

30 August 2018.

Citizen - Politician System

By: 101358, 102008.

An informatics system project proposal submitted to the faculty of information technology in partial fulfilment of the requirements of the award of a degree in Informatics and Computer Science.

# Declaration

We, 101538 and 102008, declare that this project has not been submitted in Strathmore University or any other university for the award of a degree in Informatics and Computer Science or any other degree.

**Student Signature:**

Sign ­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Student Signature:**

Sign ­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Supervisor Signature:**

Sign ­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Abstract

The status quo in Kenya is that citizens do not know the type of leader they select. In most cases citizens often find that the leader disappears after he is elected. The elected leaders also do not fulfil their duties as stipulated in the constitution or their manifesto.

Normally during elections, candidates hand out their manifestos in form of booklets. In most situations some of the objectives in the manifestos are not fulfilled. Citizens have no way of contacting their leaders to raise a complaint or observation.

This document proposes a web application that displays information about a politician that is relevant to the public. With this application citizens can also contact the leader and also post problems related to the respected area. Citizens will also be able to see a detailed analysis of their leaders to help them decide who to vote for.

The type of system development methodology going to be used is prototyping. This type of methodology best fits our application since it is easier to test and develop. Also, the users are constantly met to refine their requirement specifications thus developing a system that best fits their needs. The prototype will eventually become the final product (Evolutionary Prototyping).

# Table of Contents

[Declaration ii](#_Toc523419428)

[Abstract iii](#_Toc523419429)

[Table of Contents iv](#_Toc523419430)

[List of Figures vii](#_Toc523419431)

[List of Tables viii](#_Toc523419432)

[Chapter 1: Introduction 1](#_Toc523419433)

[1.1 Background 1](#_Toc523419434)

[1.2 Problem Statement 2](#_Toc523419435)

[1.3 Aim 3](#_Toc523419436)

[1.3.1 Specific Objectives 3](#_Toc523419437)

[1.3.2 Research Questions 3](#_Toc523419438)

[1.4 Justification 3](#_Toc523419439)

[1.5 Scope and Limitation 4](#_Toc523419440)

[Chapter 2: Literature Review 5](#_Toc523419441)

[2.1 Introduction 5](#_Toc523419442)

[2.2 Challenges Facing Kenyan Citizens in the Political Process 5](#_Toc523419443)

[2.3 Existing platforms for evaluating politicians 5](#_Toc523419444)

[2.3.1 I-Citizen 5](#_Toc523419445)

[2.3.2 PolitiFact 7](#_Toc523419446)

[2.3.3 African Politics and Policy (APP) 10](#_Toc523419447)

[2.4 Gaps in Existing System 11](#_Toc523419448)

[Chapter 3: Methodology 12](#_Toc523419449)

[3.1 Introduction 12](#_Toc523419450)

[3.2 System Development Methodology 12](#_Toc523419451)

[3.2.1 Requirements gathering and analysis: 13](#_Toc523419452)

[3.2.2 Quick design: 13](#_Toc523419453)

[3.2.3 Build prototype: 13](#_Toc523419454)

[3.2.4 User evaluation: 14](#_Toc523419455)

[3.2.5 Refining prototype: 14](#_Toc523419456)

[3.2.6 Engineer product: 14](#_Toc523419457)

[3.3 System Analysis 14](#_Toc523419458)

[3.3.1 Functional Requirements. 14](#_Toc523419459)

[3.3.2 Non-Functional Requirements 15](#_Toc523419460)

[3.3.3 System Narrative 15](#_Toc523419461)

[3.4 System Design 16](#_Toc523419462)

[3.4.1 Use Case Diagram 16](#_Toc523419463)

[3.4.2 Data Flow Diagram (DFD) 17](#_Toc523419464)

[3.4.3 Entity Relationship Diagram (ERD) 18](#_Toc523419465)

[3.4.4 Database Schema 19](#_Toc523419466)

[3.5 System Development Tools and Techniques 22](#_Toc523419467)

[3.5.1 Web Design Tools 22](#_Toc523419468)

[3.5.2 Back End Development Tools 22](#_Toc523419469)

[3.5.3 Database Tools 23](#_Toc523419470)

[3.5.4 Software Tools 23](#_Toc523419471)

[3.5.5 Online Resources 23](#_Toc523419472)

[3.6 Deliverables 23](#_Toc523419473)

[3.6.1 Admin Module 23](#_Toc523419474)

[3.6.2 Politician’s Module 24](#_Toc523419475)

[3.6.3 Citizen’s Module 24](#_Toc523419476)

[References 25](#_Toc523419477)

[Appendix 28](#_Toc523419478)

[Appendix A: Gantt Chart 28](#_Toc523419479)

# List of Figures

[Figure 2.1: Citizen Wiki 5](#_Toc523419505)

[Figure 2.2: Citizen Interests 6](#_Toc523419506)

[Figure 2.3: New Ideas 6](#_Toc523419507)

[Figure 2.4: Polls 7](#_Toc523419508)

[Figure 2.5: Elected leaders 7](#_Toc523419509)

[Figure 2.6: Home Page 8](#_Toc523419510)

[Figure 2.6: Popular leaders 8](#_Toc523419511)

[Figure 2.7: Opinions 9](#_Toc523419512)

[Figure 2.8: Politician Rankings 9](#_Toc523419513)

[Figure 2.10: APP Home 10](#_Toc523419514)

[Figure 2.11: African Politics and Policy 10](#_Toc523419515)

[Figure 3.1: Steps in Prototyping methodology (Naumann & Jenkins, 1982). 13](#_Toc523419516)

[Figure 3.2: Use Case Diagram 17](#_Toc523419517)

[Figure 3.3: Data Flow Diagram 18](#_Toc523419518)

[Figure 3.4: Entity Relationship Diagram 19](#_Toc523419519)

[Figure 5.1: Gantt Chart Table 28](#_Toc523419520)

[Figure 5.2: Gantt Chart Diagram. 28](#_Toc523419521)

# List of Tables

[Table 3.1: Politician Political Profile 19](#_Toc523419497)

[Table 3.2: Politician Achievements and Critiques. 20](#_Toc523419498)

[Table 3.3: Politician Educational Background 20](#_Toc523419499)

[Table 3.4: Bugs and Reports. 20](#_Toc523419500)

[Table 3.5: Politician Comments. 21](#_Toc523419501)

[Table 3.6: Politician Personal Profile. 21](#_Toc523419502)

[Table 3.7: Admin Profiles. 21](#_Toc523419503)

[Table 3.8: Citizen Profiles. 22](#_Toc523419504)

# Chapter 1: Introduction

## 1.1 Background

The law of Kenya embodied in the Kenyan Constitution gives qualifications for various political seats from the lowest to the highest (Kramon & Posner, 2011). The Constitution of Kenya 2010 gives more viable and better qualifications than the Independence Constitution. For example, the former considers the educational background of our leaders, stating that a leader must at least have a degree if they wish to sit in office (Kramon & Posner, 2011). In the past anyone could get into office.(*Joho*, 2017), (“Yaliyo ndwele sipite: Entertainment News,” 2017). Leaders currently present their papers to the Electoral Committee, but citizens do not get to know what is on them, especially for low level leaders.

The Kenyan constitution was promulgated on the 27th of August 2010 (Kramon & Posner, 2011), leading to a devolved government and independence of the arms of government. Not everyone really understands the work of the various leaders in the devolved government (Cheeseman, Lynch, & Willis, 2016). People tell leaders in their region problems that do not fall in their docket. The roles of different leaders are not understood by many people. The people with the highest number of votes live in oblivion and though our leaders have tried, they have not succeeded in fully educating them.

Leaders in Kenya get into office through elections after every five years (Kramon & Posner, 2011). They can go for re-election for another term. The constitution states that a leader can only be in office for a maximum of 2 5-year terms years (Kramon & Posner, 2011). During campaigns the candidates move to the streets giving out their manifestos in form of booklets for all to read. Voting takes place but many of the successful leaders do not manage to achieve what they promised to achieve through their manifesto. Citizens also do not have the means to either air their views on their leaders’ contribution to development or to know what the leaders have achieved in relation to their manifesto. In other words, citizens do not have a forum where they can view what their leaders have done in their terms of office, air their views on what those leaders have done with respect to what was expected of them and get a comparison on if they fulfilled their duties efficiently. Efficiency here means that the leader followed both their manifesto and the constitution in carrying out their duties.

Our country has a tense voting period due to the 2007/08 post-election violence. (Ismail & Deane, 2008). People from the outside community normally come into the country after that event to supervise our elections. Kenyans try to lighten the tension with funny memes. What really happened in 2007? Leaders sent out their people to spread propaganda about their counterparts. (Ismail & Deane, 2008). This lead to a tense atmosphere in the country and resulted in the post-election violence. This left many citizens displaced as Internally Displaced Persons, businesses shut down and the foreign sector suffered a major blow (Ismail & Deane, 2008). It is common to hear people saying they will vote for a leader who is of the same tribe. This is because after what happened in 2007/08, Kenyans cannot trust anyone who does not speak their language (Ismail & Deane, 2008). Kenyans need a source of political information that is free from bias and propaganda to prevent the events of 2007/08 from re-occurring.

After elections citizens depend on social media to contact their leaders. Leaders normally have social media accounts where they post information and citizens can react to this information. They also go directly to the leader’s office, but they may lack an appointment or must travel very far to meet them, especially those of higher ranks. Most of the information in social media is not free from bias neither is it credible. Corruption is a norm in Kenya (K. R. Hope, 2017). Kenyans voted in a leader whose integrity was questionable (Kamau, 2018). The Bible says that God’s people perish due to lack of knowledge. And the lawyers have their motto: Ignorance is no defense. From that aspect all this would not have happened if the people had information about the leaders to begin with.

Information is needed to bring change in Kenya. A technological approach is the best way to solve the problem at hand.

## 1.2 Problem Statement

Normally, during campaigns politicians present their manifestos to the citizens to gain more votes on their side. The constitution and the manifesto are not used to gauge the efficiency of the leader after his term of office.

For low level positions like MCA, most of the time citizens have no idea who the person is, what he does or what he stands for. This is quite a critical issue because what happens during elections is that the citizens choose a leader who is in their favourite political party hence they choose a person they don’t know and thus there is a high likelihood that the politician will sit on his job.

After elections once the leader has been chosen, usually the politician sets up an office where the citizens can reach to him and inform him of any problems. At times the location is too far for the citizens to access and since some don’t have adequate means to communicate with the politician it becomes hard to contact the politician.

Citizens often follow euphoria in voting instead of analysing achievements of the campaigner in their area. This is an issue that brings about biasness for example, especially in the rural areas the citizens choose a person who belongs to their tribe even if he is not the qualified person for the position. Citizens need to be made aware of the qualification status of their leaders.

Citizens don’t get to know what to know what their politicians have done in their terms of office. This brings about confusion during re-election since some don’t know what the politician has done for his people. It may lead to the election of a lazy leader and ruling out of a good potential leader.

## 1.3 Aim

To develop an application that assists the citizens to know their politician fully and his efficiency in bringing change to the country.

### 1.3.1 Specific Objectives

1. To evaluate a politician’s efficiency based on his manifesto and his functions as a leader as stipulated in the constitution.
2. To display a politician’s background information that the public needs to know.
3. To display the achievements and downfalls of the politician during his term of office if any.
4. To design, develop and test an application that assists the citizens to know their politician and his efficiency in bringing change to the country.

### 1.3.2 Research Questions

1. Who is the politician, what had they promised in their manifesto and what have they managed to achieve in their terms of office.
2. What is the politician’s background information?
3. What are the achievements and downfalls of the politician?
4. How is a political application designed, developed and tested to assist citizens know their politician?

## 1.4 Justification

There are many different political applications and websites, this application gives a citizen information that is required to know about a politician. Communication will be simplified for the citizen – politician relationship. The citizen will not have to struggle looking for the politician because this application will display contact information about application.

The fact that any information posted and displayed must be validated by the administrator, ensures that anything posted is corrupt free and it is important for both parties such that the citizens know what type of leader they have and with the problems posted, the leader knows what changes need to be done to the area.

In other words, the system bridges the gap between the citizen and the politician and enables citizens to see an evaluation of their politician on an unbiased platform. This will enable the citizen to make an informed decision come the following elections about who to vote for. It will also enable the citizen to know their politician better and get contact information to contact them in case of anything.

## 1.5 Scope and Limitation

Kenya is divided into 47 counties, leaders are allocated according to this system, but this system will cover only 10 counties and with the respective leaders. This is because of time constraints thus it will be hard to get information about leaders from all counties. The scope will also involve only electoral seats of the government.

The leaders may give false information about their personal or educational background. The leaders may decide to be discrete about their information. To cover all the 47 counties requires a lot of attention and time may be a limiting factor. The platform is admin dependent, so the integrity of the administrators must be unquestionable which is hard to establish. Finally, politicians may fail to create accounts on the website which will lead to an inefficient website. Citizens may also fail to create accounts which will reduce the user base thus leading to an inefficient system.

# Chapter 2: Literature Review

## 2.1 Introduction

This chapter discusses the challenges encountered by the citizens during and after elections. It also shows the existing platforms and websites like ours and an evaluation of those platforms. This chapter finally highlights the gaps in the existing systems.

## 2.2 Challenges Facing Kenyan Citizens in the Political Process

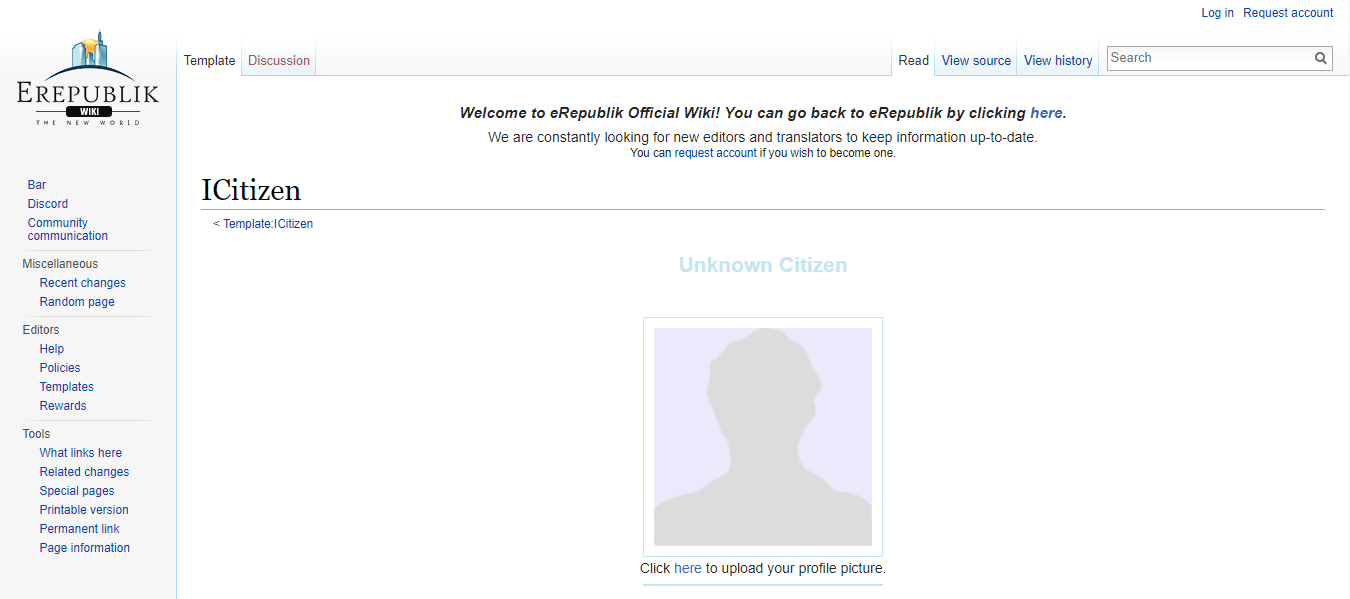
During elections, the citizens don’t have enough information about particular candidates rendering confusion and election of corrupt leaders. The elected politicians don’t do their respective jobs. The elected politicians lie about what they have done for citizens. The citizens cannot easily contact their leaders in case of a problem. The elected politicians do not follow their manifesto when working for the citizens. New and upcoming leaders have no platform

## 2.3 Existing platforms for evaluating politicians

There are 3 websites similar to ours and we evaluated them as follows:

### 2.3.1 I-Citizen

With this application users can vote in polls on trending issues. Elected officials can gauge public opinion to make informed decisions. Leaders can test new ideas to a targeted audience. It is source for local, state and national news. Track trending polls and issues in your community.



#### Figure 2.1: Citizen Wiki

This is the Citizen Wiki where a user can adjust account setting by, for example, changing their profile picture.



#### Figure 2.2: Citizen Interests

Here users select particular topics of interests in order to get news based on their interests. This helps shape their notifications based on what they like.



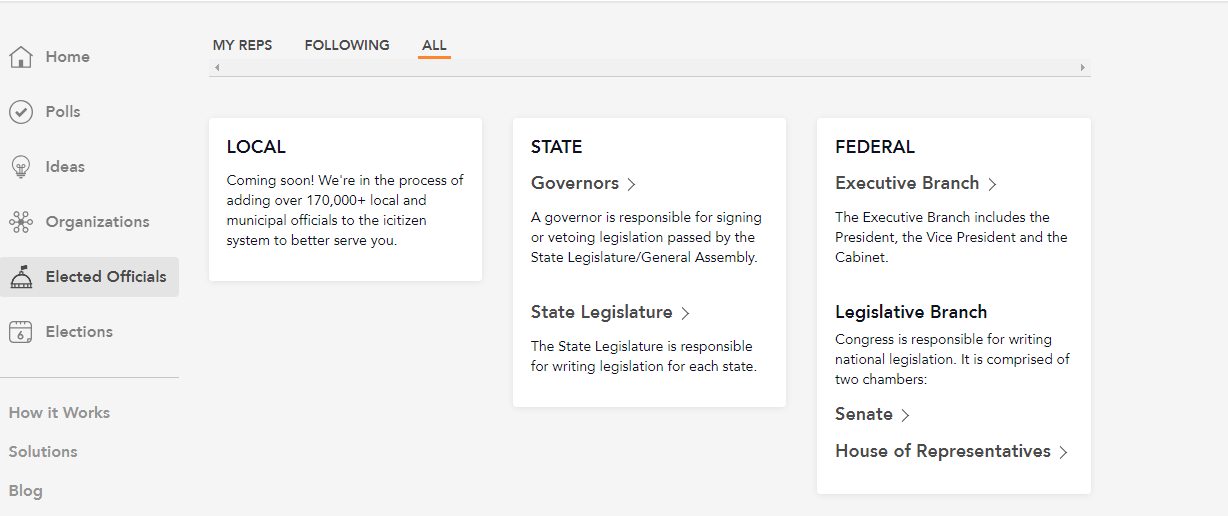
#### Figure 2.3: New Ideas

Users can post a new idea which will be seen by other viewers and also by politicians thus enabling the politicians to implement ideas directly from their citizens.



#### Figure 2.4: Polls

Checking polls. Here users can check polls of different subjects of interest.



#### Figure 2.5: Elected leaders

Citizens can view information about particular elected leaders.

### 2.3.2 PolitiFact

PolitiFact is focused on looking at specific statements made by politicians and rating them for accuracy. PolitiFact is run by the editors and journalists who make up the PolitiFact team.

The goal of the Truth-O-Meter is to reflect the relative accuracy of a statement. The meter has six ratings, in decreasing level of truthfulness: TRUE – The statement is accurate and there’s nothing significant missing. MOSTLY TRUE – The statement is accurate but needs clarification or additional information. HALF TRUE – The statement is partially accurate but leaves out important details or takes things out of context. MOSTLY FALSE – The statement contains an element of truth but ignores critical facts that would give a different impression. FALSE – The statement is not accurate. PANTS ON FIRE – The statement is not accurate and makes a ridiculous claim. The burden of proof is on the speaker, and then statements are rated based on the information known at the time the statement is made.

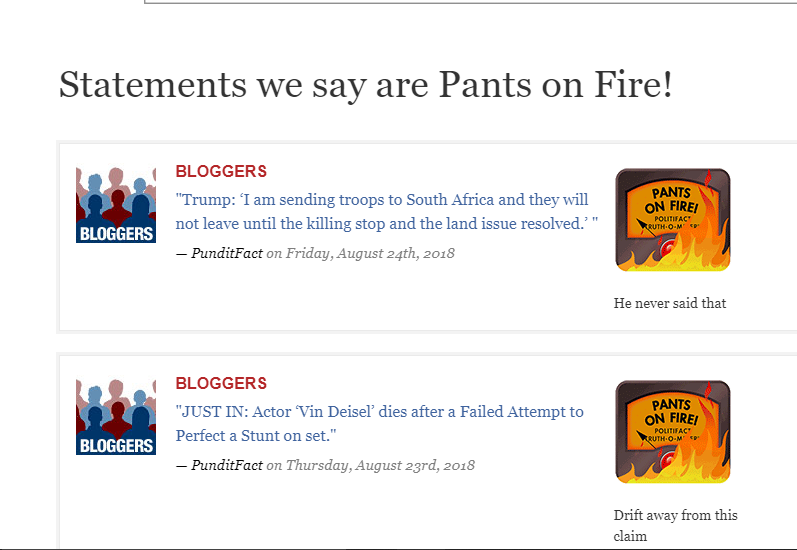


#### Figure 2.6: Home Page



#### Figure 2.6: Popular leaders

There are only a few leaders which this application focuses on. These are the popular leaders in the area.



#### Figure 2.7: Opinions

Citizens can post opinions. These opinions are then displayed as above.

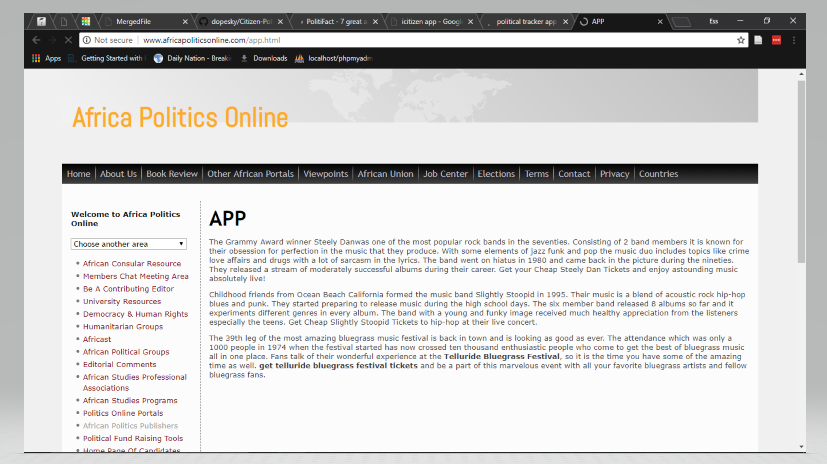


#### Figure 2.8: Politician Rankings

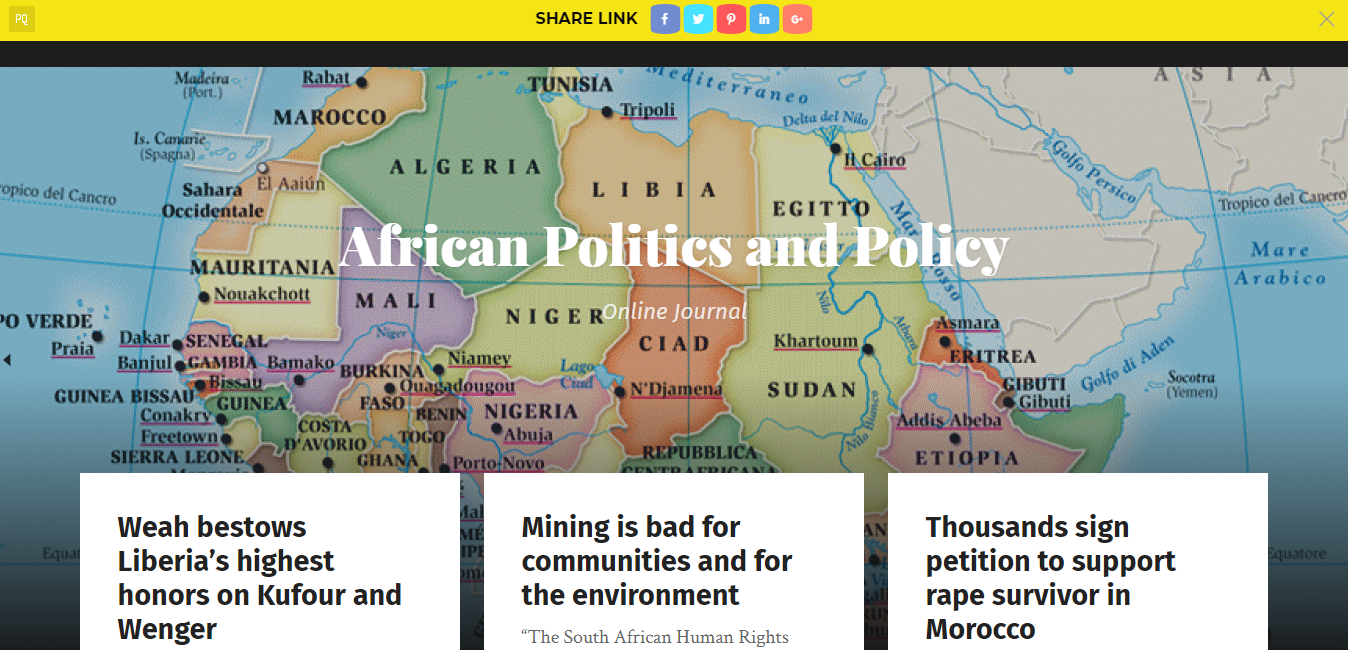
Promises the leaders stated. The site keeps track of what the leaders have promised their citizens. This helps politicians keep their promises since they know it might be used against them.

### 2.3.3 African Politics and Policy (APP)

This website displays latest political stories happening in Africa. Keeps Africans informed about what is going on.



#### Figure 2.10: APP Home



#### Figure 2.11: African Politics and Policy

## 2.4 Gaps in Existing System

The above applications only give information about what is happening in politics. They do not have information about politicians in terms of their background information. They also do not provide contact information of the politicians. Finally, the most obvious gap is that the sites have scope limited to the United States or Africa in general thus there is need to have one that is tailored for Kenya.

# Chapter 3: Methodology

## 3.1 Introduction

This chapter discusses the System Development Methodology, System Analysis and Design aspect of the project, System Development Tools and Techniques and the Deliverables for the project.

## 3.2 System Development Methodology

A Software Development Methodology or System Development Methodology in Software Engineering is a framework that is used to structure, plan, and control the process of developing an information system (“Software Development Methodologies,” 2016).

The Citizen - Politician Website will be developed using the Prototyping Model. The Prototyping Model is a Software Development Life Cycle Model where a prototype is first developed to allow the users to evaluate developer proposals and try them out before implementation (Naumann & Jenkins, 1982). A prototype is a working model of the proposed system.(Naumann & Jenkins, 1982)

The prototyping model to be used will be the Evolutionary Prototyping model. The Evolutionary Prototype model is a life cycle model in which the system is developed in increments so that it can readily be modified in response to end user and customer feedback (Shafer, Press, Scott, & Bieman, n.d.). This means that the prototype eventually becomes the final product. Prototyping consists of 6 stages:



#### Figure 3.1: Steps in Prototyping methodology (Naumann & Jenkins, 1982).

### 3.2.1 Requirements gathering and analysis:

  A prototyping model begins with requirements analysis and the requirements of the system are defined in detail. The user is interviewed to know the requirements of the system. Basic system requirements for the Citizen – Politician Website as described on the System Objectives. These were arrived at from Interviews with the citizens, politicians and owners of the system who will act as the administrators of the system.

### 3.2.2 Quick design:

When requirements are known, a preliminary design or quick design for the system will be created. It will not be a detailed design and will include only the important aspects of the system, which gives an idea of the system to the user. A quick design helps in developing the prototype.

### 3.2.3 Build prototype:

Information gathered from quick design is modified to form the first prototype, which represents the working model of the required system. The first prototype of the project website will be presented to users for verification and then comments from users will be used to modify the system.

### 3.2.4 User evaluation:

Next, the proposed system will be presented to the user for thorough evaluation of the prototype to recognize its strengths and weaknesses such as what is to be added or removed. Comments and suggestions will be collected from the users and provided to the developer.

### 3.2.5 Refining prototype:

Once the user evaluates the prototype and if he is not satisfied, the current prototype will be refined according to the requirements. That is, a new prototype is developed with the additional information provided by the user. The new prototype will be evaluated just like the previous prototype. This process continues until all the requirements specified by the user are met. Once the user is satisfied with the developed prototype, a final system is developed based on the final prototype.

### 3.2.6 Engineer product:

  Once the requirements are completely met, the user accepts the final prototype. The final system will be evaluated and tested thoroughly followed by the routine maintenance on regular basis for preventing large-scale failures and minimizing downtime.

## 3.3 System Analysis

It is a process of collecting and interpreting facts, identifying the problems, and decomposition of a system into its components (tutorialspoint.com, n.d.-b). It refers to identifying the requirements of the system. The requirements include: Functional Requirements and Non-Functional Requirements. It also entails giving a system narrative or a walk through the system.

### 3.3.1 Functional Requirements.

The official definition of ‘a functional requirement’ is that it essentially specifies something the system should do (“Functional Requirements vs Non Functional Requirements,” 2012). Typically, functional requirements will specify a behaviour or function.

The Citizen-Politician Website will enable its users, citizens and politicians to: Create an account, Log into their account, define the type of account created, post a comment, achievement or critique, modify their account information and report a bug or problem. The website will also be able to analyse the politicians and give each a percentage score based on comments, achievements or critiques. The system will also be able to show recently posted stories, politician information and own account information. Politicians will have an added functionality to their accounts where they will be able to post their manifestos, participation in the next elections and post their personal, educational and political backgrounds. Finally, administrators will be able to verify accounts, verify posts by other users, update functions of various politicians, update date of next elections and reply to bugs posted by other users.

### 3.3.2 Non-Functional Requirements

These describe how the system works. The definition for a non-functional requirement is that it essentially specifies how the system should behave and that it is a constraint upon the systems behaviour. (“Functional Requirements vs Non-Functional Requirements,” 2012). One could also think of non-functional requirements as quality attributes of a system. They specify criteria that judge the operation of a system, rather than specific behaviours. For example, the project website will have the following non-functional requirements:

Availability- System and database will be online on trustworthy servers that are always up and not prone to failure.

Portability- Being a web application, the system will be accessible by users of all available platforms from Windows, Linux, Mac if they have a browser.

Operational- The web application will be tailored to work efficiently and effectively on all available browsers and on all devices. This will be done using Bootstrap.

Reliability- The site will be developed to be reliable in terms of information provided. Information will be kept up to date by the Admins to make the system reliable. Any problem or bug shall be fixed as soon as it is identified.

Usability- The system will be user friendly and easy to use. It will have a help page to help users navigate the site.

### 3.3.3 System Narrative

The Citizen-Politician Website will have a homepage. The homepage will be a page with a little bit of information about the system and hyperlinks for registering, login, and navigating to other pages like report a bug page, ask a question page or contact us page. A user will be allowed to login after successfully creating an account in the system. The user will then be redirected to the start page.

The start page will have recent stories and a navigation bar to navigate to other pages. One of the pages will be the politicians’ page. This page will allow the user to search or sort politicians and view their information. It will also allow a user to post information about a politician in terms of critiques, achievements and comments.

Another page will be my profile page which will have information about the current logged in user. There will also exist a settings page which will allow the user to select various settings like change profile details. Information available about the politician will be personal, political or educational.

There will also exist a page where users will be able to see various rankings of politicians vying for the same seat in the same or all counties in the upcoming elections. The rankings will be a percentage score of popularity to the citizens and viability/efficiency of the candidate to the seat they are taking.

The politician’s module will have the same interface as the citizen’s module only with a few major changes. Politicians will not be able to post comments, only achievements and critiques. They will also have a page that will guide them on how to post a manifesto. In their my profile page, politicians will also be able to specify if they will be participating in the next election and for what seat.

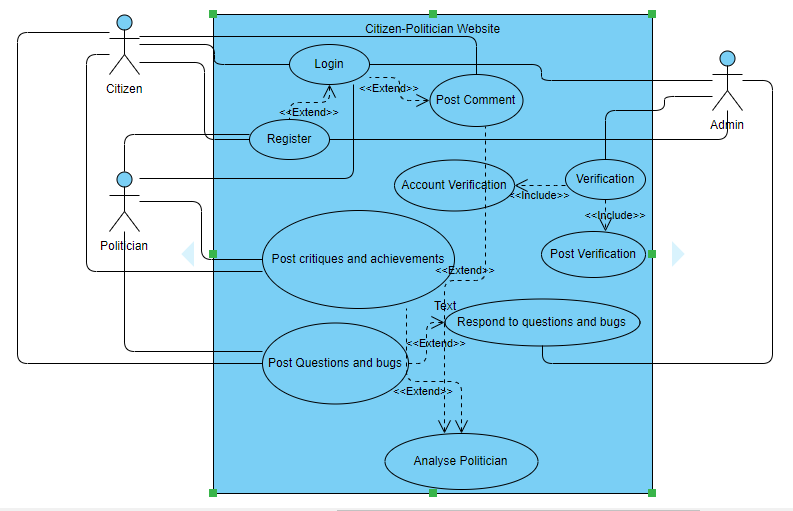
All information available on the site will either come from the citizen’s module or the politician’s module but will have to be verified for accuracy by the admin module.

## 3.4 System Design

System design is the process of defining the components, modules, interfaces and data for a system to satisfy specified requirements.(“System Design and Development,” 2013). It refers to the process of defining how the system will work or look to do what it was meant to be. This can be done using various diagrams. The diagrams that will be used to define the System Design for the Citizen-Politician Website are: Use case diagram, Data flow diagram, Entity Relationship diagram and a Database schema.

### 3.4.1 Use Case Diagram

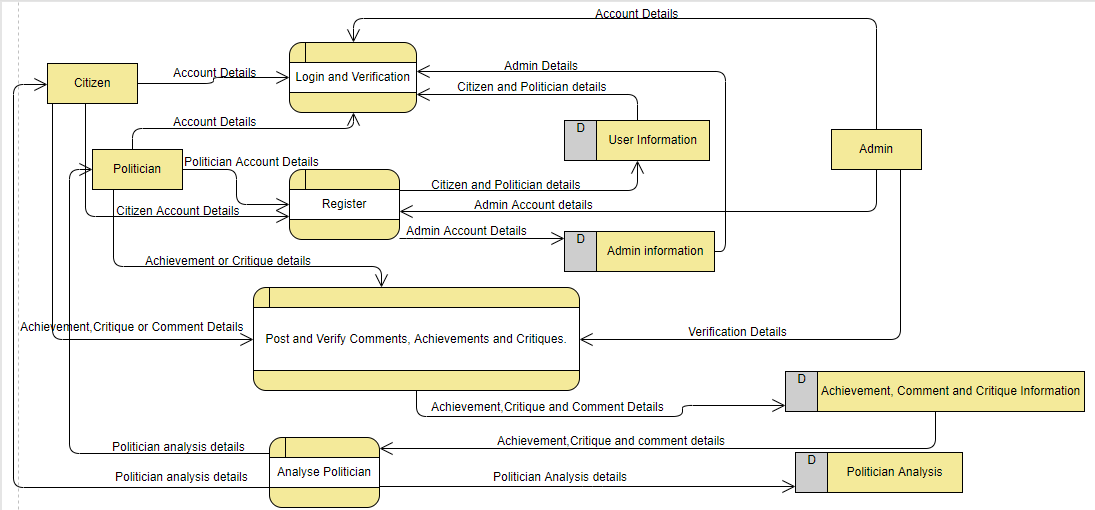
A Use Case describes the interaction, triggered by an external actor, between a system and its environment. A Use Case defines a goal-oriented set of interactions between external actors and the system under consideration. (“Modelling variability by UML use case diagrams,” n.d.). The term actor is used to describe the person or system that has a goal against the system under discussion. The use case diagram for the Citizen-Politician Website is as follows:



#### Figure 3.2: Use Case Diagram

### 3.4.2 Data Flow Diagram (DFD)

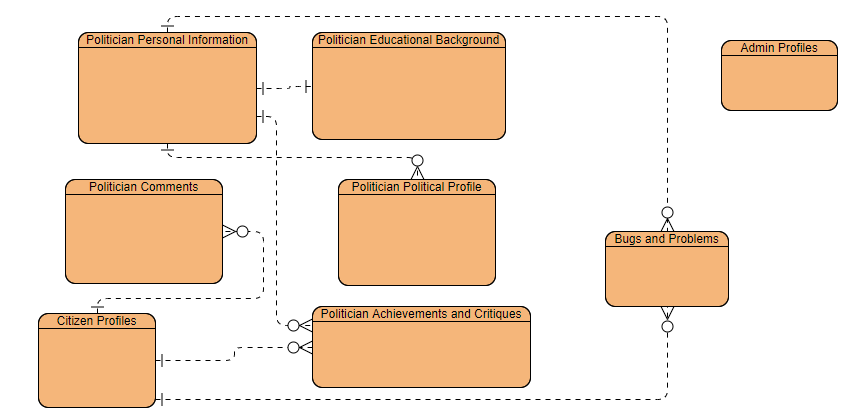
A Data Flow Diagram is defined as a diagraph together with a binary relation, called the precedence relation (Tao & Kung, 1991). It is widely used to specify large complex software systems. A DFD is visual and informal, hence, easy to learn and use. The nodes of the digraph represent the processes, data stores, and external entities, and the directed edges represent the data flows. The precedence relation for a Data Flow Diagram is an abstraction of the functional semantics and specifies the “is-used-to-produce” relationships among the data flows. In other words, it is a diagram showing processes, external entities and data stores in a System and how data flows from one to another. The Data Flow Diagram for the Citizen-Politician Website is as follows:



#### Figure 3.3: Data Flow Diagram

### 3.4.3 Entity Relationship Diagram (ERD)

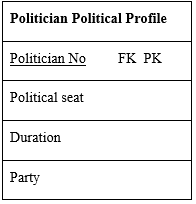
The Entity-Relationship Diagram (ERD) is a data model that represents the logical structure of the database (Rossi, n.d.). Its essential components are Entities, Relationships, Attributes and Cardinalities. Entities are real world objects about which data can be stored. Relationships show how entities are related to one another in the database. Attributes are typical characteristics of entities. Cardinalities describe how entity instances can be in a relationship. There are two notations of an ERD namely the Crow Foot’s notation and Chen’s notation. The Entity Relationship Diagram for the Project Website will be designed using the Chen’s notation as follows:



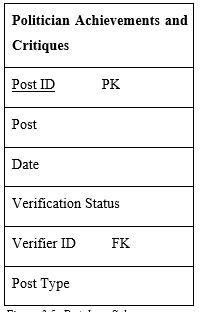
#### Figure 3.4: Entity Relationship Diagram

### 3.4.4 Database Schema

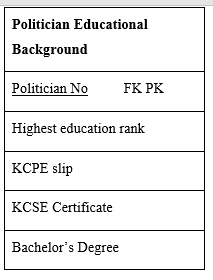
The term "database schema" can refer to a visual representation of a database, a set of rules that govern a database, or to the entire set of objects belonging to a particular user (“What is a Database Schema,” 2016). A database schema represents the logical configuration of all or part of a relational database. A database schema is the skeleton structure that represents the logical view of the entire database (tutorialspoint.com, n.d.-a). It shows the structure of the relations with their attributes in table format and the relationship between the tables. The database schema for the Citizen-Politician Website is as follows:



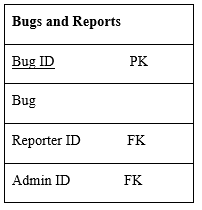
##### Table 3.1: Politician Political Profile



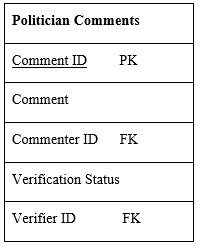
##### Table 3.2: Politician Achievements and Critiques.



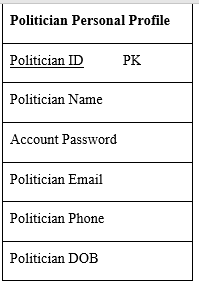
##### Table 3.3: Politician Educational Background



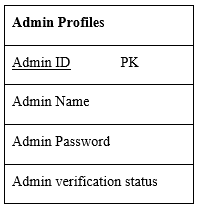
##### Table 3.4: Bugs and Reports.



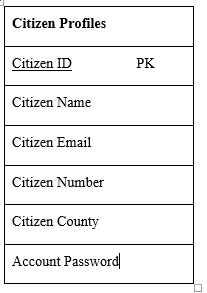
##### Table 3.5: Politician Comments.



##### Table 3.6: Politician Personal Profile.



##### Table 3.7: Admin Profiles.



##### Table 3.8: Citizen Profiles.

## 3.5 System Development Tools and Techniques

This refers to the actual tools used in develop the website. The tools to be used will be grouped into 5: Web design tools, back-end development tools, database tools, software tools and online resources.

### 3.5.1 Web Design Tools

The web design tools to create web pages will be Hypertext Mark-up Language (HTML), Cascading Stylesheets (CSS) and JavaScript (Ajax and jQuery). Hypertext Mark-up Language (HTML) will be used to define the logical representation of elements on the different web pages. Cascading Stylesheets (CSS) will be used to define format of the web pages and their elements. JavaScript will be used to create dynamic web pages with the help of Ajax and jQuery. Bootstrap will also be employed to create web pages that change depending on size of screen thus looking good on any device. These web design tools are essential for front end development of the web pages. This refers to the user interface and user experience.

### 3.5.2 Back End Development Tools

PHP will be the main backend language for the platform. PHP will help in processing of data to give information and will also enable communication with the database. A database is needed for storage of information. Java may also be employed in the backend if a functionality is better implemented in Java than PHP due to constraints like security. These two back end languages will enable data to be processed to give information that can be used in decision making.

### 3.5.3 Database Tools

The database will be a MySQL database which will be put on an online database for availability. A database is essential for information storage after processing on the back end. The MySQL database will first be designed and tested on localhost using Apache phpMyAdmin before being deployed to an online database vendor.

### 3.5.4 Software Tools

The software to be used in development will be Sublime Text for HTML, CSS, JavaScript (front end) and PHP (back end) and NetBeans for Java Servlets (back end). Apache (phpMyAdmin) will be used to develop the database on localhost after which it will be deployed. The website will also first be developed and tested on localhost through Apache servers before it is deployed. This is because PHP and Java Servlets code can only run on a server and Ajax has strict policies like same origin policy. Thus, to mitigate these constraints, the initial server will be localhost (Apache Xampp) before deployment.

### 3.5.5 Online Resources

These are the online platforms that will aid in development or research in this project. Information on coding will be retrieved from sites such as docs.Oracle, Php.net, StackOverflow and W3Schools. The project files will, after development and testing on localhost, be deployed on GitHub. This will enable it to be always available from any part of the world. GitHub will also be used for collaboration between us since it is a version control system, thus enabling ease of development. The database will be deployed on an online database vendor. These online resources will enable ease of development and deployment of the system after development and testing.

## 3.6 Deliverables

There shall be 3 deliverables for this project: Citizen’s Module, Politician’s Module and an Admin Module.

### 3.6.1 Admin Module

The admin module will only be used for verification purposes. It will verify Politician accounts in the system, comments by users, any post that comes into the system from the users and it will also specify the dates for the next election. The admin module will also be responsible for defining functions of various governmental seats so that these functions can be used to gauge the efficiency of the politicians. No post or comment will be visible to users unless verified by the admin module. No Politician account will be viable unless verified by the admin module. Admins will also be allowed to remove accounts that do not agree with terms and conditions of the site, view and reply to bug reports and respond to problems brought to light by the users.

### 3.6.2 Politician’s Module

The Politician’s module will allow politicians to create accounts and specify their background, personal and political information. This information will be visible to all after verification. Users can then post their own information regarding the politicians in terms of achievements, critiques and comments. Both the posted information and the information provided by the politician himself will be used to gauge the popularity and performance of the politician in his seat. This module will also allow politicians to post achievements and critiques about themselves or other politicians but not comments to prevent spreading of propaganda. Politicians will also be allowed to specify if they will be participating in the next elections. This module will finally be able to allow a politician to post their manifesto or alter their information. A manifesto can only be posted once in a term of office before elections are held.

### 3.6.3 Citizen’s Module

The Citizen’s module will allow citizens in general to create accounts. A politician cannot have a citizen account. Citizen accounts will allow users to view politician information and post comments about the politicians. They will also be able to post politician achievements and critiques on this module. All information posted by this module will need verification by admin module before it become viable. A citizen account will also need to be verified by an admin to ensure it is not a politician disguised as a citizen. Also, it will need to be ascertained that the citizen does not own more than one account in the System. This account will be the main source of information about politicians. This is because the politicians are working for the citizens and citizens need to verify that the politicians are really doing their jobs.

# References

Cheeseman, N., Lynch, G., & Willis, J. (2016). Decentralisation in Kenya: the governance of governors. *The Journal of Modern African Studies*, *54*(01), 1–35. https://doi.org/10.1017/S0022278X1500097X

Functional Requirements vs Non-Functional Requirements. (2012, April 5). Retrieved August 26, 2018, from https://reqtest.com/requirements-blog/functional-vs-non-functional-requirements/

Hope, K. R. (2017). Corruption in Kenya. In S. Hope Kempe Ronald (Ed.), *Corruption and Governance in Africa: Swaziland, Kenya, Nigeria* (pp. 61–123). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-50191-8\_3

Ismail, J. A., & Deane, J. (2008). The 2007 General Election in Kenya and Its Aftermath: The Role of Local Language Media. *The International Journal of Press/Politics*, *13*(3), 319–327. https://doi.org/10.1177/1940161208319510

*Joho: Look where my D- grade brought me — VIDEO*. (2017). Retrieved from https://www.nation.co.ke/news/Hassan-Joho-woes-KCSE-grade/1056-3867864-rqxbre/index.html

Kamau, M. (2018). Governor Waiguru to sue IPSOS for ranking her second most corrupt. Retrieved August 28, 2018, from https://www.standardmedia.co.ke/article/2001292970/governor-waiguru-to-sue-ipsos-for-ranking-her-second-most-corrupt

Kramon, E., & Posner, D. N. (2011). Kenya’s New Constitution. *Journal of Democracy*, *22*(2), 89–103. https://doi.org/10.1353/jod.2011.0026

Modelling variability by UML use case diagrams. (2016). Retrieved August 26, 2018, from http://scholar.googleusercontent.com/scholar?q=cache:gafd3pLXkDEJ:scholar.google.com/+use+case+diagram+definition&hl=en&as\_sdt=0,5

Naumann, J. D., & Jenkins, A. M. (1982). Prototyping: The New Paradigm for Systems Development. *MIS Quarterly*, *6*(3), 29–44. https://doi.org/10.2307/248654

Rossi, B. (2007). Entity Relationship Diagram, 16.

Shafer, L., Press, Y., Scott, V., & Bieman, J. M. (1996). McConnell, Steve. Rapid Development. Redmond WA: Microsoft Press. 1996., 2.

Software Development Methodologies. (2016). Retrieved August 26, 2018, from http://www.itinfo.am/eng/software-development-methodologies/

System Design and Development. (2013). *The MITRE Corporation*. Retrieved from https://www.mitre.org/publications/systems-engineering-guide/se-lifecycle-building-blocks/system-design-and-development

Tao, Y., & Kung, C. (1991). Formal definition and verification of data flow diagrams. *Journal of Systems and Software*, *16*(1), 29–36. https://doi.org/10.1016/0164-1212(91)90029-6

tutorialspoint.com. (n.d.-a). DBMS Data Schemas. Retrieved August 27, 2018, from https://www.tutorialspoint.com/dbms/dbms\_data\_schemas.htm

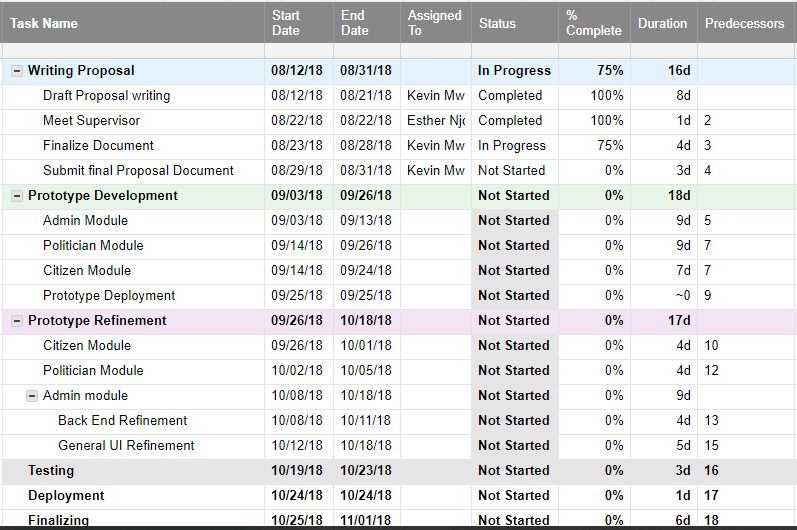
tutorialspoint.com. (n.d.-b). System Analysis and Design Overview. Retrieved August 26, 2018, from https://www.tutorialspoint.com/system\_analysis\_and\_design/system\_analysis\_and\_design\_overview.htm

What is a Database Schema? (2016, May 9). Retrieved August 27, 2018, from https://www.lucidchart.com/pages/database-diagram/database-schema

Yaliyo Ndwele Sipite: Wavinya Ndeti’s hilarious phrase is now a song! - Entertainment News. (n.d.). Retrieved August 28, 2018, from https://www.sde.co.ke/article/2001245886/yaliyo-ndwele-sipite-wavinya-ndeti-s-hilarious-phrase-is-now-a-song

# Appendix

## Appendix A: Gantt Chart



#### Figure 5.1: Gantt Chart Table

#### Figure 5.2: Gantt Chart Diagram.