated that graduate tracer study provides the desirable information as to what is happening to new graduates when they join the world of work. It is equally important to find out how adequate the training as provided by any institution in the overall performance of their career life, the extent by which the knowledge, communication and other skills have been developed.



This tracer study is also a way which can provide valuable information for evaluating the results of education and training of an institution and thereby serve as a basis for future planning of activities. To keep on tracing the graduates of St. Paul University Philippines (SPUP), Tuguegarao City, Cagayan

Valley, this study proposed a systematic, faster, more efficient, and systematic way of monitoring the status of the graduates as regards graduate's employment and their professional advancement. It is an admitted fact that to date, there is an absence of an interactive system in monitoring the graduates. Thus, the researchers proposed a system towards a Dynamic Alumni Monitoring with Decision Support System to make the tracking faster and printing of reports easier and more convenient in producing alumni reports which eventually serve the entire University.

II. AIM OF THE PAPER

A. Statement of the Problem

This study aims to determine the locations, and the extent of the employability of the graduates of SPUP. Specifically, it seeks to answer the following questions:

1. What are the problems, and challenges encountered by the SPUP in terms of graduates' traceability?
2. What system can be developed to facilitate the monitoring of the graduates' employability faster and more convenient?
3. What is the extent of compliance of the developed system to ISO/IEC 25010 Software standards in terms of:
 - a. Functional suitability;
 - b. Performance efficiency;
 - c. Compatibility;
 - d. Usability;
 - e. Reliability;
 - f. Security;
 - g. Maintainability; and
 - h. Portability
4. What enhancement can be done to improve the developed system?

B. Framework of the Study

As shown in Figure 1, a design of the portal fishbone diagram of the proposed tracer study. The object in green indicates the focus of discussion in this study which is the development of a dynamic alumni monitoring with decision support system. The objects in blue indicate the different stages of procedures in the development of the system.

Need for Alumni Monitoring Study	Design of Alumni	Software Model
Problem Identification of Alumni Monitoring Study	USE CASE Design	ALUMNI PORTAL
Analysis	Database Relation	Web Mining

Solution		Application of personalization, features, communication	Design of a Dynamic Alumni Monitoring with Decision Support System
Design of Interactive Web-Based System	Application of Web Service		
Need for Datamining	Application of personalization , features, communication	Application of Web Services	
Problem Requirements	Solution Requirements	Implementation	

Figure 1. Conceptual Framework

Figure 1 presents the structure which the researchers proposed to explain the progression of the implementation of the system. There are six (6) stages of procedures performed to achieve the intended results. The first stage is the need for alumni monitoring study which includes the problem identification of alumni proposed questionnaire to be answered by the alumni, analysis of the given data, and coming up with a solution to the given problem. The second stage includes the design of the alumni portal. In the said portal, the Use Case and Database and Relation Design were conceptualized based on the data that were gathered. The third stage includes the created software model, which is the alumni portal and web mining. The fourth stage consists of the problem requirement where the researchers developed a design which is interactive web-based system and the need to mine the data of the university for the past five years. The fifth stage contains the solution of requirements where the Application of personalization, features, communication and application of web service were determined in order to upload the said system; and lastly, is the implementation of the developed dynamic alumni monitoring with decision support system. The system approach is adopted in this study. Figure two (2) presents the conceptual paradigm. It consists of three (3) stages of development namely: Input, Process, and Output.

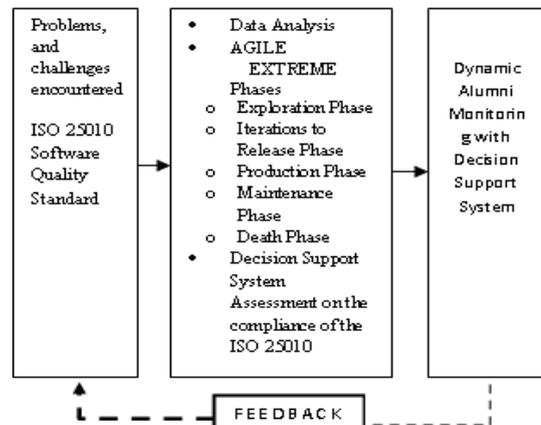


Figure 2: Conceptual Paradigm of the Study

The INPUT presents the issues and problems encountered by the Administration, Faculty, Staff and Alumni, the ISO 25010 Software Quality Standard and the Alumni Questionnaire. The PROCESS in this study refers to the different phases in developing the proposed system. This is the stage wherein inputs are analyzed, processed and evaluated. This involves the following Phases: (1) Exploration Phase; (2) Iterations to Release Phase; (3) Production Phase; (4) Maintenance Phase; (5) Death Phase; Decision Support and System Validation with respect to the Assessment on the Compliance of the Developed Dynamic and Interactive Alumni Monitoring with Decision Support System to ISO Software Quality Standard. The OUTPUT consists of the developed “Dynamic Alumni Monitoring with Decision Support System” which will be linked to the website of the University to monitor the employability of graduates. Feedback mechanisms shall be integrated to solicit comments and suggestions from IT experts and end users to revise and further improve the proposed system. This study focuses on the gathering of real-time data with regards to employability of graduates of the different schools in SPUP, thus a web-based Dynamic Alumni Monitoring with Decision Support System was developed and linked to the SPUP website for easy and convenient monitoring of the SPUP graduates. The system provides an alumni verifications and confirmation after doing the pre-registration. The system provides a platform for maintaining alumni data and notifications to periodically update their profiles anytime they open the portal. News and updates to all registered alumni concerning alumni activities of the University shall also be sent through their email addresses. Likewise, it also generates reports for the school administrators.

III. METHODOLOGIES

A. Research Design

To realize the objective of this study, the agile method research design process is utilized. The agile methodology is a project management technique in software development process. The researchers used the developmental research method to gather, organize, and present the collected data from various respondents as to determine the extent of the compliance of the study to the specified requirements and employ a database for the improvement of the availability of data. Extreme Programming (XP) is an agile software development framework which aims to produce higher quality software, and higher quality of life for the development team. XP is the most specific of the agile frameworks regarding appropriate engineering practices for software development.

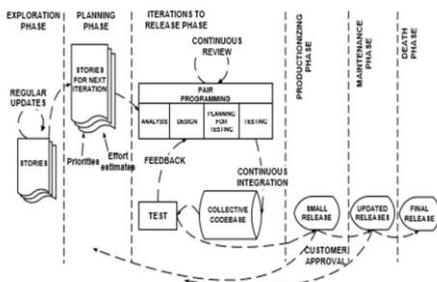


Figure 3: XP Life Cycle

The Extreme Programming (XP) has evolved from the problems caused by the long development cycle of traditional

development models (Beck 1999a). The life cycle of XP consists of six phases: Exploration, Planning, Iterations to Release, Production, Maintenance and Death.

1. Exploration Phase: SPUP comes up with a high-level requirement of the project. It is necessary to have the entire requirement finalized along this stage. The researchers get familiarize with the tools needed, the technology and practices that will be used in the project.
2. Planning Phase: The researchers will further discuss to SPUP Administrators certain conditions concerning the proposed project to have a deeper understanding to come up with an agreement.
3. Iterations to release: The project will break down to a number of iterations.
4. Productionizing/Validation phase: Prior to the utilization of the system thorough testing and checking of the performance will be done.
5. Maintenance Phase: The researchers will update the system before it will be released for customer’s use, the XP project must both keep the system in the production running while also producing new iterations. It requires an effort for customer support tasks. Development velocity may decelerate after the system is in production and may require incorporating new people into the team and changing the team structure.
6. Death Phase: When the customer no longer has any stories to be implemented. System satisfies customer needs also in other respects (e.g., concerning performance and reliability). Necessary documentation of the system is finally written as no more changes to the architecture, design or code are made. Death may also occur if the system is not delivering the desired outcomes, or if it becomes too expensive for further development.

B. Data Analysis

The following statistical tools were used in presenting the result of the study:

- a. **Frequency Counts and Percentages.** These were used to describe the total number of participants.
- b. **Weighted Mean.** This was used to analyze the extent of compliance to ISO 25010 of the developed Dynamic Alumni Monitoring with Decision Support System. The extent of compliance of the system to the said Software Quality Standards was rated using the following Likert Scale:

Range of Weighted Mean and its Descriptive Interpretation

SCALE	RANGE	DESCRIPTIVE INTERPRETATION
5	4.20 – 5.00	Extremely Serious/Very Great Extent
4	3.40 – 4.19	Serious/Great Extent
3	2.60 – 3.39	Moderately Serious/Moderate Extent
2	1.80 – 2.59	Less Serious/Low Extent
1	1.00 – 1.79	Not at all/Very Low Extent

IV. RESULTS AND DISCUSSION

This chapter presents analysis and interpretation of the results of the study in the following order: problems and challenges encountered in tracking the graduates of St. Paul University Philippines, the developed system to track the graduates of SPUP, the developed system’s extent of compliance to the ISO 25010 Software Quality Standards, and enhancements that can be done to improve the developed system further. Discussions are provided after each tabular presentation of the treated data.

1. **Problems, and Challenges Encountered by the SPUP in terms of Graduates’ Traceability.**

The researchers, together with the deans, program coordinators, the university alumni coordinator, and the university registrar, organized meetings to identify problems in tracing the University's alumni. These members have a good grasp and understanding of the challenges in tracking the alumni. Each member has contributed to identifying the problem. The problems and challenges raised by the members were structured and directed, which yielded a lot of information in a relatively short time. The problems and challenges encountered in tracking the graduates of the University were presented, interpreted, and analyzed in this section. The result is shown in the Table.

Problems and Challenges encountered in tracking the graduates of St. Paul University Philippines

<i>Problems and Issues</i>		<i>Category Value</i>	<i>Description</i>
1.	Difficulty in tracing the alumni.	4.75	Extremely Serious
2.	Interaction with the alumni in their area/location requires too much time and effort.	4.50	Extremely Serious
3.	Compulsory registration is not initiated.	4.31	Extremely Serious
4.	Difficulty in consolidating required reports.	4.85	Extremely Serious
5.	The information gap is experienced between the University and the alumni, which results in poor decision making.	4.58	Extremely Serious
6.	The current manual system is unsecured because any unauthorized person can access it.	4.74	Extremely Serious
7.	Huge number of papers used for information storage and searching of data take much more time.	4.64	Extremely Serious
8.	The University presently experiences bulky and	4.44	Extremely Serious

	unsecured paper-based graduate records.		
Average Weighted Mean		4.60	Extremely Serious

The table shows the extent of seriousness of the problems and challenges encountered by the Alumni Coordinator, Registrar, Deans, and Program Coordinators in tracking the university graduates. Further, it was found out that there is a difficulty in tracing the alumni because the alumni coordinator does not have their details. Interaction with the alumni in their location requires too much time and effort. Compulsory registration is not initiated because there is no proper registration process before graduation. There is also difficulty in consolidating required reports because the deans and program coordinators experience hard time reaching out to their graduates. This is experienced between the University and the alumni, which results to the difficulty in making decisions. The current practiced to trace is not secured where limited alumni only would fill-out hard copies. Papers can be scattered anywhere and can be damaged anytime. After graduation, the default records of the alumni are their records during their stay at the University. When the alumni visit the school, they are asked to fill-out an alumni form, which makes their records redundant. Huge and unsecured paper-based graduate records are also presently experienced by the University. As revealed by the overall mean of 4.60, the problems and challenges are described as extremely serious.

2. **The Developed System to Facilitate the Monitoring of the Graduates’ Employability Faster and more Convenient.**

The Dynamic Alumni Monitoring with Decision SUPPORT SYSTEM for St. Paul University Philippines is a web-based application system. It was developed to serve as an online tool in tracking the university's alumni to generate relevant reports. All the designs involved in developing the system were visualized using the Unified Modeling Language (UML) – a general-purpose, developmental, modeling language in software engineering. Activity diagrams are graphical representations of workflows of activities and actions with support for choice, iteration, and concurrency. It is a flowchart to represent the flow from one activity to another. The activity can be described as an operation of the system.

3. **The extent of Compliance of the Developed System to ISO 25010 Software Quality Standards.**

In this section, the assessment on the extent of compliance of the developed Dynamic Alumni Analytics and Mining System to ISO 25010 Software Quality Standards in terms of functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability and portability has been conducted after a formal consent, presentation and actual usage of the IT experts.



Summary table on the assessment of IT experts on the extent of compliance of the developed system to ISO 25010 Software Quality Standards

Criteria	Weighted Mean	Descriptive Interpretation
Functional Suitability	4.45	Very Great Extent
Performance Efficiency	4.34	Very Great Extent
Compatibility	4.75	Very Great Extent
Usability	4.80	Very Great Extent
Reliability	4.55	Very Great Extent
Security	4.65	Very Great Extent
Maintainability	4.38	Very Great Extent
Portability	4.42	Very Great Extent
Overall Mean	4.54	Very Great Extent

The assessment summary on the extent of compliance of the developed system to ISO 25010 Software Quality Standards is presented in table.

With an overall mean of 4.54 which is described as very great extent, the evaluation of the developed dynamic alumni analytics and mining system is compliant with the ISO 25010 Software Quality Standards in terms of functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability as assessed by the IT experts. This means that IT experts found the system to be usable, perform its perceived functions, and met their needs. The finding agrees with the study of John Estdale and Elli Georgiadou (2018) entitled "Applying the ISO/IEC 25010 Quality Models to Software Product" that ISO 25010 provides the leading models for assessing software products. This is an important contribution towards establishing the delivery performance of software processes and proposed improvements.

4. Enhancements that can be done to improve the Developed System.

The developed system provides a temporary username and password. The username and password are system generated and are sent personally to every alumnus thru SMS for them to be able to access the system. To enhance this feature of the developed system, the researchers proposed that before the alumni leave the university, or before the graduation ceremonies, there should be a compulsory registration for every batch. With this, there shall be a regular registration of alumni and should be initiated every year. A group chat (GC) of the different batches of alumni of the university was established in the developed system. This way, all alumni in their GCs can communicate/chat with each other with the

System Administrator. Announcements, news, and events for a certain batch are posted by the admin in the GC. This feature of the developed system should have an additional video chat attribute for better communication and private messaging for direct messaging. With this feature, interaction with every alumnus in their location shall not require too much time and effort. Instead, the alumni coordinator of the university can acquire information needed from certain alumni immediately. The private messaging shall provide alumni a private exchange of messages between different members which is only seen and accessible by the users participating in the group chat.

V. CONCLUSION

One of the best ways to market a school is to be able to track the whereabouts and accomplishments of its graduates, their employment and productivity. The graduates' productivity speaks of the quality of instruction and services offered by any school. Most often, schools have difficulties to keep in touch with its graduates. Thus, school administrators should be able to introduce mechanisms to track their graduates faster and easier. With the emerging technologies, and technological advancement nowadays are greater chances and opportunities to ease people's life including school operations more specifically in tracking the graduates. Thus, the DYNAMIC ALUMNI MONITORING WITH DECISION SUPPORT SYSTEM solves the problem concerning graduates' traceability. The develop system has the capacity to generate reports needed by the faculty and administrators and it can be a model for other institutions to trace their alumni. Finally, this tool can be utilized for a more convenient and a speedier collection of data among graduates, giving the administrators, faculty and personnel a clear picture of the graduates' profile.

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