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Approval Sheet

Designing an Emory healthcare IT platform as a mission to enhance care coordination and improve patient safety.

By

Akeem Adebayo

Degree to be awarded: Master of Public Health

Department: Executive MPH

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Laura Gaydos

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Abstract Cover Page

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By

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MBBS

College of Medicine, University of Lagos, Nigeria

[2008]

Thesis Committee Chair: Laura Gaydos, PhD

An abstract of

A thesis submitted to the Faculty of the

Rollins School of Public Health of Emory University

in partial fulfillment of the requirements for the degree of

Master of Public Health in Applied Public Health Informatics

in

2020

Abstract

Designing an Emory healthcare IT platform as a mission to enhance care coordination and improve patient safety.

By Akeem Adebayo

This Thesis describes designing an Emory healthcare IT platform with a mission to enhance care coordination and improve patient safety. In the United States, poor health care coordination has been known to cause an increase in health care costs and poor outcome as a lot of wastage due occur from unnecessary tests or investigations. This healthcare IT platform strives to curb this and improve overall operational efficiency in rendering better health services.

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Acknowledgements

I *give the Glory to my Lord Almighty for seeing me through the completion of this project. Immense gratitude and appreciation also to my family and friends who supported in no little measure to making sure that this was possible.*

Thank you very much.

Table of Contents

Introduction

This Thesis was written to describe a project that entails designing an IT platform to connect patients to all their care team providers such as physician, pharmacist, physiotherapist, specialists, etc. The primary goal of the project is to enhance the coordination of care. The idea behind this work is like the social media platform, Facebook that connects us to friends, friend's friends and families.

The current status quo in many health systems is the huge challenge with interoperability which prevents seamless exchange of information. Different patient's information exists in different data repositories which do not communicate or link up smoothly for easy transfer of information.

This work was borne out of a challenge I had as a physician with a patient few years ago. Mr. X (not real name) presented in my clinic to establish care. He had chronic medical conditions that included congestive heart failure, Glaucoma, chronic kidney disease and chronic obstructive pulmonary disease. He was unable to state the names of the different specialists or doctors that he was seeing. This would have helped a great deal to reach out to them to get more information on his past care and to obtain previous results of his investigations. As none of these could be done, I had to start the whole process again, connecting him to new specialists and repeating his tests. All these efforts could have been avoided via a well-coordinated care which would save a lot of costs already associated with the poorly efficient healthcare in the country.

The proposal was presented to Emory to consider the cost benefits of having such a platform in the system to save cost, improve coordination efficiency as well as safer patients and better patients' satisfaction.

EXECUTIVE SUMMARY

Emory healthcare IT platform has a mission to enhance care coordination and improve patient safety. In the United States, poor health care coordination has been known to cause an increase in health care costs and poor outcome as a lot of wastage occur from unnecessary tests or investigations. This healthcare IT platform strives to curb this and improve overall operational efficiency in rendering better health services.

Problem:

Poor health care coordination is a serious problem that is often overlooked. It is estimated that it costs millions of dollars each year. It also sometimes leads to medical errors and a lot of wastage in the industry.

Solution:

This proposed project will help to curb the waste in the system by ensuring a better coordination of care and improved efficiency.

Enterprise Application Integration Service (EAIS) and Model Organization Choice Proposal.

My proposal in simple term is designing a platform that will mimic Facebook, I sometimes refer to it as "Patients' Facebook."

This idea stems from my observation as a physician. Often, I am confronted with patients who have seen providers/specialists and because of interoperability challenge due to the different electronic medical records, I am unable to identify their neurologist, nephrologist and other providers who manage the patients.

My proposal will strive to connect all the providers that have ever had an interaction with patients, kind of like how Facebook brings to you your friends and suggest your friend's friend suggestion. Another good thing about my proposal is to guide against waste from ordering tests or investigations that may already have been done at another providers' location. Essentially, it will coordinate and connect all the care team members of a patient thus enhancing interoperability somewhat regardless of the type of the electronic medical record used by each organization.

My model organization choice will be a health system, for example Emory health system but I hope it can be applied to all healthcare organizations.

Business Need Documents

Project and Product Overview

This is a project to create an IT platform to connect all members of a care team for every patient at Emory health System starting 2020.

Justification

Business Need: This is needed to combat the costs of interoperability challenge and poor coordination of care.

Business Impact/Outcome: Its impact and outcome will ensure a more efficient way of coordinating care while improving patient safety and cutting cost.

Strategic Alignment: This perfectly aligns with Emory's strategic goals to serve humanity by improving health through integration of education, discovery and health care delivery.

Scope

- Objectives – The project is intended to abate the challenges that arise from interoperability and poor coordination of health care delivery. It will enhance efficient coordination of healthcare delivery and save cost from repeating unnecessary tests or investigations. It will ultimately lead to a huge cost saving and enhance patient safety.
- High-Level Requirements – The IT platform will have the function to connect all the members of the care team for every patient that comes through Emory health system.

- Major Deliverables – Major deliverables that will be completed by the end of this project is a healthcare service networking IT platform that will connect all providers of different types to each patient in and outside Emory network.
- Boundaries – The IT platform will connect every provider of an Emory health system within the US and its territories. It will not provide details of their interactions but will identify the provider's name and title/role.

Project Organization

- Roles and Responsibilities –

Business sponsor: Emory health system

Business and Technical Subject Matter Expert: AAMD Intelligent IT LLC.

Security Officer: Obama Security Inc.

Project Manager: Ms. Natasha Payne's

- Stakeholders –

1. Emory Health system

2. Patients

3. Healthcare service providers

4. Insurance companies

5. Research communities

Duration

- Timeline – Project estimated duration is 6 months
- Milestones –

June: Meeting with high level executives at Emory to discuss proposal

July: Meeting with stakeholders to answer questions and concerns

August: Approval for project

September: IT team to design prototype

October: Prototype tested in playground

November: Testing Usability

December: Optimize for live application

January 2020: Kick off/ Go live date

Budget Estimate

- Funding Source –

Will be completely funded by Emory Health system. We plan to receive 25% of the total cost starting each month after project approval in August 2019.

- Estimate – estimated that total budget will cost 50 million US dollars with 95% confidence in the accuracy of the estimate.

Assumptions, Constraints, and Risks

- Assumptions –

It is assumed that there will be little to no inflation during the period of project implementation.

It is also assumed that there will be no HIPPAA violation or laws violated and will ensure compliance with associated regulatory bodies.

- Constraints –

The biggest constraint is cost. We hope to get a good contractor to work with our estimated budget of 50 million dollars.

- Risks –

The high-level risk here is if patients express concern around the confidentiality/privacy of knowing who cares for them by a 3rd party or risk of cyber threat. The way we plan to mitigate against this is to provide as much information as possible to educate them that we are ensuring a high security infrastructure to be put in place to safeguard against this and no one will be made to participate in this without their consent upfront.

Public Health and Business Impact

This is a project geared towards improving overall health outcome to patients at Emory.

It proposes to create an IT Platform that will connect all the providers with a patient.

A patient often comes to the hospital and sees different providers depending on the diagnosis. They end up seeing Pharmacists, physicians, physical therapist etc. And when they are discharged, some of them are lost to follow up.

If it were a patient that has had multiple admissions, it is often difficult to follow up with three different providers.

This is made more challenging when they are following up with their PCP, who also is unable to follow up their providers because they are not remembered or known by the patients in some cases.

Needed investigations are unnecessarily repeated and the whole management process may be restarted all over again. Leading to a lot of waste in the system depressive episodes.

The public health impact is improving health outcome while making patients safer and its business impact is reducing wastage while improving overall efficiency of providing safer care.

Objectives

- The goal is to abate the challenges that arise from interoperability and poor coordination of health care delivery. It will enhance efficient coordination of healthcare delivery and save cost from repeating unnecessary tests or investigations. It will ultimately lead to a huge cost saving and enhance patient safety.
- Increase the proportion of adults with mental health disorders who receive treatment
- (Aligns with HP2020 Goal MHMD-9)
- Increase depression screening by primary care providers (Aligns with HP2020 Goal
- Identify most effective treatment methods for depressive disorders
- Reduce the suicide rate (Aligns with HP2020 Goal MHMD-1)
- Reduce the proportion of persons who experience major depressive episodes

High Level Requirements

- High-Level Requirements – The IT platform will have the function to connect all the members of the care team for every patient that comes through Emory health system.

RISKS	MITIGATION
The high-level risk here is if patients express concern	The way we plan to mitigate against this is to provide as much information as possible to educate them that we are ensuring a high
Funding for project may be diverted or retracted	Seek out support from other organizations who share similar interests who may benefit from this research and ask for financial

Major Deliverables

The following table presents the major deliverables of this project.

Major	Deliverable Description
High level executive meeting	Meeting to discuss proposal with Emory high level executives
Meeting with all stakeholders	Meeting with stakeholders to answer questions and concerns
Approval and funding	Proposal approved for funding
Prototype development	A prototype is designed and tested for a site or several patients.
Usability testing	Testing of the prototype for any concerns and
Kick off date for	Disseminate the findings and recommend

Boundaries

The IT platform will connect every provider of an Emory health system within the US and its territories. It will not provide details of their interactions but will identify the provider's name and title/role.

Business Need and Solution

Poor health care coordination costs each patient an extra 4,000 us dollars, poor health care coordination continues to be one of the factor affecting access to healthcare and making it safer and more efficient (Khullar & Chokshi, 2018)

It is estimated that the project will be completed within 6 months and the budget is within 2 million.

Enterprise Architecture

This is an example of an enterprise architecture from an organization which is like Emory Healthcare.

Business Architecture

Emory healthcare strives to impact patient care, healthcare spending, and business growth well into the future. These services are provided by four core workgroups, namely:

- Application Services (Enterprise, Departmental, Data Warehouse)
- Project and Process Improvement Services (Budget Requests, New Requests, Project Management, Process Improvement, Contracts)
- Client Services (Desktop, Service Desk, Security)
- Technical Services (Hardware, Storage, Operating Systems, Virtualization, Development

Information Architecture:

- Data: new types of data will be added to the system.
- Integration: Data from external sources will be integrated into existing systems.
- Applications: Applications will be created to store and retrieve information on an encounter from different providers on an individual patient

Technology Architecture:

It employs HL7 messages from Emory heath care for lab results and has an Emory Web service registry.

MITA BUSINESS PROCESS TEMPLATE

Establish User Agreement/ Business Associate Agreement	
Description	Create and sign agreement with business associate
Trigger Event	Contact made with vendor regarding sharing of data

Result	Vendor agrees to relationship and sharing of data. Communication protocols are established for exchange. Established agreement between business associates.
Business Process Steps	1. Send request to establish business agreement. 2. Conduct collection of agreement materials with other party.
Shared Data	Data transferred and stored within Emory healthcare
Predecessor	Receive inbound transaction

Successor	Send Report Outbound
Constraints	Federal, State, and Local policies and regulations.
Failures	Parties cannot agree on terms of agreement.
Performance Measures	Time to complete business process.

Skills/ Roles needed for Project Implementation

Roles:

- Architects for:

— Enterprise Architecture

— Data Architecture

— Application Architecture

— Technology Architecture

- IT Project Manager
- Software Programmer

- Data Scientist

Skills:

- Program or Project Management Skills: typically comprising managing business change, project management methods and tools, etc.
- IT General Knowledge Skills: typically comprising brokering applications, asset management, migration planning, SLAs, etc.
- Technical IT Skills: typically comprising software engineering, security, data interchange, data management, etc.

- Legal Environment: typically comprising data protection laws, contract law, procurement law, fraud, etc. Familiarity with HIPAA and HITECH standards are also vital.

Risk Management

Risks have been identified and categorized.

Probability and Impact - Probability should be measured as the likelihood of that the risk will occur. Impact should be measured in terms of deviations from the schedule, effort, or costs from the schedule if risks occur.

Probability Levels: Certain, Expected, Likely, Possible, Unlikely

Impact Levels: Very High, High, Medium, Low, and Very Low

1. Lack of Participation

Description- Patients may not want to participate in study.	Probability: High	Impact: High
	Mitigation Strategy: Explain benefit to patient	
	Contingency Plan: Reduce scope of project	

2. Lack of Cooperation

Description –IT platform vendor may not collaborate with us,	Probability: Possible	Impact: Medium
	Mitigation Strategy: Ensure cooperation prior to	
	Contingency Plan: Emory healthcare could develop its own IT platform	

3. Funding Issues

Description – Funding for project may be	Probability: Possible	Impact: High
	Contingency Plan: Seek out support from other organizations who share similar interests who	

4. Patient Privacy

Description – Protected Health Information may be exposed.	Probability: Possible	Impact: Medium
	Mitigation Strategy: Data is encrypted using	
	Contingency Plan: If there is a data breach, it will be caught quickly as to minimize impact. Victims of the breach will be offered credit	

6. Inability to Reach Patient

Description – If patient does not have a working phone number on file, they can't be called.	Probability: Likely	Impact: High
	Mitigation Strategy: Regularly update contact	
	Contingency Plan: Provider will mail a letter to the patient's residence with instructions to call the office	

Approaches to Strategic Planning: Emerging Technologies

The emerging technologies that one could find in my EAIS project include the following:

1. Big data and advanced analytics.

2. Introduction of a business model through IT inspired personalization and simplification.

3. Transforming healthcare for the government and research education through innovative ways of capturing data.

The alternatives to my EAIS project are:

1. Doing nothing

Pros: This is cheap and involves doing nothing and just remaining in the status quo.

Cons: Nothing is achieved, and a lot of waste, poor efficiency and lack of coordinated care still looms.

2. Healthy Planet

Pros: This a specific module of the current EHR which strives to enhance care coordination, but it is still not as streamlined as my EAIS project.

Cons: It is more expensive and only limited to organizations that use EPIC as their electronic health record.

Facts:

My EAIS project will cost estimated around 2 million dollars. There is current less efficient and poor coordination of healthcare.

Assumptions:

I. This will be compatible with mobile app
II. This will be accessible to all health provider within and outside the Emory network
III. The data from it will be pushed into health information exchange
IV. Patients will be willing to participate

Requirements:

I. Ability of the platform to be well integrated into any type of EHR
II. Ability to use technology that can be upgraded easily
III. Create an IT infrastructure to access needed data
IV. Design analytic strategies to ensure more efficient workflow for providers and patients.

The strategies, goals, and infrastructure of Emory Healthcare were translated into criteria that would be

used to evaluate the different types of technology used in the EAIS solution. Each technology was rated on scale from 1-5, with 1 being the worst and 5 being the best. The scores were totaled to indicate which solutions best aligned with the strategic initiatives of Emory.

Evaluation Matrix:

This matrix analyses and evaluates the different criteria to compare the different criteria to compare the various alternatives. It is on a scale of 1 – 5 with 1 being the least suitable and 5 being the most suitable.

Criteria	**EAIS project**	**Healthy Planet**	**Doing Nothing**
Increase Productivity	5	4	1
Increase efficiency	5	3	1
Decrease costs	1	2	5
Improve health outcome	5	5	1
Interoperability	5	3	1
Infrastructure	4	5	1
Information Security and Privacy	5	5	1
Meaningful use	5	5	1
BA Strategic Alignment	5	4	1

IA Strategic Alignment	5	4	1
TA Strategic Alignment	5	5	1
Total Score	50	45	15

Recommendation:

The recommendation is to use the EAIS design to improve health outcome and enhance care coordination. In addition, this combination of technologies will reduce the challenges of interoperability and provide a more efficient way of using the available resources for patients' care.

Change Request Form and Change Management Log

[List and define the data elements the project team needs to include on the Change Request Form and in the Change Management Log. Examples of these are provided in Appendix D and Appendix E. At a minimum, the following data should be included on the project's Change Request Form and Change Management Log.]

Element	Description
Date	The date the CR was created
CR#	Assigned by the Change Manager
Title	A brief description of the change request
Description	Description of the desired change, the impact, or benefits of a change should also be described
Submitter	Name of the person completing the CR Form and who can answer questions regarding the suggested change
Phone	Phone number of the submitter
E-Mail	Email of the submitter
Product	The product that the suggested change is for
Version	The product version that the suggested change is for
Priority	A code that provides a recommended categorization of the urgency of the requested change (High, Medium, Low)

Evaluating and Authorizing Change Requests

[In order to evaluate and prioritize a change request, the "priority" and "type" of the change are taken into consideration. Use the first and second tables below to list and define the "priority" and "type" data elements that are applicable for the project. The third table provides examples of commonly used project status types. The list of elements is at the discretion of the project manager.]

Change requests are evaluated using the following priority criteria:

Priority	**Description**
High	*<Insert the definition the project assigns to a high priority CR>*
Medium	*<Insert the definition the project assigns to a medium priority CR>*
Low	*<Insert the definition the project assigns to a low priority CR>*
<priority>	*<Insert the definition the project assigns to this level of priority CR>*

Change requests are evaluated and assigned one or more of the following change types:

Type	**Description**
Scope	Change affecting scope
Time	Change affecting time
Duration	Change affecting duration
Cost	Change affecting cost
Resources	Change affecting resources
Deliverables	Change affecting deliverables
Product	Change affecting product
Processes	Change affecting process
Quality	Change affecting quality
<change type>	*<define this change type>*

Change requests are evaluated and assigned one of the following status types:

Status	**Description**
Open	Entered/Open but not yet approved or assigned
Work in Progress	CR approved, assigned, and work is progressing
In Review	CR work is completed and in final review prior to testing
Testing	CR work has been reviewed and is being tested
Closed	CR work is complete, has passed all tests, and updates have been released.
<status type>	*<define this status type CR>*

Discussion

Public Health Application/Implication

The public health implication of this project has multidimensional benefit and include the following, namely:
cost savings, quality, patient safety and coordination efficiency.

Other benefits will include patient satisfaction and improving in interoperability.

It is estimated that about an extra cost of 4,500 USD is involved in the management of a chronic medical condition. This cost arises from duplicate lab investigations or studies, delay in care due to poor information and a host of other factors.

With such a project fully implemented at Emory, it implies that every Emory patient will have a centralized data repository across the different Emory entities and partner health system that stores the details of the care team members of such patient and can easily be reached for more information on past care. The major concern about such information exchange is confidentiality and privacy as set by HIPAAA, and that is why it is necessary that the project is implemented following the industry standards that regulates such initiatives. It will also be imperative to

ensure that patient sign release authorization on their information particularly if it contains mental health information.

The way forward and considerations in implementing deliverables

With the successful completion of my deliverable, I think the way forward is to implement it. Before that, I will like to subject it to review by experts in the field for suggestions to improve upon it and ways to implement it. I will also consider a stakeholder meeting or committee.

In confirming the actual cost of project implementation, a similar project cost comparison as previously performed offers a good guidance. It is my hope that this is embraced and bought in by Emory Executives.

References:

Khullar, D., & Chokshi, D. A. (2018). Can Better Care Coordination Lower Health Care Costs? *JAMA Netw Open, 1*(7), e184295. doi: 10.1001/jamanetworkopen.2018.4295