

Design Document

Team: WISE

Project: SLHS-SIM

Date: April 17th, 2015

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# 2 Revision History

|  |  |  |
| --- | --- | --- |
| Date | Author | Revisions Made |
| 2014-10-02 | Jimmy Dixon, Matt Pace, Ze An | Initial documentation |
| 2014-10-03 | Jimmy Dixon, Matt Pace, Ze An | Minor revisions and formatting |
| 2014-12-04 | Jimmy Dixon, Matt Pace, Ze An | Revision for final design review |
| 2015-02-18 | Devika Pradhan, Hang Yang, Michael Wu, Taoyue Zhang | Initial 2015 documentation and revision to previous semester documentation |
| 2015-04-17 | Devika Pradhan, Hang Yang, Michael Wu, Taoyue Zhang | Final design review documentation and progress for Spring 2015. |

# 3 Design Status Summary

|  |  |
| --- | --- |
| Phase 6: Service / Maintenance | Status: Outside current progress |
| *Gate 6: Project Partner and Advisor approve continued fielding of project. If not, retire or redesign.* |  |
| Date of Advisor approval: |  |
|  |  |
| Phase 5: Delivery | **Status: Outside Current Progress** |
| *Gate 5: Continue if Project Partner, Advisor and EPICS Admin agree that project is ready for delivery!* |  |
| Date of Advisor approval: |  |
|  |  |
| Phase 4: Detailed Design | **Status: In-Progress** |
| *Gate 4: Continue if can demonstrate feasibility of solution (is there a working prototype?). Project Partner and advisor approval required.* |  |
| Date of Advisor approval: |  |
|  |  |
| Phase 3: Conceptual Design | **Status: Complete** |
| *Gate 3: Continue if project partner and advisor agree that solution space has been appropriately explored and the best solution has been chosen.* |  |
| Date of Advisor approval: |  |
|  |  |
| Phase 2: Specification Development | **Status: Complete** |
| *Gate 2: Continue if project partner and advisor agree that you have identified the “right” need, specification document is completed and no existing commercial products meet design specifications.* |  |
| Date of Advisor approval: |  |
|  |  |
| Phase 1: Project Identification | **Status: Complete** |
| *Gate 1: Continue if have identified appropriate EPICS project that meets a compelling need for the project partner.* |  |
| Date of Advisor approval: |  |

# 4 Project Charter

## 4.1 Description of the Community Partner

The project partners for this project are Professors Anu Subramanian and Barbara Cicholski, from Purdue’s Department of Speech, Language, and Hearing Sciences (SLHS).

The goal of this project is to provide an online method for SLHS students to practice administering a speech test, the Pearson Peabody Vocabulary Test (Version IV).

The main beneficiaries of this project are the SLHS students, who will be better prepared for their professions, and the SLHS professors, who will be able to provide more feedback to their students.

The SLHS department will receive our deliverable upon completion.

## 4.2 Stakeholders

The project partners’ students will be using the project. Ultimately, the student’s future patients will be affected as well.

Our project partners and other instructors within the SLHS are interested in the project’s success. They will be using the project to evaluate their students in their ability to administer the tests that the project simulates.

## 4.3 Project Objectives

Currently, the department uses live examinations for students to practice the administration of these exams. This practice involves paperwork for each subject and scheduling their examinations. Much of this work can be alleviated by the use of a simulation. Additionally, each scoring form for the PPVT-IV costs money, so using a virtual form eliminates any practice costs.

Our project fits within the mission of our partner: educating students in speech, language, and hearing sciences. By being able to practice online, students will be able to learn more quickly and efficiently. The instructors can then devote less time organizing live examinations for students, and instead spend more time on other instructional areas.

## 4.4 Outcomes/Deliverables

Upon completion, this project should provide an online interface for students to administer a speech test by watching a recording of a subject completing a previous examination. Once students submit their answers, they can send their results to their instructors to receive feedback.

Our team will create a website of that allows for SLHS students to practice administering speech and vocabulary tests via simulation. This website will consist of several simulation videos of test subjects with varying levels of skill, and also a form for students to enter the correct data as if they were administering the test to the subject. They will be able to record responses and get feedback on their performance. Instructors may use an administration module to add videos and answer keys to a database.

The idea of this simulation is to give students an idea of how an actual test is conducted and the level of difficulty of the exam or set level they need to be evaluated for. That way, when the actual test is administered, the subjects are not intimidated when it comes to giving the actual exam.

## 4.5 Overall Project Timeline

This project will not be completed in one semester. As of now, our team believes that a deliverable could be provided to the project partner in three semesters. After initial delivery, the project could still continue by adding more online forms for different examinations, and a wider array of exam recordings for student practice.

There are five main milestones for this project. The first is front-end design, which consists of mock-ups and basic website framework. The second is form creation and incorporation of the forms into the website. The third milestone is to implement set progression and to synchronize videos with specific sets. The fourth is to create the summary form that the student provides to their instructor for feedback, along with an active messaging system to give the students real-time feedback about their performance (correctness). The last milestone is to expand the scope of the project, by adding a variety of online forms and more videos for the student to select, and a database through which more content can be made available.

This semester, the first three milestones have been completed. The third is almost complete, but requires simulation videos from the project partner to demonstrate full functionality. We are down to the fourth, which should be completed either in the remaining time this semester, or at the very beginning of the next semester.

# 5 Overall Project Design

## 5.1 Phase Six: Service and Maintenance

|  |  |  |
| --- | --- | --- |
| Phase 6: Service / Maintenance | Status: | Evidence can be found: |
|  Evaluate performance of fielded project | Incomplete | - |
|  Determine what resources are necessary to support and maintain the project | Incomplete | - |
| *Gate 6: Project Partner and Advisor approve continued fielding of project. If not, retire or redesign.* | Decision: | Rationale summary: |
| Advisor approval: | Yes / No | Date: |

### Phase outside current progress.

## 5.2 Phase Five: Delivery

|  |  |  |
| --- | --- | --- |
| Phase 5: Delivery | Status: | Evidence can be found: |
| Goal is to refine detailed design so as to produce a product that is ready to be delivered! In addition, the goal is to develop user manuals and training materials. |  |  |
|  Complete deliverable version of project including Bill of Materials | Incomplete | - |
|  Complete usability and reliability testing | Incomplete | - |
|  Complete user manuals/training material | Incomplete | - |
|  Complete delivery review | Incomplete | - |
|  Project Partner, Advisor, and EPICS Admin Approval | Incomplete | - |
| *Gate 5: Continue if Project Partner, Advisor and EPICS Admin agree that project is ready for delivery!* | Decision: | Rationale summary: |
| Advisor approval: | Yes / No | Date: |

### Phase outside current progress.

## 5.3 Phase Four: Detailed Design

|  |  |  |
| --- | --- | --- |
| Phase 4: Detailed Design | Status: | Evidence can be found: |
| Goal is to design working prototype which meets functional specifications. |  |  |
|  Bottom-Up Development of component designs | In-Progress | Module and technology research in individual design documentation.  Examples:  [An: 19; Dixon: 19,20,21,25;  Pace: 20,21,24,25;  Wu: 3,4,7,8,10,11,20,21,23,24,28,29,  32,34] |
|  Develop Design Specification for components | In-Progress | Components typically address global project design specifications.  [Dixon: 28,29; Wu: 14] |
|  Design/analysis/evaluation of project, sub-modules and/or components (freeze interfaces) | In-Progress | Analysis to determine satisfactory complete of goals; revision of previous modules to current standards.  [An: 20-23; Pace: 22-24;  Wu: 17,18,20,21] |
|  Design for Failure Mode Analysis (DFMEA) | - | - |
|  Prototyping of project, sub-modules and/or components | In-Progress | Functional mockups (Github) |
|  Field test prototype/usability testing | Incomplete | - |
| *Gate 4: Continue if can demonstrate feasibility of solution (is there a working prototype?). Project Partner and advisor approval required.* | Decision: | Rationale summary: |
| Advisor approval: | Yes / No | Date: |

### Detailed design addresses the technicalities and practical implementation of concepts.

## 5.4 Phase Three: Conceptual Design

|  |  |  |
| --- | --- | --- |
| Phase 3: Conceptual Design | Status: | Evidence can be found: |
| Goal is to expand the design space to include as many solutions as possible. Evaluate different approaches and selecting “best” one to move forward. Exploring “how”. |  |  |
|  Complete functional decomposition | Complete | Specification documentation.  [Pace: 16; Wu: 14] |
|  Brainstorm several possible solutions | Complete | Refer to individual design documentation as goals are identified. |
|  Prior Artifacts Research | Complete | Peabody Picture Vocabulary Test administration flow.  [Dixon: 13; Wu: 1] |
|  Create prototypes of multiple concepts, get feedback from users, refine specifications | Complete | Various mockups (Github), documentation figures.  [An: 9,10; Pace: 12,13;  Wu: 3, 7, 10, 13, 20, 23, 28, 34] |
|  Evaluate feasibility of potential solutions (proof-of-concept prototypes) | Complete | Functional mockups (Github). |
|  Choose "best" solution | In-Progress | Under constant revision (PIGS, Design Review presentations, meetings with project partner). |
| *Gate 3: Continue if project partner and advisor agree that solution space has been appropriately explored and the best solution has been chosen.* | Decision: | Rationale summary: |
| Advisor approval: | Yes / No | Date: |

### Conceptual design for continued development realizes itself in the form of draft revisions to previous modules and design and mockups of new solutions to meet project goals.

## 5.5 Phase Two: Specification Development

|  |  |  |
| --- | --- | --- |
| Phase 2: Specification Development | Status: | Evidence can be found: |
| Goal is to understand “what” is needed by understanding the context, stakeholders, requirements of the project, and why current solutions don’t meet need, and to develop measurable criteria in which design concepts can be evaluated. |  |  |
|  Understand and describe context (current situation and environment) | Complete | Partner Meetings.  [An: 7; Dixon: 6,16; Pace: 7,15;  Wu: 1,2,5,6] |
|  Create stakeholder profiles | Complete | Stakeholder Profiles.  [Pace: r-2, Wu: 14] |
|  Create mock-ups and simple prototypes: quick, low-cost, multiple cycles incorporating feedback | Complete | Mockups and Modules (Github).  [An: 9,10; Pace: 12,13; Wu: 10,11] |
|  Develop a task analysis and define how users will interact with project (user scenarios) | Complete | Specifications.  [Pace: r-3; Wu: 14] |
|  Identify other solutions to similar needs and identify benchmark products (prior art) | Complete | Similar Products and Benchmarks.  [Pace: r-3] |
|  Define customer requirements in more detail; get project partner approval | Complete | Partner Meetings.  [An: 7,8; Dixon: 6,16; Pace: 7,12,13,15; Wu: 2,5,6] |
|  Develop specifications document | Complete | [Pace: r-3, r-4; Wu: 14] |
|  Establish evaluation criteria | Complete | [An: 8; Dixon: 16; Pace: 15; Wu: 14] |
| *Gate 2: Continue if project partner and advisor agree that you have identified the “right” need, specification document is completed and no existing commercial products meet design specifications. [This includes their agreeing that you have captured and documented the critical requirements and specifications for this project]* | Decision: | Rationale summary: |
| Advisor approval: | Yes / No | Date: |

### The specification development phase for continued development consists of drafting additional client-requested criteria, integrating them into the schedule, and identifying the effects of these revisions on the existing project specifications. The majority of the information for this phase’s maintenance comes from correspondence and meetings with the project partners.

## 5.6 Phase One: Project Identification

|  |  |  |
| --- | --- | --- |
| Phase 1: Project Identification | Status: | Evidence can be found: |
| Goal is to identify a specific, compelling need to be addressed | Complete and subject to future change | Goals and objectives slides from the Mid semester design review and final semester design review (Wise sharepoint < design documentation< spring 2015< SLHS-SIM< Design Review). |
|  Conduct needs assessment (if need not already defined) | Complete | Initial Project Partner Meeting.  [An 7; Dixon 6; Pace: 7; Wu: 2] |
|  Identify stakeholders (customer, users, person maintaining project, etc.) | Complete | Partner emails, Partner meeting.  [Pace: r-1; Wu: 2,5,6] |
|  Understand the Social Context | Complete | Partner emails, Partner meeting.  [Pace: r-4; Wu: 2,5,6] |
|  Define basic stakeholder requirements (objectives or goals of projects and constraints) | Complete | Partner emails, Partner meeting.  [An 7; Dixon 6; Pace: 7; Wu: 2] |
|  Determine time constraints of the project | Complete | Partner meeting.  Gantt Schedule and Semester Timeline (Sharepoint).  [Wu: 2] |
| *Gate 1: Continue if have identified appropriate EPICS project that meets a compelling need for the project partner [This includes a Project Charter]* | Decision:  Complete | Rationale summary:  The project has been identified and meets Project Partner expectations.  (Previous semester; renewed approval at initial meeting) |
| Advisor approval: | Yes / No | Date: |

### The Speech, Language, and Hearing Sciences Video Simulation (SLHS-VID or SLHS-SIM) is a second term project beginning development in the fall 2014 semester. Project identification for continued development consists of renewing approval for current design direction with the Project Partner during an introductory meeting, individual research to further distinguish client and proxy subject needs, and developing a draft semester-schedule of project goals.

# 6 Semester Documentation

## 6.1 Team Members

Devika Pradhan: Team Leader for SLHS-VID. A freshman engineer with the intended major of Computer Engineering. An experienced programmer, Devika or Dee loves coding and is open to learning new languages. For this semester, her job is to monitor the team’s progress and make significant changes on the existing model made by the previous semester.

Mika Wu: Main programmer for the team. He is an experienced programmer and has contributed greatly to the coding and testing the code for video.js library for the first design review. He is the senior most member on the team and is a great team builder.

Zhang Tao Yue: A Freshman Engineer with his mind set on Mechanical Engineering, Zhang makes sure that we have our PIGS presentation in place every week and highlight’s the goals for each team meeting. He is also the buffer person between the team and our Project Partners. Throughout the semester, he will develop programming skills and will contribute greatly into the hard coding of the project.

Hang Yang: The team coordinator and is soon going to be working on the hard coding module. He intends to pursue Electrical Engineering. A quiet guy, he is a lot more productive, efficient and hardworking when it comes to working on this project. Hang is responsible in doing most of our PIGS presentation and work with Zhang on communicating frequently with the project partners.

## 6.2 Current Status and Location on Overall Project Timeline

This project is a semester old (Fall 2014) and currently comprises of a team entirely of new members (none of the past members have stayed with the team). Currently, the past team had sample YouTube videos uploaded on their site that they fixed with time stamps and sample grading rubric that recorded responses, but did not store those responses. The video stops as the test is being administered.

The mid semester state of the project is almost the same as the previous semester with additional inputs from our side. We have got hold of modules form the SLHS Department and Mika has been working on the video.js library in order to get the time stamps. He is working on getting the stamps to be flexible. As we are in Week 6, we have made progress on our individual agendas and team goals. All the team members are working on developing programming skills and applying it on the website. According to our Gantt Schedule, we are on track.

From the previous mid-semester review, we have made substantial progress. Our communications with our project partner have been more transparent and this time there is more involvement with them. We replaced the dummy feed with an actual test that is being administered. However, the video quality is not good so we have to make pop up responses for the video. This allows the viewer to have a better view of the PPVT Form.

## 6.3 Goals for the Semester

We intend to make substantial contribution to this project (more than what the previous semester team did). We intend to work on actual videos from the SLHS Department, that is, videos of test administration. We want to make the constrains (age, measure of a level of disability, past experience in taking the tests, number of past attempts, etc) for determining the test level to be a lot more clear so that our tests can match the subject’s level of understanding. This is also accompanied by flexible time stamps that ensure the video moves back and forth freely. We also want to design it to make it user friendly.

## 6.4 Semester Timeline

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Week | SLHS-VID Gantt Schedule Objective | Objective Description | Semester Milestone | Responsibilities and Resources for both Milestones and Team Objectives. |
| 1-3 | Project Orientation; Code Comprehension; Plan/Budget      Meet up with the project partner to determine semester needs; meet the past team members  Design work; getting all the members to start learn coding individually. | Get up to speed with what the past semester has done for this project; Based on the past team’s code in JavaScript, we had a vague idea of what they had been working on.      Meet up with the project partner so that we have a better picture of what this project is about.        Register everyone on codecademy and train them on the fundamentals of JavaScript. | Learning the work ethics involved with EPICS and what are the expectations to be met for this semester.  Get in touch with our project partner; prepare the Gantt Schedule for the entire semester.    Finish up the Individual evaluation rubric as required for mandatory new students. | Getting to know the team members and laying down the team structure.      Visit project partner; begin planning and documenting.      Attend lectures that will help us in our design review, meet all the week 1-3 objectives and catalogue results. |
| 4 | Design Work; research good form submission | Narrow down on our project partner’s needs and make realistic semester objectives that are tailored around their needs. The online rubric needs studying | Approval of appropriate plan for the semester situated in overall timeline; Semester Plan and Budget included in Project Management portion of document | Meet and brainstorm ideas and on that basis determine the semester plan and budget. |
| 5 | Revise past project code; one mid- semester objective. | Decide on one objective to be met before the first design review. Use the libraries that the past team used to get standard coding from online templates and built in functions. | Keep PP in loop and make individual documentation. | Brainstorm ideas and prioritize the PP’s urgent need. |
| 6 | Revise the past code if needed and implement the code for backend functionality; Finish and submit the design documentation and formally invite our project partner for the design review. | Work around with standard JS libraries and experiment with the sample video that the SLHS has given us. Finish the design documentation and prep up for the design review. | Get all the materials ready and have something concrete ready that is to be presented before the PP. | Every member contributes to the design documentation and submit it on time. |
| 7 | DESIGN REVIEW | Give a brief overview of what our semester objectives are and give the review committee a sample run of what we have been working on. | Design Review Presentation | All members will have an equal opportunity in the presentation. |
| 8 | Reflect back on the suggestions made by our PP and decide what needs to change from our original plan of action. | Do a SWAP Analysis. Also, have a candid team chat so that we can give each other feed backs. | Mid-semester evaluation of both individual and project for grading. | Peer evaluation, Indiv and Proj Evaluation Rubrics. |
| 9-12 | Revise project code and tweak around with the code. Set up a second objective for the semester. | By now all the members should be fairly proficient in coding. We aim to split up work and try our hands in designing the page to make it more attractive. | Complete Team Culture Survey and share informal feedback to people is asked by the advisor. | Depending on individual strengths, split tasks and set objectives to be met by semester end. |
| 13 | Work on hard coding and advance knowledge base with skill sessions | Prepare for the final design review and fast track our project so that we meet our deadlines. | Practice Design Review Presentation and get feedback. Update design documentation. | All members just like the way they contributed in week 6 will contribute once more to add on to the existing document. |
| 14 | FINAL DESIGN REVIEW | Give the Review Committee and our project partner our finished product and give them a demo. | Design Review Presentation | Each member will have something different to contribute to the presentation that was different from last time. |
| 15 | Transition week | Archive the semester work in a proper format. Make the transition document as self-explanatory as possible. | Final evaluation of individual and project documentation. | All members need to catalogue all forms of evidence: notebook, recordings, coding or communications effectively and systematically. |

## 6.5 Semester Budget

We have no team budget since as of now it is not required.

## 6.6 Transition Report

### 6.6.1 Summary of Semester Progress / Comparison of Actual Semester Timeline to Proposed Semester Timeline

Compare actual semester timeline to proposed semester timeline (if different). What aspects varied the most from proposed to actual?

We are pretty much doing our work according to our timeline.

Discuss the progress made during the current semester, including any pitfalls that you encountered that would be helpful for future teams to avoid as well as any best practices you found that helped you to advance the status of the project or work well as a team.

In this semester, we coorporated as a team and made great progress as our project partner required by overcoming a lot of difficulties. In general, we coded a website that can do the basic functions of the PPVT-4 practice test. In order to do that, we distributed the work according to teammate's interest, so that each team member could do their best to move our project forward. In this process, we indeed encountered some pitfalls, and the most obvious reason is not able to communicating the project partner very well as we go. For example, at one point we were designing the way as the project partner initially required: displaying all the results at the end of each practice exam. We have discussed the method of doing that and made it like 30% complete, but after meeting the project partner, she said displaying the answer at each end of question will be better, and we need to redo a lot of the codings and redesigning methods. However, communicating with the project partner often is definitely a good design practice. We got a lot of information, including the previous team's progress, the PPVT-4 test, and suggestion about our interface as well. So try to avoid following the initial requirement all the way, and communicating and confirm with the project partner about the requirements often.

### 6.6.2 Draft Timeline for (next semester) and Relationship to Overall Project Timeline

Based on the work completed this semester, the work left to be completed, and the overall project timeline, create a draft timeline for the following semester.

For new/existing members, the following time line has been hypothesized:

Week 1-2: Familiarizing with the project progress and code.

Week 3-4: Meeting the project partner to get a clarity of what the SLHS Department does.

Week 5-7: Code in the dataset for feedback. Add more videos to the website. Also, have edit texts boxes to store viewer information and try making it password protected so that it can be accessed only by Purdue students and administrators.

Week 7-8: Design Review prep.

Week 8-11: Work on the goals for the remaining semester based on the ideas that they discuss in the mid semester design review.

Week 12-13: Mock run of the product for the project partner and prepare for the design review.

Week 14: Design review.

Week 15: Project transition.

Week 1-15: Project documentation.

# 7 Past Semester Archive

## 7.1 Past Semester 1

Semester: Fall 2014

### 7.1.1 Past Team Members

Name: Ze An Role: programmer Tel:  [(765)637-3652](tel:(765)637-3652); E-mail: [an40@purdue.edu](mailto:an40@purdue.edu)

Name: Jimmy Dixon Role: team leader E-mail: [dixon28@purdue.edu](mailto:dixon28@purdue.edu)

Name: Matthew Pace Role: coordinator E-mail: [pace4@purdue.edu](mailto:pace4@purdue.edu)

### 7.1.2 Past Timeline

Weeks 1 – 3: Project Orientation; Code Comprehension; Plan/Budget.

Weeks 2 – 3: Meet with project partner to determine semester needs.

Weeks 3 – 5: Design Work

Weeks 4 -5: Research good form submission.

Weeks 4 – 6: Revise past project code, if needed.

Weeks 5 – 13: Implement code for backend functionality.

Weeks 10 – 13: Revise project code; Front-end tweaks.

Weeks 7, 14, 15: Design review and semester documentation.

Week 7: Design Review 1

Week 14: Design Review2

Week 15: Transition Documentation

Weeks 1 – 15: Project Documentation

# 8 Current Semester Archive

Semester: Spring 2015

### 8.1 Current Team Members

Name: Devika Pradhan Role: team leader E-mail: dpradha@purdue.edu

Name: Mika Wu Role: project liaison E-mail: mii@purdue.edu

Name: Taoyue Zhang Role: programmer E-mail: zhan1730@purdue.edu

Name: Ha

### 7.1.2 Past Timeline

Weeks 1 – 3: Project Orientation; Code Comprehension; Plan/Budget.

Weeks 2 – 3: Meet with project partner to determine semester needs.

Weeks 3 – 5: Design Work

Weeks 4 -5: Research good form submission.

Weeks 4 – 6: Revise past project code, if needed.

Weeks 5 – 13: Implement code for backend functionality.

Weeks 10 – 13: Revise project code; Front-end tweaks.

Weeks 7, 14, 15: Design review and semester documentation.

Week 7: Design Review 1

Week 14: Design Review2

Week 15: Transition Documentation

Weeks 1 – 15: Project Documentation

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