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Abstract

Purpose: The purpose of this study is to examine the possible advantages of establishing an EVS at the Kenya Institute of Mass Communication (KIMC). With an emphasis on increased voter trust, lower expenses, and increased efficiency, the research seeks to assess the viability and benefits of implementing an EVS for KIMC elections.

Methodology: Using a case study methodology, this study will examine the material that has already been written about EVSs and interview important KIMC stakeholders to learn about their present voting procedures and difficulties.

Findings: The system of voting ought to be fast in terms of casting votes as well as tallying to eliminate long queues and anxiety of voters waiting for result. System voting is more preferred choice as opposed to the use of papers and boxes. Ballots are more expensive since they are bought every time election is conducted. System voting is more comfortable and done at ease with fewer resources in terms of money and time. On other hand manual system is inefficient, insecure, incorrect and expensive. A need therefore arises to develop System voting to manage voting process efficiently and effectively. Electronic voting systems, or EVSs, present a strong substitute for conventional paper-based ballots, guaranteeing improved electoral efficiency, security, and transparency.

Unique Contribution to Theory, Practice and Policy: This research will contribute to the ongoing discussion on the role of EVSs in promoting democratic processes within institutions. The findings will provide valuable insights for KIMC administrators in making informed decisions regarding the adoption and implementation of an EVS. This study can inform policy discussions on the broader application of EVSs in Kenyan institutions.

Keywords: *Election, Electronic Voting Systems (EVSs), Efficiency, Transparency, Institutions, System, Student Leaders, Conflicts, Results, Tallying, Costs*

INTRODUCTION

The Kenya Institute of Mass Communication's (KIMC) suggested electronic voting system is presented in this chapter. It starts out by giving a general introduction of KIMC, covering its background and organizational setup. A brief description of KIMC's present manual voting mechanism is provided to provide context for understanding the current electoral process. Next, a description of the main characteristics and capabilities of the new electronic voting system is given. This section highlights the benefits and justifications for switching to the new electronic voting method by contrasting it with the current manual system. The significance of e-voting is highlighted, along with its advantages, which include improved security, better efficiency, and higher transparency in KIMC's election procedures. The e-voting method can also result in cost savings and increased voter trust since it requires less time and money to conduct elections.

The breadth of the suggested electronic voting system is explained, along with the desired functions and operations. It is accepted that the proposed system has limitations but offers a fair analysis. Lastly, the project schedule is shown, detailing when the electronic voting system will be put into use. This thorough introduction lays the groundwork for an in-depth examination of the potential benefits of KIMC using an electronic voting system, with an emphasis on heightened voter confidence, lower expenses, and enhanced effectiveness.

Background

When it was first founded in 1965, the Kenya Institute of Mass Communication (KIMC) was known as the Voice of Kenya (V.o.K.) technical training school. The institute grew over time, and by 1975 it was a school that taught students from Kenya and a number of other African nations, such as Uganda, Tanzania, Ethiopia, Sudan, Malawi, Zambia, and Namibia, in all fields related to multimedia. Situated on Mombasa Road in Nairobi, KIMC is roughly 1.5 kilometers away from the city's central business district (CBD). The council that oversees KIMC is made up of elected officials that represent the student body. Students can vote for their favorite leaders through the Kenya Institute of Mass Communication Student Union (KIMCSU), which is the organization that allows them to exercise their democratic rights. Every year, the union is renewed through elections, and the elected officials speak on behalf of the students' complaints before the institute's council.

The institute has three major departments:

- Accounts
- Admission/Administration
- Students Union

The proposed electronic voting (e-voting) system is particularly relevant to the Students Union department, overseen by the dean of students. This department is divided into several sub-departments, which include:

- Registration
- Treasury
- Voting
- Social Functions
- Sports

These sub-departments, with the exception of Registration, are run by the correspondingly elected students. By implementing an electronic voting system, the student union will be able

to ensure safe and fair elections for student representation while also improving the effectiveness and openness of the voting process.

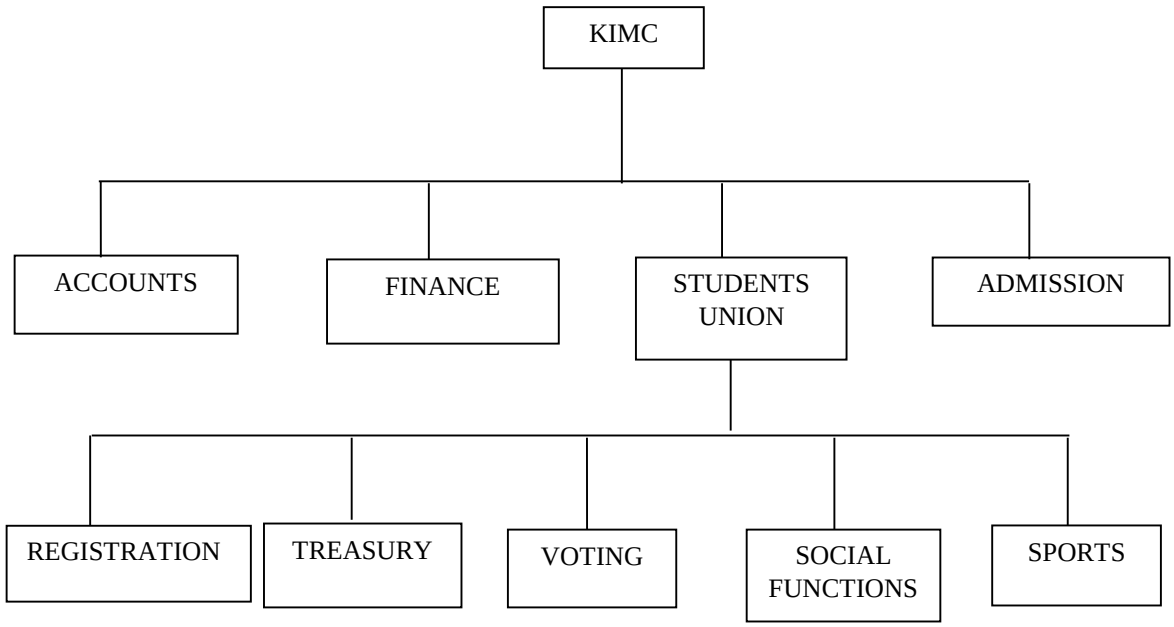

Figure 1: Illustration Showing an Organization Structure of K.I.M.C

Challenges

Defines the shortcomings in the current manual system. Kenya Institute of Mass Communication encounters the following problems during the elections of the student union.

- The process is slow leading to long queues
- Rigging of elections
- Chaos arise during tallying for lack of consensus

The proposed computerized system aims at addressing all these shortcomings.

Resolution

The proposed system will address the problem of the existing system. The computerized system will be fast and therefore there will be no much time wasted by students in the long queues. Turn up will not be an issue since students are aware of computers. They know that it works fast and so they will turn up bearing in mind that there will be no queues. The problem of chaos erupting during counting will no longer exist as there will be no physical counting since there will be no ballot papers to count. Therefore, as soon as the last person votes the result will have added up and they will shortly be announced. The computer will produce results for everyone who was contesting to all the schools and to the administration. This proposed system will solve the problem of sabotaging and bring transparency.

Scope of the Proposed System

The proposed system will cover registration and voting department. This is because they are the ones that will conduct elections. The registration department will be dealing with registering students who will take part during the elections. Every student has a right to vote as long as they are student in that institution at the time of voting. During registration students are

required to present their valid student id for affirmation. This will ensure that all those students register as voters belong to that institution and that their studentship is valid. The student details will be keyed in and stored in the database. The voting department will deal with planning and organizing for the elections. It will receive the names of all the candidates in various posts and put their details in the system. Since the system will be computerized, the department will ensure that there is proper integration from various polling centers across the institution. The department is mandated to announce the winners and submit the result to the dean of students

Justification of the Projected System

The proposed system will address the problem of the existing system. The computerized system will be fast and therefore there will be no much time wasted by students in the long queues. Turn up will not be an issue since students are aware of computers. They know that it works fast and so they will turn up bearing in mind that there will be no queues. The problem of chaos erupting during counting will no longer exist as there will be no physical counting since there will be no ballot papers to count. Therefore, as soon as the last person votes the result will have added up and they will shortly be announced. The computer will produce results for everyone who was contesting to all the schools and to the administration. This proposed system will solve the problem of sabotaging and bring transparency.

Project Risk and Mitigation

The proposed system cannot perform in absence of **electricity power**. This is because the system is a computerized system and cannot ignore the fact that it operates with power. If there is electricity cut-off the system is inconvenient.

- **Cost –** The rate for building the system very is high and it also needs preservation cost.
- **Resistance –** Some members of staff and students may resist the introduction of the system within the institution due to fear of unknown.
- **Time –** The time to develop this system is limited in time and could end up not completed on the required time.
- **Education –** Since it is high-tech system, education is a paramount for the system to utilized efficiently. It is therefore necessary for all the clerks including students to go through training on how to use the system.
- **Capitals –** The system utilizes hardware plus software that might be put through to late delivery. Due to much traffic they system may fail or result to low performance. There is a need for back up to evade this issue.

LITERATURE REVIEW

Electronic Voting System

A contemporary strategy to lower errors and improves the convenience and accuracy of electoral procedures is electronic voting, or e-voting. Its implementation has changed elections in many universities throughout the world, notably Jordan's University of Yarmouk. This university, which has over 30,000 students spread over several faculties and departments, has important and frequently heated yearly student council elections. At Yarmouk University, the introduction of electronic voting has greatly reduced conflict by making candidate information easily accessible and encouraging student participation in the electoral process.

At Yarmouk University, the e-voting system comprises four stages:

1. Registration: Voters register with registration authorities, and a list of eligible voters is compiled before Election Day.
2. Voting Day: Registered voters request voting privileges from registration establishments, where their identities are verified against the registered voter list. Only eligible voters are allowed to cast their votes.
3. Casting Votes: Voters cast their votes using the university's e-voting system, either through on-campus polling stations or online, ensuring accessibility for all eligible voters.
4. Vote Tallying: Tallying establishments count the votes and declare the election results, ensuring transparency and accuracy in the electoral process.

Students can cast their ballots online from any location with internet access, thanks to Yarmouk University's e-voting technology. This approach increases participation and convenience, but in order to guard against manipulation and maintain system dependability, strong security measures are needed.

Theory and Validation: Yarmouk University bases its study of electronic voting systems on theories related to democratic participation and technology adoption. It provides empirical support for these views by illustrating how electronic voting improves student participation and election transparency. The system's theoretical underpinnings are validated by the way it reduces conflict and enhances election results.

In contrast, an electronic voting system is also used by the Kenya Institute of Mass Communication (KIMC) for student elections. However, the client-server architecture of KIMC's system differs from that of Yarmouk University's web-based system. This implies that in order to use voting machines, students must physically attend certain polling places on campus. In spite of this distinction, both systems have comparable features and strong security safeguards to prevent system malfunctions and election manipulation.

METHODOLOGY

This chapter describes the method used to analyze the current system, how the analysis was carried out, finding of the analysis and the conclusion based on the analysis. The existing system is studied with the aim of computerizing it.

System Analysis

Analysis of the System is the dissection of a system into its components fragments to study how they interact with each other to achieve the required outputs.

Overview of the Existing System

The current system is physical. Operation involves ballot papers, ballot boxes and a register. The student presents their school identity cards to the polling clerks, then the clerks checks the details of that student in the student register. When the name of the student is found, the student is issued with ballot papers. The student is required to choose their preferred leaders by ticking alongside the names of the candidate and then puts it into the ballot box. The polling clerk then draws a line across the name of that student. The student leaves the polling center having their small finger marked.

In the evening after voting is complete, the counting clerks then open the ballot boxes counting one by one as the agents and the observers' witness. Then they submit the results to the administration where the results from all the departments are combined. They then announce the results and the reports produced of the overall elections. For the aspirants to qualify, they

must not have an outstanding fee balance. They must also be endorsed by at least one hundred students in at least three departments of the institution. The manual process is slow hence time consuming. Students spend time in the long queues and even sometimes end up being locked from voting because the time elapses before they vote. Many of these students argues it out that its plans for rigging. Again, during counting of votes, the observers and agents sometimes may bring chaos which ends up sabotaging the whole election process and sometimes this leads to no results announced which is a waste of resources. Many students also fail to turn up lest getting tired for the whole day standing in the long queues hence prefers to just attend to their other personal issues. Less than 40% of the students are the one that turn up for voting.

Overview of the Proposed System

The proposed system will be a computerized system. The student's detail will be stored in database management system. During voting a student detail will be retrieved from the database of the whole institution database management system. A student will be required to log on into a computer using his/he username. The credentials of a student will be checked in the database. If the student will logon successfully, a form will pop up in the screen of a computer and the student will select from that form the candidates they prefer. Each post will have a different form. A student will only have an opportunity of voting and so after voting the student will be deactivated and cannot vote again. This votes cast will be stored in a different table in the database. The results will be counting or adding up as votes are cast. No ballot boxes, ballot papers will be used during elections.

Terms of Reference

Terms of reference is a document that describes the purpose and structure of an organization or group of people who have agreed to work together to accomplish a common goal. It provides an organization with shared understanding of what they are about and what they aim to accomplish.

Professionals

The following is a team of personal that work together with the aim of achieving the objective of the developed system.

- System analyst
- System designer
- Programmer
- Users

Tools and Methodology

Methodology refers to the System guideline that solve issues with precise components like phases, tasks, method techniques and tools. The methodology that will be used to analyze the proposed system is structured system analysis and design methodology (SSADM). It will be used in the system analysis and design stages for Kenya Institute of Mass Communication student voting system.

Reason for Choosing SSADM

- It uses symbols that are easier to understand even without much explanation.
- It offers quality assurance for system.

- It breaks down the project into small sub-sections that can easily be managed.
- It is supported by computer-based tools

Tools Used in SSADM

Tools used in the development of the system include the following;

- Logical data modelling
- Data flow diagrams
- Entity relationship diagrams

Feasibility Study

- Involve carrying out and determining if the project is feasible and viable. The study explores the information requirements of prospective users and governs resource requirement in terms of cost and benefits.

- The goal of feasibility study is to evaluate substitute system and propose the most appropriate resolution for the development of the system.
- **Technical Feasibility Study**
  - Involve evaluating availability of technical skills, reliable hardware and software
  - It is capable of meeting the needs of the developed system, including the sustainability and maintenance of the developed system.

Entity Relationship Diagrams

It is the process of identifying modelling and documenting the business events which affect entity and their sequence. It is also known as entity life history.

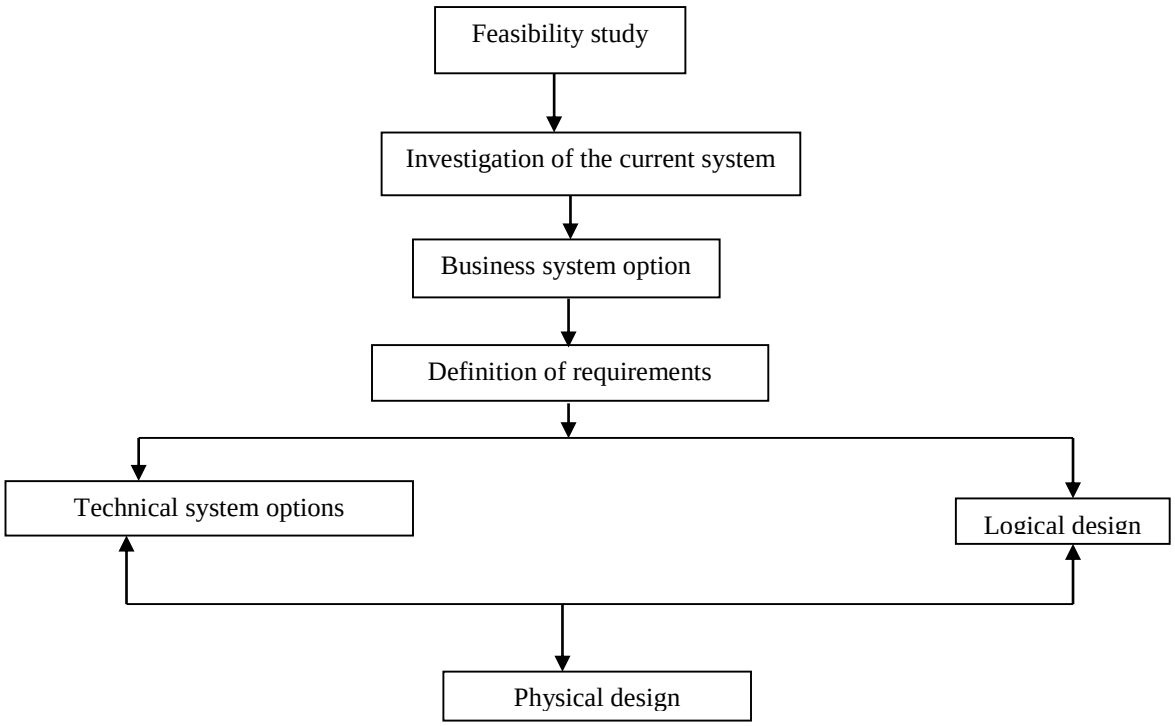

Figure 2: Illustration Showing SSADM Structure

Operational Feasibility Study

Minimizes the resistance, user friendliness, error free and acceptance of the system by the users and the management. The questions below should be considered;

- Will the users be able to run the system?
- Will the system adequately perform the procedures?
- Will the developed system be error free?

Legal Feasibility Study

This is concerned with the proposed system not going against the laws or statutes of a given society with in which it will be. The proposed system will be implemented using resources legally acquired and accepted by organization management.

Feasibility Report

Economic Feasibility Report

At the commencement of developing the system, the cost will be somewhat higher than that of existing because of the charges it cared during the development and obtaining or purchasing of the hardware.

Operational Feasibility Report

The developed system will need users to be trained on the operation of the system for the efficiency of operations.

Legal Feasibility Report

The developed system will be implemented using all resources legally acquired and accepted by the institution management team.

Data gathering and Fact Finding

Data gathering is done, to acquire information that will aid in decisions making about significant matters or to pass information on to others. Fact finding is concerned with the study carried out to collect information about a system requirement and preferences.

The following are methods used in data gathering during the system analysis.

i. Interview
ii. Observation

Interview

Is a direct conversation between the analyst and the students and KIMC stakeholders of the system in order to obtain answers, comments and suggestions about the current state of the existing system. The users are also given a chance to give their opinion on how they can be improved. The users, including representatives from the Kenya Institute of Mass Communication (KIMC) student body, are actively engaged to provide their perspectives on potential improvements.

Reasons of Using the Interview Method

- Helps in gathering the accurate information of the organization
- Gather data about the activities and processes in the company.

- Unearth the problems.

Observation

The act of executing responsibilities. It gives analyst a clear comprehending of the system in question. Is used mainly as a confirmation tool of facts obtained other from fact finding technique for example; observation of how the process of voting is conducted. An observation method will be used to investigate the problems that arise with a manual process.

Reason of Using Observation

i. Assists to verify the accuracy of data obtained by interview.

ii. It can be utilized to capture confidential data that was not captured during the interview and observation.

iii. Assists in making personal recommendation as it is better to recommend on what you have observed not just on what you have been told.

Fact analysis /Recording and Technique

Program Requirement

Table 1: Showing the Requirements of the Proposed System

Inputs	**Output**
Input data -Voter details, Aspirant details	**Output data** - Voter records, Aspirant record, election results.
Input devices-Mouse, keyboard	**Output devices** -Monitor / printers.
Frequency -The data will be input once in a year in a period of three weeks or one month before the election.	**Frequency** –Once per year after voter registration exercise is over. After the tallying of votes.

Processes

Refers to how the data will be converted into information. It's the actual conversion of data into information. They include -Voter registration, Aspirant registration, and voting process of the results.

Data Base /Files

They will include-Master files

- **Reference files**-Are used for comparison of data
- **Back up files**-offers backup storage for future reference
- **Report files**-they hold report/outcome data of the election

Devices

Computer - Pentium [4] 2.7 dual processor

Storage devices - Hard disks
- Flash disks

Input devices - Keyboard
- Mouse

Output devices - screen (monitor) softcopy
- Printers (hard copy)

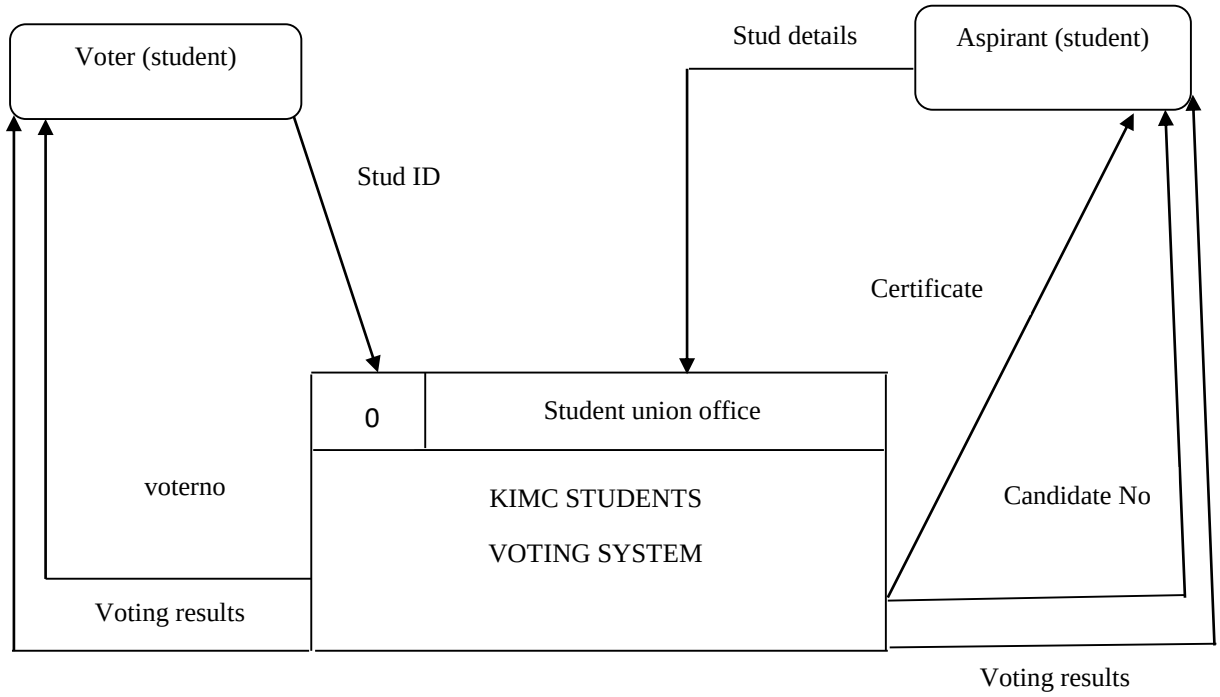

Figure 2: Below Shows Contextual Diagram of KIMC E-Voting System

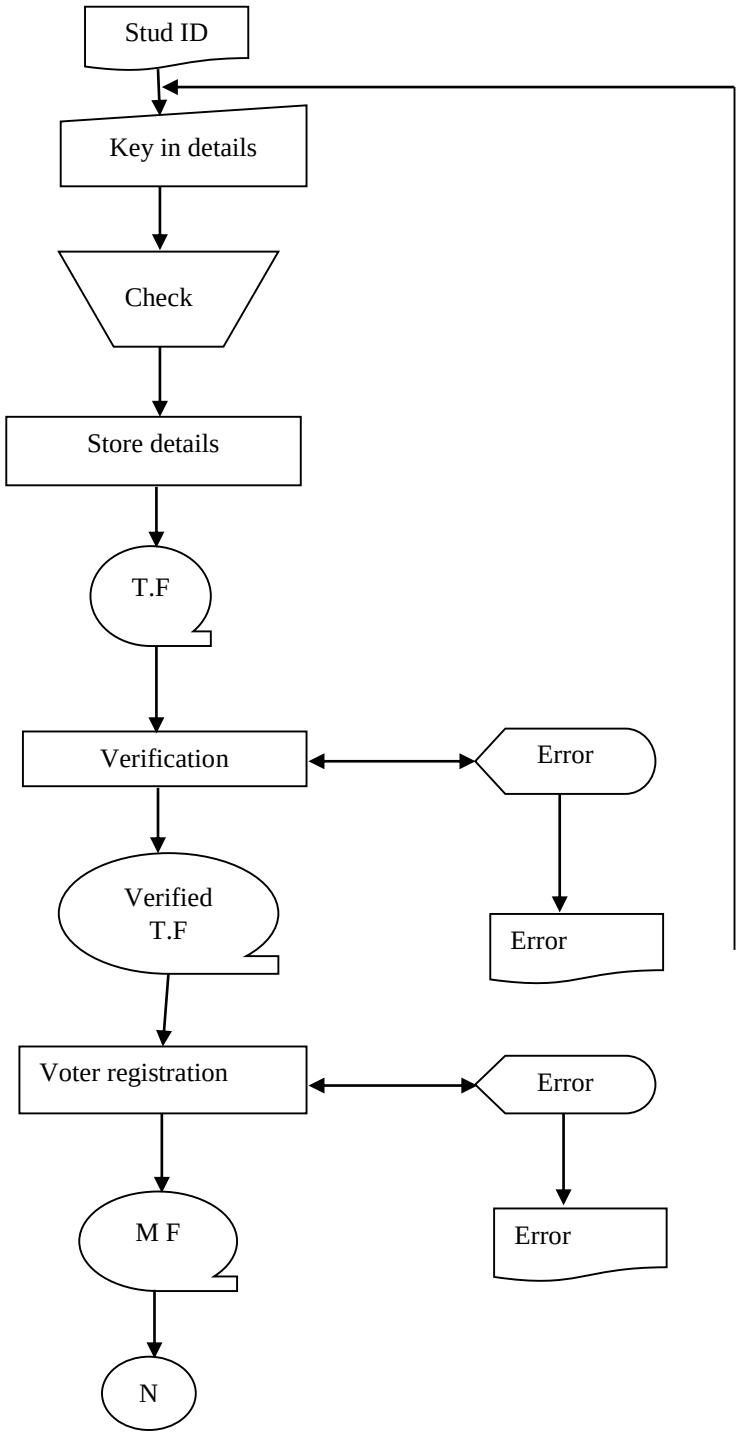

Figure 3: Below Shows KIMC Voting System Flowchart

SYSTEM DESIGN

System design is the process of defining architecture, components, modules, interfaces and data for a system to satisfy specified requirements. With respect to KIMC student voting proposed system, will focus on the nature of the system. Still, it will look into the logical design of the system i.e. entity relationship and entity life history. Another part will be physical design which will give a description on how the data flows in the system.

Design Objectives

- To design a voting system that will improve the information flow and storage over a long duration of time.
- To design a system that will carry out the process of voting in compliance with the policies of voting in the institution to avoid conflict with the corporate ethics of the entire institution and the way they do their business.
- To design a cost-effective voting system within the laid down constraints.
- To design a system that will be open and that will bring transparency in the entire electoral process.

Nature of the System

The proposed KIMC student voting system will be processing data electronically through computer. Data processing mode will be real time. This is where the process will be done without any significant delay. The computer waits for the input and as soon as data is received, it is processed and the results can be processed quickly. Once the voter clicks OK button the results are sent to the database and updates instantly. At the same time the voter is deactivated and cannot vote again as he/she cannot login again.

Logical Design

The logical design of the system represents what data is input, what data is processed and what information or report is produced.

Logical Data Modelling

It is the process of identifying modelling and documenting the data requirement of any information system. Logical data model consists of data structure and documentation. It represents; -

Entities -things which data is collected from e.g. students.

Relationships - it is an association between entities.

Data Flow Modelling

It is the process of identifying, modelling and documenting how data flows around any information system. A data flow model consists of a set of integrated data flow diagrams supported by documentation.

Logical Data Design

Relational Data Analysis

Data analysis provides a means of reducing the complexity of the information held within a system. It causes the logical groups of data to be identified and indicates how these groups

relate to each other. Anomalies are avoided or removed by a process of normalization. The tables used in the KIMC student voting system will be normalized up to the third normal form.

- Un normalized form
- 1 NF
- 2 NF
- 3NF

- **Un Normalized Form**

In this form there is data redundancy or duplication of data items.

- **First Normal Form**

This form eliminates the repeating attributes or group of attributes.

- **Second Normal Form**

In this kind of normal form every non-key attribute is fully functionally dependent on the whole key.

- **Third Normal Form**

A relation is in the third normal form if it is in the second normal form and there are no transitive functional dependencies which arises when one non-key attribute is functionally dependence on another non-key

Entity Attributes Relationship

***Relationship* –** It is an association or a link between entities involved in a system. It shows how these entities interact with and depend on each other in the system.

Three of Relationship

i. **One to one**

This is where one entity depends on another entity.

ii. **Many to many**

In this type of a relationship, for there to be an entity **A** there are many **B`s** associated to it, and for there to be a **B** there are many **A`s** associated to it.

iii. **One to many**

In these type of a relationship, for there to be an **A,** there are many **B`s** associated to it and for there to be a **B** there is an **A** associated to it. In this KIMC student voting proposed system, the one to many relationships will be used. This is where there is only **one** aspirant who can be voted by **many voters**. Another instance where this kind of relationship will exist is where by **one post** can be contested by **many aspirants**.

Entity – It is an object on which data can be stored about in a system e.g. a voter.

Attribute – it is a property that describes an entity e.g. aspirantid.

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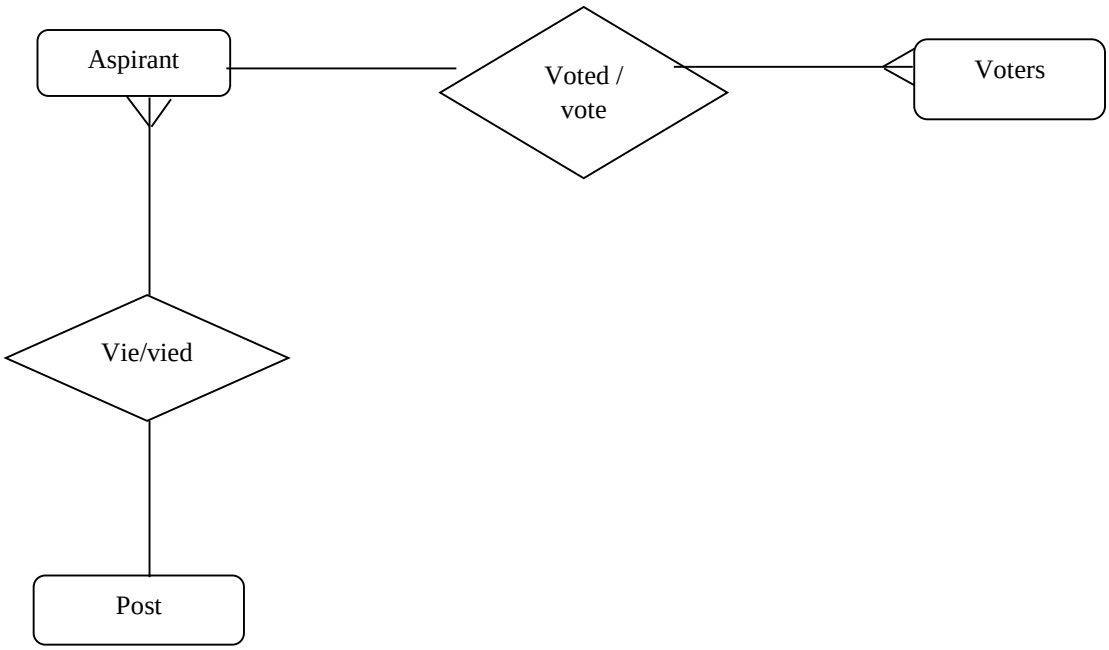

Figure 4: The Diagram Below Shows How These Entities Relate To Each Other

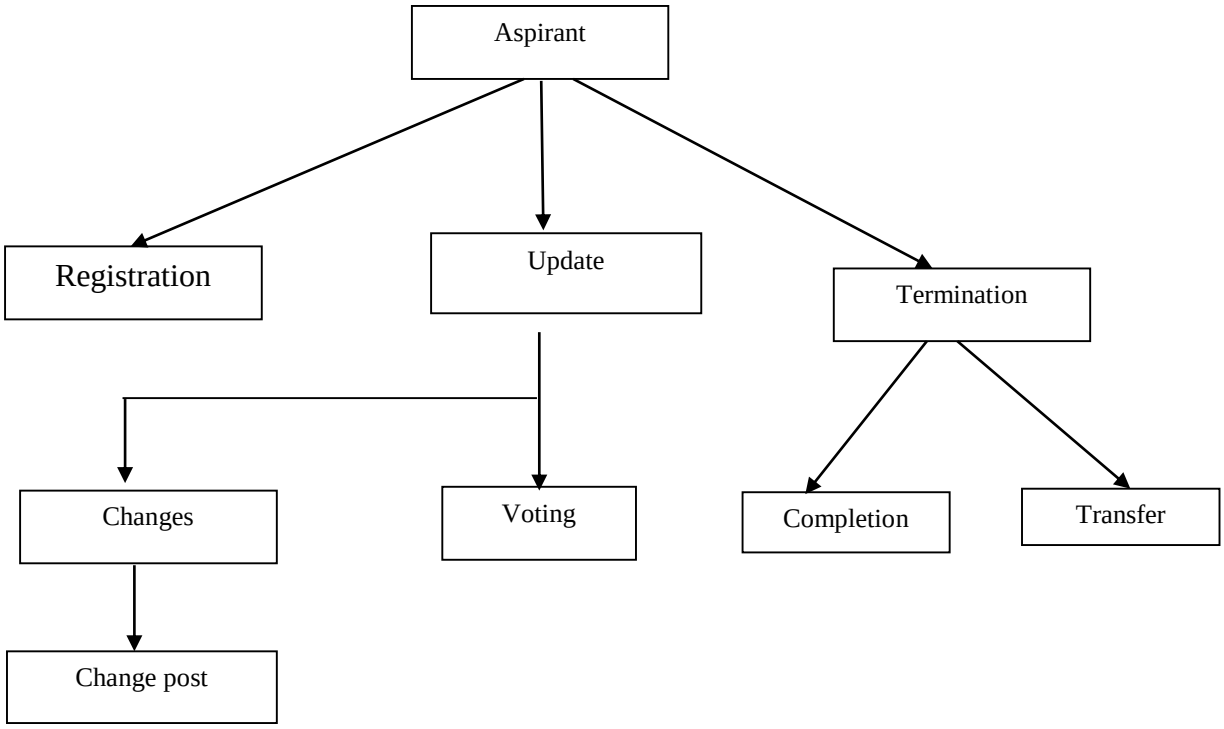

Figure 5: The Diagram Below Shows the Entity Life History of an Aspirant in KIMC Students Voting System

Physical design specifies how data is captured, how it is processed and it is produced as information.

Data Dictionary

This is data about data in the DB. It gives a summary of data and how it is used during processing. The following are some of the tables that will be used in the proposed voting system.

Table 2: Showing Student

Field	Data Type	Size
StudID	Varchar(varying character)	(10) primary key
Name	Char	(30)
CourseID	Varchar	(10)
CourseName	char	(10)
Y_O_Admission	date/time,	
Y_O_Completion	date/time)	

Table 3: Showing Voter

Field	Data Type	Size
voterID	Varchar	(10) primary key,
StudID	Varchar	(30),
Name	Char	(30),
Password	Varchar	(10)

Table 4: Showing Aspirant

Field	Type	Size
AspNo	Varchar	(10) primary key
Name	Char	(30)
VoterID	Varchar	(10)
PostID	Varchar	(10)
PostName	Char	(20)

Table 5: Showing Post

Field	Type	Size
PostID	Varchar	(10) primary key
PostName	Char	(20)

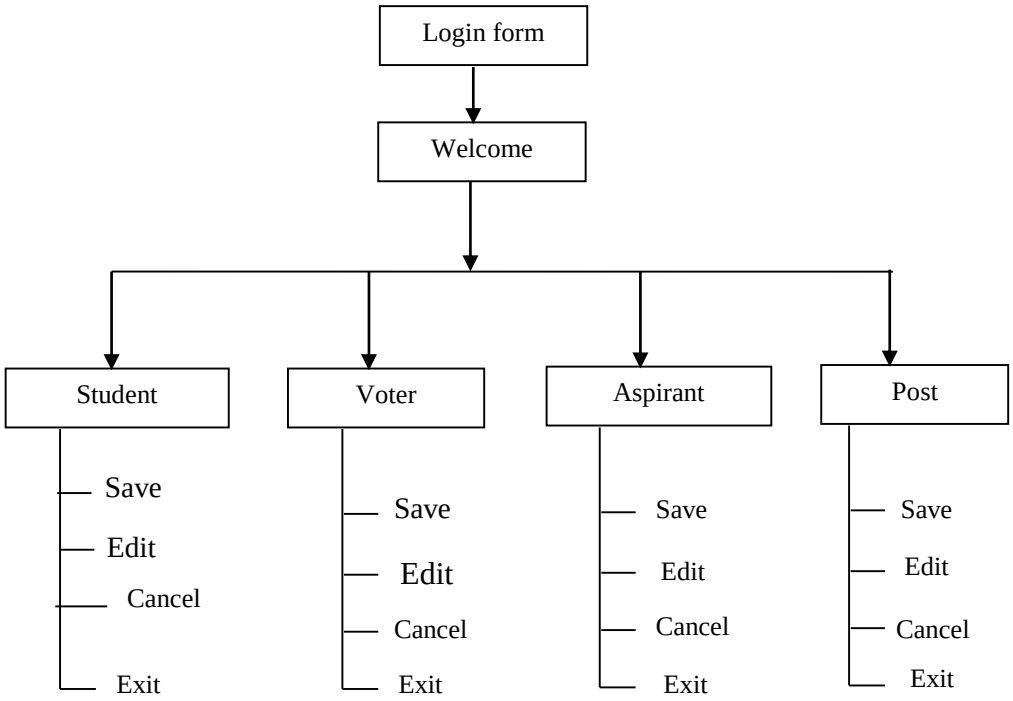

Figure 6: Block Diagram of the Proposed System

Input Screen Design

It is the interface that will guide the user on what to do next. The following are the forms which will be used to input data into the tables.

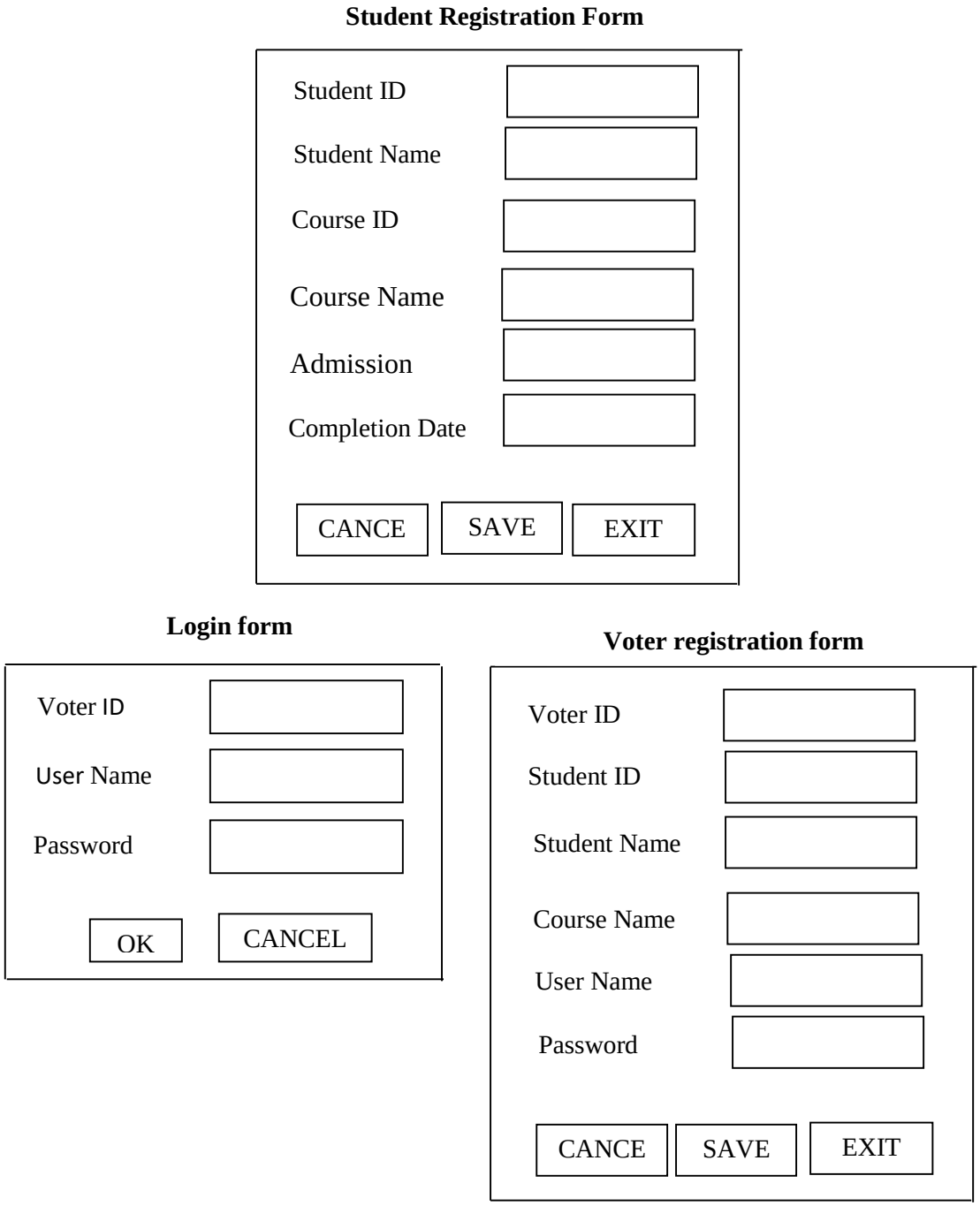

Figure 7: Showing Output Screen Design

Output design is concerned with what comes out of the computer after processing, which could be in form of hard copy or in form of softcopy. The proposed voting system will involve both hard or softcopy. This is how the output will be.

Table 6: Showing Post Final Tally of Election Results

Post	Candidate Number	Candidate Name	Total Votes
Chairman			
Sec. General			
Treasurer			
Social function			

Code Design

In code design, this will show the primary keys and the reason for that together with the foreign keys and how they work together.

Table 7: Showing Code Design

Table Name	Primary Key and reason
Student table	studID with ten characters (10) is the primary key because it is unique.
Table voter	voterID with ten characters (10) is the primary key. StudID (10) is a foreign key to refer from student table.
Table aspirant	AspID with ten characters (10) is the primary key VoterID is foreign key to refer from voter table. PostID is a foreign key to refer from post table.
Table post	PostID with ten characters is the primary key.

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