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Development of a Computerized Student- Advising and Enrollment System

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ABSTRACT

The traditional "paper and pen" method of student records handling manual enrolment system has been bungling the advising and enrolment process every semester. More related issues were raised by stakeholders who compelled the school to acquire and install a new system. The fundamental objective of the system was to bring the level of student record into a structured form. With such a mindset, the system was assumed to consequently improve the conduct of advising and enrolment processes in the school. To expedite the comparison, the author chose the queuing methodology as it allows generate low – cost and affordable technologies include SMS as well as barcode which area also injected into the computerized enrolment system. Further, in programming the application system, the author as FOSS advocate himself, used open – source web engineering tools along the lines of Apache 2 for web service, PHP 5 for server – side scripting, MYSQL for database service, XML AJAX, Code 3 of 9 bar coding technique as well as POSIX – based regular expressions. The development and full – scale implementation of this system had physically changed the landscape of student records handling in the school as student checklists and allied reports can be easily retrieved by deputized users from designated workstations. The enrolment process had significantly improved specifically in terms of advisee and adviser interaction. This becomes possible as advisers have already the luxury of time to talk and exchange ideas with their advisees. While under operational observation, the system will be of exclusive use of the school until proven to be already stable. The rest of the departments will likewise avail of the service in the near future as the application system is designed to be scalable for such expansion.

Keywords: automated system; enrolment system; SMS; student records; system development

INTRODUCTION

Background

The changing need of the society and the fast advancement of technology gave birth to computer-generated systems. Time, one of the most powerful force-out of nature endowed with the capability to change everything subjected to it, is a factor that shuffle Information Technology a necessity rather than just sumptuousity in this modern days. It has come to this detail that computers help a mint in most of the complicated works; starting from scientific researches, banking, weather forecasting, telecommunication and a lot more.

Computers and other products of technology are primarily used to aid employees and end-users for a much more efficient, accurate and less time-consuming transactions. These are the modern day techniques that are commonly used by organizations, institutions and agencies, both in public and in the government, making their work easier.

Many institutions adhere with paper-less processes which is cost-efficient and environmentally significant, thus the use of technology arises. Resorting from manual transactions to some computerized transactions often leads to discussions as institutions consider the pros and cons of using any of this technique.

Universities, and even High School, also prefer computerized enrolment system as aid for a quicker enrolment process. Enrolment system is one in all the foremost vital and evident, not solely in a university, however conjointly in lower levels of education. Associate degree correct and enrolment records helps to confirm a decent impression of the university on attainable enrolees encouraging them to matriculate within the university.

A manual method of enrolment system takes longer and usually causing delays of dealings. The unsystematic procedure of enrolment, from primary to graduate degree, is a terrible transaction for them. The reality in the enrolment processes occurring in tertiary level was worsen by country's culture of "pakikisiksik" that often leads to misunderstanding between enrolees. Students got to spend a day or two to finally finish their transactions without the security that they will be accommodated during the day.

The increasing number of enrolees annually adds to the burden of staffs responsible in the enrolment process and in order to have a much more reliable technique, deliberations and discussions were made to augment the need of the administrative staff as well as the enrolees. This will provide an avenue for universities to be equally-competitive with one another, thus meeting their standards.

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Technology has been a locality of our daily lives. Today, the utilization of technology has been an efficient tool on rising such reasonably enrolment system. The advancement of technology is not merely a positive event in the society for its advancement also gives rise to different issues both in the environment and in human lives.

The use of technology in the different systems in our daily lives gathered both positive and negative opinions. The technological advancement often requires frequent updates that can sometimes become costly as to upgrading requires payments. Technology can be reliable and at time unreliable depending on the user and the technology they are using.

Computerized and manual enrolment systems both have their limits and can also either beneficial or destructive to human. As one of the advantages of computerized system, computers are known for having wide range in storing files and other documents. The storage capacity of computers cannot be compared with the manual storing given that manual storing can be less secured. However, in terms of security of the information of users, computerized system oftentimes fails to ensure that the data of the users are confidential given that both administrative staffs and other tech-savvy may have access to it.

Computerized enrolment system promotes less-time consuming processes, while manual system usually requires longer time allotted to finish it. In the modern era where people are time-conscious, they would rather prefer computerized enrolment system most particularly if the enrolment system may be done at home with the use of their internet connections. On the other side of the coin, we have an unreliable and unstable internet connection. This is one of the reasons why some government offices are dysfunctional.

Online transactions such as registrations and applications, may cause danger to a wider population considering that there are people who are engaged in black market transactions in which they can gather data than can be used for illegal purposes. The issue on security of information become the central issue to this.

Some may consider computerized transaction as accurate and efficient. However, information may be corrupted most particularly if the user has a poor technological literacy or knowledge to backup files and data encoded. While manual enrolment system can gather data more accurately given that this require one-on-one or face-to-face interview where the administrative staff can further ask for some clarifications.

Environmentally, computerized enrolment system is not as friendly as it seems since it can add to extreme usage of non-renewable resources that later may affect the people's way of living. The release of harmful substances to the environment add up to the earth's global pollution in different forms, either water, air and land.

On the other hand, the significance of either of these methods depends on how people view them. The effectiveness of these processes oftentimes dependent on the administrative staffs' contingency planning to ensure that unexpected delays may immediately be given attention.

Enrollment process is everybody's concern, not just by the students but also by the administrative staffs who are responsible in facilitating the process. The emerging technology nowadays serves as an avenue to develop ways which do not only simplify complicated transactions but also provides more accurate and much more efficient process.

Students, both in secondary and tertiary level, are complaining on the process of enrollment in which universities and other schools are implementing. Administrative Staffs also finds difficulty as to how they will deal with bulky number of students trying to enroll and process their documents. This motivates the universities to enhance their mechanisms to improve their service with their queries.

Therefore, some other universities resort to computerized enrollment system as a replacement of the time-consuming manual enrollment in both public and private schools. This system is said to enhance the flow of transaction and to ease the work and burden of the people responsible.

Manual enrollment is known to be time-consuming and is prone to errors. This is the traditional way of registration of the students most particularly here in the Philippines. This mechanism is the comfort zone of most administrative staff. These do not require much skill in technology and even allow interpretation or clarification of queries from applicants or clients.

Technological competitiveness is a sign that a certain institution are upgrading their system, thus many universities are improving their mechanism to reduce the time consumed in the enrollment process and to store information in a more secured way.

Some SUC (State, University, and Colleges) Campus uses the manual system ofenrolment.With extra than 1,000 students to cater, there is usually a lengthy line of college students waiting for their turn to be known as in the assessment area. This has been constantly the case for each and every enrollment length in the Campus. A long line of college students is simply one of the problems the different is on the issuance of the evaluation slips.

Sometimes, human blunders make this scenario even extra complicated. Inconsistencies in the processing oftentimes lead to inefficiency and errors. On the different hand, there are instances that college students complain computational mistakes and once in a while students marvel why there are payments that they are no longer supposed to have, but then show up in their evaluation slips.

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It is also true that one course can have fee that the different course may no longer have. Take for example Bachelor of Science in Information Technology (BSIT); this path has a computer laboratory fee in which other courses may also no longer have. Sometimes the evaluation personnel commits mistake by including the laptop laboratory payment to a Bachelor of Science in Hotel and Restaurant Technology scholar which do not have a laptop laboratory subject.

Computerized enrollment system minimizes human error and maximizes the number of students served per day. The system also improves the delivery of services and promotes comfort among those who are involved in the process. At the same time, data gathered are centralized however, threat to information security arises.

Due to certain issues arising, there is a need to conduct a study which weighs both the advantages and disadvantages of computerized and manual enrollment system to ensure that data gathered are secured, there is an effective usage of any mechanism and to ensure that the quality of services provided are satisfactory.

METHODS

A research methodology describes the data gathering procedures and data validation techniques employed during the course of research activity. It tells every detail of the actual research conducted. Since, the comparative study is being used while it is in the course of development the developers are able to implement the new added features are easily incorporate to the study.

In manual enrolment system, this consists installing the system by module; the first module to be delivered will be the Registration Module. The said module will allow the registrar to encode all the data of the student into the enrolment system database. Once the registration module is fully functional comes next the Enrolment Module. This makes the students be enrolled to programs of their choosing. The proponents will wait for one or two months before installing the two other modules, this for the reason of making sure that the registration and the enrolment modules are stable.

Upon the confirmation of stability of the two previous modules, the proponents will then install the Assessment module so that accounts of the student will automatically be generated. The Cashiering Module will be installed next; this module contains functions that will make the computation of the outstanding balance of students automated. If the student will make a payment, it will automatically be deducted to his/her accounts.

Every phase consists of the following and was divided into one or several iterations, wherein every division or portion was time bounded. Software design and analysis was one iteration ahead of the software development and testing to be able to keep the study development process going.

Inception

In this phase planning and conceptualization of the study was done. This is where the plan and concept of the software system is being formulated and developed. Usually the planning and conceptualization of a particular software system means an actual interview to the Registrar personnel, the Admission personnel, the Assessment personnel and the Cashier personnel be able to know the enrolment issues that they encounter. After the interview the proponents also asked some question to some of the Faculty and Students if they were having some enrolment issues themselves.

Knowing some of the issues that concerned about enrolment, the proponents then carefully analyzed and validated the gathered issues and information about enrolment. Although some of the issues needed to be given solutions, some of them also were just personal concerns and did actually needed solution, let’s say they were just part of the enrolment flow that are inevitable.A plan and concept for the enrolment system has been roughly sketched and some small details.

Elaboration

After planning, conceptualization and requirement analysis is completed. The proponents will implement a working part of the enrollment system for evaluation purposes. Feedback on the functionality of the evaluation system will be analyzed and be given a working solution. The working solution will then be incorporated to the implemented evaluation system for further feedback and the process of analysis and solution implementation will go on until the enrollment system is completed.

Enough efforts are also exerted in order to determine and predict potential problems that may arise in the future that concern the software system.

Construction

Time has come that the decision on the software system specification will be made. Specification covers the platform or programming language to be used, which will take care the coding of a certain part of the software system and of course the time frame or duration of the said project.

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Transition

This part of the system development is considered to the packaging and deployment of the completed system. As part of the comparison of the study, the proponents planned a systematic system of the finish of the comparative study between manual enrolment system and computerized enrolment system.

RESULT

The tables below present the results of the study.

Table 1. Manual enrolment system for third year level

Questions	Weighted mean	Adjectival description
Is the enrolment processing fast?	2.7	Fair
Is the grades were generated immediately?	3.32	Satisfactory
Less mistake on student profile records (such as spelling of names, birthday entries, etc.)?	2.14	Fair
Does the records are kept accordingly?	3.46	Satisfactory
Is the system fast and efficient production of student information?	2.68	Fair
Total	2.86	Fair

Table 2. Manual enrolment system for fourth year level

Questions	Weighted mean	Adjectival description
Is the enrolment processing fast?	3.36	Satisfactory
Is the grades were generated immediately?	2.94	Fair
Less mistake on student profile records (such as spelling of names, birthday entries, etc.)?	2.28	Fair
Does the records are kept accordingly?	3.48	Satisfactory
Is the system fast and efficient production of student information?	2.76	Fair
Total	2.964	Fair

Table 3. Computerized enrolment system for third year level

Questions	Weighted mean	Adjectival description
Is the enrolment processing fast?	3.58	Satisfactory
Is the grades were generated immediately?	4.02	Very satisfactory
Less mistake on student profile records (such as spelling of names, birthday entries, etc.)?	3.74	Satisfactory
Does the records are kept accordingly?	4.16	Very satisfactory
Is the system fast and efficient production of student information?	4.36	Very satisfactory
Total	3.972	Satisfactory

Table 4. Computerised enrolment system for fourth year level

Questions	Weighted mean	Adjectival description
Is the enrolment processing fast?	3.4	Satisfactory
Is the grades were generated immediately?	4.1	Very satisfactory
Less mistake on student profile records (such as spelling of names, birthday entries, etc.)?	4.1	Very satisfactory
Does the records are kept accordingly?	4.46	Very satisfactory
Is the system fast and efficient production of student information?	4.42	Very satisfactory
Total	4.096	Very satisfactory

DISCUSSION

The study conducted by the proponent was able to identify problems that Eastern Visayas State University – Tanauan Campus is experiencing regarding their system of enrolment. Common among the problems identified are the stretching lines of students waiting to get their assessment slip and the generation of the Transcript of Records of the student which extends one month to release. The study showed that there is a need of enrolment

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system software to be implemented in Eastern Visayas State University – Tanauan Campus. This would take the handling of student information, such as transcript generation and assessment slip, easier and faster.

The proponents utilized the Iterative and Incremental Development Model in the development of the enrolment system software. This development model used repeated cycles and every cycle – a portion of the system is gradually developed. The utilization of an open source relational database management system and other open source software was taken advantage for cost reduction purposes of the study.

Considering the fact that the target users of the system are mostly non-information technology experts, the proponents developed this system to be user-friendly as possible. The implementation of the system will also be followed with training on how to use the enrolment system. A dry run of the system operation will be done to test the functionality of the enrolment system. This will serve as a pre-implementation planning to ensure that the system will give significant impact to the enrolment process.

Moreover, included in the design of the system is the capability for local area network operation. This is based on the idea that different users and departments are going to use this system but only one storage unit which is the database. The design also specified the computer specifications that the enrolment system software will be running. Taking into consideration the cost of the equipment that will be used upon actual implementation and operation of the proposed system, the proponent made a cost-benefit analysis for the said study to determine the cost advantages of the computerized enrolment system in contrast with the current manual process.

Based on the results from the data gathered, computerized enrolment process gets very satisfactory and satisfactory rating in terms of the rate of processing, generation of grades, less human error, data storage and efficiency of production. On the other hand, manual enrolment, there is a fair result in terms of the same qualities asked in the computerized enrolment process.

For manual enrolment system, one among its several disadvantages is that it is very much time consuming. Often the books are lost without the librarian being aware of it, there is no proper records for the workers, members and book transactions. Another is in the storage issue, if manual record book is lost, data will be completely lost. A lot of manual labour is required for record keeping and oftentimes, duplication occurs as workers find it hard to keep track in the bundles of registers.

There is also a less security in terms of storing data specially if these data can get in the wrong hands and can be used against the company or institution. Data is not always reliable as it is hand written and some human errors might have occurred. Retrieval of data is very slow and storing consumes a lot of space.

On the other hand, Computerized Enrolment System allows the ability to reliably update data and take action on trigger events though it takes time to manage data. Such system will make enrolment much easier and faster and less time consuming. A computerized system can hold more files in an organized way rather than a non-computerized system. It is also easier to locate information and is free from human error. Systems operations proceed faster, more efficiently and with greater accuracy than manual enrolment systems. Since, it reduced human errors (mistakes) and processing time, thus it can boost productivity and resulted into high quality of product.

The results of a financial justification business case. It is distinguished from other business case approaches only by the special emphasis on financial decision criteria.

Total Cost of Ownership (TCO)

Today, TCO analysis is used to support acquisition and planning decisions for a wide range of assets that bring significant maintenance or operating costs across a long ownership life. Total cost of ownership (TCO) analysis is center stage when management is faced with acquisition decisions about computing systems, vehicles, buildings, laboratory equipment, medical equipment, factory machines, and private aircraft, for instance. Today, TCO analysis for these kinds of assets is in fact a central concern in: (Solution Matrix Ltd., 2012)

- Budgeting and planning.
- Asset life cycle management.
- Prioritizing capital acquisition proposals.
- Vendor selection.
- Lease vs. buy decisions.

All of these approaches to cost benefit analysis attempt to predict the financial impacts and other business consequences of an action. All these approaches have the same structural and procedural requirements. They differ primarily in terms of:

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- How they define "cost" and "benefit" in practical terms.
- Which costs and benefits are included for analysis.
- Which financial metrics are important for decision makers and planners.

(Solution Matrix Ltd., 2012)

Table 5. Estimated monthly cost (manual system)

Personnel/Items		Number	Estimated Cost
Registrar	Registrar	1	28,300.00
	Permanent Personnel	2	21,000.00
	Job Order Personnel	2	10,200.00
Accounting	Job Order Personnel	2	10,200.00
Cashier	Permanent Personnel	1	11,300.00
	Job Order Personnel	1	5,100.00
Others	Bond Paper (Short)	1 ream	200.00
	(Long)	1 ream	230.00
	Ballpen	26	650.00
	Pencil	11	55.00
Sub Total			87,025.00
Registrar	Computer: Pentium D PC Set	1	16,000.00
	Core 2 Quad PC Set	3	63,000.00
	Printer: Brother DCP-J125	1	3,800.00
	HP Deskjet D2460	1	3,500.00
	HP PSC 1410	1	5,000.00
	HP Deskjet F380	1	5,000.00
Accounting	Computer: Dual Core PC Set	1	17,000.00
	Core 2 Quad PC Set	1	21,000.00
	Printer: EPSON LQ + II	2	22,000.00
Cashier	Computer: Dual Core PC Set	2	34,000.00
	Printer: EPSON LQ + II	1	11,000.00
			201,300.00
Sub Total	Equipment Life Span (3 years)		16,775.00
Others	Matriculation Form	1500 pcs.	30,000.00
			30,000.00
Sub Total	Two enrolments per school year		5,000.00
ESTIMATED MONTHLY TOTAL COST			108,800.00

Table 6. Estimated monthly cost (computerized enrollment system)

Personnel/Items		Number	Estimated Cost
Registrar	Registrar	1	28,300.00
	Permanent Personnel	2	21,000.00
Accounting	Job Order Personnel	1	5,100.00
Cashier	Permanent Personnel	1	11,300.00
Others	Bond Paper (Short)	1 ream	200.00
	(Long)	1 ream	230.00
	Ballpen	20	250.00
	Pencil	9	45.00
Sub Total			66,280.00
Registrar	Computer: Dual Core PC Set	3	51,000.00
	Printer: Brother DCP-J125	1	3,800.00
	EPSON LX + II	2	17,000.00
Accounting	Computer: Dual Core PC Set	1	17,000.00
	Printer: EPSON LX + II	1	17,000.00
Cashier	Computer: Dual Core PC Set	1	17,000.00
	Printer: EPSON LX + II	1	8,500.00
SERVER	Computer: Core i3 PC Set		20,000.00
			142,800.00
Sub Total	Equipment Life Span (3 years)		11,900.00
Others	Enrolment Form	660 sheets	6,000.00
	Plotting Form	1500 sheets	1,500.00
	Student Information Form	1500 sheets	750.00
			8,250.00
Sub Total	Two enrolments per school year		1,375.00
ESTIMATED MONTHLY TOTAL COST			79,555.00

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Estimated Difference (ED): Current SystemCost – Proposed System Cost

ED = 108,800.00 - 79,555.00

ED = 29,245.00

Estimated Investment (EI) (Proposed System)

EI = 217,330.00

Gains (G): ED x 12 Months

G = 29,245.00 x 12

G = 350,940.00

Return on Investment (ROI)

$$ROI = \frac{\text{Gains} - \text{Investment Cost}}{\text{Investment Cost}}$$

$$ROI = \frac{350{,}940.00 - 217{,}330.00}{217{,}330.00}$$

$$ROI = 0.6148$$

$$ROI = 61.48\%$$

CONCLUSION

An academic institution is a warehouse of information that needs to be managed, manipulated, maintained, stored and most importantly secured. These are the student records, namely grades, subjects, tuition fees, academic programs and student information. In a manual process of enrolment system these records are represented by folders or envelopes filled with papers with a name of a student as a tag. A shelf stands as the storage of these records.

On the other hand, the maintenance of this manual process is costly and time consuming. Human error makes this process even difficult; retrieving andreturning these papers into the shelf, misplaced and sometimes tore some pages apart. Re-building these torn pages is easy if all the necessary data of a page is still intact. However, if it lost, the re-building story will be a different; it will take a lot of time just a single file to be whole and intact again.

The overall assessment, Enrolment System for Eastern Visayas State – Tanauan Campus is a tool that will make most of the transactions, if not all, of the university easier, faster and reliable.

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