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DEPARTMENT OF COMPUTER ENGINEERING

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Text To Learn: A Digital Training System for Global Social Enterprises

BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

BACHELOR OF SCIENCE IN COMPUTER SCIENCE AND ENGINEERING

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Text To Learn: A Digital Training System for Global Social Enterprises

by

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SENIOR DESIGN PROJECT REPORT

Submitted in partial fulfillment of the requirements
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Text To Learn: A Digital Training System for Global Social Enterprises

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ABSTRACT

Text to Learn is a training tool made with Social Enterprises in mind that uses SMS to distribute training materials and to test users on their learning. Our goal is to give social enterprises a way to train employees and customers digitally and remotely. We will create an online dashboard, using RapidSMS and a cloud storage service, for social enterprises to upload and send training materials, manage users, and create SMS-based quizzes to assess users progress.

Acknowledgements

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Chapter 1

Introduction

1.1 Background

Social enterprises are rising in prevalence in developing countries to help address issues related to social, economic, environmental, and other issues that these countries face. We worked with two different social enterprises in Nepal and India, respectively, and saw the life-changing work they do for extremely disadvantaged people. However, we also encountered some of the problems that these types of organizations face, especially concerning training of employees. Many factors contribute to the difficulty social enterprises have in providing proper and effective training for their employees, including fewer resources relative to other types of organizations and logistical barriers inherent to working in developing countries. Employee training is vital for social enterprises to succeed in both their social missions and business goals, and cannot be taken for granted in the context of the developing world.

Social enterprises take on various approaches to training their employees, but most of these approaches do not overcome the barriers described above. Anudip, the organization Melissa worked with in India, holds annual Training of Trainers events, where hundreds of trainers gather and receive formal lessons on how to teach new employees either English/workplace readiness or information technology (IT) skills. While this event is great for uniting all of the Anudip trainers and sharing ideas, it is not necessarily the most effective way to train employees. The training was

impersonal due to such a large number of people, and many of the employees seemed unfamiliar with the material that they were supposed to teach to others.

Anudip also has informal training in each of its centers, which typically is conducted by having the trainer working at a computer and explaining the material to a group of employees crowded around her. Anudip, like many social enterprises, does not have the resources for designated classrooms, so training happens in the main workspace alongside other working employees. Additionally, this informal training, while very personal, can be fast-paced and overcrowded, making it hard for employees to learn the material effectively. Our senior design project addresses these difficulties social enterprises face in trying to train employees.

Our solution to this issue of training in social enterprises is to use mobile phones, which are becoming increasingly popular in developing countries. We have developed Text to Learn as a system for trainers within social enterprises to upload digital training materials to a common repository. This information can then be sent as SMS text messages to the mobile phones of employees who are registered by the trainers. Text to Learn is interactive with the addition of quizzes created by the trainers. Registered employees can respond to these quizzes via SMS.

This product addresses the issue of lack of resources by utilizing a resource that nearly all people, even in developing countries, already have–the mobile phone. More specifically, we have developed the system to be used on feature phones, which are less advanced than smartphones and much more common in the developing world. Furthermore, this product overcomes the logistical barriers many social enterprises face by allowing training and learning of materials to be done on employees' own time, at their own pace, and in their own space. Employees will have full access to training materials as they will be stored on their personal feature phones. They will also not be limited to training only at work where computers are available, but they can learn from the materials on their phones at home as well.

Ultimately, Text to Learn is an affordable, adaptable, accessible, and appropriate solution for social enterprises to provide vital training to their customers and employees and continue producing social benefit for the developing world.

1.2   Project Overview

Our system is a website interface for social enterprises to upload and send training materials and quizzes, which are sent as SMS messages to trainees' mobile phones. Through the website, trainers are also able to manage users, keep track of all messages sent and received, and monitor users' progress on training and quizzes. Text to Learn could be used in addition to or in place of other traditional training methods.

Chapter 2

System Requirements

2.1 Requirements

From discussions with a social entrepreneur, founder and CEO of Anudip, Dr. Radha Basu, and by reflecting on our own experiences working abroad with social enterprises, we have compiled the following requirements for this project. Functional requirements are quantitative and describe the actual functions our system needs to be able to perform, while nonfunctional requirements are qualitative and describe the way in which the functional requirements are implemented.

Functional

Critical

- Trainers are able to make training materials available to trainees digitally.

- Trainers are able to test trainees knowledge of training materials.

- Trainers are able to view results of quizzes.

- Trainers are able to enable/disable quizzes.

- Trainers are able to register/unregister trainees for use of system.

- Trainees are able to access training materials.

- Trainees are able to receive training materials in small pieces.

Recommended

- Trainers are able to send notifications when new training materials are added.

- Trainees are able to automatically receive results from quizzes.

- Trainees are able to view their progress.

- Trainees are able to access notifications/training materials multiple times.

Suggested

- Trainers are able to set a time limit on the completion of quizzes.

Non-Functional

Critical

- Compatible with basic/feature phones.

- Easy to read.

- Low distribution costs for social enterprises.

- Portable to different web and mobile platforms.

- Maintainable.

Recommended

- Scalable for more users.

Suggested

- Open source, extensible.

- Support for multiple languages.

2.2 Use Cases

For our implementation, we have come up with several key use cases for the two types of users of our system: trainers and trainees. The following figures visually describe the main functions for each type of user. The primary use cases are also described in greater detail below.
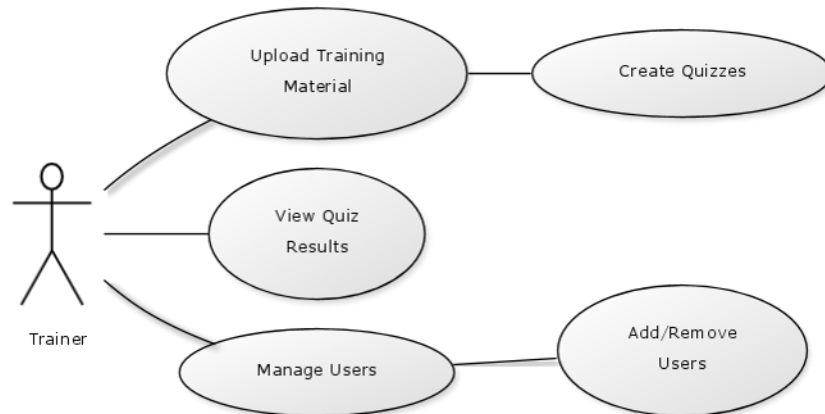
Figure 2.1: Use Case for Trainers
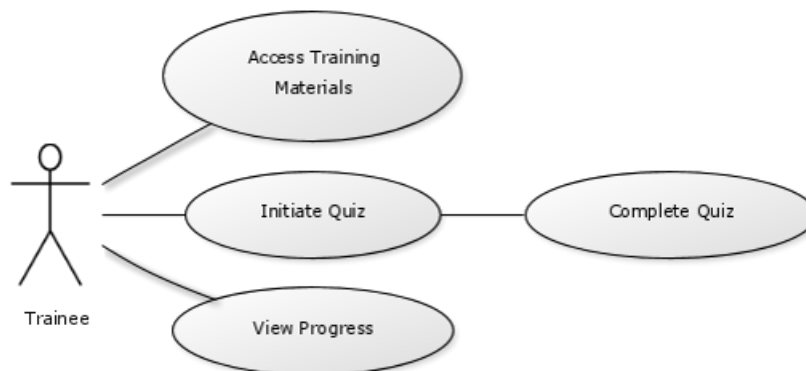
Figure 2.2: Use Case for Trainees

Case 1 - Upload Training Material

Actor: Trainer

Goal: Materials with related quiz are ready to distribute.

Preconditions: Have materials in a plaintext format, be a registered user, and have internet con-

nection.

Postconditions: Materials are uploaded and a quiz is created.

Scenario:

1. Navigate to the "Add New Materials" page.

2. Enter text of training materials into the box.

3. Fill in the questions and answers in the appropriate boxes.

4. Hit Submit.

Exceptions:

1. Text is too long to process.

2. Something on the site is broken.

Case 2 - Add User

Actor: Trainer

Goal: Grant access to training materials to their employees.

Preconditions: Be a registered user, know the phone-number the employee will be using.

Postconditions: A registered user can download training materials.

Scenario:

1. Navigate to the "Manage Users" page.

2. Select "Add Contact" from the action list.

3. Enter the new user's name and mobile number.

4. Hit "Save" to store the number and send a verification text to the trainee.

Exceptions:

1. Incorrect mobile number.

Case 3 - Manage/Edit Training Materials

Actor: Trainer

Goal: Ability to view and edit all uploaded training materials, quizzes, and related SMS messages.

Preconditions: Be a registered user, have previously uploaded training materials, and have working internet connection.

Postconditions: Training materials can be edited.

Scenario:

1. Navigate to the "Training Materials" page.

2. To add a new training material, click on "Add Training Material" within the Actions Panel.

3. To view or edit an existing training material, click on "List Training Materials" in the action list and then click on the title of the desired training material.

4. Once a training material has been saved, it can be previewed by clicking "Preview" at the bottom of its edit page.

5. To assign and send a training material to users, select "Assign" next to the desired training material from the main "List Training Materials" page, check users to assign to, and click "Assign and Send Notification".

Exceptions:

1. Cannot edit texts that have already been sent; must send new version.

Case 4 - Initiate and Take Quiz

Actor: Trainee

Goal: Respond to quizzes based on specific training materials.

Preconditions: Trainee is registered by trainer and has received and completed reading training

materials on phone.

Postconditions: Trainee can submit responses to quiz.

Scenario:

1. Receive assignment notification text message with instructions on how to begin quiz.

2. Reply to message following the instructions to begin quiz.

3. Receive quiz questions one at a time on phone as SMS messages.

4. Answer questions by texting back answer along with appropriate tag.

5. Receive feedback and correct answer if applicable.

Exceptions:

1. Quiz is not available.

Chapter 3

Design and Implementation

3.1 Trainer Interface: The Website

The following are screenshots of the website we designed and built for the trainers. These five images show the main pages of our website: Home, Add a User, Training Materials, Assign Training Material, and Message Log. The goal is a clean, simple interface that is intuitive and functional. Additional screenshots from the website are included in the Appendices.

This first screenshot in Figure 3.1 shows our landing page which gives a short description of our project and instructions on how to use the different pages on our website. The text below will be shown next to the corresponding screenshot.
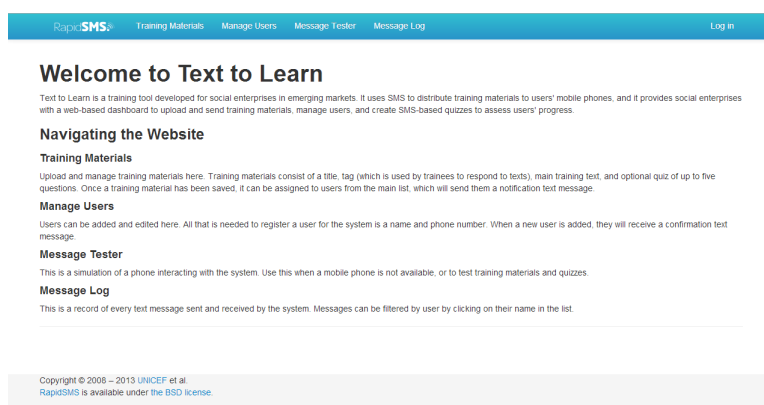
Figure 3.1: Home page

On this page of our website in Figure 3.2, users can be added and edited. All that is needed to register a user for the system is a name and phone number. When a new user is added, they will receive a confirmation text message.
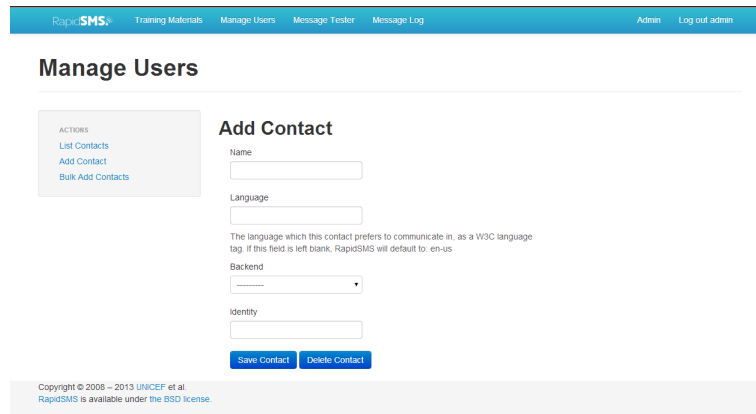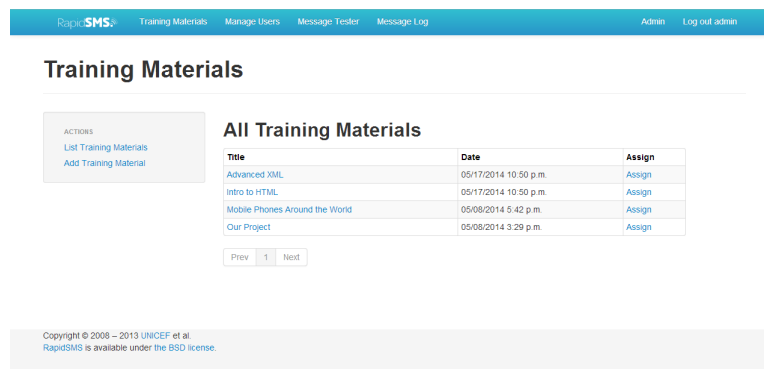
Figure 3.2: Add a User

This page in Figure 3.3 is where training materials can be uploaded and managed. Training materials consist of a title, tag (which is used by trainees to respond to texts), main training text, and optional quiz of up to five questions.

Figure 3.3: Training Materials

Once a training material has been saved, it can be assigned to users from the main list from the Assign Training Materials page shown in Figure 3.4, which will send them a notification text message.

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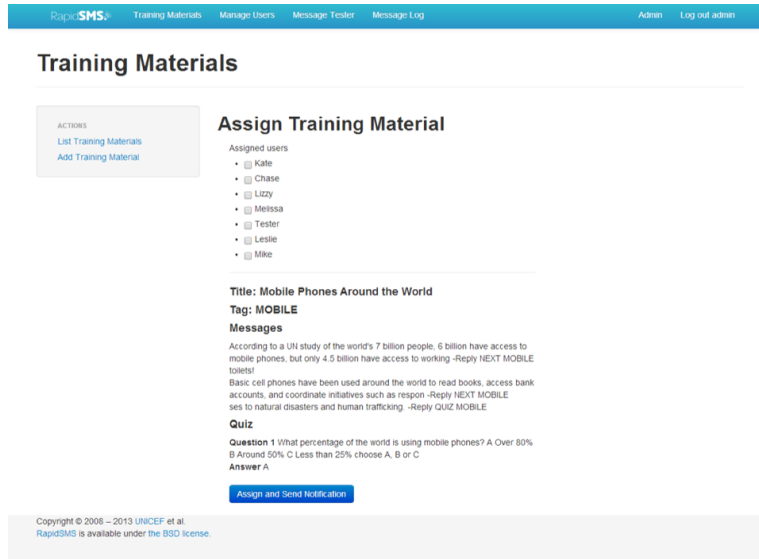
Figure 3.4: Assign Training Material to Users

This page shown in Figure 3.5 shows a record of every text message sent and received by the system. Messages can be filtered by user by clicking on their name in the list.

Figure 3.5: Message Log

3.2   Trainee Interaction: The Phone

Trainees, or the users that are registered for Text to Learn, interact with the system through their mobile phones via SMS text messaging. Once their phone number has been registered by a trainer,

they are able to text the Text to Learn phone number. At any time, a user can get help for using our system using the *HELP* command. The help commands are listed in Table 3.1 below:

Table 3.1: Help messages

Text Sent by Trainee	Text Received by Trainee in Response
HELP	Reply HELP TRAINING or HELP QUIZ for instructions.
HELP TRAINING	To start, reply START TAG. Example, START INTRO. To continue, reply NEXT TAG.
HELP QUIZ	To start, reply QUIZ TAG. Example, QUIZ INTRO. To continue, reply ANS youranswer.

While the trainee is reading a training material or taking a quiz, there are three text commands that can be used (in addition to *HELP*, which can be used at any time): *START*, *NEXT*, and *QUIZ*. These are each followed by the unique tag associated with the current training material. The training material and quiz text commands are described in Table 3.2 below:

Table 3.2: Text messages used during training materials and quizzes

Status	Text Received by Trainee
Once assigned a training material	You have been assigned <training material title>. To begin, reply with START <tag>.
After starting a training material	...training material text -Reply NEXT <tag>
At final message of training material with a quiz	...training material text -Reply QUIZ <tag>
At final message of training material without a quiz	...training material text (end)
At final message of quiz	...final quiz question feedback (quiz complete)

If any other command that is not listed above is sent to the Text to Learn phone number, then a default message will be sent back as a response. This is shown in Table 3.3 below:

Table 3.3: Default text message for invalid commands

Status	Default Text Received by Trainee
If an invalid message is received by Text to Learn	Invalid message. Reply HELP TRAINING or HELP QUIZ for instructions.

3.3   System Design

The following diagrams show our design visually by specifying the three main components of our system (webpage, cloud storage, and SMS service), the main functionality of each component, and how they interact with each other.

Our system is designed around three main components: a website, SMS, and cloud storage. The website is the way trainers or distributors interact with the system. Through the website, trainers can login and manage users, add new training materials and quizzes, and view, edit, and manage previously uploaded training materials and quizzes, all hosted in our cloud.

To add users, the trainer simply needs to know the trainee's phone number and add it into the system. Adding new training materials and quizzes requires trainers to have these in plain text format and then copy and paste them into the appropriate text fields. When a trainer adds a training material through the website, the text is split up into 160 character text messages including instructions on how to receive the next part of the training material appended which is then put into storage so it can be called systematically. From there, the materials can be assigned and sent to trainees via SMS. Through the website's message log, the trainers are able to view every message sent and received by the system, and filter this by user to see a particular user's responses to a quiz. This process is shown in Figure 3.6:
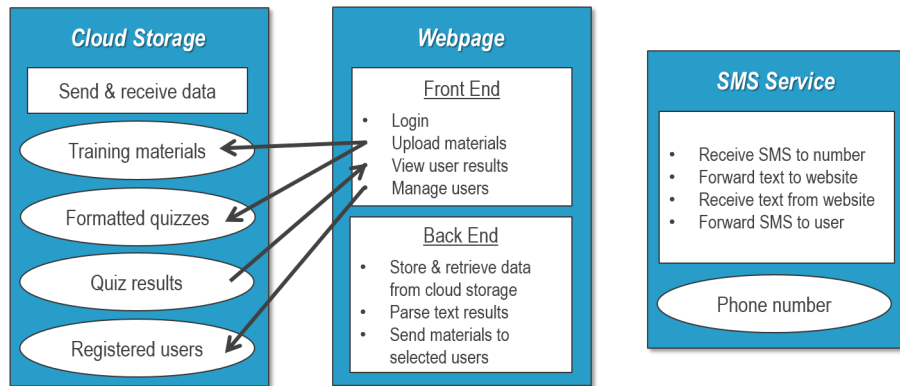
Figure 3.6: System Diagram for Trainer

Trainees will interact with the system through SMS. When the SMS service receives a message it will forward that to the website to be parsed. The website first verifies that the person is in fact a registered user, if not will send a rejection message. If the trainee is making a request for a training material the website will determine which section of training material this person should be receiving and forward this back to the SMS service. If they begin a quiz the first question will be forwarded to the SMS service. This process is shown in Figure 3.7:
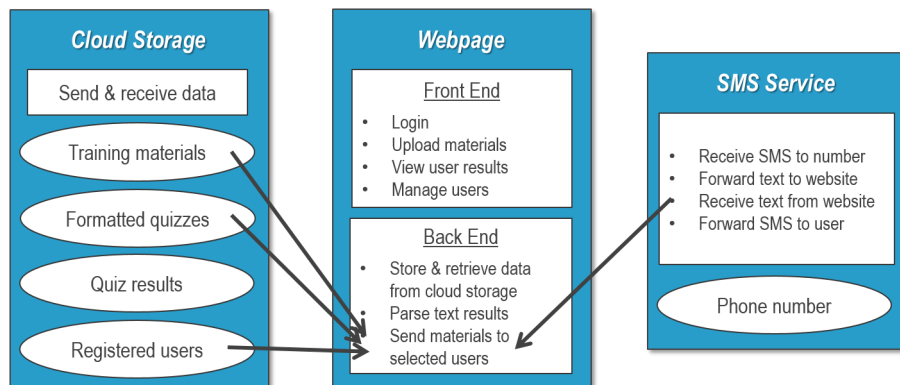
Figure 3.7: System Diagram for Trainee Request

If the trainee is instead answering a quiz question the system will determine which quiz they are taking, what question they just answered and then compare their answer with the expected result. If they answered correctly the message "Correct." will be added to the beginning of the next message forwarded to the SMS service. Otherwise two SMS will be forward "Incorrect." followed by the

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correct answer and the next message. In both cases the next message will be either the next quiz question or "(end of quiz)". This process is shown in Figure 3.8:
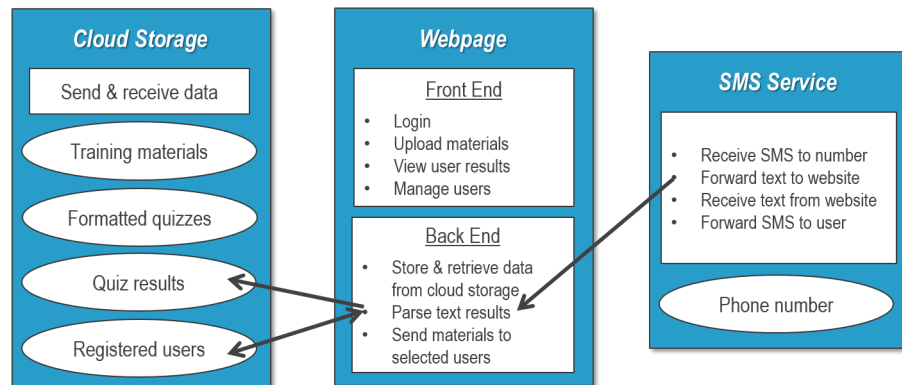
Figure 3.8: System Diagram for Trainee

3.4   Technologies Used

RapidSMS: a recent UNICEF project built to integrate SMS services with the Django web-framework

Django: a web-framework that lends itself to form collections

Python: the primary programming language used in Django

dotCloud: a cloud web-hosting service that hosts our website in a Python web server and our data in a PostgreSQL database

Tropo: a web-based SMS service that generates a phone number and API to connect to websites

GitHub: version control system

3.5   Design Rationale

We chose to use a cloud service for storage rather than a local server. The cloud service holds all of the information that is sent and received between trainers and trainees, including training

documents, formatted quizzes, quiz results, and registered users. Storing information in the cloud means that it can be accessed by other people directly through the internet, so trainers have access to this information from any computer with internet connection, whether at the office or at home. The cloud offers storage for large amounts of data, so trainers will not be limited by storage space when uploading training materials. The alternative to using cloud storage would be to have all of the training materials stored on a server belonging to the individual social enterprise. We decided against this option because cloud computing is the technology of the future. Although all social enterprises may not have the capability to use cloud services at their offices currently, cloud computing is growing rapidly in popularity and is sure to be utilized by more social enterprises eventually.

We considered building our system as a native phone apps, however we saw more barriers to this approach versus an SMS-based system. Since our target audience will often have the most basic phones, their phones may not be able to support even Java applications that are available on most feature phones, and would require use of the internet which again is often not supported. Even if these problems were not a barrier, the application would need to be installed on the phone, and not all phones have a way to install applications via the Web and may require the phone owner to go to their office to install the application. Essentially, using SMS has virtually no startup costs, and it will reach the broadest audience possible in emerging markets.

The system will also be using a paid SMS service to manage incoming and outgoing texts. While we could have written scripts to send texts from an email address for free, we would have needed to know the users service provider, and that service provider must have an email domain which may not be extensible to developing countries. There are open source models that work by plugging a gsm modem with a sim card into a computer to receive texts, but these are often difficult to work with and hard to scale. For these reasons, we made the decision to use a paid SMS service rather than using an email address to handle text messaging.

Chapter 4

Testing and Documentation

4.1   Testing

At each stage of development, we tested the system extensively using a variety of mobile phones as well as the message tester provided by RapidSMS. We created many test training materials to ensure that form validation and database functionality were working properly, as well as to test the usability from both the trainer and trainee perspective. We also had third-party testers unaffiliated with our project act as trainees to further judge usability.

4.2   Documentation

We have provided documentation to help social enterprises to use our system. The Setup and Installation Guide in Appendix B details how to upload the code to a personal website and customize the system for the social enterprise to use their own SMS services. The User Manual in Appendix C is a guide for trainers on how to use the website to add, edit, and manage contacts and training materials, as well as how an administrative user can add other login accounts. Additionally, all of the source code for our project is stored on GitHub at:

<p align="center">https://github.com/melissab147/TextToLearn.git</p>

Chapter 5

Project Management

5.1   Project Schedule

Our development timeline for completing various portions of the project is defined in the Gantt charts (see Appendix A.1). There is one chart per quarter, each displaying the actual weekly timeline for the work we accomplished. Since we worked together on all aspects of the project, there is no distinction between our work on the charts.

5.2   Risk Management

In addition to creating a schedule of when to complete different tasks for our project, we also compiled a list of potential risks to our project in the fall, including their probability of occurring, severity, and total impact. This risk analysis includes mitigation strategies for each risk so that if a risk were to occur, we would be prepared for it. At the completion of our project, we re-evaluated out risk analysis and made changes to reflect the actual risks, severities, and impacts. Our final risk analysis chart is defined in Appendix A.2.

Chapter 6

Societal Issues

6.1   Ethical

Our project's goal is to aid social enterprises by utilizing a widely accessible platform, mobile phones, to distribute information, particularly training materials. Information can be difficult to distribute in the developing world due to poor infrastructure. Getting new information to customers and employees of social enterprises far from centralized offices is crucial, but difficult. After each of our two team members worked with social enterprises over the past summer, we both recognized the importance of effective and accessible training within this type of organization. Applications of our project more generally could aid in education by giving anyone with a mobile phone the ability to learn from the materials.

Several ethical concerns could arise from the use of our product by both employers who distribute materials and employees who access the information. From the distributor end, employers could potentially misuse our system to distribute false information. Furthermore, employers could give access to others to our system to upload information. If our security is poor, others could gain access without the permission from the organization, which could affect the authenticity of uploaded training materials. Additionally, since our product is also meant to be used as an evaluation tool through the SMS quiz feature, there is potential for unethical usage from the trainee end as well. If training is being used by a social enterprise to certify employees on certain training information

rather than simple reinforcement of material, the trainees could cheat much more easily than by more traditional evaluation methods. We will need to consider implementing authentication and security features into our system to address these concerns about the ethics of using our product.

6.2   Social

Since we are building a product meant to be used in the developing world, specific ethical concerns arise related to social responsibility and appropriateness. Our customer base has very different requirements than a customer from a developed country would have. It is important for us to be culturally aware of our customers and potential users of the product. We will be able to do this by keeping in communication with these potential users, which will be possible for us after working and making contacts with people from developing countries over the summer. We will make sure that our technology is appropriate, usable, and affordable for the specific clients we are working with, in addition to meeting the specific functional and nonfunctional requirements they have asked for.

6.3   Political, Health and Safety, and Manufacturability

Our project is designed for the private, non-profit sector, and therefore would not have direct effects on public policy. It would not need any political support sine this is only meant to be used within individual social enterprises. Additionally, as this is a software project and not a life-critical system, health and safety concerns are irrelevant. Since this is also an open-source project, manufacturing is not an issue. Anyone can download the system online and implement it themselves.

6.4   Sustainability and Environmental Impact

In a narrow sense, Text to Learn is a sustainable product in that it can continue to be viable and useful for the forseeable future. The system relies on hosting a website and utilizing SMS, two technologies which are and will surely continue to be widely used around the world. However, web standards are constantly evolving, so some maintenance of the website would be necessary in order for the system to remain functional and relevant. In a broader sense, web hosting requires a lot of energy and, in terms of sustainability, does not give anything back to the environment. Nevertheless, Text to Learn takes advantage of the fact that most people in the world have access to mobile phones capable of SMS, and should not require investment in additonal hardware, making its carbon footprint smaller.

6.5   Usability

Distributor End

What the distributor, or trainer, sees and uses is the website. They upload training materials and quizzes through a website. On this website they manage their user base by adding phone numbers of employees they wish to register to receive their uploaded documents. They can also view results of quizzes and materials accessed by their trainees.

Since our product is meant to be used by social enterprises in the developing world, the technical level of the user may vary greatly, and as a consequence we designed our product with this in mind. The website includes easy-to-use forms to cut and paste in training materials for the trainees to read. Navigating the website is intuitive and simple through clearly named and well-placed buttons and links. Since this could be used in many different countries, it is important to consider easy ways to change language content in our design to make the website as accessible as possible.

Receiver End

The receiver end of our product consists of SMS messages containing the text of uploaded documents from distributors. The main aesthetic goal for the receivers is simplicity, as we intend for our system to be usable on the simplest type of mobile phones. The text messages will have to comply with basic SMS message lengths, which is typically around 140-160 characters. Because most training documents will be longer than this, we will implement functionality for receivers to easily continue receiving text messages until they have received the entire document. This function will likely be implemented by having the receiver press 1 to receive the next text message. If there are any quizzes accompanying the training documents, they can press 2 to receive to receive the quiz in a separate text message. All of these instructions will be included concisely at the end of each message to ensure that users will always receive entire training documents.

6.6   Lifelong Learning

This project has prepared us greatly for our future careers as computer engineers. Web programming, as well as all of the technologies we used, were brand new to both of us, and required much independent learning and studying of new material. Designing and building a website also made us think more about the end user and consider usability, something we do not always consider in our software engineering courses.

6.7   Compassion

Through our experiences as Global Social Benefit Fellows working abroad with social enterprises in emerging markets, we saw a great contrast in life and living standards from the United States. We have also seen the efforts that many social enterprises put forth to improve these conditions. Santa Clara University, the Center for Science, Technology, and Society, and the Frugal Innovation Lab all inspired and supported us to contribute to the social entrepreneurship movement. Text

to Learn is our way of helping to bridge the education gap in the workplace by supporting the livelihoods of people who work for social enterprises.

Chapter 7

Conclusions

7.1 Summary

Text to Learn is a frugal solution to addressing the barriers to training that many social enterprises working in emerging markets face. It uses SMS to distribute training materials and to test users on their learning. This system gives social enterprises a way to train employees and customers digitally and remotely, and takes advantage of the mobile world–a world in which nearly everyone has a mobile phone. Trainers use an online dashboard to upload and send training materials, manage users, and create SMS-based quizzes to assess users progress. Trainees receive these training materials and quizzes as text messages on their phone and interact using specific commands. Text to Learn can help social enterprises by providing a digital alternative to traditional training methods, and allowing them to succeed in their social and business missions.

7.2 Lessons Learned

Throughout the course of the project, we have learned several lessons about project management and developing a product for social benefit.

- By discussing our project with social entrepreneurs, we realized that Text to Learn has many applications and is not limited to training. The system could be used in any context in which

many people would need to receive important information at once. While the computer is typically used in these situations, Text to Learn was designed knowing that many people have phones and use this as their sole means of communication, and do not necessarily have access to computers.

- The scope of our project as we originally defined it in the fall was too large and ultimately infeasible. We learned that is is all right to cut certain items from our list of requirements in order to achieve a fully-functional and user-friendly product. While our final product may not have all of the features we originally intended, it could certainly be used in its current state by any social enterprise.

7.3 Future Improvements

In the future, we would like more features that we were unable to implement ourselves to be added to the system.

Analytics: Trainers will be able to view statistics about individual users and individual training materials. Specifically, they could view quiz scores and averages among groups of trainees. This will help them to measure their trainees' understanding of the material and to adjust their training as needed.

More form validation: The form for creating a training material will have increased checks on certain fields, particularly those pertaining to the quiz. For example, it will be enforced that each quiz question provided has an answer.

Dynamic quiz creation: Quizzes will not be limited to a speciifc number of questions and answers. Quiz fields will only be available if a quiz is to be associated with the training materials, and questions can be entered one at a time.

Search and filtering options: The message log will have increased search and filtering functionality, so that messages can be searched or filtered by user, date, and message or quiz content.

Appendix A

Project Management

A.1   Project Schedule

	1	2	3	4	5	6	7	8	9	10
Problem statement		■	■							
Roelandt's application		■	■	■						
Gather requirements from customer				■	■	■	■			
Finalize design						■	■	■		
Design report									■	■
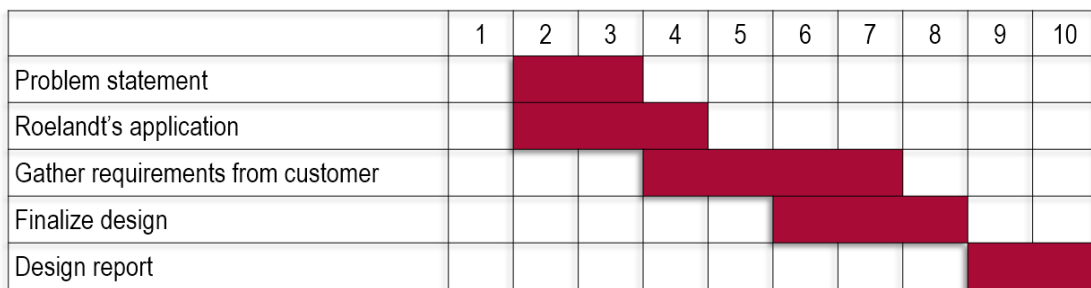
Figure A.1: Gantt Chart for Fall Quarter

	1	2	3	4	5	6	7	8	9	10
Deliverables										
Design review	███	███								
Revised design report			███	███						
Operational system								███	███	███
Implementation										
Set up cloud service		███	███							
Webpage design & functionality		███	███	███	███	███	███			
Quiz functionality					███	███	███	███		
Testing										
Create tests	███	███	███	███	███	███				
Unit/feature testing			███	███	███	███	███	███		
System testing							███	███	███	
Acceptance testing								███	███	
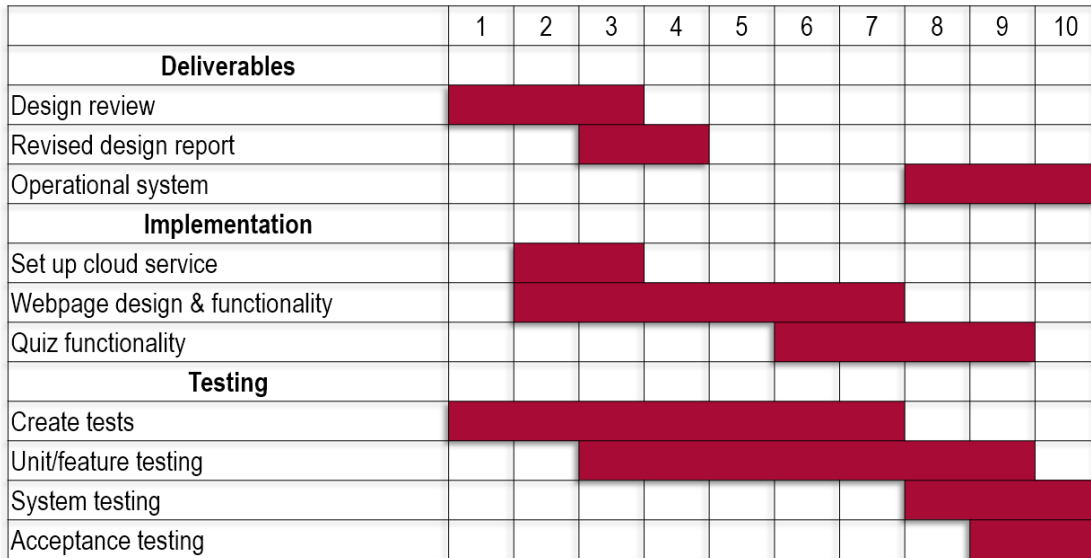
Figure A.2: Gantt Chart for Winter Quarter

	1	2	3	4	5	6	7	8	9	10
Problem statement		███	███							
Roelandt's application		███	███							
Gather requirements from customer				███	███	███	███			
Finalize design						███	███	███		
Design report									███	
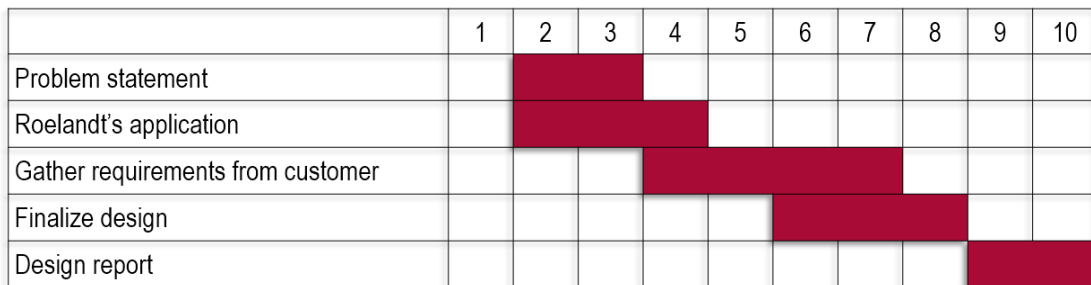
Figure A.3: Gantt Chart for Spring Quarter

A.2 Risk Analysis

Table A.1: Risk Analysis

| Risk	Consequence	P	S	I	Mitigation Strategy
Scope of project larger than anticipated	Delayed completion	1.0	5	5.0	- **Prioritize features** and cut those with lowest priority if necessary. - Follow **Gantt chart**.
Team members do not complete their tasks	Missed deadlines	0.5	6	3.0	- Ensure both team members **fully understand** every component of the project.
Problems with RapidSMS	Delayed completion, restructuring of project	0.3	8	2.4	- Learn **RapidSMS** before starting.
Data loss	Lost work, delayed completion	0.1	5	0.5	- Keep **backups**. - Be careful with **version control**.

Appendix B

Setup and Installation

This project is currently configured to be hosted on dotCloud with a Python server and PostgreSQL database and connects to a Tropo SMS backend. This manual will detail how to switch to your own subscription of dotCloud and Tropo and what to delete if you wish to replace Tropo with your own service.

B.1   General

You will need Python on your system, Python 2.7 is recommended. https://www.python.org/download/releases/2.7 You will also ideally be using something unix based (Mac or Linux) if you are on a Windows machine try using Cygwin, but this has had mixed results.

B.2   Using your own dotCloud Credentials

In order to deploy to dotCloud you will need to have python already installed on your computer. The code for this project was gotten from this github project, please see their documentation if you need additional instructions: https://github.com/caktus/rapidsms-deploy-dotcloud

Once you have Python 2.7 installed navigate to that folder through the terminal (or Cygwin) and follow the instructions in dotCloud installation instructions. http://docs.dotcloud.com/firststeps/install/

This will ask for your personal credentials, no changes to the code should be necessary.

You should now be able to push using dotcloud push" in the terminal. This process may take some time

For adding custom domains see the following dotCloud documentation: http://docs.dotcloud.com/guides/domains/

B.3   Using your own Tropo backend

You will need to modify code. You will need to get your account authorized before you can send outgoing messages. For help setting up your Tropo account or trouble shooting the installation see this rapidSMS tutorial:

http://rapidsms.readthedocs.org/en/latest/tutorial/tutorial04.html#tutorial04

To complete this next part have your outgoing messaging token and Tropo phone number ready.

1. In the rapidsms_tut folder open the settings.py file

2. At nearly the bottom of the file, look for "INSTALLED_BACKENDS = " in this section you should find

```
"my-tropo-backend": {
    "ENGINE": "rtropo.outgoing.TropoBackend",
    'config': {
        'messaging_token': '[insert_token]',
        'number': '[+1-555-555-5555'],
    },
},
```

3. Change the string under messaging token to your messaging token

4. Change the number to you number, make sure you start with a + followed by your country code

Removing Tropo

∗WARNING: Following these steps after you have created contacts with my-tropo-backend" may result in critical errors. Be sure to delete any contacts with this backend first.

You will need to edit three files rapidsms_tut/settings.py, rapidsms_tut/urls.py, and requirements/base.py.

settings.py

1. As in the previous section open settings.py in the rapidsms_tut folder

2. Delete the lines of code show in step 2 of the previous section

urls.py

3. Open urls.py (also in the rapidsms_tut folder)

4. Delete the following lines of code:
```
url(r'^tropo/',
  message_received,
  kwargs={'backend_name': 'my-tropo-backend'}),
```

base.py

5. From the main folder navigate to the requirements folder and open base.txt

6. Delete the line rapidsms-tropo<=0.2.0

7. After saving all these files, you should be able to "dotcloud push" and "my-tropo-backend" will no longer be available.

Appendix C

User Manual

C.1 Administrative

Logging In

Every page except the landing page is locked, the default username is *admin* and the default password is *text2learn*.

NOTE: You may wish to deactivate this after adding a new user. At the very least change the password!

Add a New Login

1. On the top bar, to the right, there is a button called "Admin" click on it.

2. Under the top section "Auth" click on "+Add" on the line that begins with "Users".

3. Fill in a username and password then click "save and continue". This will take you to a new screen with additional information to fill in.

4. Fill in personal information if desired.

5. Under "Permissions" make sure active is checked, if you want the account to have access to this admin panel check "Staff status" if you want them to have total editing permission check

"Super-user status," if not there is a box below that can give them certain permissions.

6. When you are done scroll to the bottom and click "save".

Remove a Login

1. From the top bar navigate to the admin page.

2. Under the section titled "Auth" click on "Users".

3. Click on the user you wish to remove.

4. Instead of deleting, under the "Permissions" section uncheck "Active".

5. When you are done scroll to the bottom and click save. This account can no longer login.

Leave Admin Page

To leave the admin page you must manually re-enter your URL; delete /admin/ and everything that follows.

C.2   Manage Users

Adding a New Trainee

1. Click "Manage Users" on the top bar.

2. Click "Add Contact" from the left bar.

3. Fill in the form.

    (a) Under "Name" enter whatever will help you identify your trainee.

    (b) Under "Language" you may enter the 5 character W3C language tag, but it is for your reference only.

(c) Under "Backend" select "my-tropo-backend" for cell phone numbers or "message_tester" if you would like to use the Message Tester tab.

(d) Under "Identity" enter the mobile number without additional characters be sure to enter it with the country code (exclude leading 0s), and do not start with a "+" Example "15556667777".

∗WARNING: If you do not enter the phone number correctly the user will not be able to receive training materials.

∗NOTE: If this person has texted in before being made a contact, you will need to delete that connection from the admin panel.

4. Click "Save Contact" at bottom of the page.

Remove a Trainee

1. Click "Manage Users" on the top bar.

2. Select the name of the contact to be deleted from the list.

3. Click "Delete" at the bottom of the form.

∗WARNING: Deleting a user will remove all of their messages from the message log and revoke their permissions to use the system.

C.3 Training Materials

Add a New Training Material

1. Click "Training Materials" from the top bar.

2. Click "Add Training Material" from the left bar.

3. Fill in the form.

(a) Under "Title" enter maximum of 32 characters.

(b) Under "Tag" how users will identify which training they wish to receive, enter maximum 8 characters, must be unique fro other training material tags.

(c) Under "Text" enter any length of text, this will be split by our system into 160 character pieces with instructions appended.

(d) Under "Question x" enter max 140 character question, with a max 140 character limit. *NOTE: Be sure each question has an answer characters and questions are entered in order on the form (i.e. do not fill out question 1 then question 3, leaving question 2 blank).

4. Click "Save".

*NOTE: To preview the new training material, you must be in edit mode. Click "List Training Materials" and select the training material to preview. Click "Preview" at the bottom of the form.

Assign a Training Material

1. Click "Training Materials" from the top bar.

2. Click "Assign" next to the training material to be assigned.

3. Check the users to send an assignment notification message to. Be sure to uncheck anyone who you don't want to assign the training material to. Once users receive the message, they can start the training material.

4. Click "Assign and Send Notification" at the bottom of the page.

Edit a Training Material

1. Click "Training Materials" from the top bar.

2. Select the training material to be edited from the list.

3. Make changes to training material and/or quiz.

4. To preview the training material and quiz (if entered) as individual SMS messages, click "Preview" at the bottom of the page.

Remove a Training Material

1. Click "Training Materials" from the top bar.

2. Select the training material to be deleted from the list.

3. Click "Delete" at the bottom of the form.

C.4 Message Log

From the Message Log, you can view all messages sent and received by the system chronologically. You can order the messages by Contact, Connection, Direction, Date, or Text by clicking on the appropriate heading in the table. You can filter the messages by contact by clicking on the contact's name anywhere in the log.

C.5 Message Tester

The Message Tester is used to simulate sending and receiving training materials as text messages.

1. To test a training material, you need to set up a test contact with a name and identity of your choosing and the message_tester backend.

2. Click "Message Tester" from the navigation bar.

3. Enter the test contact identity as the phone number.

4. Enter a message and click "Send" (or hit Enter from the keyboard) to view the response in the table.