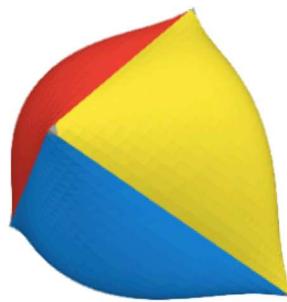


# OLEI Survey



*Final Report*

Team ELRC

Department of Computer Science and Engineering  
Texas A&M University

30 April 2024

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## **ELRC - Organization and Leadership Effectiveness Inventory**

### **1. Summary**

This project is the start of a journey to bring the Synergistic Leadership Theory, a modern take of leadership theory, into a practical and interactive web application. The mission is to develop a platform that not only educates on the theory but also allows users to access leadership effectiveness through The Organization and Leadership Effectiveness Inventory (OLEI).

Stakeholders include Drs. Beverly Irby and Matthew Etchells, alongside a team of students committed to transcending traditional, male-dominant leadership paradigms. The platform will feature an animated, interactive tetrahedral model representing the theory's core factors: Leadership Behaviors, Organizational Structure, External Forces, and Attitudes, Values, and Beliefs. This tool will facilitate a deeper understanding of leadership dynamics but also generate personalized leadership style analysis.

#### **Customer**

Dr. Beverly Irby   Dr. Matthew Etchells

#### **Product Owner**

Jacob Mathes

#### **Scrum Master**

Chengyuan Qian

#### **Developers**

Yi-Ting Lee   Minseo Park

Andres Santiago   Jacob Mathes

Brandon Nguyen   Chengyuan Qian

## 2. User Stories

### 2.1. Sprint 1

Story	Points	Status
<b>Development Environment Setup</b> ( Chengyuan Qian Jacob Mathes ) <p>[As a] development team,            [So that] we can start developing the leadership style analysis tool efficiently,            [I want to] set up our development environment with all necessary tools and dependencies.</p>	3	Done
<b>Leadership Theory Study</b> ( Chengyuan Qian Jacob Mathes ) <p>[As a] development team,            [So that] we can accurately implement its principles into our tool,            [I want to] study Synergistic Leadership Theory in-depth (or in a nutshell?).</p>	0 (Chore)	Done
<b>Initial UI/UX Design</b> ( Brandon Nguyen Minseo Park Andres Santiago ) <p>[As a] UI/UX designer,            [So that] we have a clear visual direction for our project,            [I want to] create initial wireframes for the web application.</p> <p>See: LoFi Diagram and Figma Wireframe below.</p>	3	Done
<b>Data Model Design</b> ( Jacob Valdiviez ) <p>[As a] backend developer,            [So that] we can efficiently store and process user inputs,            [I want to] design the data model for storing leadership survey responses.</p>	3	Done
<b>Data Submission</b> ( Andres Santiago Minseo Park Brandon Nguyen ) <p>[As a] school leader,            [So that] I can receive an analysis of my leadership style based on the Synergistic Leadership Theory,            [I want to] input my leadership style data through a survey on the website.</p>	3	Done
<b>Analysis Result Presentation</b> ( Yi-Ting Lee ) <p>[As a] school leader,            [So that] I can understand my alignment or misalignment within the four factors of the theory,</p>	3	Done

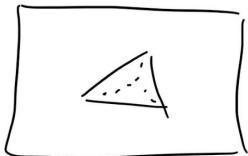
## ELRC - Organization and Leadership Effectiveness Inventory

[I want to] see my leadership style analysis presented visually.		
<b>Theory Exploration</b> ( Andres Santiago )  [As a] visitor to the website, [So that] I can learn about its principles and how it applies to educational leadership, [I want to] explore information about the Synergistic Leadership Theory.	3	Done

## ELRC - Organization and Leadership Effectiveness Inventory

### 2.1.1. Lo-Fi Diagrams

#### Synergistic Leadership



See how aligned your leadership  
is with your organization.

Take The Test

(Go to survey page)

Learn Leadership

(Go to about page)

#### About Synergistic Leadership

Developed in the 90s to provide  
a more diverse systematic view  
of leadership.

This survey allows participating  
organizations to analyze 'fit' between  
leadership style and expectations.

Take the Survey

(Go to survey page)

# Leadership Survey

①



- Strong Disagree
- Dis agree
- neutral
- agree
- Strong agree

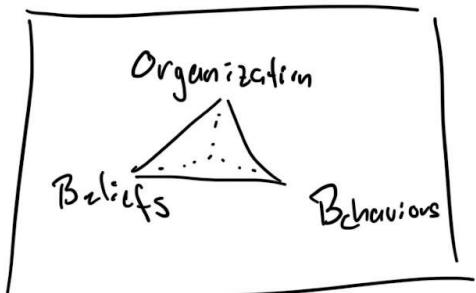
②



Analyze your Leadership

( Go to Analysis page )

# Your Leadership Style



(interactive model ⤵)

You are aligned  
with your organization.

# ELRC - Organization and Leadership Effectiveness Inventory

## 2.1.2: Figma Wireframe

The wireframes illustrate the user interface for the OLEI application across different sections:

- OLEI Overview and Background:** Shows the homepage with the Texas A&M University Education Leadership Research Center logo, navigation links (Home, About, Test, Profile), and a large graphic of the Synergistic Leadership Theory tetrahedron.
- SYNERGISTIC LEADERSHIP THEORY:** A detailed view of the tetrahedron model with vertices labeled **CHARACTER**, **BELIEF**, **BEHAVIOR**, and **EXTERNAL FACTORS**.
- ABOUT SYNERGISTIC LEADERSHIP THEORY:** An informational page about the leadership diversity concept, featuring the same tetrahedron diagram.
- CONTACT US:** A form for users to provide feedback or ask questions, including fields for name, email, subject, and message, along with a "Send" button.
- RESOURCES:** A section listing various resources available for download or reference.
- OLEI Overview and Background:** A second instance of the overview page, likely a duplicate or a different view of the same content.
- OLEI Questionnaire:** The main survey interface. It includes a header, a brief description of the inventory, and a list of four parts:
  - Part 1: Leadership Behavior - Interpersonal
  - Part 2: External Forces
  - Part 3: Organizational Structure
  - Part 4: Values, Attitudes, and Beliefs
 Below this, users are prompted to select their response for each question. The first question is "For each question, select the response that best fits your judgment." The second part, "Part 1: Leadership Behavior - Interpersonal," contains three statements with five-point Likert scale options from "Strongly Disagree" to "Strongly Agree". The statements are:
  - Leads by Example
  - Ability to "guide" many things in professional and personal life
  - Communicator
- OLEI Analysis/Profile:** A summary page showing the alignment overview and a table of scores for Part 1: Leadership Behavior - Management. The table includes columns for "Score" and "Strength" (e.g., 1, 2, 3, 4, 5) and rows for various items like "1. Leads by Example" and "3. People Oriented".
- OLEI Overview and Background:** A third instance of the overview page.
- OLEI Questionnaire (Mobile):** A mobile-optimized version of the questionnaire, showing the same layout and survey content as the desktop version.
- OLEI Analysis/Profile (Mobile):** A mobile-optimized version of the analysis/profile page, showing the alignment overview and the Part 1 score table.

## ELRC - Organization and Leadership Effectiveness Inventory

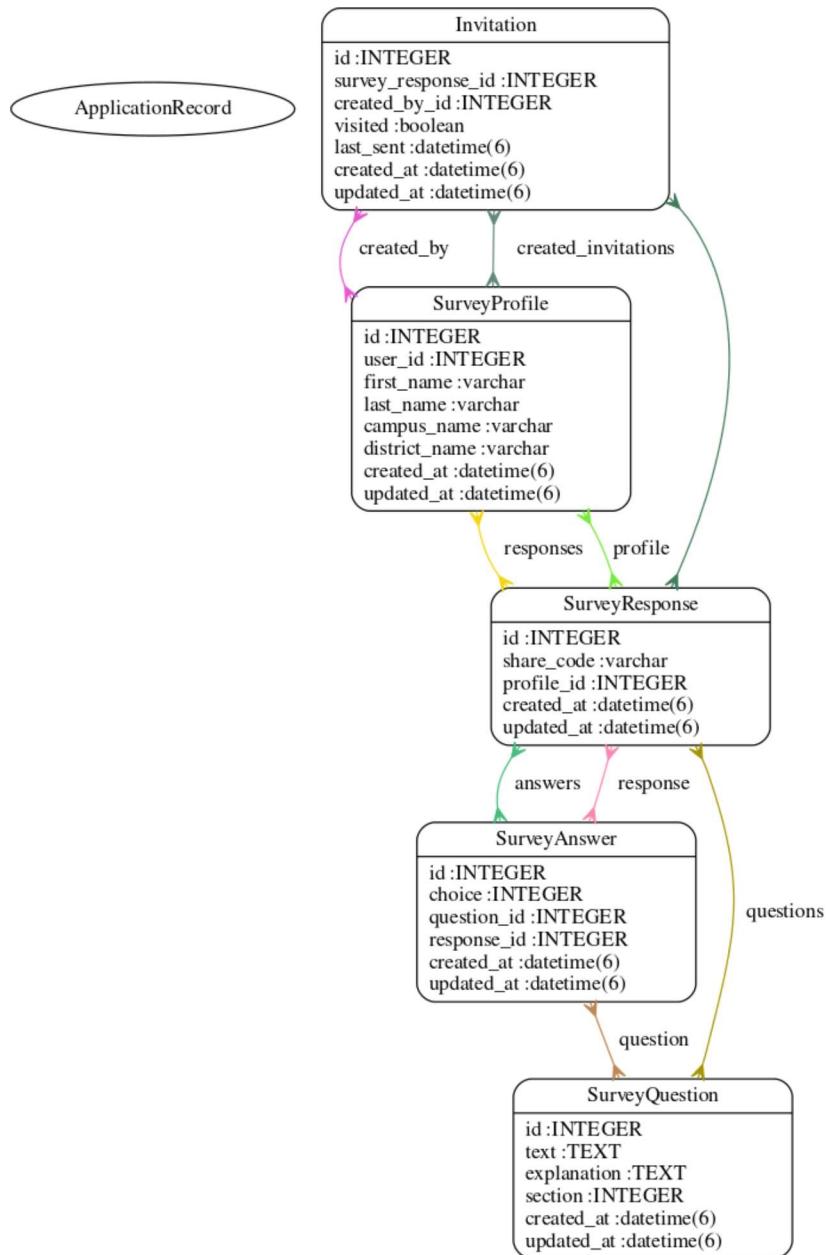
### 2.2: Sprint 2

Story	Points	Status
<p><b>UML Documentation &amp; Model Rework</b>            ( Minseo Park Brandon Nguyen Jacob Mathes )</p> <p>[As a] developer,  [So that] we can ensure that our application's architecture is clearly understood and maintainable,  [I want to] have a set of UML diagrams that accurately represent the system's current functionalities and planned features.  [I want to] access a comprehensive UML documentation that includes models of the system's architecture, data flow, and interaction between components.</p> <p>See: UML Diagram section below.</p>	3	Done
<p><b>Query Survey Information</b> ( Andres Santiago Jacob Mathes )</p> <p>[As a] Employer/Researcher  [So that] we see the survey results related to the candidate,  [I want to] query all survey results related to the candidate using the unique case number.</p>	3	Done
<p><b>Raw Survey Results</b> ( Yi-Ting Lee Brandon Nguyen )</p> <p>[As a] employer/researcher,  [So that] I can clearly see the answers to each question in a survey,  [I want to] see the raw results of a survey with each section in a separate box.</p>	3	Done
<p><b>Explanation For Each Question</b> ( Andres Santiago Chengyuan Qian )</p> <p>[As a] employer/researcher,  [So that] I can understand the implications of each survey question,</p>	2	Done
<p><b>Survey Invitation</b> ( Jacob Valdiviez Minseo Park )</p> <p>[As a] candidate,  [So that] I can have other people fill in the survey on my leadership style,  [I want to] send invitations to other people with my unique case number.  [I want to] see an explanation of each survey question on the survey result page.</p>	2	Done

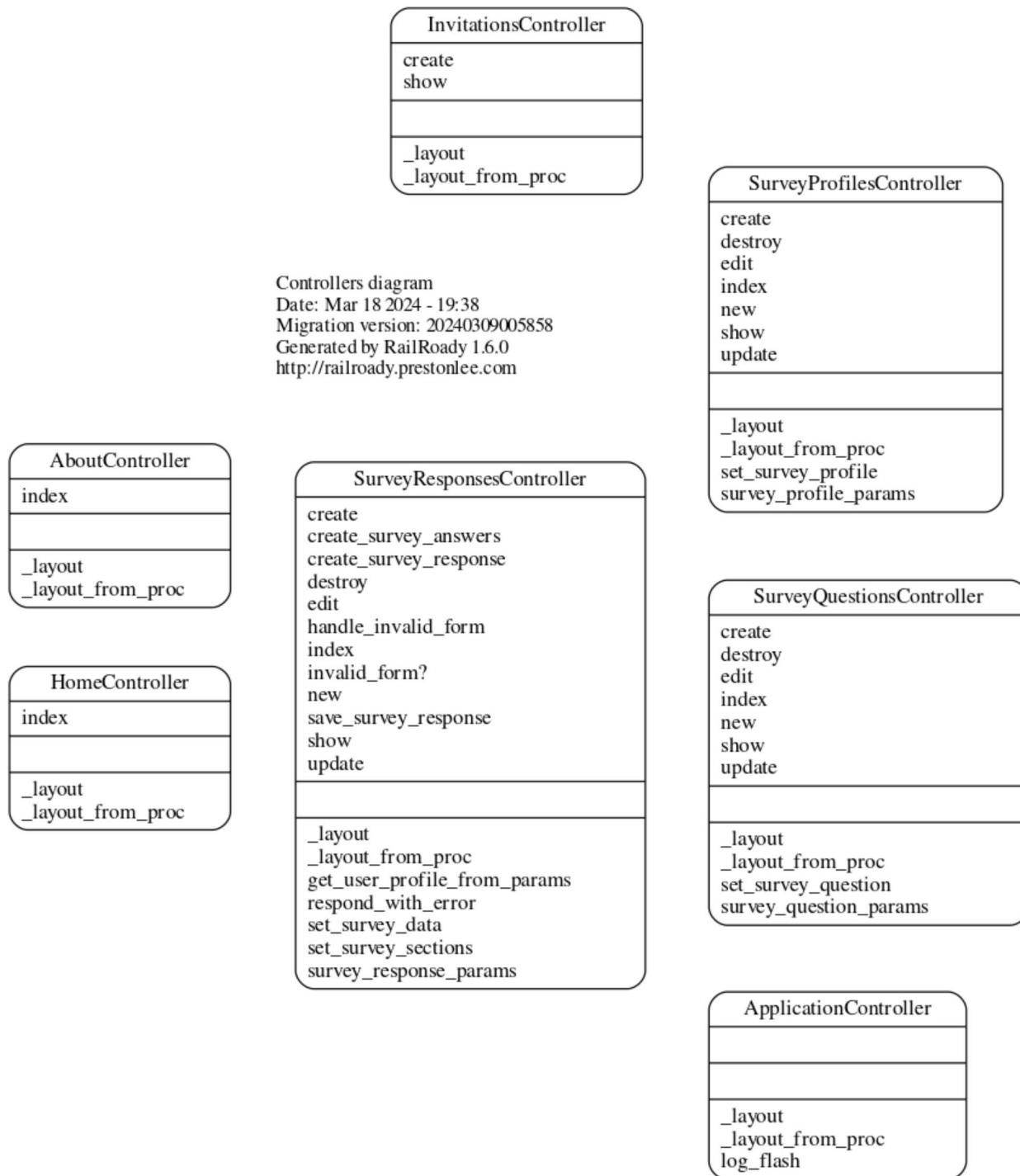
## ELRC - Organization and Leadership Effectiveness Inventory

### 2.2.1: UML Diagrams

Models diagram  
 Date: Mar 18 2024 - 19:38  
 Migration version: 20240309005858  
 Generated by RailRoady 1.6.0  
<http://railroadystatic.prestonlee.com>



## ELRC - Organization and Leadership Effectiveness Inventory



## ELRC - Organization and Leadership Effectiveness Inventory

### 2.3: Sprint 3

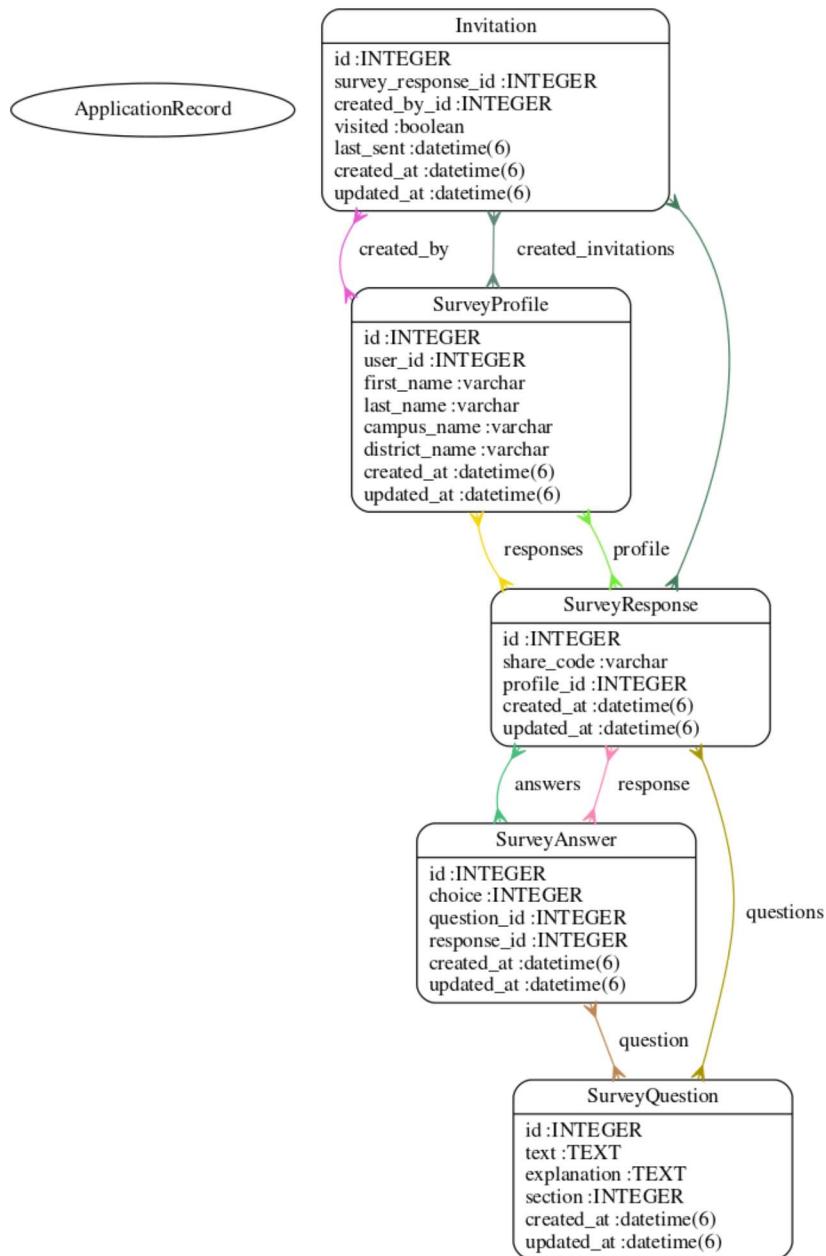
Story	Points	Status
<p><b>Auth0 - User Session &amp; Authentication</b>            ( Andres Santiago Jacob Mathes Minseo Park )</p> <p>[As a] Interested Survey Participant  [So that] I can associate my user session with an authenticated third-party identity  [I want to] Be able to login to the survey site with my OAuth / OIDC third-party identity</p> <p>See: Diagrams below for updates.</p>	3	Done
<p><b>Survey Pagination</b> ( Brandon Nguyen Yi-Ting Lee )</p> <p>[As a] survey participant,  [So that] I can focus on a smaller set of questions,  [I want to] have the questions split across multiple pages.</p>	3	Done
<p><b>Save Survey Progress</b>            ( Brandon Nguyen Chengyuan Qian Jacob Mathes )</p> <p>[As a] survey respondent,  [So that] I can complete the survey when convenient,  [I want to] be able to save my current survey progress and resume taking it later.</p>	2	Done
<p><b>Unify survey profiles and responses</b> ( Minseo Park Yi-Ting Lee )</p> <p>[As a] survey responder,  [So that] I can create a profile and take the survey,  [I want to] have a unified user experience allowing me to easily create a profile and fill out the survey.</p> <p>See: Diagrams below for updates.</p>	2	Done

## ELRC - Organization and Leadership Effectiveness Inventory

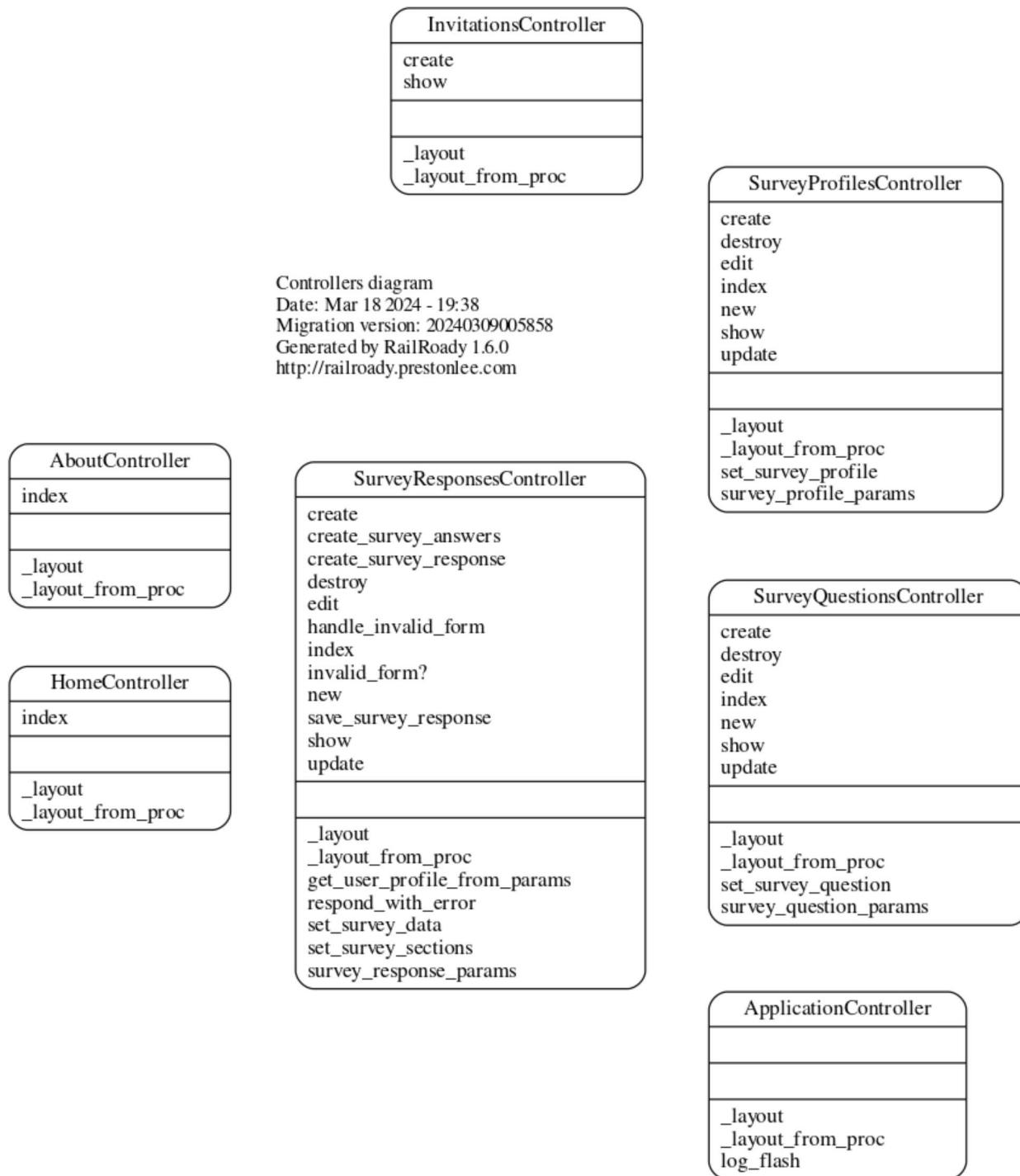
### 2.3.1: Diagrams

In this sprint, some of the models and controllers were changed to accommodate the implementation of the new features.

Models diagram  
Date: Mar 18 2024 - 19:38  
Migration version: 20240309005858  
Generated by RailRoady 1.6.0  
<http://railroadystatic.prestonlee.com>



## ELRC - Organization and Leadership Effectiveness Inventory



## 2.4: Sprint 4

Story	Points	Status
<b>Survey Profile Roles ( Jacob Mathes )</b>  [As a] survey respondent, [So that] I can answer questions based on my position, [I want to] save my position in the user profile.	1	Done
<b>Role-Based Questions ( Jacob Mathes )</b>  [As a] survey respondent, [So that] I can evaluate the principal from my perspective, [I want to] answer questions based on my relative role to the principal.	1	Done
<b>Average Supervisee (teachers) survey results ( Yi-Ting Lee )</b>  [As a] principal who has taken the survey, [So that] I can compare my result to the overall result from teachers, [I want to] calculate an average result of teachers' responses.	1	Done
<b>Show Survey Result Comparison ( Yi-Ting Lee )</b>  [As a] principal who has taken the survey, [So that] I can see my leadership style matches the environment. [I want to] see the comparison of the survey results against my supervisor and supervisees in three columns.	2	Done
<b>Bulged Tetrahedron Models ( Chengyuan Qian Minseo Park )</b>  [As a] principal who has taken the survey, [So that] I can have a clear and intuitive understanding of my leadership style with the synergistic leadership theory, [I want to] have different bulged tetrahedron models to illustrate the survey results.	2	Done
Implementation Details/Changes:  <ul style="list-style-type: none"> <li>- Initial plan was to pregenerate tetrahedrons using CAD, however, this would have required handling hundreds of OBJ/MTL files.</li> <li>- Minseo Park used delta blendshapes in order to do dynamic bulging.</li> </ul>		

## ELRC - Organization and Leadership Effectiveness Inventory

<p><b>Analyze the survey results</b> ( Jacob Mathes Brandon Nguyen )</p> <p>[As a] principal who has taken the survey,  [So that] I evaluate my leadership style according to the synergistic leadership theory.  [I want to] analyze the matches and mismatches between my survey results and my supervisor and supervisees' results, and visualize them by showing two tetrahedra and coloring the table cells.</p>	3	Done
<p><b>Accessibility Features</b> ( Brandon Nguyen )</p> <p>[As a] principal who has taken the survey,  [So that] I can see the survey results on browsers that do not support JavaScript,  [I want to] have the tetrahedron visualization to be compatible with browsers that do not support JavaScript.</p> <p>Implementation Details/Changes:</p> <ul style="list-style-type: none"> <li>- We decided that it was difficult to visualize a bulging tetrahedron via pre-generated 2D images due to lack of perspective/lighting.</li> <li>- Instead, we decided that it would be best to not use an image and instead use a text-based table</li> <li>- This table is always visible, regardless of JavaScript/WebGL support.</li> </ul>	3	Done
<p><b>Invitation with Login Routing</b> ( Minseo Park )</p> <p>[As a] invited survey respondent,  [So that] I can create my account that is linked to the inviter,  [I want to] create an account from the invitation link.</p> <p>Implementation Details/Changes:</p> <ul style="list-style-type: none"> <li>- This feature introduces the whole invitation logic</li> <li>- The corresponding Cucumber test manifests the use of this feature</li> </ul>	3	Done
<p><b>Cannot view result if it is not yours</b> ( Chengyuan Qian )</p> <p>[As a] survey respondent,  [So that] my privacy is protected,  [I want] other unrelated survey respondents not to see my survey results.</p>	3	Done
<p><b>Polishing codes</b> ( Andres Santiago Chengyuan Qian )</p> <p>Goals: Fix bugs, improve test coverage, reduce code smells.</p>	3	Done

## 3. Sprint Summaries

### 3.1: Sprint Roles

	Product Owner	Scrum Master
Sprint 1	Chengyuan Qian	Jacob Mathes
Sprint 2	Andres Santiago	Minseo Park
Sprint 3	Brandon Nguyen	Yi-Ting Lee
Sprint 4	Jacob Mathes	Chengyuan Qian

### 3.2: Summaries

#### 3.2.1: Sprint 1

(Total Points: 18)

This sprint was to establish the ground works for the project. This included setting up the development environment, studying about the Synergistic Leadership Theory, creating initial UI/UX designs, and designing the data model.

#### 3.2.2: Sprint 2

(Total Points: 10)

The data schema was acting as a roadblock for the rest of the stories. The Scrum Master gathered the team members' opinions to define a data schema, because of this, we could fully support the functionalities required by the stories given in this sprint.

This sprint was the phase where we delved into actual development, so to prevent wasting work hours or energy due to communication mishaps, the project owner and scrum master engaged in very close communication with the client. We have also completed a significant portion of the RSpec and Cucumber tests, which previously existed as placeholders, into useful tests with actual meaning.

#### 3.2.3: Sprint 3

(Total Points: 10)

In this sprint, we accomplished the goal by utilizing a third party API in auth0 to provide the user authentication system. With this, we overhauled the user profile system by attaching a profile for each unique auth0 user which enabled persistence across multiple clients. Finally, there is now a straightforward user interface which enables potential users to quickly sign up, create a profile, and take the survey.

## **ELRC - Organization and Leadership Effectiveness Inventory**

### **3.2.4: Sprint 4**

(Total Points: 20)

We successfully met our sprint goals, enhancing the web platform focused on synergistic leadership theory. Our team excelled in refining the analysis of survey results, implementing dynamic algorithms that adjust based on respondent roles, thereby enriching the data's relevance and accuracy. We also advanced the visual presentation by integrating sophisticated tetrahedron models, which now effectively illustrate complex analytical results. Additionally, we made significant strides in code quality—debugging, expanding our testing framework, and improving test coverage have all contributed to a more robust and maintainable system. This sprint has not only fulfilled but also exceeded client expectations, setting a high standard for future development phases.

### **3.3 Point Breakdown**

<b>Assignee</b>	<b>Sprint 1</b>	<b>Sprint 2</b>	<b>Sprint 3</b>	<b>Sprint 4</b>	<b>Total</b>
Brandon Nguyen	6	3	5	6	20
Yi-Ting Lee	3	3	5	3	14
Chengyuan Qian	3	2	2	6	13
Andres Santiago	9	5	3	3	20
Jacob Mathes	3	3	5	5	16
Minseo Park	6	2	5	3	16
Jacob Valdiviez	3	2	0	0	5

## 4. Customer Breakdown

### 4.1: Online, 2024-02-13 12 PM

#### Summary

- Began meeting with introductions from team and project sponsors, Beverly Irby and Matthew Etchells
- Student performance predictions created from data processed by AI models to enable better learning
- Described other projects in the works by ELRC
- Discussed origin of synergistic leadership theory
  - Synergistic Leadership Theory
    - Organizational Leadership Effectiveness Inventory (OLEI)
    - 4 factors - tetrahedral model (Beliefs and Values, Leadership Behaviors, External Factors, Organizational Structure)
    - Consider all 4 factors when evaluating leadership
  - Website contain:
    - synergistic leadership theory information
    - Animated/interactive tetrahedral model
      - Selecting a side of the tetrahedral pulls up information about selected field
    - OLEI processing (input and output)
      - Survey
      - Outputs leadership style analysis from predetermined options
      - Similar to personality analysis sites (Enneagrams, Myers Briggs, etc.)
  - In person meeting - Feb. 13 4pm - 5pm @ Harrington Tower
  - Sponsors will upload relevant documents to shared drive

#### Feedback

- The sponsors are highly pleased with our meeting preparations and hold a positive outlook on the future of our partnership.

## **ELRC - Organization and Leadership Effectiveness Inventory**

### **4.2: 715B Harrington Tower, 2024-02-13 4 PM**

#### **Summary**

- Database Model:
  - A person (principal/superintendent, or candidate for the job) takes a survey, this will create a case number.
  - Other evaluators (school board, administrative team, teachers) can use the same case number to fill out surveys evaluating this person.
  - A person can take surveys at different times to reveal the changes in their leadership style.
- Survey Types:
  - A person can take a survey reflecting their own leadership style and estimation of their supervisors, organization, and external community.
  - People from the school board (supervisors), the organization, and the external community can take survey reflecting their opinion on the leadership style
- Survey Analysis:
  - The survey consists of 5 parts, the first part will be compared with the other four parts to give a matching score on the four aspects of the synergistic leadership theory.
  - Questions are correlated across different parts. For example, questions 1-3 in part 1 and question 1 in part 5 all ask about the openness to changes. If the answers in part 1 and part 5 both tend to agree on the openness to changes, then the matching score for the Values, Attitudes, and Beliefs aspect increases.
- Visualization:
  - The four aspects of the synergistic leadership theory correspond to the four faces of a tetrahedron. If the matching score in an aspect is high, its corresponding face is flat; otherwise, the face will bulge out (being convexly curved).
- Others:
  - Annual reminder to the principal to take the survey again.

#### **Feedback**

The sponsors are extremely content with our Lo-Fi User Interface Sketches, Storyboards, and the website's framework. They are willing to supply us with additional materials for the website's content.

## 4.3: Online, 2024-02-20 16:00 CST

### Summary

- The sponsors expressed a desire to query survey information related to their respective teachers or subordinates.
- They discussed the addition of icons and context to accompany the raw survey results, intending to enrich the results with a narrative.
- There was a request for an explanation for each survey question, accessible via a dropdown menu, along with a more comprehensive categorical analysis.
- It was mentioned that using library definitions for explanations of some questions is acceptable (for example, exploring what empathy might look like from the perspective of a high school principal).
- The team agreed on the plan to distribute our Minimum Viable Product (MVP) to actual schools for a testing period of approximately 4-5 weeks before the final report, with April 5th earmarked as the "market launch" date.
- They desire the creation of four boxes to display the raw results of the survey, with narrative explanations provided below these results. Additionally, they want to implement a dropdown menu (or another mechanism) for each question to offer its explanation.
- They wish for principals to have the capability to invite others or share links to the survey and to send reminders to those who have not yet completed the survey.

### Feedback

The sponsors were extremely content about our development progress and the communication experience with us. They understood our questions and promised to prepare more materials to solve them.

## 4.4: Online, 2024-03-05 16:00 CST

### Summary

- Discussion around the updated UML documentation and model rework. The team walked through the changes made to ensure the application's architecture is clearly understood and maintainable.
- The team mentioned the upcoming spring break and discussed plans to ensure continuity of work during this period. They committed to maintaining communication and completing any critical tasks before the break to minimize disruption
- Sponsors inquired about the plan for the next sprint. The project owner outlined the remaining features to be implemented and any anticipated challenges.
- Set the expectation for the MVP to be ready for a round of user testing with actual schools by early April, aligning with the previously discussed "market launch" timeline.

### Feedback

The sponsors expressed satisfaction with the progress made during sprint 2 and the team's responsiveness to feedback. They reiterated their enthusiasm for the project and willingness to provide any additional materials or input needed to support the next phase of development.

## **ELRC - Organization and Leadership Effectiveness Inventory**

### **4.5: Harrington Tower, 2024-03-19 16:00 CDT**

#### **Summary**

- Discussed realistic expectations and directions for the project deliverable at the end of the semester.
- Client discussed steps remaining for data processing before it can be given to the development team to implement in the data analysis feature.
- Client also mentioned providing the development team with real-world responses to the OLEI in order to validate the application.
- The client mentioned potential features regarding user retention during the survey response phase, and user feedback on their opinion of the quality of results.
- The client is aware that they need to provide a detailed explanation/specification of analysis of the OLEI in order for the development team to continue making meaningful progress towards a completed product.

#### **Feedback**

The clients were satisfied with the progress made in sprint 2, and were understanding of the end-of-semester timings in order to get the project completed on time.

**4.6: Online, 2024-04-2 16:00 CDT**

## **Summary**

- User Profile needs to include job position / role
- Part X (in survey) - Could render different questions based on role (Role-based questions).
- Chen suggests sending invite links , and in that process, the subject selects if they are sending to supervisors or subordinates.
- Instead of superior / subordinate, use supervisor - supervisee
- Correlation matrix - if a question is answered, points are added to corresponding categories
- For "360" responses - how does tetrahedron get updated when supervisor finishes survey on supervisee?
- For now - Focus on the bulging between "360" responses on an individual - show where the supervisor disagrees with a supervisee
- To show alignment with different groups within an organization, average the responses from each group (teachers, principal) see how you are aligned with each group.
- Add fields to add 'why' they feel they are misaligned / aligned with different points on survey
- Principal gets responses - principal has two tetrahedrons - superintendents & teachers don't see tetrahedrons. ( $\text{tet 1} = p + s$  ,  $\text{tet2} = p + t_{\text{avg}}$ )
- It's all about the principal - the principal is the only one answering in first person.
- Include metrics (how aligned?) to show the degree of bulge.

## **Feedback**

Some really good discussion in this last meeting. The sponsor has backed off the need for us to do individual analysis (correlation matrix) for each individual response, and has pivoted to more analyzing the degree of alignment with others within the same organization. This will mean we need to look at implementing more detailed user profiles that include user roles, and implementing phrasings of questions for different roles going forward.

## **ELRC - Organization and Leadership Effectiveness Inventory**

**4.7: Online, 2024-04-11 16:00 CDT**

### **Summary**

- DISCUSSING NEXT STEPS:
- Irby's next steps - (next semester) :
  - Analyze the differences - have a reporting on the actual bulging points. Basically a write up of their differences.
- Chatbot reporting feature - to add a human element to the narrative.
- Steps now:
  - Add OLEI Title to the homepage to make it more clear which page is the home page.
  - Ask Ritchey if Etchells can access to edit the frontend to make wording changes to the survey itself (because they want to edit their proprietary survey questions). Needs to be some capacity where they can modify the UI.

### **Feedback**

Want to demo the survey result analysis next thursday ( 4/18 )

## **ELRC - Organization and Leadership Effectiveness Inventory**

4.8: Online, 2024-04-18 15:30 CDT

### **Summary**

- Live demonstration of analysis feature:
- Sponsor was pleased with the result analysis

### **Feedback**

For the final report - possibly write the final report in the style of an educational research paper (i.e., designing instruments). We can talk to Ritchey and have him communicate with sponsors.

## **5. Process**

### **5.1: BDD/TDD Process**

**Requirement Analysis:** We began with gathering and analyzing requirements. This involved close collaboration with stakeholders to ensure that the user stories accurately captured the desired functionalities.

#### **5.1.1: Test-Driven Development (TDD):**

1. **Write Tests First:** For each functionality, we started by writing RSpec tests before writing any code. These tests were designed to fail initially.

#### **5.1.2: Behavior-Driven Development (BDD):**

1. **Feature Files:** We used Cucumber to write feature files, which describe the behavior of the application from the user's perspective.
2. **Scenarios:** Each feature consisted of multiple scenarios, written in plain language that non-technical stakeholders could understand.
3. **Step Definitions:** These scenarios were then linked to step definitions, which are Ruby blocks that execute the scenarios.

#### **5.1.3: Integration:**

We integrated TDD and BDD by ensuring that:

1. Unit Tests (from TDD) covered the technical aspects.
2. Feature Tests (from BDD) covered the user interactions and workflows.

#### **5.1.4: Continuous Integration (CI):**

We used GitHub Actions to run tests on the application. Only once all the tests pass can the code be deployed.

## **5.2: Benefits**

1. **Improved Communication:** BDD helped improve communication between developers, testers, and non-technical stakeholders by using plain language to describe product features.
2. **Higher Quality Code:** TDD led to more robust, error-free code, as it required developers to thoroughly test each piece of functionality before it was integrated.
3. **Early Bug Detection:** Both methodologies helped in detecting issues early in the development cycle, reducing the cost and effort of fixing bugs in later stages.

### **5.3: Problems**

1. Initial Learning Curve: The team needed time to adapt to the rigor of writing tests before actual code and learning BDD tools and syntax.
2. Time Investment: Initially, writing tests, especially feature files for BDD, required more time than traditional development methods.
3. Maintenance: Maintaining a large suite of tests could become cumbersome as the application grows and changes, potentially slowing down the development process.

### **5.4: Conclusion**

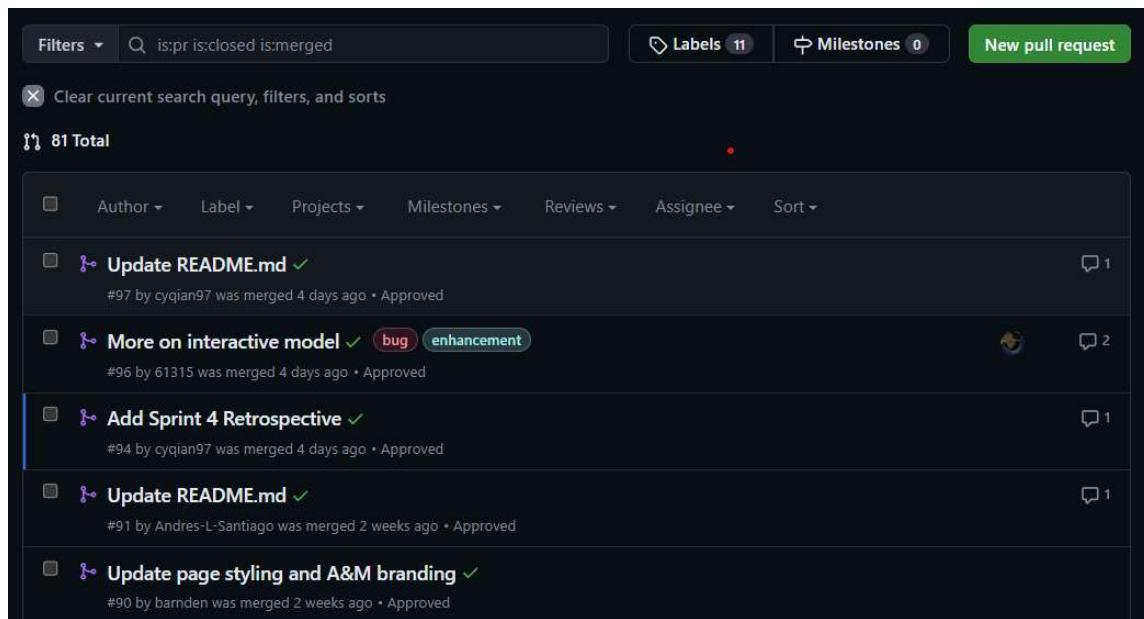
Integrating TDD and BDD in a Ruby on Rails project significantly enhanced our development process by fostering better communication and producing higher-quality code. While the initial investment in terms of time and learning was significant, the long-term benefits in terms of reduced bugs and better collaboration were well worth the effort.

## 6. Config Management

We did not officially have any spikes during any of our sprints. Our high level of communication and familiarity with the framework covered most of the technical issues we encountered.

### 6.1: Branches & Pull Requests:

We have a total of 81 merged pull requests, each corresponding to a unique feature branch that was created to modify the codebase or add a new feature.



The screenshot shows a pull request list with the following details:

- Filters:** is:pr is:closed is:merged
- Labels:** 11
- Milestones:** 0
- New pull request:** button
- Total:** 81
- Pull Requests:**
  - #97 by cyqian97 was merged 4 days ago • Approved
  - #96 by 61315 was merged 4 days ago • Approved
  - #94 by cyqian97 was merged 4 days ago • Approved
  - #91 by Andres-L-Santiago was merged 2 weeks ago • Approved
  - #90 by barinden was merged 2 weeks ago • Approved

### 6.2: Releases:

We have 4 Releases - one for each Sprint MVP. Each release includes a changelog and information regarding the contributors for that sprint.

## ELRC - Organization and Leadership Effectiveness Inventory

The screenshot shows a GitHub repository page for 'Sprint4'. At the top left, it says '4 days ago' and has a user icon for '61315'. Below that is a dropdown menu with 'Sprint4' and '32de96a'. A 'Compare' button is also present. The main title 'Sprint4' is at the top center with a 'Latest' badge. To the right are edit and delete icons.

### What's Changed

- Add Sprint 4 Plan and Sprint 3 Retrospective by [@cyqian97](#) in [#68](#)
- Fix a lot of things by [@cyqian97](#) in [#69](#)
- Fix unify feature by [@LucaLee207](#) in [#67](#)
- Added rails credentials by [@Andres-L-Santiago](#) in [#71](#)
- users can select role upon login and see role later on by [@jacbtoddmathes](#) in [#72](#)
- adding tests and groundwork to make survey response page render role---- by [@jacbtoddmathes](#) in [#73](#)
- Added redirection of users without profile to profile creation by [@Andres-L-Santiago](#) in [#74](#)
- [#187381833] Feature 28: Invitation with Login routing by [@61315](#) in [#75](#)
- [#187382426] Offenses and coverage by [@61315](#) in [#76](#)
- Average and compare by [@LucaLee207](#) in [#79](#)
- fix invitation button in show page by [@LucaLee207](#) in [#80](#)
- updating the questions for each section based on role by [@jacbtoddmathes](#) in [#81](#)
- README.md update by [@Andres-L-Santiago](#) in [#82](#)
- Fix bug with printing teacher response by [@barnden](#) in [#84](#)
- Home page and survey responses page now show the invite token associa... by [@jacbtoddmathes](#) in [#87](#)
- Tetrahedron & Synergism Table by [@barnden](#) in [#86](#)
- feat: tetrahedron with blendshapes by [@61315](#) in [#88](#)
- removing javascript from simplecov by [@jacbtoddmathes](#) in [#89](#)
- Update page styling and A&M branding by [@barnden](#) in [#90](#)
- Update README.md by [@Andres-L-Santiago](#) in [#91](#)
- Add Sprint 4 Retrospective by [@cyqian97](#) in [#94](#)
- More on interactive model by [@61315](#) in [#96](#)

Full Changelog: [Sprint3...Sprint4](#)

### Contributors

barnden, 61315, and 4 other contributors

### Assets

- Source code (zip) 4 days ago
- Source code (tar.gz) 4 days ago

## 7. Production

We are deploying our application using PaaS provider Heroku, and have set up continuous deployment hooks inside our GitHub repository.

The automatic deployment pipeline catches any code that fails any tests and does not deploy the new application code. Once the code passes the test checks, Heroku detects a successful push to the main branch and creates a new deployment.

Heroku instantiates a production postgresql database for our application to use in its production environment.

We have had no issues with application downtime using Heroku.

## 8. Tools

### 8.1 CI/CD with GitHub Actions

For the Rubocop badge in the CI/CD workflow on GitHub we used the [Dynamic Badges Action](#) plugin. To set this up, a developer must create a GitHub OAuth token with gist permissions and store it as a repository secret under GIST\_SECRET. Then, navigating to <https://gists.github.com> make a blank gist named “badge.json” and copy the Gist ID into the workflow configuration; the link will look like [https://gist.github.com/username/:gist\\_id](https://gist.github.com/username/:gist_id).

### 8.2 Auth0

We are using [Auth0 authentication service](#) to authenticate users within our application (OAuth / OpenID service).

There is very easy-to-follow documentation for integrating Auth0 with our rails application [here](#).

To be able to be added to the Auth0 tenant in the future (for future project developers), please email the team at the emails listed in the repository readme. This is a chore, but must be done.

### 8.3 SimpleCov & CodeClimate

We are using SimpleCov to measure our application’s code coverage, which is the percentage of our code that is covered in our automated behavioral and unit level tests. This tool is incredibly useful, as it reveals hidden areas of our code that were untested, and therefore unpredictable by our test-driven development standards.

CodeClimate is where we publish the results of our SimpleCov coverage report, such that interested parties may see the maintainability and relative health of our codebase. The link to our public CodeClimate page is in our GitHub readme.

### 8.4 Testing Framework

We are primarily using the [Cucumber](#) testing framework for our behavioral tests, and using [Rspec](#) testing tool for our unit-level tests.

## 9. Deployment Steps

Our deployment documentation and setup steps are all documented in our repository readme.

The link to our readme is [here](#).

## 10. Links

GitHub	<a href="https://github.com/tamu-edu-students/csce606-ELRC-Synergistic-Leadership-Theory">https://github.com/tamu-edu-students/csce606-ELRC-Synergistic-Leadership-Theory</a>
Pivotal Tracker	<a href="https://www.pivotaltracker.com/n/projects/2690137">https://www.pivotaltracker.com/n/projects/2690137</a>
Slack	<a href="https://app.slack.com/client/T06GRHECJEM/C06GY2R74KX">https://app.slack.com/client/T06GRHECJEM/C06GY2R74KX</a>
Live Deployment	<a href="https://elrc-app-dfcfc7cd862b.herokuapp.com/">https://elrc-app-dfcfc7cd862b.herokuapp.com/</a>
Presentation and Demo Video	<a href="https://youtu.be/PPLdSZ64VRw">https://youtu.be/PPLdSZ64VRw</a>