1. Project proposal
   1. Introduction

Addis Ababa University (AAU), established in 1950 is the oldest and largest higher learning and research institute in Ethiopia. Today, AAU has more that 33,000 undergraduate students and over 2,000 academic staff in its 14 campuses.1 Creating a conducive learning environment is a multifaceted challenging feat. Part of the challenge comes from the number of moving parts involved in making the University function in harmony — the academic staff, supporting staff, student body, administration, leadership and many more.

One of these parts, important in the teaching-learning process, is the communication between students and their instructors. Most commonly, instructors relay message to students through a class representative, an assigned student for each section. This representative has the responsibility of making sure every student in the section receives the announcement, the handout copy or any other information. Aside from the class representative, staff members use the noticeboard to post announcements.

In November of 2015, during our first year at the Department of Computer Science, we noticed the inefficiency of the communication. With this problem in mind, we built AAU Push. A website that gives teachers a simple way to post announcements and upload course textbooks, references and assignments for students. Students receive these information through the website and the Android application. A similar system, made by an American company, called Piazza ([piazza.com](http://piazza.com)) is used by the Software Engineering Department at Addis Ababa Institute of Technology.

The utility of AAU Push was evident over the following two years as the staff of Department of Computer Science used it to communicate to students. It relieved unnecessary pressure from the class representative and empowered instructors to be more interactive outside of class. Currently this system is to be placed to all departments in the College of Natural and Computational Sciences (CNCS) under the recommendation of the dean of CNCS.

Although this system is good and helpful, it is not without shortcomings. In this project we seek to find out problems in this current system and improve its usability, practicality and adoption.

1 <http://www.aau.edu.et/about/aau-at-glance/>, accessed December 27, 2018

* 1. Statement of the Problem and Justification

AAU Push (Push) currently requires both instructors and students to signup and login to use the website. There, instructors share information, announcements or files like assignments, references and PDF handouts.

The system is faces multiple limitations:

* Communication is one way: instructor to student
  + - * Students don't have a way to ask questions or submit assignments
* The system works over the internet. If file sizes exceed a certain limit, downloading the resources will be difficult. Large file sizes also incur higher costs for server space.
* Although the system has an Android app at some time, it is now out of date and useless.
* For iOS users, an application is not available.
* Several usability issues have been reported.

In addition to these limitations, there are many more features that could enhance the teaching-learning experience. Fixing these issues and developing the system further will help students be well informed and productive because AAU Push delivers, in one place, all information from teachers in the most organized manner. It will also help instructors be at ease and reassured because Push lets them reach all their students in the fastest, reliable and convenient way from anywhere at anytime.

* 1. Project Objective
     1. General Objective of the System

Create e-learning communication platform to aid the instructor-student relationship.

* + 1. Specific Objective of the System
* Document and analyze the current system
* List the shortcomings to the current system
* Gather list of features to add and errors to correct
* Develop features as needed
* Test and deploy the new system
  1. Scope of the Project

//We will be back to this after seeing the requirements and decide on what we will do and not do.

* 1. System Development Methodology

Since our system is driven by user interface requirements, we will be using Rapid Application Development as our software development approach. We will be putting less emphasis on planning and more emphasis on an adaptive process — prototyping, testing and documenting when approved.

* + 1. Investigation (Fact-Finding) Methods

We will be investigating the pros and cons of the current system by using the following methods:

* Survey: collect comments from students
* Interview: ask instructors and students in-depth of what they think of the product
* Observation: see how instructors use the product to find usability issues
* Research: review the landscape of similar e-learning solutions to make note of what could be missing from AAU Push
  + 1. System Development Tools
* Only laptops and different types of phones are required to complete this project.
* Python is used as the language to develop the backend of the system with Django framework.
* HTML, CSS and Javascript are used to build frontend with several libraries and frameworks.
* React Native is a new technology out of Facebook used to make mobile apps using Javascript. We use this cross-platform framework to make Android and iOS apps.
  1. Significance of the Project

This solution will empower the academic staff to teach without limitations in communication. We will see an increased level of interaction with students.

Push will also let students focus their efforts on studying as opposed to stressing on how to get resources. It will help them stay informed and feel like they are on top of their work. This will result in boosted confidence and academic performance.

* 1. Beneficiaries

The beneficiaries of the new system are teaching staff members and their students.

* 1. Time Schedule

1. Requirement Analysis
   1. Introduction

The purpose of AAU Push is to serve as a communication platform between teachers and students in the college environment.

* 1. Current System

The current system of Push has been in agile development and active use over the past two years. With substantial exposure to the real world school environment, its strength and weaknesses can be highlighted.

* + 1. Major Function of the Current System / Current System Description

For teachers:

* Email Invitation: Teachers sign up to Push via an automated invitation by the system
* Secure login: enter email and password to access portal area
* Class List: Teachers can update the classes/courses they are teaching
* Post Announcement: Teachers are able to send messages to the specific sections they teach.
* Send any material (documents or images) to students
* Tracker: Teachers are able to view how many students has seen their post or downloaded their materials.
* Account: teachers can update their credentials

For students:

* Sign Up: students sign up on the home page of [aaupush.com](http://aaupush.com) by entering their name, ID, year and section among other informations.
* Login: Students must login with their ID and password to access their dashboard area
* View announcements: students can see announcements sent to them by their teachers
* Download materials: students can download materials shared to them
* Add/Drop: students can adjust the courses they are taking
* Account: students can update their credentials
  + 1. Problem of the Existing System

**On Teacher’s Side**

1. Terminology - the language used throughout the system’s interface is not
2. Teachers are not able to edit their announcements once its sent
3. Mobile Applications are not available for teachers to update their students on the go

**On Student’s Side**

1. Mobile Application not available for students
2. Students can only receive information on the platform. Students cannot submit assignments or ask questions.

**General Problems**

1. Website interface is responsive but has difficulty with browsers that do not Javascript
2. Forgot password — email recovery does not work
   1. Requirement Gathering
      1. Requirement Gathering Methodologies
3. User Observations: we have gathered requirements by watching teachers and students interact with the system in different use cases like sign up, login, post announcement, download materials…
4. User Interviews: we have collected requirements by interview teachers and students to find what is missing. Issues of the system and feature lists have been developed from this activity.
5. Review Other Systems: to develop feature lists, we have also researched other systems to see what needs to be added to ours.
   * 1. Results Found
6. User Observations
   1. Interface Clarity Issues: The process of posting an announcement is not clear. Users were confused where they should click.
   2. Terminology: users were confused by words used to describe actions.
7. User Interviews:
   1. Teachers suggested adding a way have students submit assignments on Push
   2. Students asked for mobile applications with push notifications
   3. Proposed System
      1. Overview
      2. Functional Requirements

Feature list

1. Tracker: teachers should be able to edit their announcements
2. Reminders feature
3. Intranet Connection: Push should work offline on campus network seamlessly synced with the online database. Local servers will host large files.
4. Mobile applications: both iOS and Android for students and teachers with most functionalities
5. Assignment submission / Q&A Commenting Feature
   * 1. Non-Functional Requirements
        1. User Interface and Human Factors
        2. Documentation
        3. Hardware Consideration
        4. Performance Characteristics
        5. Error Handling and Extreme Conditions
        6. Quality Issues
        7. System Modifications
        8. Physical Environment
        9. Security Issues
        10. Resource Issues
   1. System Model
      1. Scenario
      2. Use Case Model
         1. Use Case Diagram
         2. Description of Use Case Model
      3. Sequence Diagram
      4. Activity Diagram
      5. State Chart Diagram
      6. Object Model
         1. Data Dictionary
         2. Class Modeling
         3. Dynamic Modeling
      7. User Interface