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ELECTRONIC STUDENT-FORM MANAGEMENT SYSTEM

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A Project  
Presented to the  
Faculty of  
California State University,  
San Bernardino

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Business Administration  
in  
Information Management

---

by  
Donia Ibrahim Alsayed

June 2014

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June 2014

Approved by:

Dr. Conrad Shayo, Committee Chair, Information Management

Dr. Frank Lin, Committee Member

Dr. Jake J Zhu, Department Chair

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## ABSTRACT

The development of technology has made the world a smaller place where communicating instantaneously irrespective of the geographical location is a way of life. Electronic Forms (E-FORMS) are an easy way to communicate efficiently with students. At present, universities are still using old systems for communication where efforts to improve the system is a lethargic process. As most of these universities are still using student forms manually, the introduction of E-FORMS will speed up the whole process and positively impact in communicating efficiency. In addition, the inconvenience of making numerous visits to the university is sometimes seen as a hassle but due to lack of Information Technology (IT) development in universities, this is the usual pattern still seen at most universities. In this study, the use of E-FORMS at universities is proposed to help students and university staff to communicate effectively and efficiently. As it is still a fairly new concept, the study proposes the many features involved in E-FORMS communication. The Researcher has chosen California State University San Bernardino (CSUSB) to do this study. This study consists of the detailed design of the proposed E-FORMS Application System at CSUSB.

The design provides a more efficient and supportive system that is easy to use while maintaining student privacy and flexibility. The solution is designed taking into consideration the use of PeopleSoft Enterprise. This proposed system upgrades the existing CSUSB form management system. It is a step forward to a more efficient and the operative system.

## ACKNOWLEDGEMENTS

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## CHAPTER ONE

### BACKGROUND

#### Introduction

The Internet has been developing at a very high rate over the past decade. People from far apart regions are now able to do business with each other easily and cheaply. The utilization of advanced technology in organizations has led to increased efficiency in production leading to increased quality and quantity of the products, saving of time, and money; hence development.

Technology is so crucial in development in that most organizations are adapting technology in all of their operations; including those that were initially carried out using manual techniques. Unfortunately, learning institutions such as Universities are not part of this group of 'technology crazy' organizations. Most universities continue using manual operations in most of their activities, such as in the management of student forms. This project seeks to solve the problem of managing student forms manually in universities by managing them electronically using E-FORMS.

## Purpose of the Project

The purpose of this project is to determine the best design for the electronic student-form management system which will make the process efficient, easy to use and able to sustain large volumes of data. As this is a personal initiative proposed by the researcher, the originality of this project is stressed. Although a number of universities are adapting the use of E-FORMS systems, it is still a fairly new concept. From the outset of this study, it was anticipated that the results generated would be valuable in many forums. Examples of such forums in which the findings of this study could be instrumental include those responsible for creating professional development experiences, those responsible for developing education curriculum for all levels of education, instructional materials and/or resources (pedagogy) especially in instances that determine the effective components that promote and support technological literacy.

## Problem Background

Universities, especially public universities, have always lagged behind when it comes to information technology adoption. This is due to three reasons: Organization culture, organizational structure, and organizational orientation. The organization culture present in the universities is by far the biggest cause of slow adoption of IT innovations in these organizations. The culture of an organization consists of the manner in which organization members relate with each other, the management style applied by managers, the manner in which decisions are made, the manner in which innovation is handled, and the manner in which employees are remunerated. In most universities, the relationships that exist among university members are very weak. Generally, there is no felt need to change and compete. The researcher thinks this lack of competitiveness could lead to reduced innovativeness, especially in technology adoption.

Apart from the organization relationships, the management style applied by managers in the universities also has a huge impact on development. From the researcher view, most universities are normally autocratic management style. In this management style, stakeholders (students,

faculty, staff, and administrators) are not given opportunities to participate in the decision-making process. They are also not allowed to air their suggestions and opinions on organizational matters, even those that affect them directly. This management style hinders innovation because the innovative ideas of the stakeholders are never listened to as a result of the top-down organizational communication channel.

Successful organizations have achieved their success because of the use of participative management style. Participative management style is where the managers allow the organizational stakeholders to take part in all important organizational activities such as decision making. The managers also deal with all stakeholders as team members, listening to all their production ideas and opinions. When all stakeholders are allowed to contribute idea in the crucial matters of the organization, they become motivated since they will feel they are crucial members of that organization. This will inspire them to work to their full potential leading to increased productivity in the organization. This management style also encourages innovation since managers allow all stakeholders to air their innovative ideas on how the

organization can be improved. The manager then selects the best ideas from the stakeholder's pool of ideas and implements them to bring about innovation in the organization. These organizations then utilize innovation to boost their productivity; hence, giving them a competitive advantage on the market.

The last organizational culture issue that makes some universities lag behind in development is the remuneration or reward systems used. Most universities are known for using only money based rewards, such as salaries and wages (Snyder and Parth, 2006). This reward system is not; however, the best reward system because it does not motivate employees to optimal levels. According to Maslow's theory, human beings have different levels of needs, which when satisfied, give the employees varied levels of satisfaction and motivation. Money-based rewards only satisfy needs down on Maslow's hierarchy of needs, such as basic needs for survival. Once these needs have been satisfied, the employee seeks to satisfy other needs up in the hierarchy. Money-based rewards; therefore, cease being motivators to the employees once the basic needs have been satisfied.

Successful organizations normally use integrated reward systems so as to ensure continuous and sustained motivation of employees. In integrated reward systems, both monetary and non-monetary rewards are given to the employees. Non-monetary rewards, as the name suggests, are rewards which does not involve the use of money; such as promotions, opportunities for advancement and work recognition. This reward system helps to keep the employees motivated at all times because it has components that satisfy the employees needs at all levels of the Maslow's hierarchy of needs. When employees of an organization are motivated, their production output is high leading to overall organizational development.

The organization culture of most academic institutions may affect productivity because of its impact on the decision making process. The organization structure present in most universities is the hierarchical organization structure. In Universities where this organization structure is applied, decisions are made only by strategic managers. This leads to low quality decisions because functional managers with extensive knowledge about the operations of their areas of jurisdiction, are not involved in the decision making process. The matrix organization

structure is preferred by most successful organizations because it delegates decision-making powers to the functional managers. This leads to increased speeds in the decision making process, and also increased quality of the decisions because functional managers have better experience of how their departments work than the strategic managers.

The final issue that has led to the current problem is the lack of IT adoption in universities is the orientation of these organizations. Most universities are not profit-oriented; hence, they are not aggressive in formulating and implementing organizational strategies that will lead to massive development and increased profitability. For example, all government owned universities are 'not-for-profit' universities and they depend for government funding to operate. These universities; therefore, see no need of adapting strategies that will help them increase the efficiency of their operations, such as the adapting an electronic student-form management system (E-FORMS).

The use of manual techniques in managing students' forms has led to a lot of problems. The first problem is that students must physically go to the university before they can fill academic forms such as admission forms,

graduation forms, changing major forms and project contract forms. This inconveniences and wastes time of the students who live far from the university and causes them to incur huge sums of money in transportation. The use of E-FORMS will help solve this problem because it provides the platform where students can fill their forms electronically from the comfort of their homes. E-FORMS will; therefore, help the students to avoid frequent trips to the university, which may be costly and time consuming.

#### Scope of the Project

This project is set to achieve various targets under certain time and financial budgets. The first target that the project seeks to achieve is increased efficiency in student-form processing. In order to achieve this, E-FORMS will be designed in an easy-to-use design so that both students and University employees can efficiently and effectively apply it. The second target of this project is to ensure ease of tracking the processing of forms. E-FORMS will give updates to students at various levels of the form processing process; thus, helping them, track their forms. This will be achieved because E-FORMS will be designed with



an automatic updater function that will send messages and e-mails to the relevant students at certain intervals.

### Significance of the Project

There are several reasons that support the significance of this study. To begin with, there has been little research performed on the value of technology used for communication in universities. First, E-FORMS will serve as a fast step towards the adaption of advanced technology in the operations of the University. This is because when the university's management experiences this efficiency; they will be motivated to introduce more technology-based operations in the University. The second significance of the project is that it will increase the productivity of the university. The use of E-FORMS will enable the University to recruit international students; hence, expanding its operations.

The project is also significant because it will help the university to monitor the performance efficiency of its employees. This is because E-FORMS send a report to the manager when an employee fails to process a specific number of forms within a stipulated period. The University can; therefore, utilize this project to replace inefficient

staff members. Lastly, this project is significant because it will save students significant sums of money and time that could have been incurred in making frequent trips to the university or making numerous phone calls on matters concerning their forms.

## CHAPTER TWO

### METHODOLOGY

#### Introduction

The research will collect CSUSB forms from the university website "<http://www.csusb.edu>" in order to analyze it and implement the E-forms. The researcher will take into consideration the use of PeopleSoft Enterprise. According to oracle documentation one of the preliminary requirements for the application based on PeopleSoft is that the Institutional Structure/Campus Community setup sequence must be completed prior to setting up ERP system (Oracle, 2010). PeopleSoft is an Enterprise resource planning (ERP) system.

#### E-FORMS Application System

This system is an upgrade of the existing CSUSB manual forms processing solution. It is a step forward to a more efficient and the operative system.

Table 1. Comparison of the Two Systems (Old System Versus the E-FORMS System)

MANUAL SYSTEM	E-FORM SYSTEM
Require students to be physically present at the University	Can be accessed from anywhere irrespective of the location
Time consuming	Fast and efficient
Registration confirmation takes time	Registration for academic purposes is instant
Involves actual individuals	Done electronically
Different forms to be collected from the university premises for each purpose	Available online for instant filling and confirmation
Requires students to visit different faculties for various purposes	Available online under each faculty name

The researcher has chosen twelve manual forms used to serve MBA students at California State University, San Bernardino. The offices where the forms were collected are:

1. MBA office.
2. Graduate study office.
3. International office.

The researcher analysed the twelve forms and implemented an E-form system. Through this updated system the user will be able to access twelve manual forms on the automated system and perform the requested operations online.

#### Parties that Relevant to the System

1. MBA office.
2. Graduate study office.
3. Graduate admission office.
4. International office.
5. Record, Registration and evaluation.
6. Departments.
7. Students.

#### The Twelve E-Forms Name

The following forms and its protocols were collected from the university website (<http://www.csusb.edu>).

- Leave of Absence Form.

- Advancement to Candidacy Form.
- Graduate Project Contract Form.
- Changing in Program Plan Form.
- Comprehensive Examination (Computer Request) Form.
- Register For Comp Exam Only/Portfolio Only/or Both Form.
- Petition for A Retroactive Add Form.
- Add After the Census Date Form.
- Drop After the Census Date Form.
- Discount Grade Form.
- Readmission from a Leave of Absence Form.
- Withdrawal Form.

#### Generalizability of the Findings

There are many other contravening factors that come into play when considering use of E-FORM system technology in universities, which are not controllable in the present study. These factors may make findings generated from the singular university sampled herein not representative of all universities. Nonetheless, it is hoped that at least, the present study will provide generalizable insights to

guide similar empirical undertakings across many  
institutions of higher learning.

## CHAPTER THREE

### IMPLEMENTING E-FORM

#### Introduction

E-Form applications system design is based on the server centric architecture also known as thin client application. As mentioned by refresh Technologies, the implementation of this thin client architecture, organization can realize dramatic reductions in hardware, software licensing and travel costs even up to 75% (Oracle., 2013). With this economical electronic solution universities can have a perk of double benefits of low cost and stand with the 'technology crazy era'.

#### Thin Client Architecture

This system is simply accessible via browsers on any machine using inter or intranet and no installation is required. This feature supports the ease of access within or outside the premises of University. Applications are easier to use for end user. All the data load is on the server end and server handle the processing of request/query from the user. Server further distributes the load to



between application server and web server to manage the load on the system.

### Application Implementation

Main identifiable entities in this system are the objects that collaborate with each other to perform the operations. These objects have their own attributes and behaviors which will give us the complete system functionality.

#### Students

Students can access, fill and submit the required form and he has its roll number as a unique identification to access the system and file the application. Students are the main system user and the upgrade of the system is to serve them in the timely manner and to reduce their problems at the campus.

Table 2. Student Main Functionalities

List of functionalities	Entries in the table
Sign in	Record exists in the STUDINFO
Fill application form	Information stored in the session
Submit Application	Information stored in the APPINFO table
Track Application	Information retrieved from the APPINFO table and viewed through the record group of application status view.

University Employees

University employees in various departments can access the only required application forms for update, approval or rejection. It is noteworthy that department employees have specifically assigned duties and responsibilities in the processing of the forms. For example, approval is done by higher level employees or even a committee. The particular employees who are responsible to handle the manual applications and forms will do their same job through the online E-Forms system. They have to update the form status after processing it so that it is viewable by their

supervisor. This will indicate the efficiency in their work.

Table 3. Offices Main Functionalities

List of functionalities	Entries in the table
Sign in	Entries exist in EMPLOYEEINFO. It contain all the employees attributes
View Applications	Record from APPINFO
Approve/ Deny after verification	Access STUDINFO for verification and then approve and update in the APPINFO

### Forms

These are the twelve forms in the university system that is made available through the campus portal. Users will save time and energy and participate in an environmentally friendly solution that reduces paper waste in the organization.

### System

The system is mainly responsible to perform the mandatory checks on the application/form and update the status of the applications. It is also providing the

tracking capability of employees' actions and students input during the entire applications life cycle. It notifies the relevant person or supervisor responsible for the application about the application status. When a request is placed to an employee, requiring her to process an application, a supervisor will also receive an email or some kind of push up notification.

Table 4. System Functionalities for E-FORMS Application

List of functionalities	Entries in the table
Signout / session time out set	Information set in the SIGN_INFO_TAB control table
Notify user	Information store in the NOTIFIC_TAB Control table

### Applications Flowchart

#### Leave of Absence Form

- The student will access the system.
- The system will check if the student is permitted to fill out the form, if he/she is, one of the following actions will happen.

1- The system will not allow the student to fill the form and end the procedure because it is summer quarter.

2- The system will allow the student to fill the form and submit the request.

- If the student has submitted the request, the system will send it to the Program Coordinator for approval.
- Then the request will go to the Dean of Graduate Study for final processing. From there one of the following actions will happen.

1- Approve the request - The system will do the following actions.

- o Inform the student via E-mail or Text-MSG.
- o Send a copy of the final decision to the Program Office.
- o Send a copy of the final decision to the Program Coordinator.
- o Send a copy of the final decision to the Graduate Study Office.
- o Send a copy of the final decision to the Office of Record.

2- Return the request to the student to submit any documents needed. When the student submits the document, the system will check if it has been approved by the Program Coordinator, if so, the

system will send the request to the Dean of Graduate Study.

3- If the request is denied the system will do the following actions.

- o Inform the student via E-mail or Text-MSG.
  - o Send a copy of the final decision to the Program Office.
  - o Send a copy of the final decision to the Program Coordinator.
  - o Send a copy of the final decision to the Graduate Study Office.
- Send a copy of the final decision to the Office of Records Registration and Evaluation.
  - The system will update the data, and finally end the procedure.

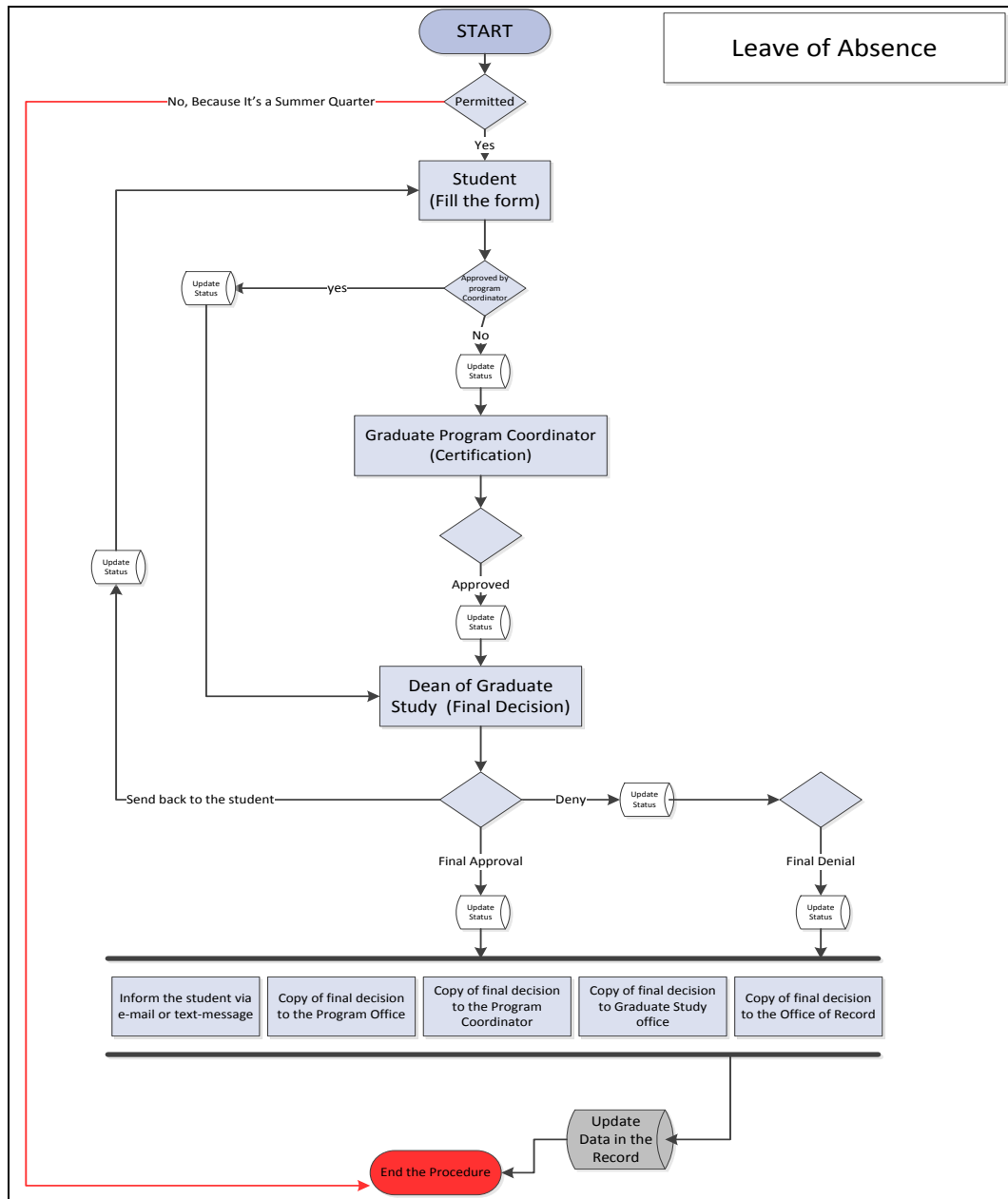


Figure 1. Leave of Absence Form Flowchart

## Advancement to Candidacy Form

- The student will access the system.
- The system will check if the student permitted to fill the form, if he/she is, one of the following actions will happen.

1- The system will not allow the student to fill the form and end the procedure for many reasons.

- The student GPA is less than 3.0.
- The student did not complete 20 units.
- The student did not declare the concentration.

2- The system will allow the student to fill the form and submit the request.

- If the student has submitted the request, the system will notify the MBA Office for evaluation; from there one of the following actions will happen.

1- Deny the request and end the procedure. In addition, the system will inform the student via email.

2- Accept the request and send it back to the student to approve the information that provided by the MBA Office.



- When the student approves the information that provided by the MBA Office, the system will send the request to the Department Chair.
- Then the request will go to the Association Dean for final approval. In addition, the system will do the following actions.
  - Inform the student via E-mail or Text-MSG.
  - Send a copy of the final decision to the MBA Office.
- Send a copy of the final decision to the Office of Records Registration and Evaluation.
- The system will update the data, and finally end the procedure.

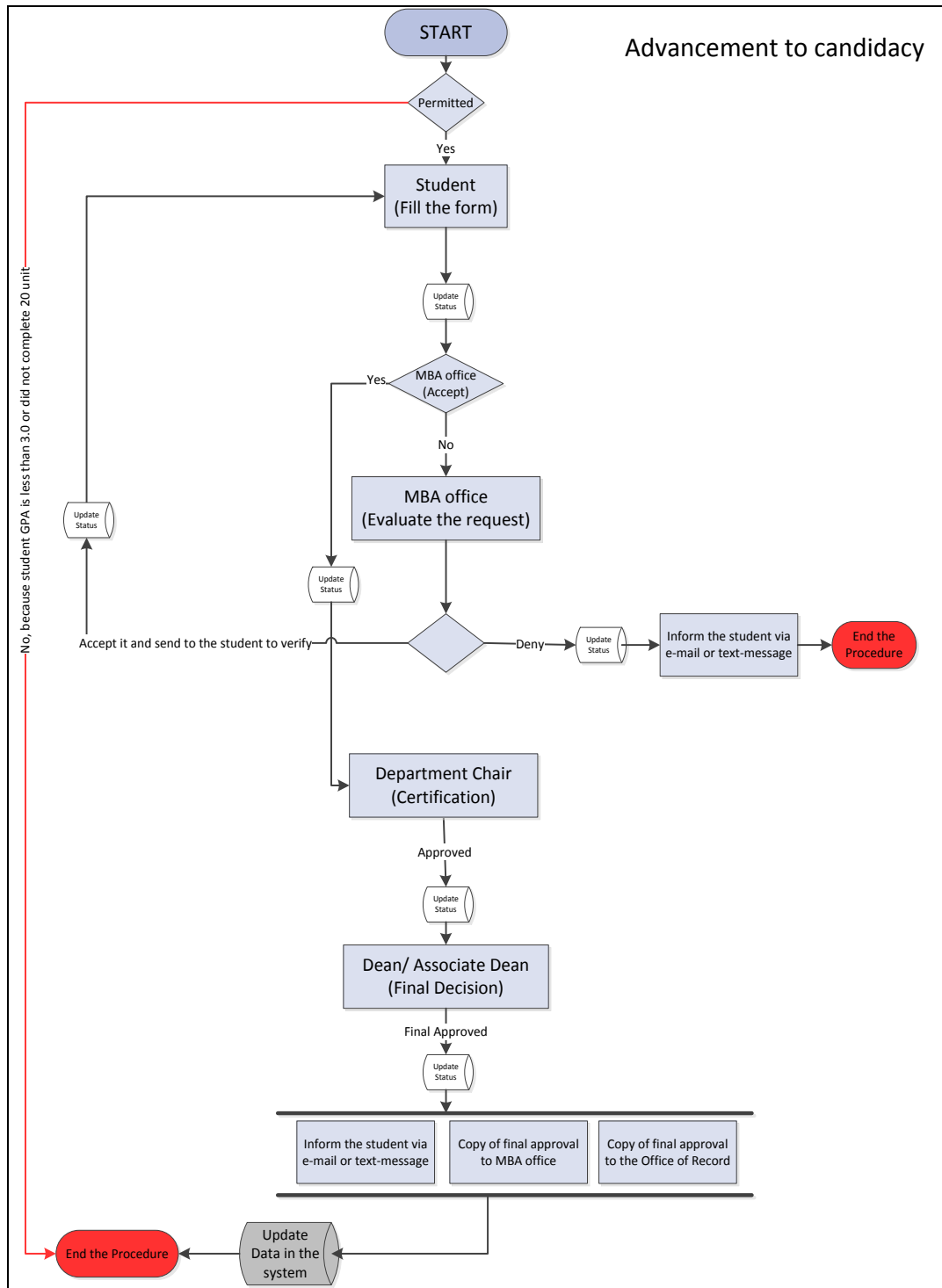


Figure 2. Advancement to Candidacy Form Flowchart

## Graduate Project Contract Form

- The student will access the system.
- The system will check if the student permitted to fill the form, if he/she is, one of the following actions will happen.
  - 1- The system will not allow the student to fill the form and end the procedure because the student has filled the form before.
  - 2- The system will allow the student to fill the form and submit the request.
- If the student has submitted the request, the system will send it to the Committee Chair 'First Instructor' to evaluate the request. From there one of the following actions will happen.
  - 1- Approve the request.
  - 2- Return the request to the student to submit any documents needed. When the student submits the document, the system will send it back to the First Instructor to decide.
  - 3- Deny the request and end the procedure. In addition, the system will inform the student via E-mail or Text-MSG.

- If the First Instructor approved the request, the system will send the request to the Second Instructor. From there one of the following actions will happen.
  - 1- Approve the request.
  - 2- Return the request to the student to submit any documents needed. When the student submits the document, the system will check if the first instructor approved the request, if so, the system will send it back to the Second Instructor to decide.
  - 3- Deny the request and the system will send the request back to student to choose another instructor.
- If the Second Instructor has approved the request the system will send the form to the Department Chair for final approval. The system will do the following actions.
  - Inform the student via E-mail or Text-MSG.
  - Send a copy of the final approval to the Committee Chair.
  - Send a copy of the final approval to the Second Reader.

- o Send a copy of the final approval to the Department Chair.
  - o Send a copy of the final approval to the MBA Office.
- The system will update the data, and finally end the procedure.

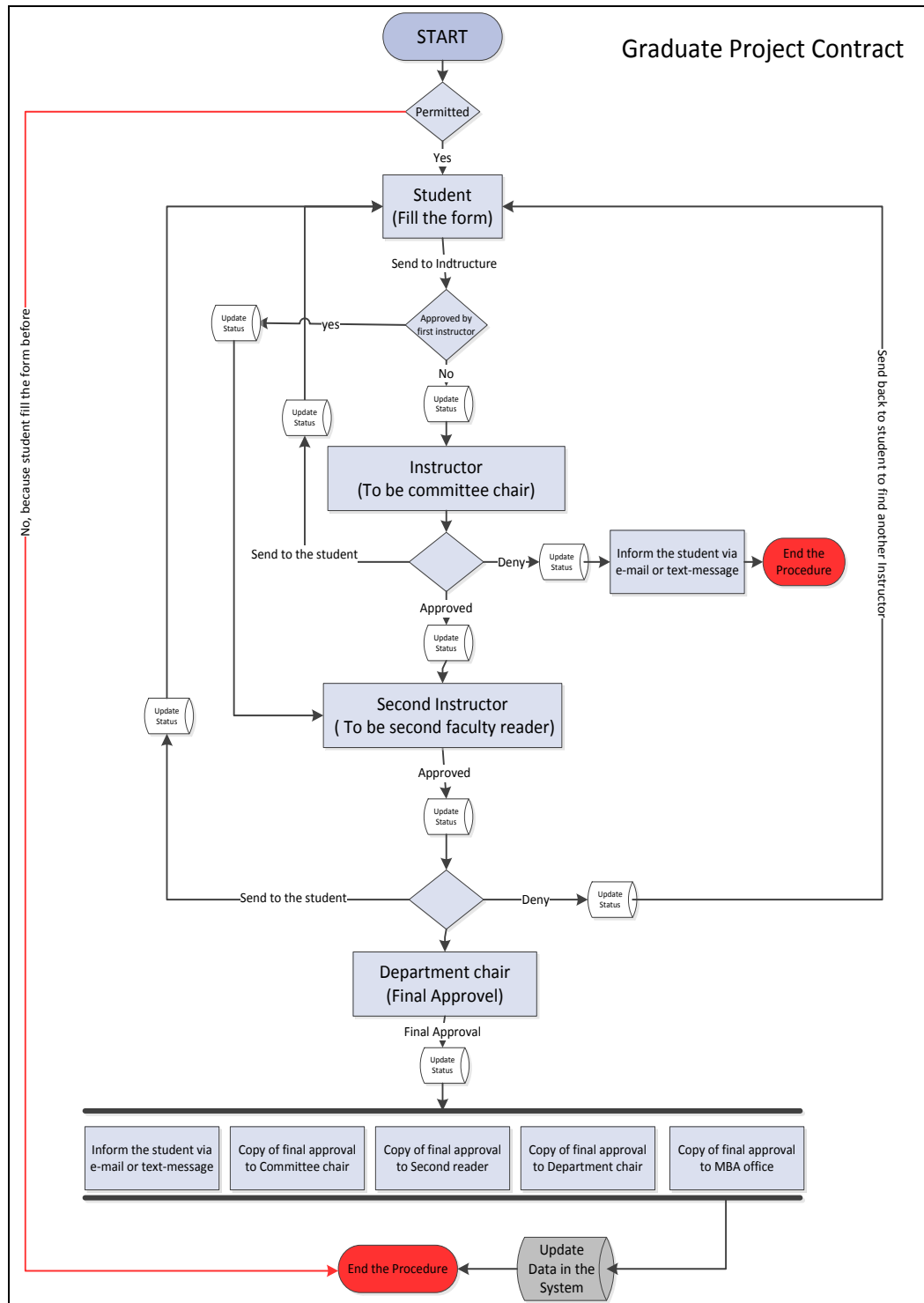


Figure 3. Graduate Project Contract Form Flowchart

### Changing in Program Plan Form

- The student will access the system.
- The system will check if the student permitted to fill the form, if he/she is, one of the following actions will happen.

1- The system may not allow the student, who did not have the advancement to candidacy, to fill the form and then the system will end the procedure.

2- The system will allow the student to fill the form and submit the request.

- If the student has submitted the request, the system will send it to the MBA Program Director for final decision. From there one of the following actions will happen.

1- Approve the request - The system will do the following actions.

- Inform the student via E-mail or Text-MSG.
- Send a copy of the final decision to the MBA Office.
- Send a copy of the final decision to the Office of Record.

- 2- Return the request to the student to submit any documents needed. When the student submits the document, the system will send the request to the MBA Program Director.
- 3- Deny the request and end the procedure - The system will do the following actions.
  - o Inform the student via E-mail or Text-MSG.
  - o Send a copy of the final decision to the MBA Office.
  - o Send a copy of the final decision to the Office of Record.
- The system will update the data and end the procedure.



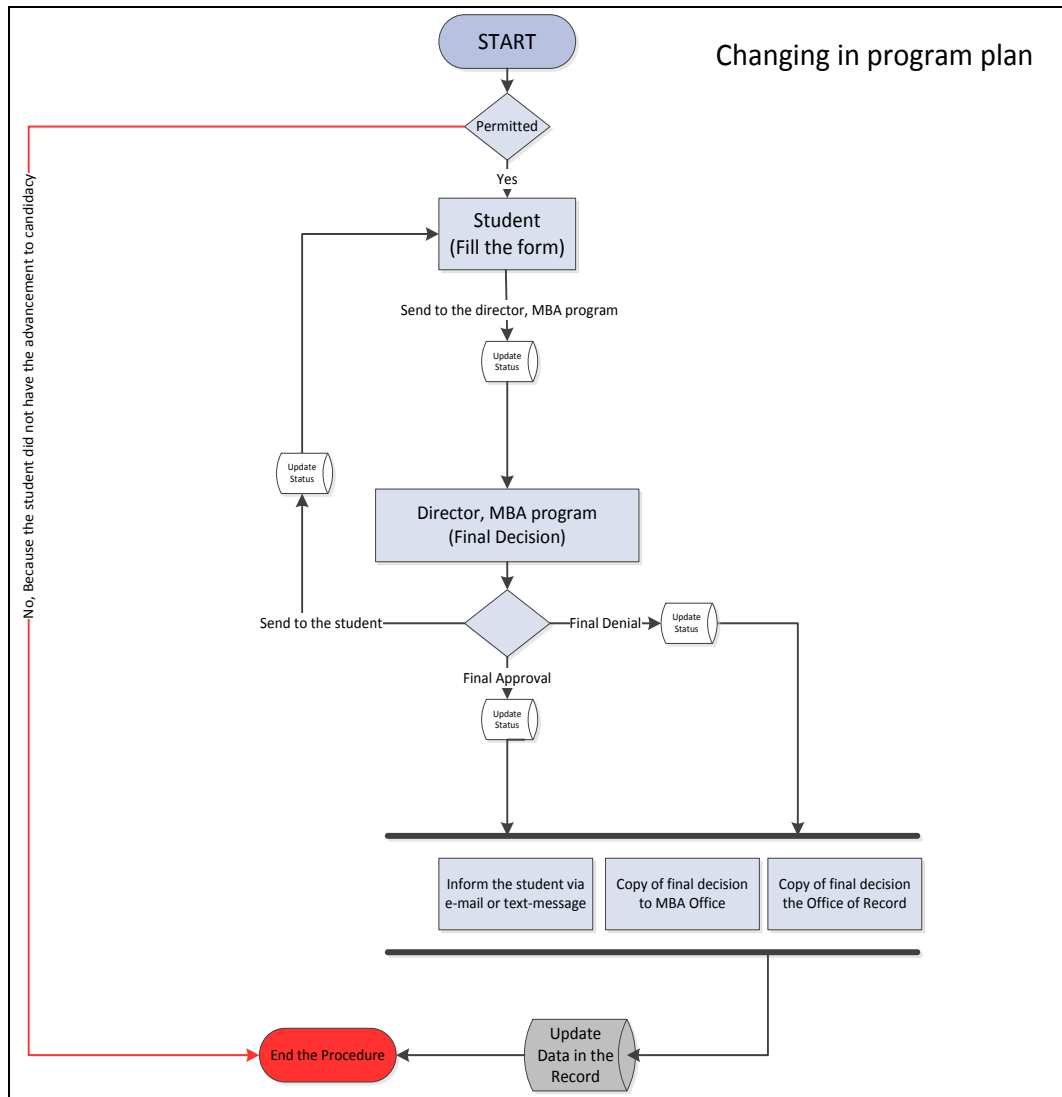


Figure 4. Changing in Program Plan Form Flowchart

### Comprehensive Examination (Computer Request) Form

- The student will access the system.
- The system will check if the student permitted to fill the form, if he/she is, one of the following actions will happen.
  - 1- The system may not allow the student to fill the form and end the procedure because the student did not apply for the Comp Exam or the student missed the due date.
  - 2- The system will allow the student to fill the form and submit the request.
- If the student has submitted the request, the system will send the request to the MBA Office for final approval. From there one of the following actions will happen.
  - Inform the student via E-mail or Text-MSG.
  - Send a copy of the final decision to the MBA Office.
- The system will update the data and end the procedure.

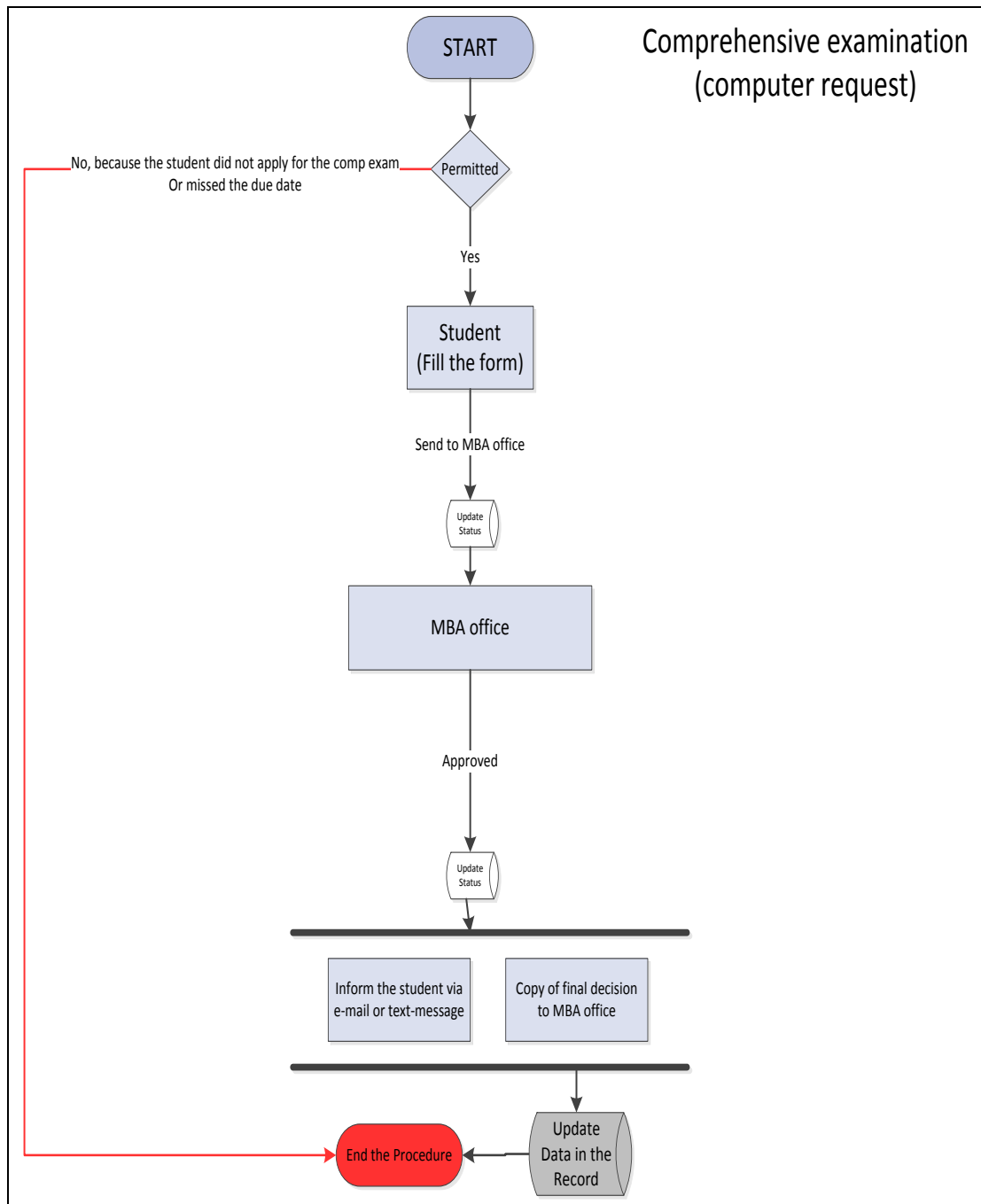


Figure 5. Comprehensive Examination (Computer Request) Form  
Flowchart

Register for Comp Exam Only/Portfolio Only/or Both Form

- The student will access the system.
- The system will check if the student permitted to fill the form, if he/she is, one of the following actions will happen.

1- The system may not allow the student to fill the form and end the procedure because the student has missed the due date or filled the form before.

2- The system will allow the student to fill the form and submit the request.

- If the student has submitted the request, the system will notify the MBA Office to evaluate the request. From there one of the following actions will happen.

1- Approve the request - The system will do the following actions.

- Inform the student via E-mail or Text-MSG.
- Send a copy of the final decision to the MBA Office.

2- Deny the request and end the procedure - The system will do the following actions.

- Inform the student via E-mail or Text-MSG.

- o Send a copy of the final decision to the MBA Office.
- The system will update the data and end the procedure.

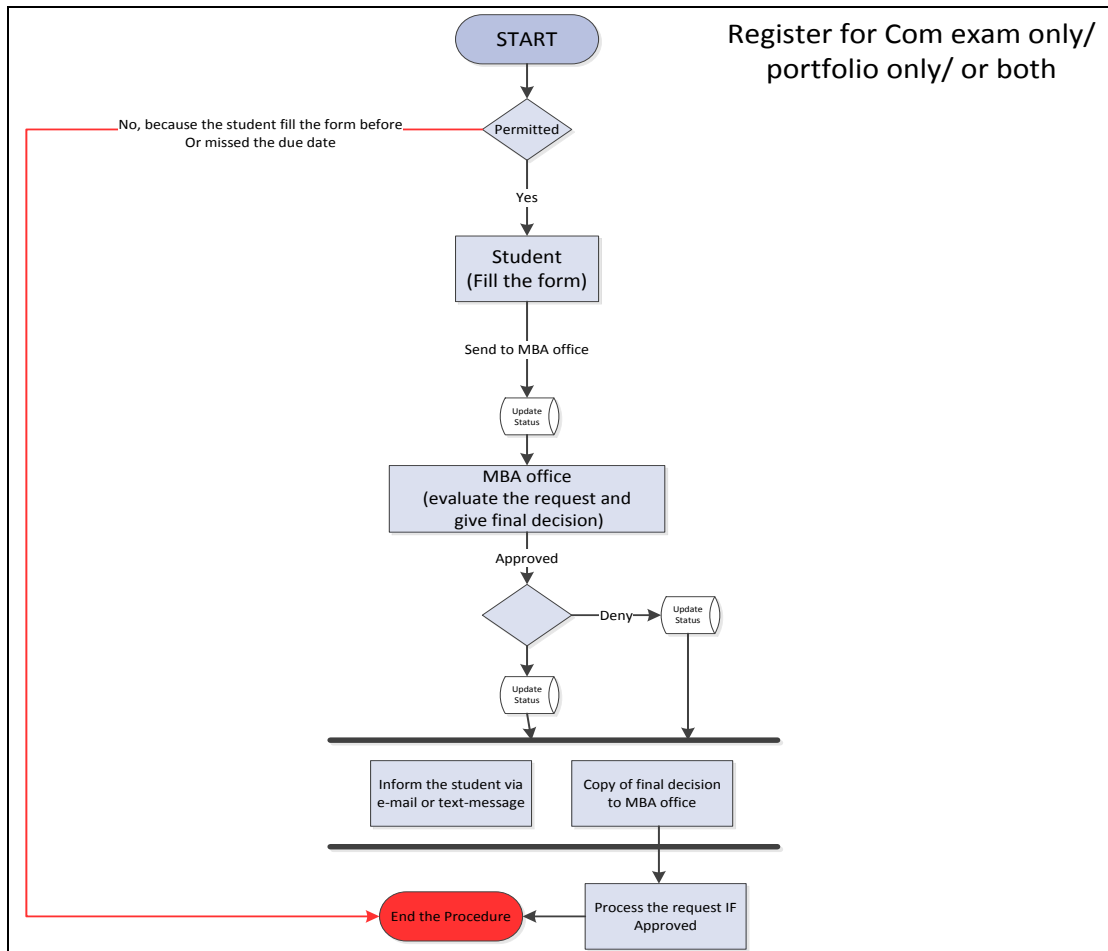


Figure 6. Register for Comp Exam Only/Portfolio Only/or Both Form Flowchart

### Petition for a Retroactive Add Form

- The student will access the system.
- The system will check if the student permitted to fill the form, if he/she is, one of the following actions will happen.
  - 1- The system will not allow the student to fill the form and end the procedure.
  - 2- The system will allow the student to fill the form and submit the request.
- If the student has submitted the request, the system will notify the Instructor to evaluate the request. From there one of the following actions will happen.
  - 1- Approve the request.
  - 2- Return the request to the student to submit any documents needed. When the student submits the document the system will send it back to the Instructor.
  - 3- Deny the request and end the procedure - The system will do the following actions.
    - o Send the denial to the Department Chair to approve it.

- o The system will send the Department Chair denial to the College Dean for final denial. In addition, the system will do the following actions.
  - Inform the student via E-mail or Text-MSG.
  - Send a copy of the final decision to the Graduate Office.
  - Send a copy of the final decision to the College.
  - Send a copy of the final decision to the Office of Record.
- If the Instructor has approved the request, the system will send the request to the Department Chair for certification.
- Then the system will send the request to the College Dean for final decision, from there one of the following actions will happen.
  - 1- Approve the request - The system will do the following actions.
    - o Inform the student via E-mail or Text-MSG.

- o Send a copy of the final decision to the Graduate Study.
- o Send a copy of the final decision to the College.
- o Send a copy of the final decision to the Office of Record.

2- Return the request to the student to submit any documents needed. When the student submits the document the system will check if the request approved by the instructor if yes the system will send the request back to the College Dean for final decision.

3- Deny the request and end the procedure - The system will do the following actions.

- o Inform the student via E-mail or Text-MSG.
- o Send a copy of the final decision to the Graduate Study.
- o Send a copy of the final decision to the College.
- o Send a copy of the final decision to the Office of Record.

- The system will update the data and end the procedure.





### Add After the Census Date Form

- The student will access the system.
- The system will check if the student permitted to fill the form, if he/she is, one of the following actions will happen.

1- The system may not allow the student to fill the form and end the procedure for many reasons.

- Censuses date did not end.
- The student has missed the due date to fill the form.

2- The system will allow the student to fill the form and submit the request.

- If the student has submitted the request, the system will notify the Instructor to evaluate the request. From there one of the following actions will happen.

1- Approve the request.

2- Return the request to the student to submit any documents needed. When the student submits the document the system will send it back to the Instructor.

3- Deny the request - the system will do the following actions.

- o Send the denial to the Department Chair to approve it.
- o The system will send the Department Chair denial to the Dean of Graduate Study for final denial and end the procedure. Then the system will do the following actions.
  - Inform the student via E-mail or Text-MSG.
  - Send a copy of the final decision to the Graduate office.
  - Send a copy of the final decision to the College.
  - Send a copy of the final decision to the Office of Record.
- If the Instructor has approved the request, the system will send the form to the Department Chair for certification.
- Then the system will send the request to the Dean of Graduate Study for final decision. From there one of the following actions will happen.
  - 1- Approve the request - The system will do the following actions.

- o Inform the student via E-mail or Text-MSG.
- o Send a copy of the final decision to the Graduate Study.
- o Send a copy of the final decision to the College.
- o Send a copy of the final decision to the Office of Record.

2- Return the request to the student to submit any documents needed. When the student submits the document the system will check if the request approved by the Instructor if yes the system will send the request back to the Dean of Graduate Study for final decision.

3- Deny the request and end the procedure - The system will do the following actions.

- o Inform the student via E-mail or Text-MSG.
- o Send a copy of the final decision to the Graduate Study.
- o Send a copy of the final decision to the College.
- o Send a copy of the final decision to the Office of Record.

- The system will update the data and end the procedure.

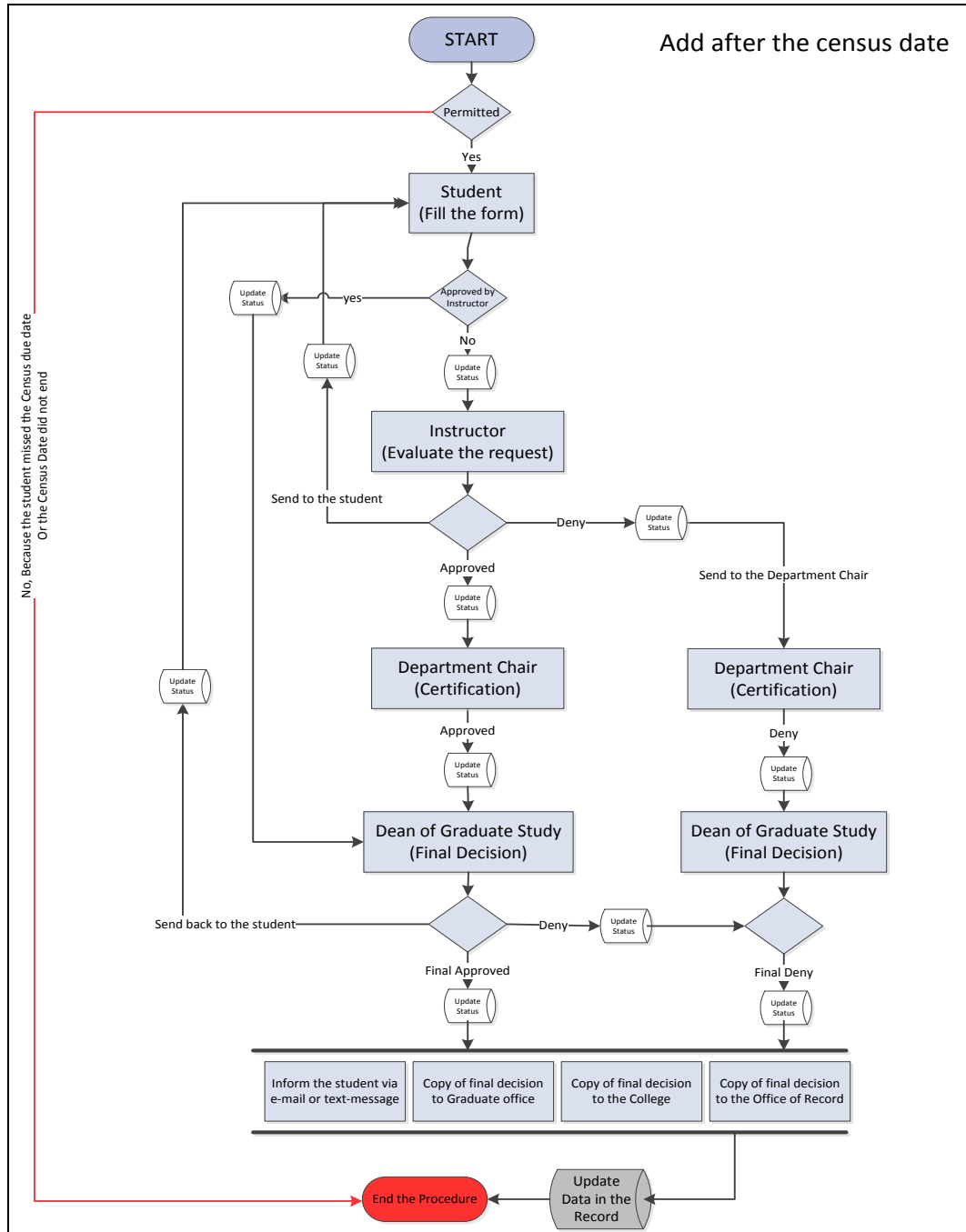


Figure 8. Add After the Census Date Form Flowchart

### Drop After the Census Date Form

- The student will access the system.
- The system will check if the student permitted to fill the form, if he/she is, one of the following actions will happen.

1- The system may not allow the student to fill the form and end the procedure for many reasons.

- Censuses date did not end.
- The student has missed the due date to fill the form.

2- The system will allow the student to fill the form and submit the request.

- If the student has submitted the request, the system will notify the Instructor to evaluate the request. From there one of the following actions will happen.

1- Approve the request.

2- Return the request to the student to submit any documents needed. When the student submits the document the system will send it back to the Instructor.

3- Deny the request - The system will do the following actions.

- o Send the denial to the Department Chair to approve it.
- o The system will send the Department Chair denial to the Dean of Graduate Study for final denial and end the procedure. In addition, the system will do the following actions.
  - Inform the student via E-mail or Text-MSG.
  - Send a copy of the final decision to the Graduate Office.
  - Send a copy of the final decision to the College.
  - Send a copy of the final decision to the Office of Record.
- If the Instructor approved the request the system will send the form to the Department Chair for certification.
- Then the system will send the request to the Dean of Graduate Study for final decision. From there one of the following actions will happen.

- 1- Approve the request - The system will do the following actions.
  - o Inform the student via E-mail or Text-MSG.
  - o Send a copy of the final decision to the Graduate Study.
  - o Send a copy of the final decision to the College.
  - o Send a copy of the final decision to the Office of Record.
- 2- Return the request to the student to submit any documents needed. When the student submits the document the system will check if the request approved by the Instructor if yes the system will send the request back to the Dean of Graduate Study for final decision.
- 3- Deny the request and end the procedure - The system will do the following actions.
  - o Inform the student via E-mail or Text-MSG.
  - o Send a copy of the final decision to the Graduate Study.
  - o Send a copy of the final decision to the College.



- o Send a copy of the final decision to the Office of Record.
- The system will update the data in the record, and finally end the procedure.

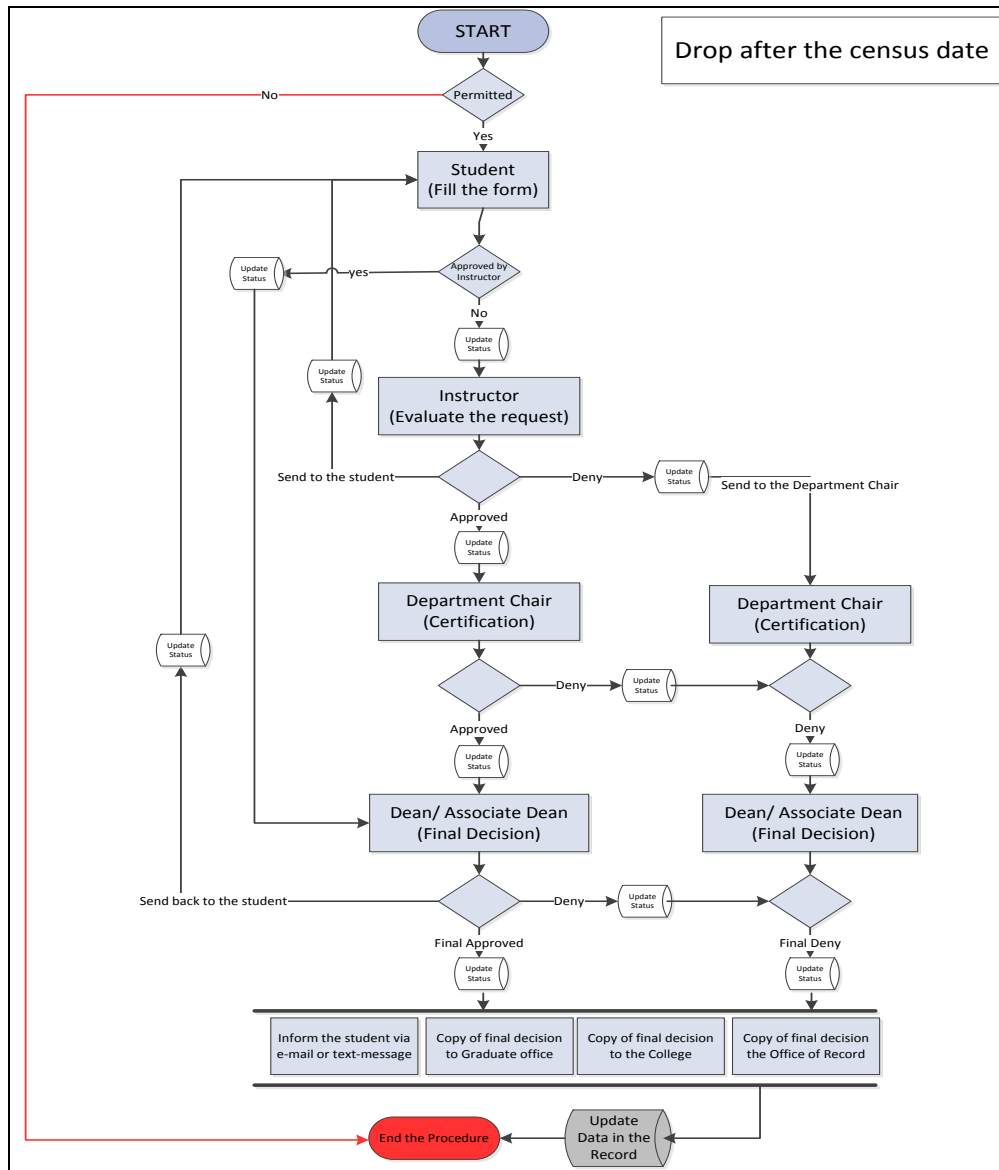


Figure 9. Drop After the Census Date Form Flowchart

## Discount Grade Form

- The student will access the system.
- The system will check if the student permitted to fill the form, if he/she is, one of the following actions will happen.
  - 1- The system may not allow the student to fill the form and end the procedure because the student did a grade discount before.
  - 2- The system will allow the student to fill the form and submit the request.
- If the student has submitted the request, the system will notify the Program Coordinator for certification. From there one of the following actions will happen.
  - 1- Approve the request.
  - 2- Return the request to the student to submit any documents needed. When the student submits the document the system will send it back to the Graduate Program Coordinator for certification.
  - 3- Deny the request - the system will send the denial to the Dean of Graduate Study to approve the denial and end the procedure. Then the system will do the following actions.

- o Inform the student via E-mail or Text-MSG.
  - o Send a copy of the final decision to the Graduate Office.
  - o Send a copy of the final decision to the Program Office.
  - o Send a copy of the final decision to the Program Coordinator.
  - o Send a copy of the final decision to the Office of Record.
- If the Graduate Program Coordinator has approved the request, the system will send the request to the Dean of Graduate Study for final decision, one of the following actions will happen.
  - 1- Approve the request - The system will do the following actions.
    - o Inform the student via E-mail or Text-MSG.
    - o Send a copy of the final decision to the Graduate Office.
    - o Send a copy of the final decision to the Program Office.
    - o Send a copy of the final decision to the Program Coordinator.

- o Send a copy of the final decision to the Office of Record.
- 2- Return the request to the student to submit any documents needed. When the student submit the document, the system will check if it has been approved by the Graduate Program Coordinator, if so, the system will send it to the dean of graduate study for final decision.
- 3- Deny the request and end the procedure - The system will do the following actions.
  - o Inform the student via E-mail or Text-MSG.
  - o Send a copy of the final decision to the Graduate Office.
  - o Send a copy of the final decision to the Program Office.
  - o Send a copy of the final decision to the Program Coordinator.
  - o Send a copy of the final decision to the Office of Record.
- The system will update the data and end the procedure.

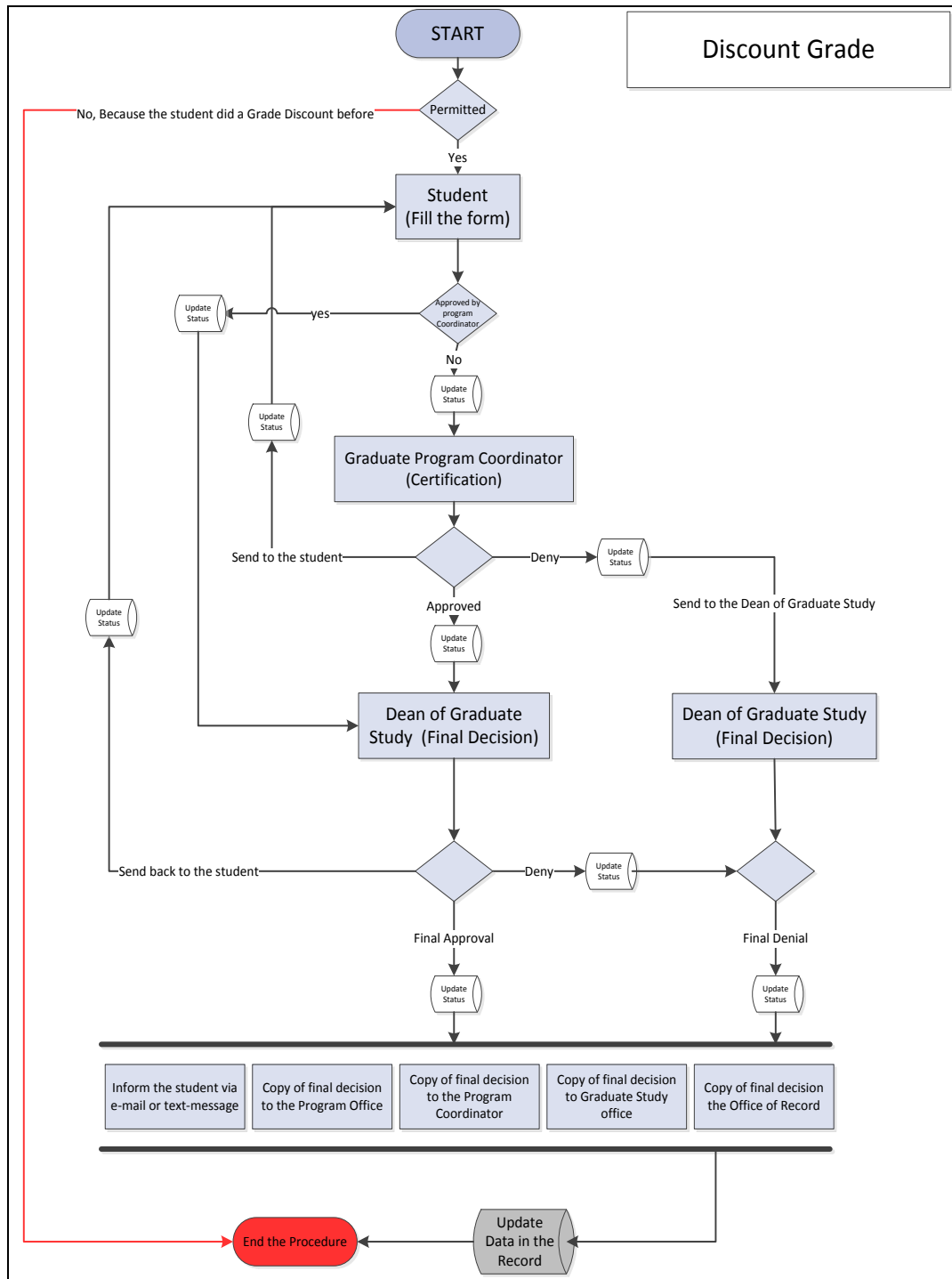


Figure 10. Discount Grade Form Flowchart

### Readmission from a Leave of Absence Form

- The student will access the system.
- The system will check if the student permitted to fill the form, if he/she is, one of the following actions will happen.
  - 1- The system may not allow the student to fill the form and end the procedure because the student did not request a leave of absence.
  - 2- The system will allow the student to fill the form and submit the request.
- If the student has submitted the form, the system will send it to the Office of Record for final approval. In addition, the system will do the following actions.
  - o Inform the student via E-mail or Text-MSG.
  - o Send a copy of the final decision to the Office of Record.
- The system will update the data and end the procedure.

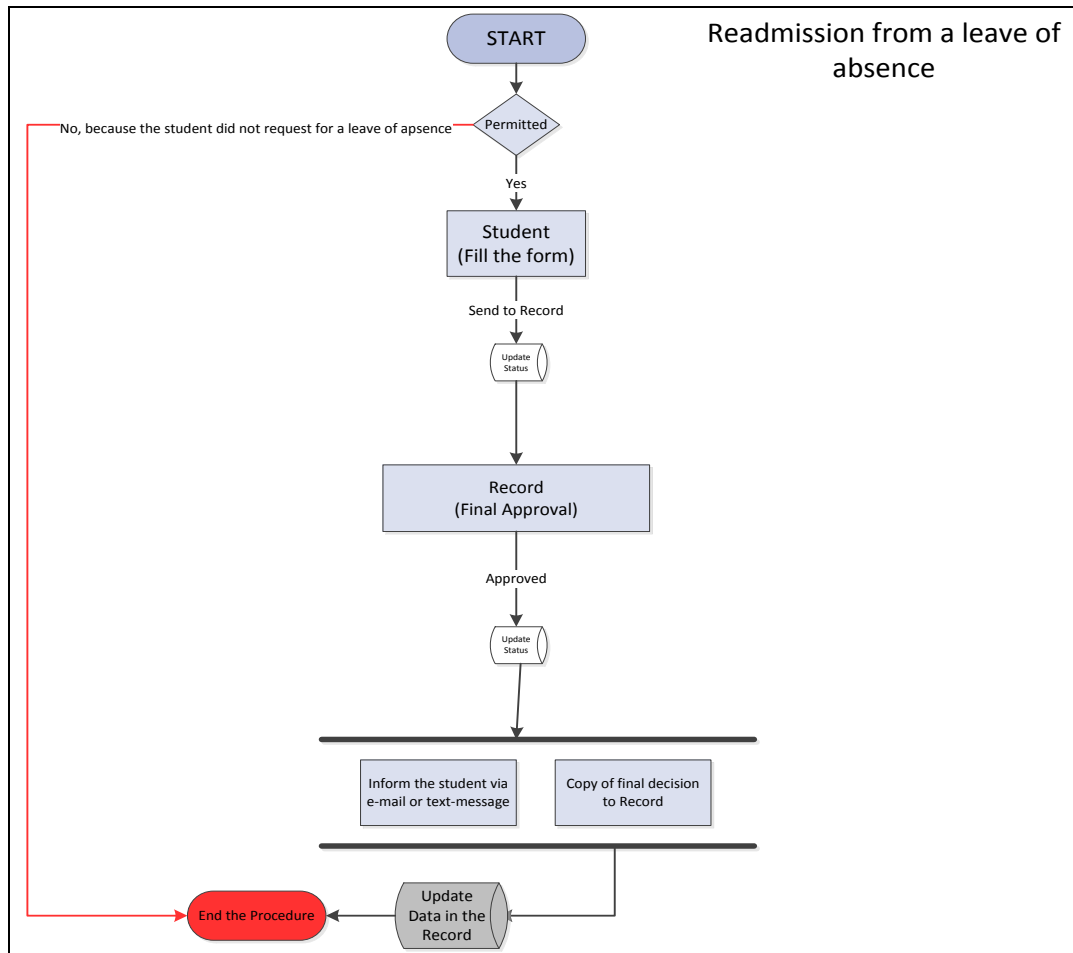


Figure 11. Readmission from a Leave of Absence Form  
Flowchart

## Withdrawal Form

- The student will access the system.
- The system will check if the student permitted to fill the form, if he/she is, one of the following actions will happen.

1- The system may not allow the student to fill the form and end the procedure because the student missed the due date.

2- The system will allow the student to fill the form and submit the request.

- If the student has submitted the form, the system will send it to the Dean of Graduate Study for final dissection. In addition, there is one of the following actions will happen.

1- Approve the request - The system will do the following actions.

- Inform the student via E-mail or Text-MSG.
- Send a copy of the final decision to the Dean of Student Major.
- Send a copy of the final decision to the Graduate Study Office.



- o Send a copy of the final decision to the Office of Record.
- 2- Return the request to the student to submit any documents needed. When the student submits the document the system will send it to the Dean of Graduate Study for final decision.
- 3- Deny the request and end the procedure - The system will do the following actions.
  - o Inform the student via E-mail or Text-MSG.
  - o Send a copy of the final decision to the Dean of Student Major.
  - o Send a copy of the final decision to the Graduate Study Office.
  - o Send a copy of the final decision to the Office of Record.
- The system will update the data and end the procedure.

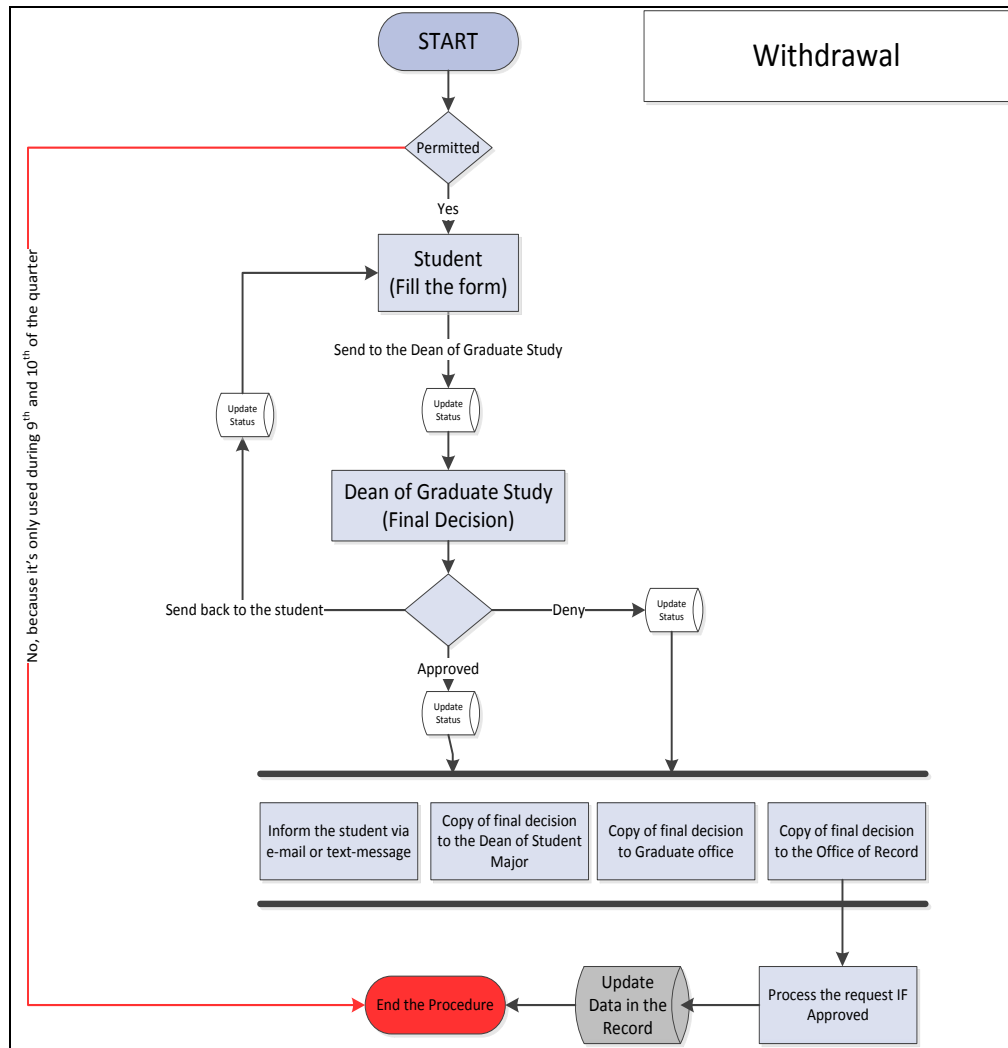


Figure 12. Withdrawal Form Flowchart

## High Level System Architecture

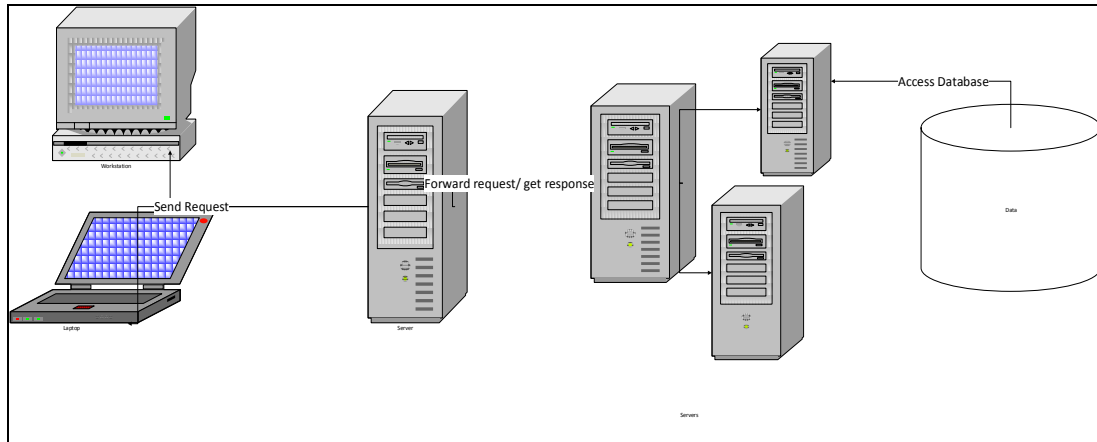


Figure 13. High Level System Architecture

This high level system architecture depicts the main components of system and their communication. End-user sends the required request of an application processing to the web-server. The web-server get the request and send it to the appropriate application server (if any) for further processing. The application server identifies the request and accesses the database (Relational Database Management System RDBMS Server) to update the relevant information in the system and send the response back to the application server and application server in the same way responds to the web-server and web-server shows the updated result to the end user and notify other system user to perform or

view the mandatory functions. This is the high level overview of the system implementation and further system design details update accordingly. The application server is the main business logic unit in the Enterprise Resource planning (ERP) solution. The business logic unit is responsible to have the logic of system. It contains the decisions and the assignment of responsibility and data handling with security. The E-form Application system design consists of.

1- Front-end Design.

2- Back-end logic /Database Design.

#### Front-end Development

In the front end part is about the creation of Forms/Pages in the PeopleSoft Tool setup on the campus and decide to assign the form attributes and field elements in that page. After form/page setup completion, the next step is assignment of responsibilities to the existing relevant users in the system according to their defined roles. Using the PeopleSoft system we don't have to create the interface from scratch and write the whole code whereas from the PeopleSoft existing options system administrator can set

pages, fields and relevant record group and tables for the application.

### Back-end Development

Here the System Administrator creates the relevant fields/Tables in the back-end database and assigns queries with the security checks to provide data security to keep irrelevant information safe and hidden. It consists of table and their field's development and removal in the back-end system. Also the logic building to handle the data according to the user query from the front end system. Business logic of the system is built in the Business unit and the entities that store the data are set into the RDBMS. PeopleSoft has its own defined rules for Business unit and TableSet with the records set.

#### Business Units and TableSet with Their Significance

In the PeopleSoft systems business unit is the operational subset of the organization. According to PeopleSoft Campus solution 9.0 fundamentals at least one business unit must exist in the system (Oracle., 2012). Business units are mainly responsible to store transactions, manage reports and enforce security in the system. Business unit design and development depends on the

structure of organization. For the E-FORM Application system, a business unit for E-FORM Application is to be added in the existing PeopleSoft ERP solution.

Multiple business units can share central Database to avoid redundancy. This new business unit of E-FORMS Application is optimized to use the existing transaction and control tables of the PeopleSoft's RDBMS to access students and employees information. To communicate between the business unit and the TableSet ID, a record group exists. A record group consists of field(s); the lowest unit of the objects in the PeopleSoft. A record set can be a SQL table, a SQL view or a sub record.

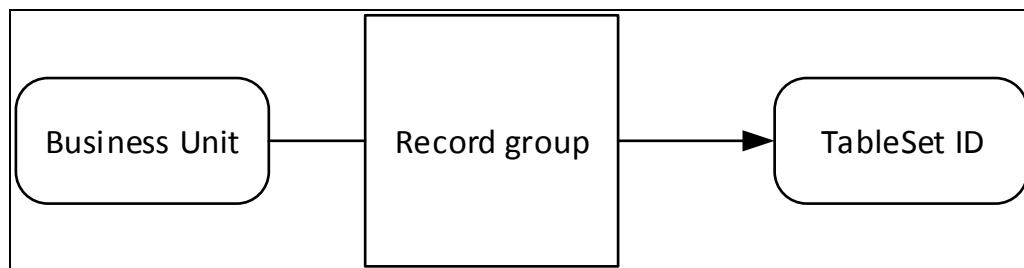


Figure 14. Communication from Business Unit to TableSet ID

For this new business unit a Control Table of forms is required. To handle the application requests through this business unit a transaction table of application is

mandatory to handle the request data and save the transaction in the data store.

### Database Design

The system database contains information about the structure of data of the organization so that tables and table set can be properly developed. It is the recommended that the organization setup be completed before installing any PeopleSoft tools. This removes the data redundancy problem and defines the proper structure of system that helps to ensure better data access and clean system design.

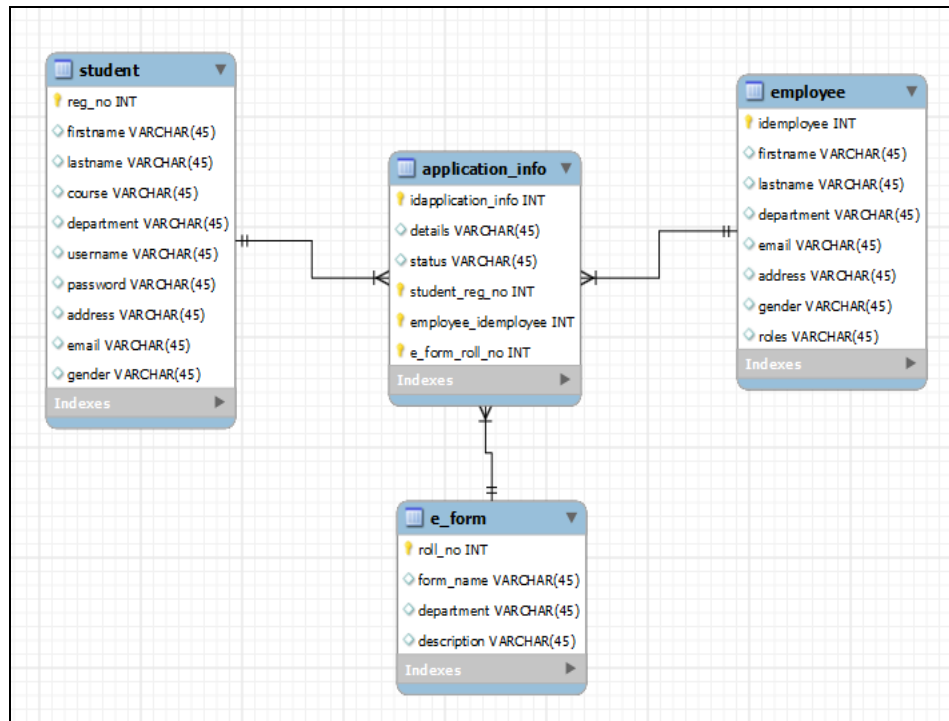


Figure 15. Conceptual Design of the E\_FORMS Application

The conceptual model clearly depicts the E\_FORMS Application high level entities, their attributes and the relations among the entities. Further normalization of the relations among the data sets modeled in the conceptual design led to the breakdown of the entities and relations into finer relations and fully independent entities as shown by the logical entity relationship diagram below.



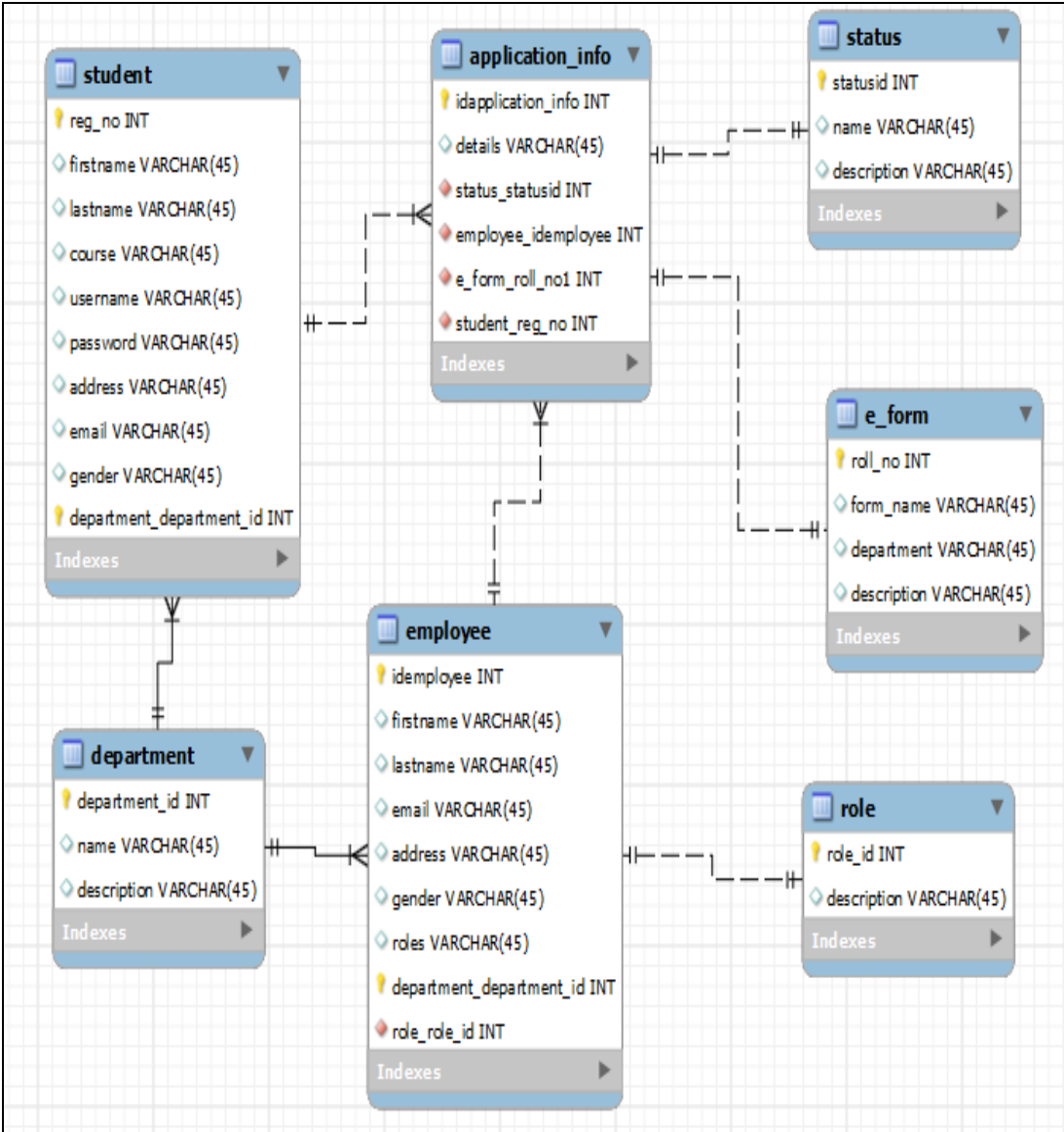


Figure 16. Logical Entity Relationship Diagram

Forms (it is the Control Table in the System)

Form Ids will be unique key for all the form types added to the system. Student level is the field that will help to make only relevant form visible to the students. And Form name is the name of the form added to the system. When any other forms will be required to be added into the system on a later date, it will be simply added to this table.

Table 5. Form List

Form Id	Form Name	<i>Student level</i>

Application/ Request (A Transaction Table)

When a request is placed in the system, the entry will be stored in the request table and the particular information is updated and notifies the users.

Table 6. Application Record

Application number	Application status	<i>Submitted by Student ID</i>	<i>Reviewed by Employee ID</i>	Date Application signed	Date Application Status updated

### User Hierarchy

The design of this application will use two user hierarchy levels in the organization. The pyramid depicts two main entities of the organization which are communicating with each other either directly or indirectly.

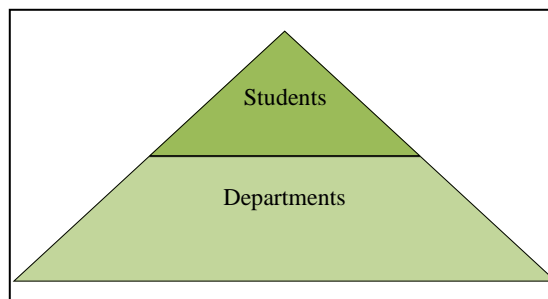


Figure 17. User Hierarchy

In the department level, there is further breakdown of office members according to their positions and responsibilities assigned to them. As there are multiple offices involved in the forms processing, the main breakdown of the office hierarchy is depicted below.

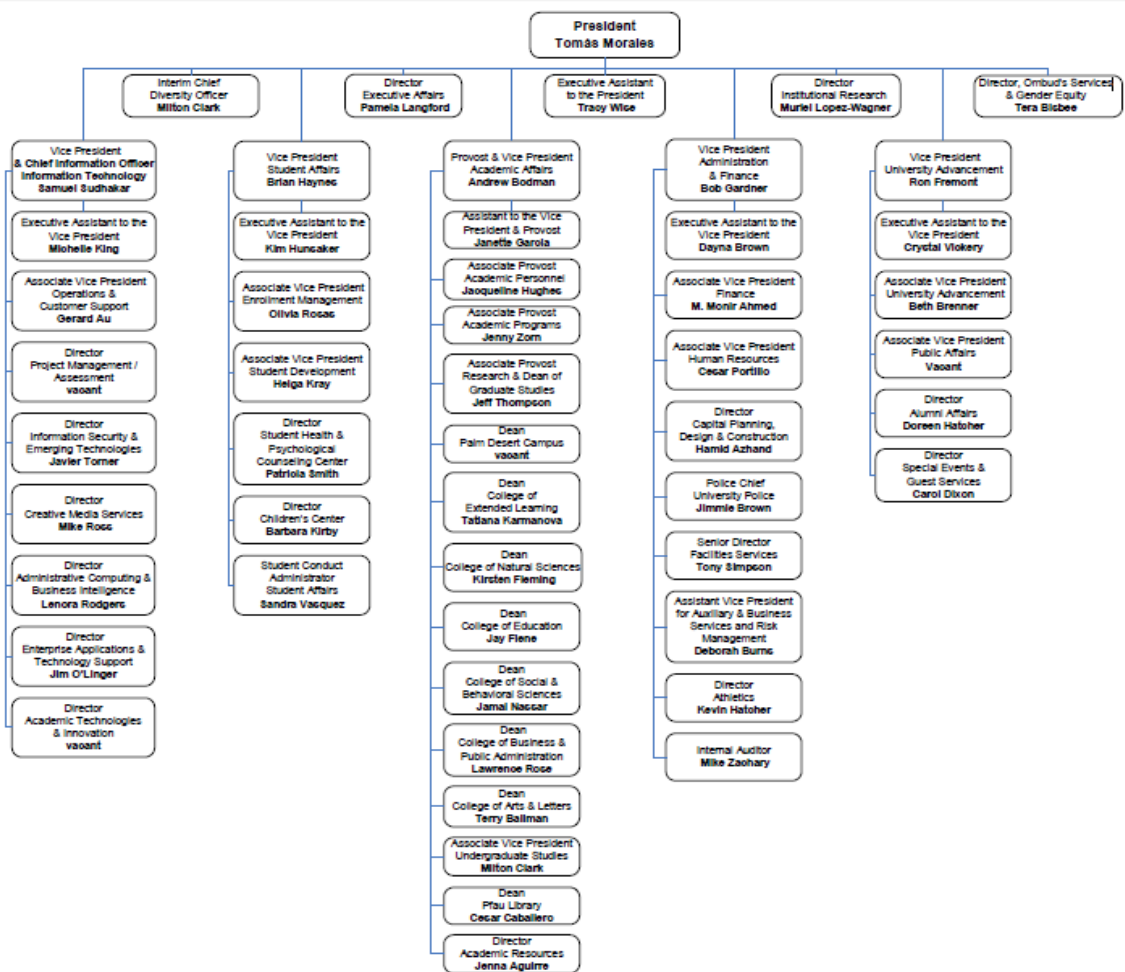


Figure 18. Organizational Hierarchy

This is the apparent hierarchy of CSUSB. It have a President, Vice Presidents, Deans, Directors/ Department Heads, Faculty/Staff. . In addition, tthe university community is interlinked through one way or other, but they are subordinate of the particular person(s). Indeed an organization follows the mesh instead of this simple tree hierarchy. This is just for illustration purpose to understand the organization structure.

This objective the E-FORMS Application System is to automate the manual system of twelve forms. These forms are created online and their appropriate access levels are to be provided to the relevant offices and the students to make the system working. Sequence of the each form flow is depicted and explained in the application programming section.

#### Application Programming

GUI doesn't need to be created from scratch by writing the code. PeopleSoft provides the flexibility of adding and removing page(s) and field(s) through PeopleTools *Application designer*. Application programming will include the programming of the fields and database setting and the

security setting of the system is required to set through PeopleCode.

### Interface Design

In this section below we describe the design of each page and the fields available on each page and fields availability according to roles and permission on the page. The basic information provided by of students when they file the application is set to be fetched automatically from the student information table in the system. This helps student not to enter the personal information in the application again and again.

## Leave of Absence Form

The students who intend to be absent from the university will have to fill up the Leave of Absence Form.

Leave of Absence Application

**Step 1 Student View**

Last term completed  Spring  fall  Winter Year \_\_\_\_\_

Term Leave will start  Spring  fall  Winter Year \_\_\_\_\_

I plan to return  Spring  fall  Winter Year \_\_\_\_\_

Graduate Level

PostBacculerate unclassified

Post bacculerate classified

Conditionally Classified

Classified

Current Graduate Program and Options

Leave applied for

Attachment

**Step 2 Program coordinator verify**

Approval from departament   Verify  Not verified

**Step 3 Final Decision Dean of Graduate Studies**

Approved  Rejected

Figure 19. Leave of Absence Form Wireframe

## Advancement to Candidacy Form

The graduate students should fill up the Advancement to Candidacy Form in order to be officially advanced to degree candidacy.

Advancement to candidacy

Step 1 Student provide info

Concentration

Concentration course no

Comprehensive exam  Graduate proejct

Step 2 MBA OFFICE

Approval from department   accepts  rejects

Step 3 Department chair

Approval from department   approve  deny

Step 4 Final Decision Dean

Approved  Rejected

Figure 20. Advancement to Candidacy Form Wireframe



## Graduate Project Contract Form

The students should fill up the Graduate Project Contract Form if they were planning to do a project for their master degree.

Graduate project contact form

Step 1 Student provide info

Registration quarter

Concentration

Concentration course no

Description of project

Attah literature review, outline and description of project

Step 2 committee chair decision

Step 3 second faculty reader decision

Step 4 Department chair decision

Figure 21. Graduate Project Contract Form Wireframe

## Changing in Program Plan Form

The students should fill up the Changing in Program Plan Form to change their program plan course from one to another.

Request for change in program plan

Step 1 Student provide info

Change request from course

Change request to courses

Reason for change

Step 2 MBA Director Decision

Approval recommended  Denial

Figure 22. Changing in Program Plan Form Wireframe

## Comprehensive Examination (Computer Request) Form

The master students should fill up the Comprehensive Examination (Computer Request) Form in order use the computer for their comprehensive exam.

The wireframe shows a rectangular container with a title at the top left: "Comprehensive Exam Computer Request Form". Inside the container, there are two horizontal rectangular boxes representing steps in a process. The first box contains the text "Step 1 Student accepts the terms of the form and submit the application". The second box, positioned below the first, contains the text "Step 2 Request approved and computer assigned".

Figure 23. Comprehensive Examination (Computer Request)

Form Wireframe

Register for Comp Exam Only/Portfolio Only/ or Both Form

The MBA students should fill up the Register for Comp Exam Only/Portfolio Only/ or Both Form to register for the comprehensive exam only or to register for the comprehensive exam and portfolio. The MBA students are required to register for portfolio and comprehensive exam/project in order to graduate.

Register for comp exam form

Step 1 Student submit information

Courses	Quarter	Instructor full name
---------	---------	----------------------

Step 2 Verification MBA Comp Exam

Approve

major

Portfolio checklist

Eligible for comp exam

Student completed 32 credit hour

4 out of 5 concentration classes completed

Approved

Figure 24. Register for Comp Exam Only/Portfolio Only/ or Both Form Wireframe

## Petition for the Retroactive Add Form

If the university is the responsible for an error of adding a class, the students are allowed to fill up the Petition for the Retroactive Add Form to add a class that following the close of the term.

Petition for retroactive add form

Step 1 student info

Course number  Attach relevant form

Course name

Reason to add

Step 2 Course Instructor

Approval of Course Instructor  approve  deny

Step 3 Department chair

Approval from department   approve  deny

Step 4 Final Decision Dean

Approved  Rejected

Figure 25. Petition for the Retroactive Add Form Wireframe

## Add After the Census Data Form

This form is for student who has the petition to add after the census date and through the 8th week of Classes.

Add a class after census date

Step 1 student info

Course number

Course name

Reason to add

Step 2 Course Instructor

Approval of Course Instructor  approve  deny

Step 3 Department chair

Approval from department   approve  deny

Step 4 Final Decision Dean

Approved  Rejected

Figure 26. Add After the Census Data Form Wireframe

## Drop After the Census Date Form

This form is for student who has the petition to drop after the census date and through the 8th week of Classes.

Drop a class after census date

**Step 1 student info**

Course number

Course name

Reason in detail

**Step 2 Course instructor**

Approval from instructor  approve  deny

**Step 3 Department chair**

Approval from department   approve  deny

**Step 4 Final Decision Dean**

Approved  Rejected

Figure 27. Drop After the Census Date Form Wireframe

## Discount Grade Form

This Form is for students who has repeated a class and would like to replace the first class with the repeated one.

Discount of previous Grade

Step 1 student info

Enrolled in program with major

Petation for discount on course name and number

Course first taken quarter and year

Course repeated quarter and year

Step 2 Program coordinator verify

Approval from department   Verify  Notverified

Step 3 Final Decision Dean of Graduate Studies

Approved  Rejected

Figure 28. Discount Grade Form Wireframe



## Readmission from a Leave of Absence Form

This form is used by student who plans return from their leave.

Returning from leave of absence form

Step 1 Student Info

Returning from type of leave

If educational leave give details of college school attended

Step 2 verify leave from records

Decision after verification  Approval

Figure 29. Readmission from a Leave of Absence Form  
Wireframe

## Withdrawal Form

This form is for student who has the petition to withdraw because extenuating circumstances during the 9<sup>th</sup> and 10<sup>th</sup> week of class.

The wireframe shows a form titled "Withdrawal Petition". It is divided into two main sections: "Step 1 student fill the application" and "Step 2 Dean of Graduate Studies".

**Step 1 student fill the application**

- Course: Enter Text
- Course: Enter Text
- Reason: Enter Text
- Attach relevant documents: Add files
- Submit

**Step 2 Dean of Graduate Studies**

- Approved
- Rejected
- Details of leave approval duration and year.
- Reasons

Figure 30. Withdrawal Form Wireframe

## Fields

Table 7. contains the list of the fields that are common for all the forms and this system has to retrieve this information from the table these fields belong to.

Table 7. Common Fields Table

Field name	Tables	Form
Name	STUINFO	All
Student ID	STUINFO	All
Address	STUINFO	All
Telephone	STUINFO	All
City	STUINFO	All
ZipCode	STUINFO	All
Course Name	COURSECAT	All
Course Code	COURSECAT	All
Quarter	COURSECAT	All
Year	STUINFO	All
Major	STUINFO	All
Student Level	STUINFO	All
Semester	STUINFO	All

In this section the wireframe of few of the forms is shown to understand the application flow. In PeopleSoft using PeopleTool Application designer, the user creates page(s) for each form and the page contains the components that will be mapped to the appropriate fields of the record in the system.

Step 1 of all the designed pages is for students: They will enter the required information in this step to submit the application.

Step 2 of the forms is verification of the information through program coordinator, instructor, and the MBA office: If verification is completed successfully, then the application is forwarded to step 3 below, otherwise it is returned to the student with the appropriate reasons. If step 2 is rejected, the backend of the system keeps the rejected status of the application in the record set. Otherwise status is accepted and application is forwarded to Step 3.

Step 3 is the final decision: It is required to be performed by Department chair or the Graduate school dean. After the final decision all the required information is update in the system record set and the student is notified about the decision.

## Permissions

Table 8. Permission Hierarchy





Step 1 fields	Permission assigned to students. Also have permission to view the step 2 and step 3 decisions on the application by viewing the current application status.
Step 2 fields	Permission to view and verify step 1 fields and take decision of approval or rejection.
Step 3 fields	Graduate school dean or department chair will take the final decision. Can view all the information of step 1 and step 2. After the decision the storage is set to update data in the relevant tables.

## Record Group and TableSets

Record group is logically the set of functionality and logically related records and views. For E-FORMS Application the record group exists for the students, Departments and Dean's Office.

**Student view:**

Requests:

Request Number	Request Name	Request Status	Request Date	View Request	Track Request
15478	Add	in progress	12/02/2013		
47474	Discount grade	Approved	10/01/2013		





Page [1](#) [2](#) [3](#)

**Employee view:**

Student ID  OR Student Name  First  Last

Request Date  dd/mm/year

Request Number

Request Number	Request Name	Request Status	Request Date	View Request	Track Request
15478	Add	in progress	12/02/2013		
47474	Discount grade	Approved	10/01/2013		

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Figure 31. Record Group and TableSets

## RecordSet for Students

In the student view they can simply track the current status.

Track Request:  
Student view

Request number 47474

	Name	Request Status	Request Date	Note
Student	Donia Alsayed	Submit the request	10/01/2013	
Graduate program coordinator	.....	1-Turn it back to student 2-In progress	11/01/2013	Submit .....
Dean of graduate study	.....	Final Approval	13/01/2013	

Figure 32. RecordSet for Student

## CHAPTER FOUR

### DATA SECURITY

#### Introduction

Data security is one of the critical technical requirements of a system design. The architecture of the system should be capable enough to provide the security which is as strong as possible because in terms of security there is no 100%. Only you can keep the system secure by keeping it updated or to upgrade the use of technologies for security. Database security, and in particular data integrity control, is one of the most essential tasks for IT managers who are responsible for controlling the whole database. Naturally, this can be realized if data integrity is ensured. Data integrity can be enforced in two following ways.

- Declarative integrity.
- Procedural integrity (Lee & Bieker, 2009).

Declarative methods are believed to be easier and generally more efficient, while procedural methods are used to enforce more complicated rules (Rankins et al., 2011).



Nonetheless, both have their own peculiarities aimed at solving the problem of data integrity.

It is usually the preferred method, since it is programmatically simple and has low overheads. It is also consistently enforced and more centrally managed because it resides in the database (Rankins et al., 2011). A database engine enforces declarative integrity automatically. According to Lee and Bieker (2009), "declarative integrity controls describe the rules that need to be enforced, but not how to enforce them," (p. 164). Among the declarative methods, constraints are believed to be the most effective ways to enforce data integrity.

Procedural data integrity is more flexible than former method, in defining the rules of data integrity. It is a logic written in either a SQL or .NET language enforced with stored procedures, triggers, and application code. It can be quite complex, and generally has higher overheads which make it less efficient. Such methods cannot be used where we are supposed to reduce the overheads of procedures in the applications. However, in contrast with declarative integrity, it has the capacity to enforce more extensive business rules. One should only implement the procedural integrity methods when "declarative integrity controls

don't meet the functional requirements of the application" (Lee & Bieker, 2009, p. 164). If integrity is implemented on the application side, load on the database reduces. Nevertheless, If the database is modified some discrepancies can creep into the database. For final words it can be concluded that although procedural integrity has some appreciative business rules but it cannot replaces the advantages of the declarative integrity (Rankins et al. 2011). In general, both of above mentioned ways to ensure database security have proved their effectiveness in numerous modern companies.

#### Types of Data Security

Data security has mainly two types.

##### User

User security data is the data defined as a user's security access. As such it ensures that users are only allowed access to what is available for them.

- Roles.
- Row Level Permission.
- Permissions.

## Transaction

What is referred to as transaction data is the data within the database that is secured. Additionally it also allows securing the row that is specific to it. The following is included in transaction data.

- Search Records.
- Access to Record Key.
- Security Sets and Access Types.

## Thin Client Solution Advantage

The thin client solution for the system will ensure data security as data is managed on the server and application accessing machines are just data vehicles so data cannot be stolen via USB, CD, DVD, etc. System administrators are responsible to choose the appropriate security solutions for the system.

According to the Oracle red paper of security of enterprise application, security is an integration of people, technology, and processes. Rather than being merely a technology fix, security must now be defined in a way that incorporates the critical roles and interdependence that exist between an organization's people, its firm

processes, and its technology infrastructure. "Leveraging a clearly defined security model will enable your organization to address these issues in combination, resulting in a PeopleSoft environment that provides a world-class-security" (Oracle, 2010, p.10). Creating critical requirements is the vital role of security model (Oracle., 2010). The E-FORMS system design suggests keeping the system security in the consideration as the ground.

Furthermore for data security system used the data encryption algorithm with database query to keep irrelevant information hidden from the user at the query time and also place it in safe location in the system and if the information is retrieved its encryption helps it to stay safe as actual information cannot be retrieved without decryption. The critical aspect of an application design is that the security of the system environment should be aligned with the system security policies. The system security policies are normally required to be created from root to be based upon the established security model. Security implementation in the system environment should not be a one-off solution. It should be implemented with the following.

- Business requirements.
- Overall corporate security rules.
- Strategies (Oracle., 2010).

Security issues of a web application are depicted in this diagram.

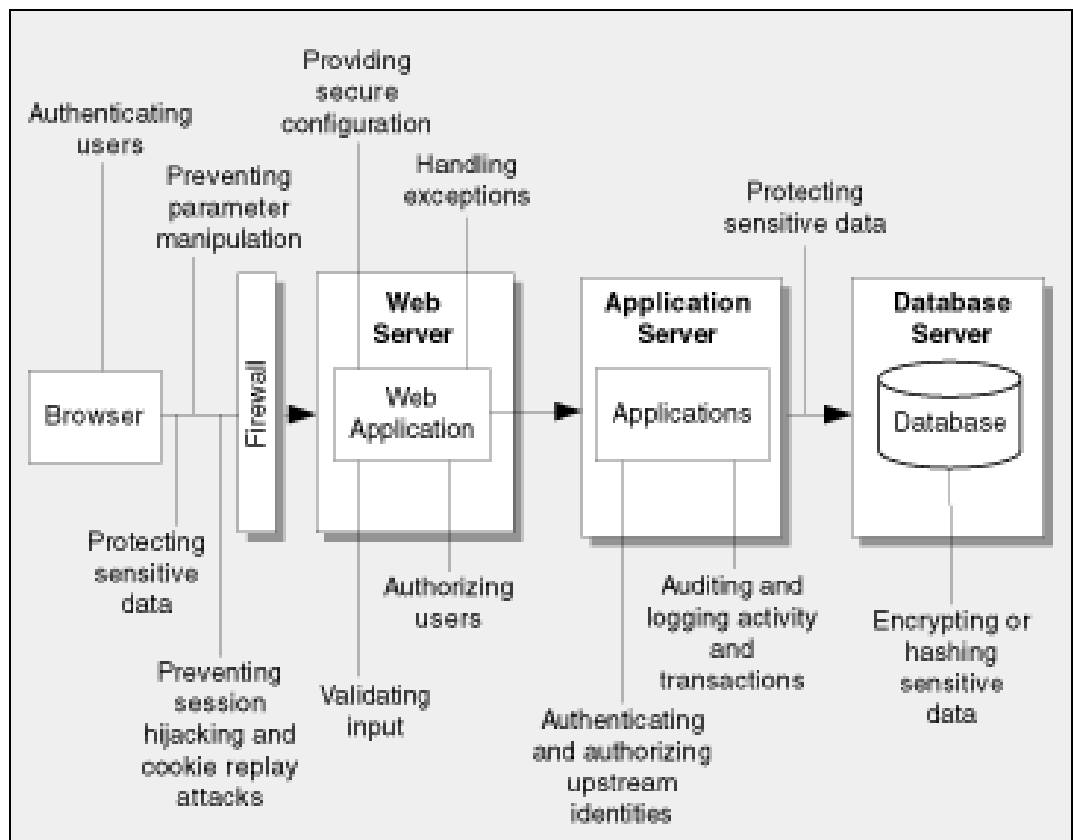


Figure 33. Data Security Issues and Locations

<sup>1</sup> Meier, J.D., Mackman, A., Dunner, M., & Srinath . (2003). *Design Guidelines for Secure Web Applications*. Retrieved from [http://msdn.microsoft.com/en-us/library/ff648647.aspx#c04618429\\_002](http://msdn.microsoft.com/en-us/library/ff648647.aspx#c04618429_002)

Poor design of the application lead to the vulnerabilities. The table below will present the possible vulnerabilities and the problem they may cause due to bad design (Meier, et al., 2003).

Table 9. Vulnerabilities and Problems to Bad Design

Vulnerability Category	Potential Problem Due to Bad Design
Input Validation	Improper implementation of input validation leads to the malicious string, for fields or HTTP header attacks in the system.
Authentication	If the authentication algorithms are not implemented it is responsible for password hacking, identity spoofing.
Authorization	Access to data tampering, restricted or private data, and execution of unauthorized operations in the system.

<p>Configuration Management</p>	<p>If the configuration management is privileged with some unauthorized access then it can change or damage configuration data of accounts and profiles.</p>
<p>Sensitive Data</p>	<p>If not handled sensibly leads to data tempering and hidden information disclosure.</p>
<p>Session Management</p>	<p>If the session information is captured session can be hijacked that will result in identity spoofing.</p>
<p>Auditing and Logging</p>	<p>If system logging is vulnerable it can fail in reporting or logging problems in system and will fail to highlight the signs of intrusion, problem diagnosis difficulties, and inability to prove a user's activities in the system.</p>

Cryptography	If not encrypted properly the confidential information and accounts credentials are on threat.
Parameter Manipulation	If the path parameters are manipulated in attacks or access control of the system can be by passed through some mechanism it leads to elevation of privileges, denial of actual and required service, and information disclosure.
Exception Management	Vulnerable to attacks results in system crash which is the denial of disclosure and services of sensitive system level details.



## Elements of Data Security

The application has to ensure the data security. Data Security of any application mainly comprises of elements like.

- Privacy - Purpose is to hide the required information from unauthorized parties
- Integrity - purpose is to support the complete data transmitted without interruptions.
- Authentication - purpose is to verify the identity of system entity that's responsible of data transfer.
- Access - purpose is to facilitate user with the appropriate privileges and ability to select pages (components) from those accessible menus
- Authorization - purpose is to provide users with access to the data to which they should have access to perform assigned or required tasks.
- Non-repudiation - capability of the system to proclaim the updates or modifications performed by a particular user based on the user's certificate (Oracle., 2012).

The application should follow a well-designed security model to ensure security of both user and data and the security model should be close to the company objectives.

Before designing the system the security model aspects should be considered seriously and fully qualified for system defined requirements. For a web based application only the security model of the application is not enough. There are many components that are involved in achieving the security of the system. These components include the followings.

- Router.
- Firewall.
- Load balancer.
- Servers.
- DNS server.
- Reverse proxy server (if any).
- Forward proxy server (if any).
- Virtual IP.

So the security model implemented on the system has its worth because of its practical implementation in the system.

## PeopleTools Support Required for the E-Form Application Data Security

### Privacy

Privacy is a concept that needs some information hiding algorithms to be implemented. Encryption is the methodology used to scramble the important information such that no unauthorized person can read it unless they have data chunk known as a key. Some enterprise frameworks have their own encryption technologies that define the already implemented and useable algorithm list because coding of algorithm from scratch can lead to many flaws. Encryption algorithms can be different symmetric and asymmetric algorithms. The encryption algorithm implemented in the system should be flexible enough to change and grow and getting stronger incrementally for data encryption of e-form application.

The encryption technologies are supposed to support the stronger cryptography with data growth. Data security is required to be ensured from flat file data to huge databases. Encryption technology in the system infrastructure helps to encrypt data by invoking the existing encryption function. The features of any Encryption Technology should include.

- Access to a robust set of asymmetric and symmetric algorithms.
- Capable to sign, decrypt, encrypt, and verify external files of the system.
- Capable of sign, decrypt, encrypt, and verify required fields in a database.
- The ability to transform data of one encryption scheme to another (Oracle., 2013).

### Integrity

Integrity is a must to ensure the correct transportation of information from one-end to other-end properly and to achieve this goal system administrator simply needs checksums or even better with one-way hashes.

### Authentication

This function is required to ensure that the system is working properly and as according to the entities performed. The E-forms system requires that authentication goes through a process of entering a password or any other authentication before access is granted like for example digital signatures. In case there is a mistake or mismatch with the entered password the E-FORM system will be caged

to automatically block out any further action. The following will explain the process in detail.

- The public and private (restricted) areas of the site should be separate.
- Use account block/ban policies for end-user accounts after particular warning status.
- Password expiration periods should be supported for different states of user and for different operations required to be performed on the site.
- Require very strong passwords that cannot be broken easily but also remember able in some way so that user don't need to store that or write that somewhere to remember.
- Be able to deactivate/disable accounts and to permanently remove their information.
- Do not save passwords in user stores to ensure system security.
- Secure authentication of system cookies (Meier, et al., 2003).

## Access

Access in a system can be controlled using the assigned Roles and Permission Lists of system. Permission Lists along with other policies, describe available periods for the particular user, i.e. sign-on/sign-off times offered in available and idle states of user. Security access has its own importance for the E-Form because the roles and permissions assigned to the member of the organization are the base for all of this module operation.

For the E-FORM Application system administrator has to perform certain operations regarding roles and their assignment to the organization member. We must comprehend roles and their importance in the system before going into any details of role management. If the roles of the user are defined appropriately it ensures data security from user end. Roles exist as a bridge between the user profile and the permission list. The role defines the way to go to which permission list of the system (Oracle., 2013).

Define Role Options. It is a very important option in a system which deals with the most critical part of permission assignment to the users of the system. System administrator is responsible of defining and managing permission lists in the system. For the E-Forms the

according role are assigned the permission list. The diagram bellow shows the overview of permission list.

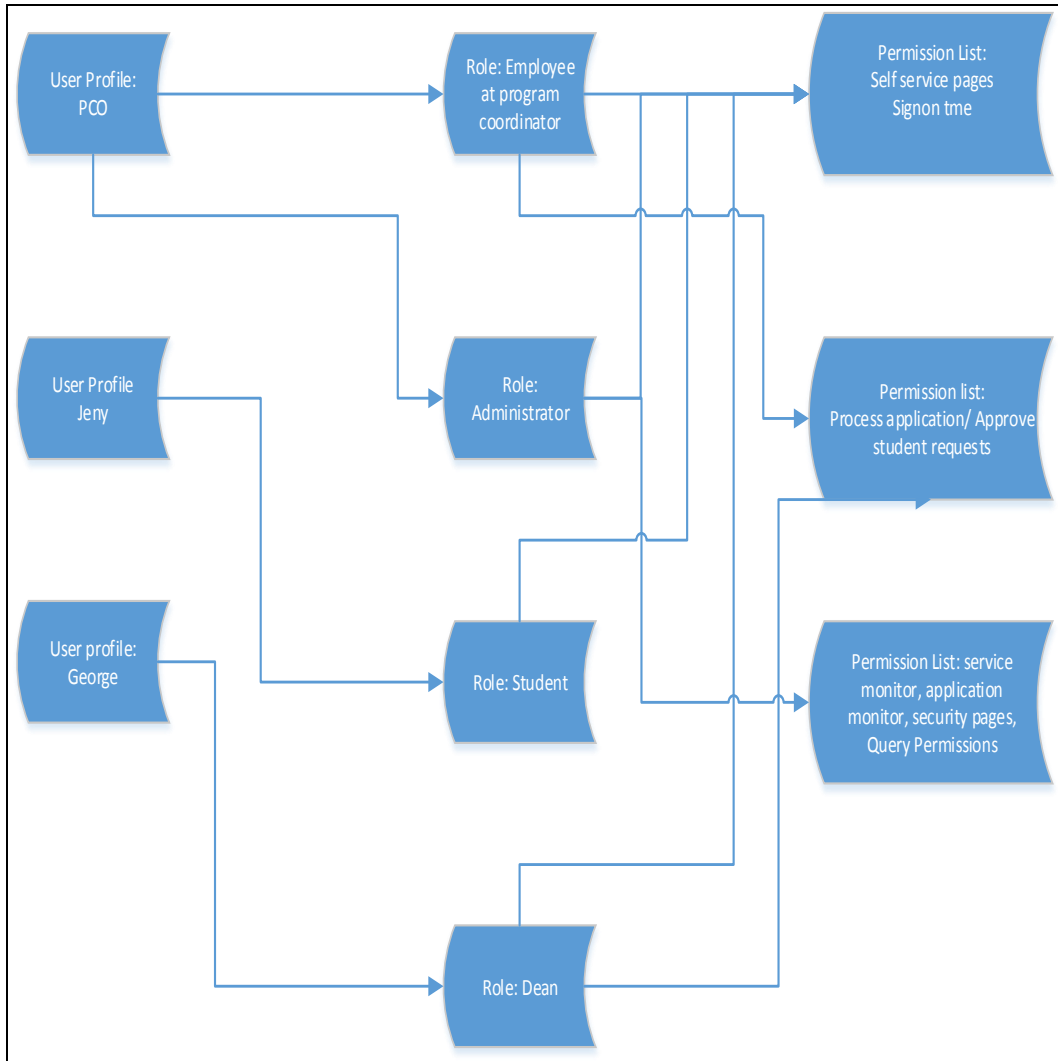


Figure 34. Permission List of E-FORM Application

## Authorization

Authorization for an enterprise application can be supported through Row Level and Query Security. Applications infrastructures provide additional authorization with extended Row Level and Field Security and through the use of Business Unit defined in the system. The User's are controlled by the permission lists from doing the followings.

- View.
- Add.
- Corrects information and update.

Defining Row-Level Security and Query Security Records

### Row-Level Security

Row-level security allows users to access a table in the system, but it does not give the users the authority to access all rows on that table. This type of security is actually implemented to the sensitive data holding system tables. In the application table of E-FORM, student can access his/her own application ,but cannot see application of anther students .In the other hand, the relevant



employee have access to the application for which he/she is responsible.

#### Query Security Record Definitions

Using query security record definition will help implementing E-FORM Application system for row-Level security. It adds a security check to the search to filter unnecessary information to return in the query results.

### Application Data Security

#### Table-Level Security

In the system we will use the security at query and table level for application tables. For each query user, system administrator is responsible to specify the records the user is allowed to access when running or building queries (Oracle., 2009). As student is allowed to view his/her records only. In addition, the Program Coordinator is allowed to view all applications which are required to be verified by the program coordinator. Also all the application records are accessible to the Dean on which his decision is required. So for all the user sets Table level security is to be defined appropriately.

## Row-Level Security

For this E-FORM Application system design "special types of SQL views-security views-to control access to individual rows of data stored within application database tables" (Anderson et al., 2006, p.320). Student can access and view the row that has his/her application record but cannot view the application record of any other student.

### Secure Setups Defined According to PeopleSoft Environment Security

This section is very important section of the data security as it emphasize on implementation of security using the important steps. The system has varying degrees of security, availability, and scalability layouts to enhance the system performances. Modification is required in different parts of the layout because every site is unique, and it has unique requirements. On a case-by-case basis, PeopleSoft consulting can have that support. In addition, the basic policies and design assumptions are as follow.

### Security

- Architecture of the system is strong enough that it does not have any point of security failure.
- Static routes should be used whenever possible within the system to avoid overheads.
- The architecture assumes that the network (internal/internal and external/internal) is untrusted because the internet is needed and a protection to system is required from both the internet (Oracle., 2010).

### Scalability

- The system should be scalable according to demands without having any changes in the architecture.
- With commodity hardware and cost-effective solution the system should scale itself (Oracle., 2010).

### Availability

- In order to prevent any failure in the design architecture at any single point, the system should be elastic (Oracle., 2010).

## How to Secure the Staff Signature

A digital signature is a way to ensure that electronic information is authentic. The information provided with digital signature is assumed not altered on its way of transportation. So privacy with integrity is the demand for secured digital signature. These days it is the most trustworthy way of authentication. Digital signatures depend on normally asymmetric algorithm "encryption" and "hashing" to ensure authentication with integrity. These two processes work hand in hand for digital signatures. Digital signature is normally implemented for authorization. For E-Form application system, digital signatures are secured using `rsa_shal_sign` encryption algorithm for signing, etc. that is why it is better to use some existing cryptography mechanism. This algorithm generates an RSA signature using an SHA1 hash. System uses `rsa_shal_verify` algorithm to verify the signatures.

One of many ways to ensure the security of digital signature is signature certification. Digital certification can be the certification available on the web server where data is transported. For secure digital signature this system will use public key encryption algorithm with digital

signature to keep the signature data cross from one user to another (Kelly, 2009).

### Pros and Cons of this Algorithm

The main good points of the algorithm are described below.

#### Pros

- Convenience - This algorithm is very convenient that gives the user a confidential way of publishing their public and private keys. In addition, the issue of encryption key distribution has been solved by this algorithm. It helps in securing key.
- This algorithm ensures message authentication through digital signatures. Public key encryption in any algorithm allows the use of digital signatures which allows the recipient of the message to verify the sender.
- Detection of data tampering - The use of digital signatures enables the recipient of the message to verify the correctness of the message after it being transferred.

- Digitally signing a message is similar to the physically signing a document.

#### Cons

- Public keys must be authenticated to ensure that the key belongs to specific person. Therefore, every person should verify that the public key belong to him/her.
- Public key encryption is a slow process as compared to symmetric encryption. It is impractical to be used in decrypting bulk messages as it will increase the overhead and prolong the processing.
- Loss of private key of this algorithm is irreparable that makes it more useable as there is nothing that cannot be repair to retrieve the messages.

## CHAPTER FIVE

### CONCLUSION

#### Introduction

It is evident that the electronic handling of forms E-FORMS is very important, especially in these modern times when the use of technology has become quite rampant. Essentially, the use of E-FORMS will ease communication between students, staff and the universities. In particular, the students will not need to physically visit the university to submit forms. Indeed, the proposed electronic communication system will allow them to fill and submit different of E-FORMS from the comfort of their homes. This will in turn, save them money and time and money that they would have used to visit the university, for the same. Moreover, the proposed e-communication system will open up the gateway for the adoption of other innovative technologies in the universities. Its worldwide accessibility will allow students around the globe to apply for studies in different universities.

## Findings

The project designs an easy-e-form that serves two primary functions: First, the design facilitates implementation of different e-forms over the internet, so that interested students can access, fill, and submit them to the university for further processing. Second, the proposed e-communication design facilitates tracking of forms, as they are processed at different stages. More importantly, each student will be notified about the status of his/her application automatically through e-mail or text message at each processing stage. Thus, the students will not have to worry about possible displacement of their forms as it happens in the manual forms handling system from time to time. Moreover, the communication system will notify supervisors through automatic email or text messages, whenever e-forms are not processed within a given period of time. This will make it easier for the supervisors to monitor the employee performance and take appropriate measures.



## Lessons

In order for the proposed e-communication system to be effective, the researcher learned that, the barriers of technological innovations in universities have to be eliminated. These barriers are the reasons why many universities still use older communication systems that are characterized by manual handling of forms. In this light, it has been noted that universities ought to reform their organizational culture, organizational structure and their organizational orientation. In particular, universities ought to shift from autocratic management style to participative management style (Wikipedia, 2014). A participative management style will allow students, faculty, staff and administrators to come together, in support of the proposed e-communication system. This will significantly reduce resistance to change. Moreover, the universities ought to adopt the integrated reward system, which awards employees for their innovativeness through rewards and recognition, as opposed to the money-based reward system, which gives the employees little or no motivation to support better communication systems. It is also imperative that the universities orient themselves as private organizations whose aim is to grow through

innovation. This way, the universities will take a proactive role in supporting electronic management of forms, as a business strategy to increase their competitive advantage.

#### Benefits

It is hypothesized that the electronic handling of files will make communication between the students and the universities cheaper. Other monetary and non-monetary benefits of going paperless include; first, unless the university database gets destroyed or the form gets corrupted by viruses, the chance of losing the E-FORMS is almost zero. Second, the use of E-FORMS will reduce the number of employees compared with the manual file handling system. This will save the universities money. Third, it is easy to sort E-FORMS within seconds compared to the tiresome nature of sorting manual files. Fourth, E-FORMS are space friendly since they only require some few hundred or thousands of bytes of memory compared to physical files which can take a number of rooms. Fifth, E-FORMS communication is environmentally friendly since it yields no wastages compared to manual files which pollute the environment once they are disposed as waste.

## Future Work

Given all this, it is imperative that the universities implement this project, and subsequently solve the problems associated with manual handling of files. To realize the full potential of this project, universities using the manual form processing system will have to fund the researcher to conduct further research on the subject, while in the meantime sensitizing their staff, faculty and students on the importance of change in the manner in which the university handles application forms. The research should collect the views of different stakeholders in the university. The university management should work on the transitioning phase, during which the staff will change roles from the manual system to the E-FORMS system. Training will be necessary at this level. Finally, the organizational culture, organizational structure and the organizational orientation will have to be changed to align with the new e-communication system. This will ensure that the stakeholders are motivated and committed to the success of the new e-communication system. This will facilitate continued improvement of the new e-communication system.

## REFERENCES

- Anderson, L., Ernst, C. & Young U. S, L. (2006). *Understanding PeopleSoft® 8* (1st ed.). Hoboken: John Wiley & Sons.
- Meier, J.D., Mackman, A., Dunner, M., & Srinath . (2003). *Design Guidelines for Secure Web Applications*. Retrieved from [http://msdn.microsoft.com/en-us/library/ff648647.aspx#c04618429\\_002](http://msdn.microsoft.com/en-us/library/ff648647.aspx#c04618429_002)
- Kelly, G. (2009, Jun 21). RSA Sign and Verify using PeopleSoft [pluggable] Encryption Technology (PET). Oracle. Retrieved 2013, from [https://blogs.oracle.com/peopletools/entry/rsa\\_sign\\_and\\_verify\\_using\\_peop\\_1](https://blogs.oracle.com/peopletools/entry/rsa_sign_and_verify_using_peop_1)
- Lee, M., & Bieker, G. (2009). *Mastering SQL Server*. Retrieved from [http://books.google.com.sa/books?id=vILEsSKWL8oC&pg=PA164&lpg=PA164&dq=declarative+integrity+controls+don%E2%80%99t+meet+the+functional+needs&source=bl&ots=xMYnaFOZzU&sig=DKau2sM8sD9VIPBKGp-mVz9hRDM&hl=en&sa=X&ei=icf6Ue2YBbL54AP7hoHACQ&safe=on&redir\\_esc=y#v=onepage&q=declarative%20integrity%20controls%20don%E2%80%99t%20meet%20the%20functional%20needs&f=false](http://books.google.com.sa/books?id=vILEsSKWL8oC&pg=PA164&lpg=PA164&dq=declarative+integrity+controls+don%E2%80%99t+meet+the+functional+needs&source=bl&ots=xMYnaFOZzU&sig=DKau2sM8sD9VIPBKGp-mVz9hRDM&hl=en&sa=X&ei=icf6Ue2YBbL54AP7hoHACQ&safe=on&redir_esc=y#v=onepage&q=declarative%20integrity%20controls%20don%E2%80%99t%20meet%20the%20functional%20needs&f=false)
- Oracle Peoplesoft Enterprise. (2009). *Enterprise PeopleTools 8.50 PeopleBook: Security Administration*.
- Oracle Peoplesoft Enterprise. (2013). *Oracle Security Docs*. Retrieved from [http://docs.oracle.com/cd/E38689\\_01/pt853pbr0/eng/pt/tsec/concept\\_SecurityAdministrationOverview-c07639.html](http://docs.oracle.com/cd/E38689_01/pt853pbr0/eng/pt/tsec/concept_SecurityAdministrationOverview-c07639.html)
- Oracle Peoplesoft Enterprise. (2012). *Poplesoft campus solution 9.0 fundamental*. Retrieved from [http://docs.oracle.com/cd/E29389\\_01/psft/acrobat/hracs90lsfn-b0312.pdf](http://docs.oracle.com/cd/E29389_01/psft/acrobat/hracs90lsfn-b0312.pdf)
- Oracle Peoplesoft Enterprise. (2010). *Securing your PeopleSoft Application Environment*. red paper series ed.

Rankins, R., Gallelli, C., Silverstein, A. T., & Bertucci, P. T. (2011). *Microsoft SQL Server 2008 R2 Unleashed*. Paul Boger. Retrieved from [http://exordio.qfb.umich.mx/archivos%20pdf%20de%20trabajo%20umsh/LIBROS%2014/Libros%20digitales%20Computaci%C3%B3n%202013/SQL/microsoft\\_sql\\_server\\_2008\\_r2\\_unleashed.pdf](http://exordio.qfb.umich.mx/archivos%20pdf%20de%20trabajo%20umsh/LIBROS%2014/Libros%20digitales%20Computaci%C3%B3n%202013/SQL/microsoft_sql_server_2008_r2_unleashed.pdf)

Snyder, C., and Parth, F. (2006). *Introduction to It Project Management*. New York: Management Concepts

Wikipedia,. (2014). *Deependramba/Participative management*. Retrieved from [http://en.wikipedia.org/wiki/User:Deependramba/Participative\\_management](http://en.wikipedia.org/wiki/User:Deependramba/Participative_management)