Life Cycle Plan (LCP)

Healthy Kids Zone Survey App

Team 14

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Version History

Date	Author	Version	Changes made	Rationale
08/20/12		1.0	• Original for CSCI577; Tailored from ICSM LCP Template	• To fit CS577 course content
10/02/13	Ye Tao	1.1	• Updated Section 3.2 Skills	• WRequirements for 577 VC Package
10/09/13	Ye Tao	1.2	• Added Chapter 1 Introduction and Chapter 2 Milestone and Products	• Requirements for 577 FC Package
10/13/13	Ye Tao	1.3	• Added Chapter 3, 4, 5	• Requirements for 577 FC Package
10/16/13	Ye Tao	2.0	• Update Chapter 3, 4, 5	• Requirements for 577 FC Package
10/22/13	Ye Tao	2.1	• Modified Section 3.1, Chapter 5	• Requirements for 577 FC Package and FCR-ARB
10/24/13	Ye Tao	2.2	• Modified Chapter 5	• Requirements for 577 FC Package and FCR-ARB
11/18/13	Ye Tao	2.3	• Added Chapter 6	• Requirements for 577 DC Package
11/30/13	Ye Tao	2.4	• Modified Section 3.1, Chapter 5,6	• Project Estimation and Requirement Doc update
12/08/13	Ye Tao	2.5	• Modified Index, Added Header	• Feedback from DCR-ARB
02/07/14	Yang Wang	3.0	• Added Chapter 6.2 • Fixed defects to coordinate with 577b Requirements	• Requirements for 577 RDC Package
02/11/14	Yang Wang	3.1	• Divide 2 Iterations to 3 Iterations	• To be coordinate with new Project Plan
03/29/14	Yang Wang	3.2	• Finished Chapter 6.2	• Requirements for CCD Reports

Date	Author	Version	Changes made	Rationale
4/4	Yang Wang	4.0	• Add Chapter 6.3	• Too fit the requirements of IOC Package

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1. Introduction

Life cycle plan is an article organized to answer the most common questions about a project or activity: Why? Whereas? What? When? Who? Where? How? How much? It discusses and demonstrates objectives, milestones, products, responsibilities, approaches, resources and assumptions of the project to facilitate project management.

The status of the life cycle plan is currently at the IOC Package version number 4.0. This is the version for the Transition Readiness Review. The major changes from Development Phase are:

- Finished the iteration assessment
- Record the feedback and concerns of CCD

2. Milestones and Products
2.1 Overall Strategy

NDI/NCS Project

2.2 Milestones

Exploration phase
    Duration: 09/30/13- 10/04/13
    Concept: These phases identify project operational concept, system and software requirement, system and software architecture, and life-cycle plan. They prioritize the capabilities, conduct investment and feasibility analysis, and implement the software prototype.
    Deliverables: Valuation Commitment Package
    Milestone: Valuation Commitment Review
    Strategy: One Incremental Commitment Cycle

Valuation phase
    Duration: 10/07/13- 10/21/13
    Concept: These phases identify project objectives, constraints and priorities, operational concept, architecture styles, patterns and frameworks. They plan for project life cycle, explore alternatives, develop and assess requirement definition, assess and plan to mitigate risk, and define quality and configuration policy. They provide feasibility evidence and analyze and prioritize capabilities to prototype, develop and assess prototype and prepare development environment. They also include project plan and quality management, and WinWin negotiation.
    Deliverables: Foundations Commitment Package
    Milestone: Foundations Commitment Review
    Strategy: One Incremental Commitment Cycle

Foundations phase
    Duration: 10/22/13- 02/13/14
    Concept: These phases continue developing the system architecture and prototyping. They manage project quality, plan and manage project, and assess project status of feasibility evidence, life cycle content, operational concept, requirements definition, prototype and components and system architecture.
    Deliverables: Development Commitment Package
    Milestone: Development Commitment Review
    Strategy: One Incremental Commitment Cycle

Development phase
    Duration: 02/14/14- 04/30/14
    Concept: These phases implement the system and assess the performance. They include core capability drivethrough, training and transition, and project plan and management.

Deliverables: Operation Commitment Package
Milestone: Operation Commitment Review
Strategy: 3 Iterations Cycles (Constructive Iteration 1, Constructive Iteration 2, Transition Iteration)

Operation phase
Duration: Start from 05/01/14
Concept: The project should be delivered and start to serve.

3. Responsibilities

3.1 Responsibilities by Phase

Table 1: Team member's roles

Team Member	Role in 577a	Role in 577b
Yang Wang	Project Manager Requirement Engineer	Project Manager Life Cycle Planner
Qianyu Liao	System Architect	-
Xu Zhang	Operational Concept Engineer	Builder (Front-end Designer)
Chenglu Wang	Feasibility Analyst	Tester
Junjun Ji	Prototyper	Builder (Mobile Designer)
Ye Tao	Life Cycle Planner	System Architect Builder (Back-end Designer)
Chad Honkofsky	IIV&V Shaper	IIV&V Quality Focal Point

Role Selections of team members are shown as Table 1, and it shows the responsibilities of all stakeholders (clients and implementation team included), as the following Table 2-10.

Table 2: Stakeholder's responsibilities (Project Manager)

Name: Yang Wang	
Role: Project Manager/Life Cycle Planner	
Exploration	Identify detail project plan Record project progress bi-weekly Create/follow up action items Record individual effort
Valuation	Identify detail project plan Record project progress bi-weekly Create/follow up action items Capture and Score MMF and Win-conditions Capture progress of win-win negotiation Record individual effort
Foundations	Identify detail project plan Record project progress bi-weekly Create/follow up action items
Development- Construction Iteration	Identify detail project plan Record project progress bi-weekly Assess Development Iteration

	Create/follow up action items Perform Core Capabilities Drive-Through
Development- Transition Iteration	Identify detail project plan Record project progress bi-weekly Develop Support Plan

Table 3: Stakeholder's responsibilities (System Architect)

Name: Qianyu Liao	
Role: System Architect	
Exploration	Record individual effort
Valuation	Analyze the proposed system Define technology-independent architecture Specify architecture styles, patterns and frameworks Assess and evaluate NDI and NCS components candidates Analyze NDI interoperability for NDI / NCS project Record individual effort
Foundations	Define Technology-Independent Architecture Define technology-dependent architecture Specify architecture styles, patterns and frameworks Assess system architecture Develop Prototype
Development- Construction Iteration	-
Development- Transition Iteration	-

Table 4: Stakeholder's responsibilities (Operational Concept Engineer)

Name: Xu Zhang	
Role: Operational Concept Engineer/Builder	
Exploration	Record individual effort
Valuation	Establish new operational concept Identify organizational and operational transformation Identify shared vision Explore alternatives Identify objectives, constraints and priorities Record individual effort
Foundations	Assess operational concept Develop Prototype
Development- Construction Iteration	Develop the Front-end of HKZ Website (Web UI) Fixed the bugs of HKZ Website Maintaining Our Project Website

	Perform Core Capabilities Drive-Through
Development- Transition Iteration	Transition The System

Table 5: Stakeholder's responsibilities (Feasibility Analyst)

Name: Chenglu Wang	
Role: Feasibility Analyst/Tester	
Exploration	Record individual effort
Valuation	Acquire NDI or NCS components Analyze business case Assess and evaluate NDI and NCS components Candidates Analyze NDI interoperability for NDI / NCS project Assess and Plans to Mitigate Risks Explore Alternatives Provide Feasibility Evidence Record individual effort
Foundations	Assess Feasibility Evidence Develop Prototype
Development- Construction Iteration	Build Detailed Test Plan and Cases Process Test and Record Test Results Perform Core Capabilities Drive-Through
Development- Transition Iteration	Perform acceptance test

Table 6: Stakeholder's responsibilities (Prototyper)

Name: Junjun Ji	
Role: Prototyper/Builder	
Exploration	Record individual effort
Valuation	Analyze and prioritize capabilities to prototype Develop prototype Prepare development / production environment Establish New Operational Concept Record individual effort
Foundations	Analyze and prioritize capabilities to prototype Develop prototype Assess prototype and components Fix defects of prototype
Development-	Develop the HKZ Survey App

Construction Iteration	Fixed the bugs in HKZ Survey App Perform Core Capabilities Drive-Through
Development-Transition Iteration	Transition The System

Table 7: Stakeholder's responsibilities (Life Cycle Planner)

Name: Ye Tao	
Role: Life Cycle Planner/System Architect, Builder	
Exploration	Detail Project Plan, Record individual effort
Valuation	Estimate Project Effort and Schedule using COCOMO II Identify Life Cycle Management Approach Identify Responsibilities and Skills Detail Project Plan Record individual effort Provide Process Feasibility Evidence Identify Milestones and Products
Foundations	Identify Development Iteration Assess Life Cycle Content Detail Project Plan Develop Transition Plan
Development-Construction Iteration	Develop the Back-end of HKZ Website Design and Construct the Database of HKZ System Perform Core Capabilities Drive-Through
Development-Transition Iteration	Transition The System

Table 8: Stakeholder's responsibilities (IIV&V)

Name: Chad Honkofsky	
Role: IIV&V/Shaper	
Exploration	Capture and Score MMF and Win-conditions Capture progress of win-win negotiation
Valuation	Capture and Score MMF and Win-conditions Capture progress of win-win negotiation Verify and Validate Work Products Using Issue (Defect) Tracking System Construct Traceability Matrix
Foundations	Verify and Validate Work Products Using Issue (Defect) Tracking System Construct Traceability Matrix
Development-Construction Iteration	Verify and Validate Work Products Using Issue (Defect) Tracking System Perform Core Capabilities Drive-Through
Development-Transition	Transition The System Develop Support Plan

Iteration	

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Table 9: Stakeholder's responsibilities (Client)

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Name: Jessie Kim, Joseph Martinez	
Role: Client Representative	
Exploration	
Valuation	Establish New Operational Concept Identify objectives, constraints and priorities Identify shared vision Identify organizational and operational transformation
Foundations	Assess Prototype and Components Develop Transition Plan
Development-Construction Iteration	Assess Development Iteration Perform Core Capabilities Drive-Through
Development-Transition Iteration	Perform Acceptance Test

3.2 Skills

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Table 10: Stakeholder's Skills

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Team members	Role	Skills	
		Current skills	Required skills
Yang Wang	Project Manager/ Life Cycle Planner	Lang: C/C++, C#, Java DB: SQL Express	Word, Excel, MS Project, COINCOMO
Chad Honkofsky	IIV&V QFP	Lang: C/C++,VB,PHP,HTML DB: SQL	HTML5/CSS, JavaScript, MySQL, Apache, Titanium, PHP
Xu Zhang	Front-end Designer	Lang: C/C++,Java, MATLAB DB: SQL	HTML5/CSS, JavaScript, Apache, PHP
Chenglu Wang	Tester	Lang: Java, C++ DB: MySQL	HTML5/CSS, JavaScript, MySQL, Apache, Titanium, PHP
Junjun Ji	Mobile Designer	Lang: C/C++, Java DB: SQL	MySQL, Apache, Titanium
Ye Tao	System Architect/	Lang: C/C++, Java, Python,	JavaScript, MySQL, Apache, PHP

	Back-end Designer	HTML, JavaScript DB: SQL	

4. Approach

4.1 Monitoring and Control

To monitor and control the project, we use several approaches to collect information, record and analyze the progress we have made, all of which can be directed from our project website.

- Progress Report
- Project Plan
- Bugzilla Bug Record
- Document Record on Google Drive
- Winbook
- Team review meeting
- Win-Win negotiation

4.1.1 Closed Loop Feedback Control

- Team members use text messages or make phone calls for information exchange for emergency issue.
- Team members use group emails, Bugzilla or Winbook to notice all the members about the latest progress.
- The team has regular team meetings about 2 times/week and daily online communication for progress updating.

4.1.2 Reviews

- **IIV&V Review**
  IIV&V help the team members to review and validate the artifact, offering appropriate suggestions to team members.
- **Peer Review and Discussion**
  Facing significant changes (topic changes, requirement update and important clarification); the team will start a special discussion on campus. It helps us share thoughts and information directly and efficiently.
- **Regular Team Meeting**
  Every Wednesday/Friday, we had a meeting after class since the team founded. The meeting let all the members know about what the others are working on, how that is going on.
- We also use Instant Message Tools and email as a complement method to all kinds of reviews, so that we could exchange new information with much less response time.

4.2 Methods, Tools and Facilities

Table 11 shows the tools and facilities we use to facilitate our project or artifacts.

Table 11: Methods, Tools and Facilities

Tools	Usage	Provider
Titanium Studio	Creates native, hybrid, and mobile web apps through a JavaScript-based SDK	Appcelerator
MySQL	An open source relational database management system(RDBMS)	Oracle
Godaddy	Provide web hosting and domain register service	Go Daddy
Dreamweaver	A web development tool	Adobe
Github	A software versioning and revision control system	Github

5. Resources

In this section, we present the project effort and schedule estimation of the project using COINCOMO 2.0.

The following conditions were used to estimate the cost of our system, Healthy Kids Zone survey application.
1. This project has limited budget for our development efforts. However, the client will provide some necessary equipment and tools for development, testing and implementation, e.g. Godaddy server and Survey Monkey.
2. The duration of the project is 27 weeks, which are 12 weeks in CSCI577a and 15 weeks in CSCI577b.
3. In the team, there are five developers and one quality focal point/IIV&V. Each member works on the project at least 10 hours per week.
4. There are five modules in this system.
    a. Survey Import
    b. Survey Configuration
    c. Survey Database
    d. Survey Completion
    e. Survey Export
5. The mobile app part of our system will be developed with the Titanium framework based on the Android platform. The web management part will be built with the Apache, PHP, HTML, etc.

The following is module listed in the system and its estimated size with Source Lines of Code (SLOC)

Table 12: Module lists and SLOC of each module

No.	Module Name	Brief Description	SLOC	REVL
1	Survey Import	Provide a web interface for administrator to import surveys from a given survey monkey account.	450	10%
2	Survey Configuration	Provide a web interface for creating a survey, a path and some associations between survey, path and school.	2000	15%
3	Survey Database	Provide data storage and management for survey design, data and associations.	500	5%
4	Survey Completion	Provide web-based surveys on mobile devices.	1400	20%
5	Survey Export	Provide a web interface for administrator to export surveys as .csv format files.	300	10%

The following is COCOMOII Scale Drivers and rationales of choosing the values.

Table 13: COCOMOII Scale Drivers

Scale Driver	Value	Rationale
PREC	VERY LOW	The development team is unfamiliar with development platform and some of the developers are unfamiliar with the programming languages and mobile applications.
FLEX	HIGH	The system needs to considerably conform to pre-established requirement from the client including location-based service, but no external interface specifications are required.
RESL	HIGH	All critical risk items, schedule, budget and internal milestones are identified. However, there is some uncertainty in hardware compatibility and performance.
TEAM	HIGH	Each stakeholder has considerable consistency of objectives and cultures, and considerable ability and willingness to accommodate others' objectives. In addition, the stakeholders have basic experience in operating as a team.
PMAT	NOMINAL	The development team follows ICSM guidelines, which the processes are defined and repeatable but the result may not be consistent, and our project started 2 weeks later than schedule because of changing in project. CMM Level 2.

The following is COCOMOII Cost Drivers of each module and rationales of choosing the values.

Table 14: COCOMOII Cost Drivers of Module 1 - Survey Import Module

Cost Driver	Value	Rationale
RELY	LOW	Most of the modules in this project depend on this module, but the effect of the module failure is low and losses are easily recoverable.
DATA	LOW	The ratio of bytes in the testing database to SLOC in the program is approximately less than 10 because the work of this module is survey import and the data are stored in the database module.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	LOW	It contains survey import, including simple user interface for survey definition and survey monkey API calls.
RUSE	LOW	It is not intended to be reused for the future project.
TIME	NOMINAL	The percentage of available execution time expected to be used by the system and subsystem consuming the execution time resource is less than 50% because this module is used by an administrator to import a survey, which is not a routine work.
STOR	NOMINAL	The percentage of available storage expected to be used by the system and subsystem is less than 50% because data storage is not a part of this module.
PVOL	LOW	Major changes of the platform, i.e. Apache, PHP, Android SDK, MySQL, and web browsers, are approximately every year.

ACAP	HIGH	The analysts have the ability to analyze, design, communicate, and cooperate well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate well.
PCON	VERY HIGH	We have 7 team members in CSCI577a and 6 in CSCI577b.
APEX	LOW	The average experience of the team members for web application is about six months and none of us have experience on hybrid mobile development.
LTEX	NOMINAL	The development team plans to develop this mobile and web management application with Titanium framework, PHP, HTML and JavaScript, and uses MySQL to query information from the database. All these tools are open-source. Therefore, the language and tool experience is nominal because team members have about one year experience with these languages and tools.
PLEX	LOW	The server platform is Apache web server and database is MySQL. 50% developers have some experience on this platform, and 50% have no experience.
TOOL	LOW	The software tools development team plan to use is just simple, frontend, backend REST, and supporting little integration. There is no support for life-cycle.
SITE	VERY HIGH	In both CSCI577a and CSCI577b, six of seven team members are on-campus students; only one team member is off-campus students. Additionally, we use online communication, email and occasional video conference.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 15 weeks in Spring semester.

Table 15: COCOMOII Cost Drivers of Module 2 - Survey Configuration Module

Cost Driver	Value	Rationale
RELY	LOW	This module is a minor part in the system, and effect of the module failure is low and losses are easily recoverable.
DATA	LOW	The ratio of bytes in the testing database to SLOC in the program is approximately less than 10 because the work of this module is survey association and modification and the data are stored in the database module.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	LOW	It contains survey-path-school association and modification.
RUSE	LOW	It is not intended to be reused for the future project.
TIME	NOMINAL	The percentage of available execution time expected to be used by the system and subsystem consuming the execution time resource is less than 50% this module is used by an administrator to create or modify survey associations, which is not a routine

		work.
STOR	NOMINAL	The percentage of available storage expected to be used by the system and subsystem is less than 50% because survey associations is not very storage demanding.
PVOL	LOW	Major changes of the platform, i.e. Apache, PHP, Android SDK, MySQL, and web browsers, are approximately every year.
ACAP	HIGH	The analysts have the ability to analyze, design, communicate, and cooperate well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate well.
PCON	VERY HIGH	We have 7 team members in CSCI577a and 6 in CSCI577b.
APEX	NOMINAL	The average experience of the team members for application database is about a year.
LTEX	NOMINAL	The development team plans to develop this mobile and web management application with Titanium framework, PHP, HTML and JavaScript, and uses MySQL to query information from the database. All these tools are open-source. Therefore, the language and tool experience is nominal because team members have about one year experience with these languages and tools.
PLEX	LOW	The database platform is MySQL. 50% developers have some experience on this platform, and 50% have experience on other SQL database platform.
TOOL	LOW	The software tools development team plan to use is just simple, frontend, backend REST, and supporting little integration. There is no support for life-cycle.
SITE	VERY HIGH	In both CSCI577a and CSCI577b, six of seven team members are on-campus students; only one team member is off-campus students. Additionally, we use online communication, email and occasional video conference.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 15 weeks in Spring semester.

Table 16: COCOMOII Cost Drivers of Module 3 - Survey Database Module

Cost Driver	Value	Rationale
RELY	LOW	This module is a critical part of the system but the effect of module failure is low and losses are easily recoverable.
DATA	NOMINAL	The ratio of bytes in the testing database to SLOC in the program is approximately more than 10 and less than 100 because this module will store information of survey design, data and associations.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	LOW	It only contains database management.

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RUSE	LOW	It is not intended to be reused for the future project.
TIME	HIGH	The percentage of available execution time expected to be used by the system and subsystem consuming the execution time resource is less than 70% because this module is used when an administrator or a user completes a survey several times a day.
STOR	NOMINAL	The percentage of available storage expected to be used by the system and subsystem is less than 50% because the most data is general text and the survey design is not very storage demanding.
PVOL	LOW	Major changes of the platform, i.e. Apache, PHP, Android SDK, MySQL, and web browsers, are approximately every year.
ACAP	HIGH	The analysts have the ability to analyze, design, communicate, and cooperate well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate well.
PCON	VERY HIGH	We have 7 team members in CSCI577a and 6 in CSCI577b.
APEX	NOMINAL	The average experience of the team members about database is more than one year.
LTEX	NOMINAL	The development team plans to develop this mobile and web management application with Titanium framework, PHP, HTML and JavaScript, and uses MySQL to query information from the database. All these tools are open-source. Therefore, the language and tool experience is nominal because team members have about one year experience with these languages and tools.
PLEX	LOW	The server platform is Apache web server and database is MySQL. 50% developers have some experience on this platform, and 50% have no experience.
TOOL	LOW	The software tools development team plan to use is just simple, frontend, backend REST, and supporting little integration. There is no support for life-cycle.
SITE	VERY HIGH	In both CSCI577a and CSCI577b, six of seven team members are on-campus students; only one team member is off-campus students. Additionally, we use online communication, email and occasional video conference.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 15 weeks in Spring semester.

Table 17: COCOMOII Cost Drivers of Module 4 - Survey Completion Module

Cost Driver	Value	Rationale
RELY	LOW	Although this module is the main part of the system, the effect of the module failure is low and losses are easily recoverable.
DATA	LOW	The ratio of bytes in the testing database to SLOC in the program is approximately less than 10 because the work of this module is survey display and result collection and the data are stored in the database module.

DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	NOMINAL	It contains survey display and result collection.
RUSE	LOW	It is not intended to be reused for the future project.
TIME	HIGH	The percentage of available execution time expected to be used by the system and subsystem consuming the execution time resource is less than 70% because this module is used when a volunteer or user completes a survey several times a day.
STOR	NOMINAL	The percentage of available storage expected to be used by the system and subsystem is less than 50% because data storage is not a part of this module.
PVOL	LOW	Major changes of the platform, i.e. Apache, PHP, Android SDK, MySQL, and web browsers, are approximately every year.
ACAP	HIGH	The analysts have the ability to analyze, design, communicate, and cooperate well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate well.
PCON	VERY HIGH	We have 7 team members in CSCI577a and 6 in CSCI577b.
APEX	LOW	The average experience of the team members for this mobile web-based application is less than two months and none of us have experience on hybrid mobile development.
LTEX	NOMINAL	The development team plans to develop this mobile and web management application with Titanium framework, PHP, HTML and JavaScript, and uses MySQL to query information from the database. All these tools are open-source. Therefore, the language and tool experience is nominal because team members have about one year experience with these languages and tools.
PLEX	LOW	The server platform is Apache web server and database is MySQL. 50% developers have some experience on this platform, and 50% have no experience.
TOOL	LOW	The software tools development team plan to use is just simple, frontend, backend REST, and supporting little integration. There is no support for life-cycle.
SITE	VERY HIGH	In both CSCI577a and CSCI577b, six of seven team members are on-campus students; only one team member is off-campus students. Additionally, we use online communication, email and occasional video conference.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 15 weeks in Spring semester.

Table 18: COCOMOII Cost Drivers of Module 5 - Survey Export Module

Cost Driver	Value	Rationale
RELY	LOW	The effect of module failure is some minor inconvenience and the losses are easily recoverable.
DATA	LOW	The ratio of bytes in the testing database to SLOC in the program is approximately less than 10 because the work of this module is survey export and the data are stored in the database module.
DOCU	NOMINAL	Because the development process follows ICSM, the document for life-cycle needs is normal.
CPLX	LOW	It contains survey import, including minimum user interface and data transformation.
RUSE	LOW	It is not intended to be reused for the future project.
TIME	NOMINAL	The percentage of available execution time expected to be used by the system and subsystem consuming the execution time resource is less than 50% because this module is used by an administrator to export a survey, which is not a routine work.
STOR	NOMINAL	The percentage of available storage expected to be used by the system and subsystem is less than 50% because data storage is not a part of this module.
PVOL	LOW	Major changes of the platform, i.e. Apache, PHP, Android SDK, MySQL, and web browsers, are approximately every year.
ACAP	HIGH	The analysts have the ability to analyze, design, communicate, and cooperate well.
PCAP	HIGH	Programmers are capable, efficient and thorough. They are able to communicate and cooperate well.
PCON	VERY HIGH	We have 7 team members in CSCI577a and 6 in CSCI577b.
APEX	LOW	The average experience of the team members for web application is about six months and none of us have experience on data transformation and .cvs file.
LTEX	NOMINAL	The development team plans to develop this mobile and web management application with Titanium framework, PHP, HTML and JavaScript, and uses MySQL to query information from the database. All these tools are open-source. Therefore, the language and tool experience is nominal because team members have about one year experience with these languages and tools.
PLEX	LOW	The server platform is Apache web server and database is MySQL. 50% developers have some experience on this platform, and 50% have no experience.
TOOL	LOW	The software tools development team plan to use is just simple, frontend, backend REST, and supporting little integration. There is no support for life-cycle.
SITE	VERY HIGH	In both CSCI577a and CSCI577b, six of seven team members are on-campus students; only one team member is off-campus students. Additionally, we use online communication, email and

		occasional video conference.
SCED	NOMINAL	The schedule is fixed for 12 weeks in Fall semester and 15 weeks in Spring semester.

The following result is from COCOMOII estimation based on Scale Drivers and Cost Drivers above. Some relative risks appear in the tutorial module and the glossary module, because there are some relatively complicate logical components in the tutorial module and the glossary module, such as automatic tutorial synchronization and glossary association. We have to develop these parts all by ourselves.

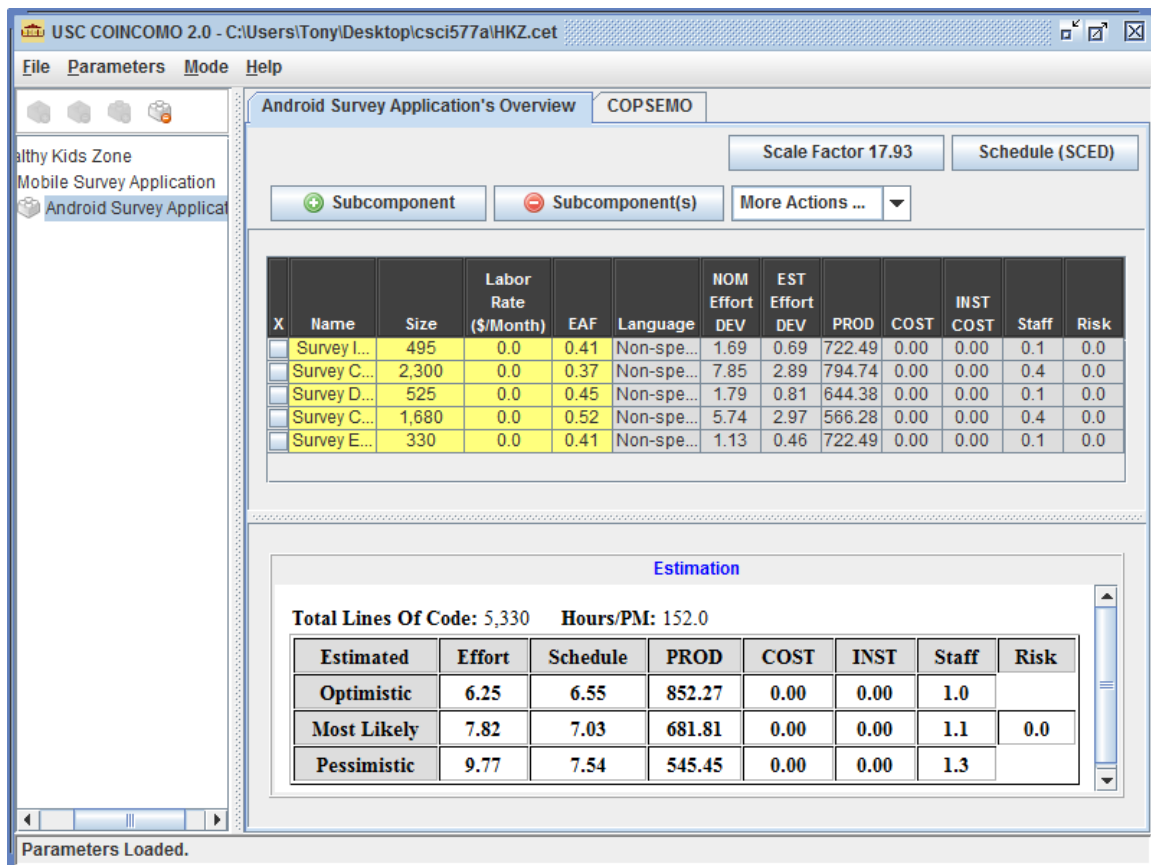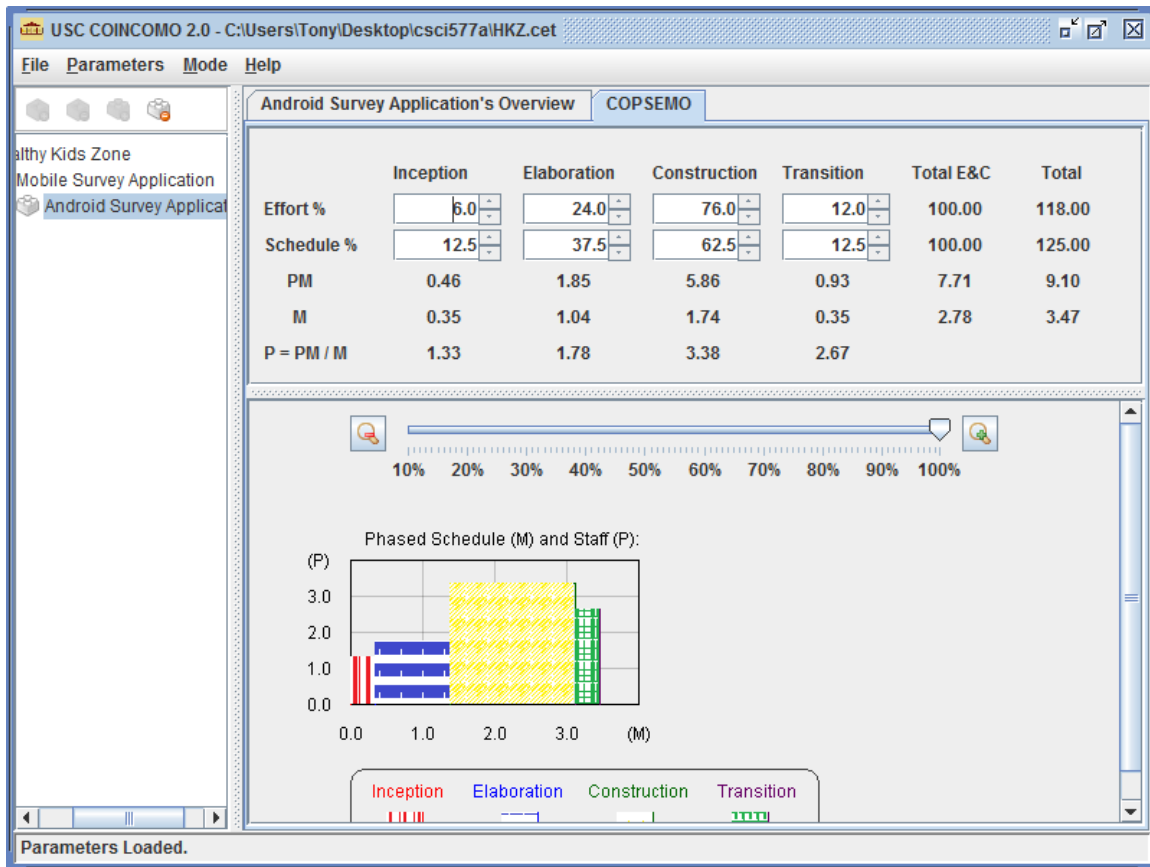**Figure 1: COINCOMO Estimation Result**

Figure 2: COINCOMO Estimation Result

According to COINCOMO Estimates, one team member effort = 1.67 person months, the pessimistic total team effort = 9.77 person months, so the total team members need for this project =5.85.

Since we have 7 members in 577a and 6 in 577b, we would be able to finish the project in time.

6. Iteration Plan

6.1 Plan

In the Development Phase, we have Development-Construction Phase and Development-Transition Phase. And for the Construction Phase, we divided it into 2 iterations.

- **Iteration 1**: we plan to develop critical capabilities of the system, including **Survey Import**, **Question Completion**. Besides. But since many works couldn't start until Survey Import Module finished, so we plan to do some small features like **School Management** and **System Login** Module while Toni developing the Survey Import Module.
  Milestone: From RDCR to Code Review (2/13/2014-3/5/2014).

- **Iteration 2**: we plan to develop **Path Management**, **Association Management**, **Survey Submission**, and **Map & Markers** Module.
  Milestone: From Code Review to CCD (3/5/2014-3/26/2014)

- **Iteration 3**: we plan to develop **Survey Deployment**, **Survey Export**, **Survey Selection**, and **Survey Storage** Module.
  Milestone: From CCD to TRR (3/26/2014-4/16/2014)

6.1.1 Capabilities to be implemented

We identify 32 capabilities from 5 modules. 8 of them will be implemented in the first iteration, 23 of them will be implemented in the second iteration. The survey export function will be implemented during transition iteration.

Table 19: Construction iteration 1 capabilities to be implemented

ID	Capability	Description	Priority	Iteration
1	System Login/Logout	Administrator can use CHC Survey Monkey account to login to HKZ System The HKZ Website shall show the user as logged into the HKZ Website The HKZ Website shall allow user to get their username or password back if they forgot it The HKZ Website shall allow user to logout	S	1
2	Survey	The HKZ Website shall display surveys from Survey	M	1

	Display	Monkey Website associated with the CHC credentials and a survey title starting with the string "HKZ_" in a list, titled "HKZ Surveys", by survey name and survey id as one row of the list The HKZ Website shall display a HKZ survey stored in the HKZ database in a list, titled "HKZ Imported Surveys" by survey name and survey id as one row of the list The HKZ Website shall not allow the HKZ survey key to exist in both the "HKZ Surveys" and "HKZ Imported Surveys" lists at the same time		
3	Survey Import	The HKZ Website shall allow user to import a HKZ survey in the "HKZ Surveys" list into the HKZ database	M	1
4	Survey Deletion	The HKZ Website shall allow the user to delete a HKZ survey from the HKZ database, at the same time, it shall remove completed survey question & results data from the HKZ database related to deleted HKZ surveys The HKZ Website shall remove a deleted HKZ survey from the "HKZ Imported Surveys" list, and that deleted HKZ survey should appear in "HKZ Surveys" list.	M	1
5	School Creation	The HKZ Website shall allow the user to uniquely define a school by searching school names or school address on Google Maps	M	1
6	School Display	The HKZ Website shall display uniquely defined school in a list titled "Schools" where one row of the list is one school label The HKZ Website The HKZ Website shall allow the user to select a row in the school list and show on Google Maps the defined school	S	1
7	School Modificatio n	The HKZ Website shall allow the user to modify a defined school's label name	C	1
8	School Deletion	The HKZ Website shall allow the user to delete a defined school, including school name, school address, its associations with paths, and all survey results data related that school. The HKZ Website shall prompt the user before school deletion	M	1

23	Question Category Display	The HKZ Mobile App shall display in the survey completion screen a drop down list of the question category where one row is tally, a block number or 'other'. The HKZ Mobile App shall display in the survey completion screen the current selected question category: tally, block number, or other	S	1
24	Block/Other Question Completion	The HKZ Mobile App shall be able to display multiple choices (one answer), multiple choices (multiple answers), comment and those 3 kinds of questions associated with a picture in block/other question section. The HKZ Mobile App shall allow user to finish multiple choices (one answer), multiple choices (multiple answers), comment and those 3 kinds of questions associated with a picture in block/other question section. The HKZ Mobile App shall allow the user to navigate to the previous and next question, if they exist, of a survey in the survey question area	M	1
25	Tally Question Completion	The HKZ Mobile App shall show a screen with all tally questions and allow user to choose one of them which expands to show detailed description of that tally question The HKZ Mobile App shall allow user to add/drop numbers of a tally	M	1

Table 20: Construction iteration 2 capabilities to be implemented

ID	Capability	Description	Priority	Iteration
9	Path Creation	The HKZ Website shall allow the user to uniquely define a start, end, and en-route locations known as a path in a Google Maps Box The HKZ Website shall allow the user to uniquely define a name for a path with ASCII text The HKZ Website shall allow the user to assign the number of blocks for a defined path	M	2
10	Path Display	The HKZ Website shall display uniquely defined paths in a list titled "Paths" where one row of the list	S	2

		shows the path name and number of blocks The HKZ Website shall allow the user to select a row in the path list and show on Google maps the defined path		
11	Path Modificatio n	The HKZ Website shall allow the user to modify the path name and path's number of blocks	C	2
12	Path Deletion	The HKZ Website shall allow the user to delete a path and related information, including path name, location, numbers of blocks, relation with school and surveys, and all the survey results data related to that path. The HKZ Website shall prompt the user before path deletion.	M	2
13	Survey-Path Association Creation	The HKZ Website shall allow the user to create an association between paths and surveys which is a many-to-many relationship The HKZ Website shall not allow the user to create an association between a path and a survey, which the path hasn't associated with at least one school	S	2
14	Survey-Path Association Deletion	The HKZ Website shall allow the user to delete the association between a path A and a survey B in the HKZ database. Meanwhile, All survey B's survey results related to path A will be deleted.	M	2
26	Map Display	The HKZ Mobile App shall be able to display a Google Maps with the path start, end, and route location	S	2
27	Add/Delete Marker	The HKZ Mobile App shall allow the user to place a hazard marker on the Google Maps The HKZ Mobile App shall allow the user to remove a hazard marker on the Google Maps	S	2
28	Comment on Marker	The HKZ Mobile App shall allow the user to enter text in the comment box of a marker on Google Maps	S	2
29	Survey Cancelling	The HKZ Mobile App shall allow the user to cancel survey completion The HKZ Mobile App shall prompt the user to before canceling survey completion	M	2
30	Survey Submission Status	The HKZ Mobile App shall disable the survey submission button if any block question category is	M	2

	Check	red or the tally completion button is unchecked The HKZ Mobile App shall enable the survey submission button if all question categories are green and the tally completion button is checked		
31	Survey Submission	The HKZ Mobile App shall display a button for survey submission in the survey completion screen The HKZ Mobile App shall display a message to the user the results, success or failure, of survey submission The HKZ Mobile App shall delete the temporary local file, which stored the most recent survey results, if the survey submitted successfully	M	2

Table 21: Construction iteration 3 capabilities to be implemented

ID	Capability	Description	Priority	Iteration
15	Survey Deployment	The HKZ Website shall define a deployable survey as an HKZ survey associated with at least one path and the associated path is associated with at least one school The HKZ Website shall allow the user to deploy a survey in the "HKZ Imported Surveys" list to mobile clients	S	3
16	Survey Deployment Display	The HKZ Website shall identify surveys in the "HKZ Imported Surveys" list as deployable (can be deployed) The HKZ Website shall identify surveys in the "HKZ Imported Surveys" list as deployed	S	3
17	Survey Retraction	The HKZ Website shall allow the user to retract a deployed survey in the "HKZ Imported Surveys" list from mobile clients from mobile clients	S	3
18	School Selection	The HKZ Mobile App shall allow the user to start a new survey which expands to show a list of HKZ schools The HKZ Mobile App shall allow the user to select a school which expands to show a list of associated paths	S	3
19	Path Selection	The HKZ Mobile App shall allow the user to select a path which expands to show a list of associated surveys	S	3

20	Survey Selection	The HKZ Mobile App shall display a survey completion screen if the user chooses to complete the survey	M	3
21	Survey Loading	The HKZ Mobile App shall allow user to load the most recent stored survey by clicking the 'Load' button on home screen.	M	3
22	Survey Storage	The HKZ Mobile App shall allow user to save current survey answers to local file by clicking a button in function menu The HKZ Mobile App shall store the most recent survey answers until successful submission or canceling	M	3
32	Survey Export	The HKZ Website shall allow user to export the survey results stored in database as a CSV file, each file include only one survey related to one school (including all the paths related to that school).	M	3

6.1.2 Capabilities to be tested

Table 22: Construction iteration 1 capabilities to be tested

ID	Capability	Description	Priority	Iteration
1	System Login/Logout	Administrator can use CHC Survey Monkey account to login to HKZ System The HKZ Website shall show the user as logged into the HKZ Website The HKZ Website shall allow user to get their username or password back if they forgot it The HKZ Website shall allow user to logout	S	1
2	Survey Display	The HKZ Website shall display surveys from Survey Monkey Website associated with the CHC credentials and a survey title starting with the string "HKZ_" in a list, titled "HKZ Surveys", by survey name and survey id as one row of the list The HKZ Website shall display a HKZ survey stored in the HKZ database in a list, titled "HKZ Imported Surveys" by survey name and survey id as one row of the list The HKZ Website shall not allow the HKZ survey key to exist in both the "HKZ Surveys" and "HKZ	M	1

		Imported Surveys" lists at the same time		
3	Survey Import	The HKZ Website shall allow user to import a HKZ survey in the "HKZ Surveys" list into the HKZ database	M	1
4	Survey Deletion	The HKZ Website shall allow the user to delete a HKZ survey from the HKZ database, at the same time, it shall remove completed survey question & results data from the HKZ database related to deleted HKZ surveys The HKZ Website shall remove a deleted HKZ survey from the "HKZ Imported Surveys" list, and that deleted HKZ survey should appear in "HKZ Surveys" list.	M	1
5	School Creation	The HKZ Website shall allow the user to uniquely define a school by searching school names or school address on Google Maps	M	1
8	School Deletion	The HKZ Website shall allow the user to delete a defined school, including school name, school address, its associations with paths, and all survey results data related that school. The HKZ Website shall prompt the user before school deletion	M	1
24	Block/Other Question Completion	T he HKZ Mobile App shall be able to display multiple choices (one answer), multiple choices (multiple answers), comment and those 3 kinds of questions associated with a picture in block/other question section. The HKZ Mobile App shall allow user to finish multiple choices (one answer), multiple choices (multiple answers), comment and those 3 kinds of questions associated with a picture in block/other question section. The HKZ Mobile App shall allow the user to navigate to the previous and next question, if they exist, of a survey in the survey question area	M	1
25	Tally Question Completion	The HKZ Mobile App shall show a screen with all tally questions and allow user to choose one of them which expands to show detailed description of that tally question The HKZ Mobile App shall allow user to add/drop numbers of a tally	M	1

Table 23: Construction iteration 2 capabilities to be tested

ID	Capability	Description	Priority	Iteration
9	Path Creation	The HKZ Website shall allow the user to uniquely define a start, end, and en-route locations known as a path in a Google Maps Box The HKZ Website shall allow the user to uniquely define a name for a path with ASCII text The HKZ Website shall allow the user to assign the number of blocks for a defined path	M	2
12	Path Deletion	The HKZ Website shall allow the user to delete a path and related information, including path name, location, numbers of blocks, relation with school and surveys, and all the survey results data related to that path. The HKZ Website shall prompt the user before path deletion.	M	2
13	Survey-Path Association Creation	The HKZ Website shall allow the user to create an association between paths and surveys which is a many-to-many relationship The HKZ Website shall not allow the user to create an association between a path and a survey, which the path hasn't associated with at least one school	S	2
14	Survey-Path Association Deletion	The HKZ Website shall allow the user to delete the association between a path A and a survey B in the HKZ database. Meanwhile, All survey B's survey results related to path A will be deleted.	M	2
27	Add/Delete Marker	The HKZ Mobile App shall allow the user to place a hazard marker on the Google Maps The HKZ Mobile App shall allow the user to remove a hazard marker on the Google Maps	S	2
29	Survey Cancelling	The HKZ Mobile App shall allow the user to cancel survey completion The HKZ Mobile App shall prompt the user to before canceling survey completion	M	2
30	Survey Submission Status Check	The HKZ Mobile App shall disable the survey submission button if any block question category is red or the tally completion button is unchecked The HKZ Mobile App shall enable the survey	M	2

		submission button if all question categories are green and the tally completion button is checked		
31	Survey Submission	The HKZ Mobile App shall display a button for survey submission in the survey completion screen The HKZ Mobile App shall display a message to the user the results, success or failure, of survey submission The HKZ Mobile App shall delete the temporary local file, which stored the most recent survey results, if the survey submitted successfully	M	2

Table 24: Construction iteration 3 capabilities to be tested

ID	Capability	Description	Priority	Iteration
15	Survey Deployment	The HKZ Website shall define a deployable survey as an HKZ survey associated with at least one path and the associated path is associated with at least one school The HKZ Website shall allow the user to deploy a survey in the "HKZ Imported Surveys" list to mobile clients	S	3
16	Survey Deployment Display	The HKZ Website shall identify surveys in the "HKZ Imported Surveys" list as deployable (can be deployed) The HKZ Website shall identify surveys in the "HKZ Imported Surveys" list as deployed	S	3
17	Survey Retraction	The HKZ Website shall allow the user to retract a deployed survey in the "HKZ Imported Surveys" list from mobile clients from mobile clients	S	3
18	School Selection	The HKZ Mobile App shall allow the user to start a new survey which expands to show a list of HKZ schools The HKZ Mobile App shall allow the user to select a school which expands to show a list of associated paths	S	3
20	Survey Selection	The HKZ Mobile App shall display a survey completion screen if the user chooses to complete the survey	M	3
21	Survey Loading	The HKZ Mobile App shall allow user to load the most recent stored survey by clicking the 'Load' button on home screen.	M	3

22	Survey Storage	The HKZ Mobile App shall allow user to save current survey answers to local file by clicking a button in function menu The HKZ Mobile App shall store the most recent survey answers until successful submission or canceling	M	3
32	Survey Export	The HKZ Website shall allow user to export the survey results stored in database as a CSV file, each file include only one survey related to one school (including all the paths related to that school).	M	3

6.1.3 Capabilities not to be tested

Some of our features are so obvious that they don't need to be tested. E.g. Display a Google Maps Box, display all of the schools' name in a list.

Table 25: Construction iteration capabilities not to be tested

ID	Capability	Description	Priority	Iteration
6	School Display	The HKZ Website shall display uniquely defined school in a list titled "Schools" where one row of the list is one school label The HKZ Website The HKZ Website shall allow the user to select a row in the school list and show on Google Maps the defined school	S	1
7	School Modification	The HKZ Website shall allow the user to modify a defined school's label name	C	1
10	Path Display	The HKZ Website shall display uniquely defined paths in a list titled "Paths" where one row of the list shows the path name and number of blocks The HKZ Website shall allow the user to select a row in the path list and show on Google maps the defined path	S	2
11	Path Modification	The HKZ Website shall allow the user to modify the path name and path's number of blocks	C	2
19	Path Selection	The HKZ Mobile App shall allow the user to select a path which expands to show a list of associated surveys	S	3
23	Question	The HKZ Mobile App shall display in the survey	S	1

	Category Display	completion screen a drop down list of the question category where one row is tally, a block number or 'other'. The HKZ Mobile App shall display in the survey completion screen the current selected question category: tally, block number, or other		
26	Map Display	The HKZ Mobile App shall be able to display a Google Maps with the path start, end, and route location	S	2
28	Comment on Marker	The HKZ Mobile App shall allow the user to enter text in the comment box of a marker on Google Maps	S	2

6.1.4 CCD Preparation Plans

Core Capability Drivethrough of 577b is scheduled on March 26.

(1) **Hardware Preparation**:
   Our system has 2 parts, a website which runs on Go Daddy web server and a mobile app.
   For the web server, we have already had a Go Daddy web server.
   For the mobile app, we need to prepare 2 or more smart phones with Android System on 03/26/2014.

(2) **Software Preparation**:
   We should upload our website code to Go Daddy web server before 03/26/2014. Since we almost develop and debug on the web server, so we don't need to do much stuff on server.
   All the Android phones should install our HKZ Survey App before 03/26/2014.

6.2 Iteration Assessment

6.2.1 Capabilities Implemented, Tested, and Results

Table 26: Capabilities implemented, tested, and results

ID	Capability	Test Case	Test Results	If fail, why?
1	System Login/Logout	TC-01-01	F	Haven't implemented logout
2	Survey Display	TC-02-01	P	
3	Survey Import	TC-02-02	P	
4	Survey Deletion	TC-02-03	P	
5	School Creation	TC-03-01	P	
6	School Display	-	P	

7	School Modification	-	P	
8	School Deletion	TC-03-02	P	
9	Path Creation	TC-04-01	P	
10	Path Display	-	P	
11	Path Modification	-	P	
12	Path Deletion	TC-04-02	P	
13	Survey-Path Association Creation	TC-05-01	P	
14	Survey-Path Association Deletion	TC-05-02	P	
15	Survey Deployment	TC-06-02	P	
16	Survey Deployment Display	TC-06-01	P	
17	Survey Retraction	TC-06-02	P	
18	School Selection	TC-08-01	P	
19	Path Selection	-	P	
20	Survey Selection	TC-08-02	P	
21	Survey Loading	TC-09-01	P	
22	Survey Storage	TC-09-02	P	
23	Question Category Display	-	P	
24	Block/Other Question Completion	TC-10-01 TC-10-02	P	
25	Tally Question Completion	TC-10-03	P	
26	Map Display	-	P	
27	Add/Delete Marker	TC-11-01	P	
28	Comment on Marker	-	P	
29	Survey Cancelling	TC-12-01	P	
30	Survey Submission Status Check	TC-12-02	P	
31	Survey Submission	TC-12-03	P	
32	Survey Export	TC-07-01	P	

6.2.2 Core Capabilities Drive-Through Results

(**1**) **Good Points:**
   a) Generally, most of the core capabilities had been finished, and has very little bugs.
   b) The GUI of Website and Mobile app is acceptable.

(**2**) **Improvements needed/Suggestions:**
   a) (Survey Import) The Layout of Survey Import Page is different from Survey Configuration/Deployment Page.
   b) (School/Path Management) For School and Path Management Page, they both have 4 operations: Create, View, Modify and Delete. In School Management Page, it has a drop

down menu which handles View/Modify/Delete operations. In Path Management Page, it has 3 tabs to handle those operations, which is inconsistent.
c) (Association Management) The Association Management Page is a little bit confusing to our customer. They needed clue characters like 'Step 1', 'Step 2' to lead them finish association operation.
d) (Survey Deployment) A survey doesn't need to be deployed for a specific school or path. In fact, just deploy the survey itself is enough.
e) (Mobile App) Some hints/descriptions on mobile app had grammar problems. E.g. The following is next block questions.

(3) Changes to be considered:
a) Unify the Layout of Survey Import Page and Survey Configuration/Deployment Page.
b) Change the Layout of School/Path Management Page, adding 4 tabs to handle "Create, View, Modify, Delete" actions accordingly.
c) Add 'Step 1', 'Step 2' label on Association Management Page. In step 1, the admin will select a school and a path. In step 2, the admin could choose one or more surveys to associate with the path selected before.
d) Since our customer has less than 10 schools, less than 10 surveys, more than 200 paths, we will add a tag called 'all schools', 'all paths' when they select the school or path in the drop down list.
e) Delete the school/path selection section on Survey Deployment Page.
f) Delete the tree structure on website.
g) Modify the words/phrase/paragraphs in our guidelines on the website.
h) Correct the grammar mistakes in descriptions/hints on our mobile app.

(4) Risks:
a) (New Risk Introduced)Potential failure to meet level of service requirement. Possibilities are network latency during download data from Godaddy Webserver or limitation of Jquery Mobile. Intermittently observed.
b) (Mitigation Action Items) Test the mobile app in several network situations, to make sure whether it is caused by network speed or Jquery Mobile itself. And if it is caused by Jquery Mobile itself, we should optimize our code.

6.3 Adherence to Plan

Generally, our project runs well according to our iteration plan.
The best stuff we did was SLOC assessment. We assessed that our project would have 4650 SLOC and actually we wrote about 5000 SLOC. It's a pretty close assessment so that our project progress always followed our project plan.

The actual development order was a little bit different from that in life cycle plan. Because the development progress of developers are different. For instance, our mobile app always developed faster than we expected, while the front end had a lot of extra work than we expected.

But generally, our project run well according to our LCP and Project Plan.