

Sprint 2 Retrospective Review Report

1. Links

- [Pivotal Tracker](#)
- [GitHub Repository](#)
- [Heroku Deployment](#)

2. Dates of the Sprint

- **Start Date:** 2/3/2025
- **End Date:** 2/14/2025

3. Team Contribution

Name	Role	Points Completed
Casey Kung	Product Owner (PO)	4
Olivia Lee	Scrum Master (SM)	4
Owen Schultz	Developer (Dev)	4
Sam Lightfoot	Developer (Dev)	4
Leo Gonzalez	Developer (Dev)	3
Ethan Nguyen	Developer (Dev)	3

4. Sprint Goal

Students can take practice tests and view their progress, instructors can add question templates, and administrators can view and change the role of all accounts.

5. Sprint Achievements

This sprint, we were able to fully meet our sprint goal and increase the functionality of our project. Students now have the ability to take practice tests and are able to select the number of questions they want in that practice test. They can also view a summary of their personal progress and what questions they've gotten right/wrong to see what areas they need to work on. The admin role was also created and administrators

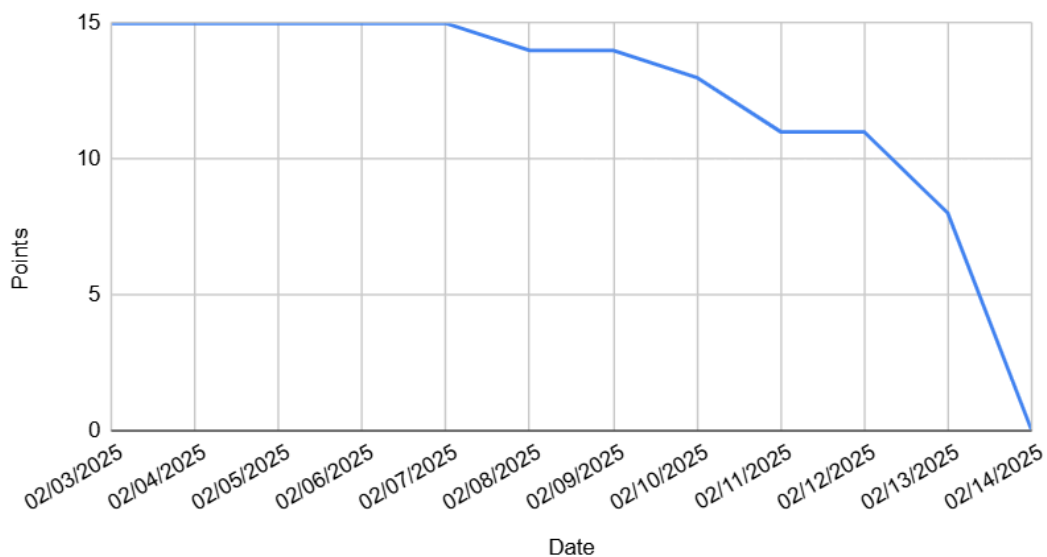
have the ability to change the roles of any other account holders. Additionally, instructors can add new questions templates so that the practice problems students receive are reflective of any changes in the course.

6. Sprint Backlog Items and Status

Backlog Item	Status	Notes
Access practice tests	Completed	Scenarios/steps changed to match test format.
Student view personal progress	Completed	No changes
Administrator promoting accounts to professor	Completed	No changes
Creation of admin role	Completed	No changes
Question templates	Completed	No changes
Navigation/Back Buttons	Completed	This story was added as per the request of our client.

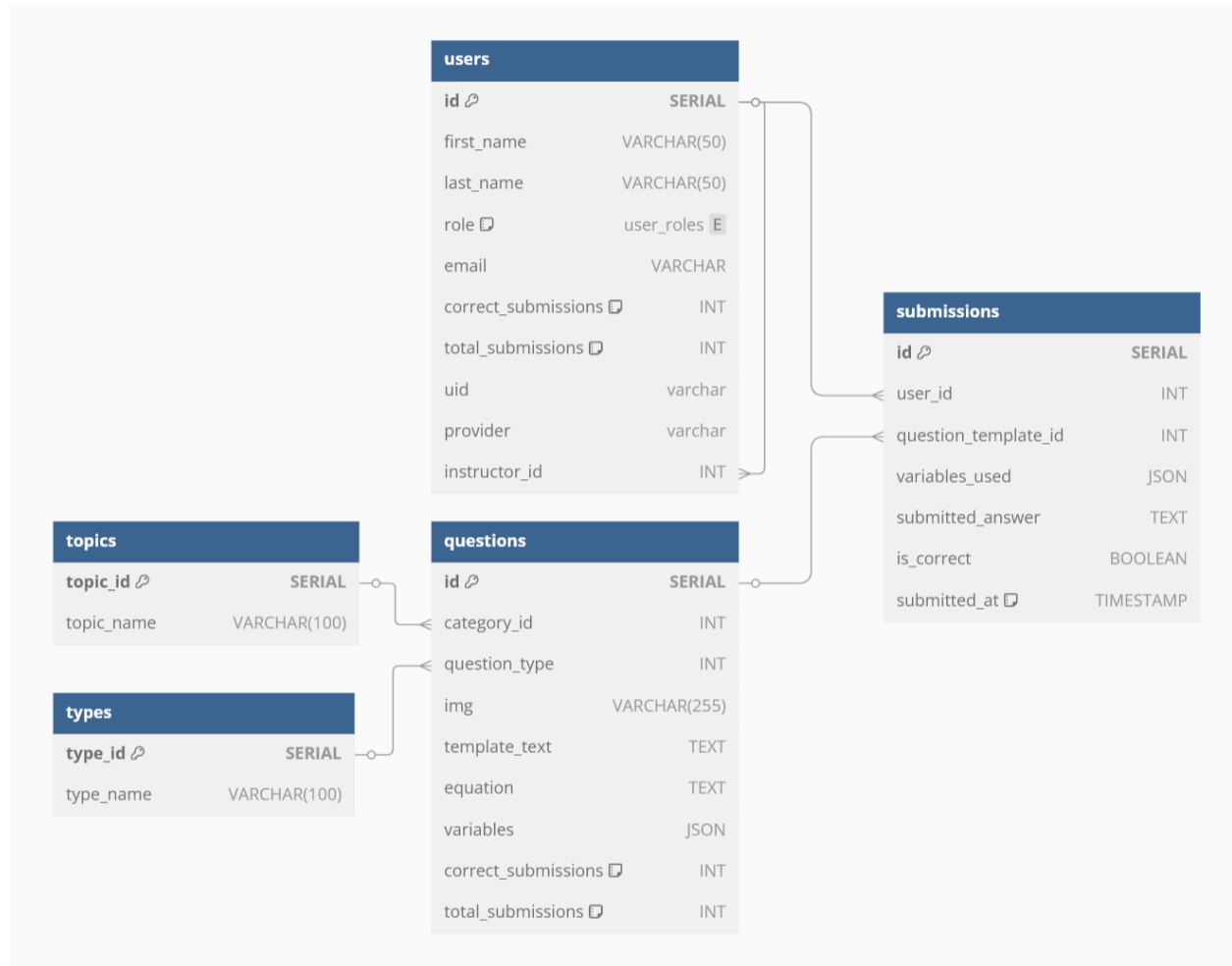
7. Burndown Chart

Sprint 2 Burndown



- **Notes:** In this sprint, many developers had tests the first week, delaying our progress due to the need for studying. We unfortunately ended up not being able to get much done this week, and didn't have much to show for our first week meetings. But the second week, everyone worked hard to get our user stories done and we were able to complete everything to meet the sprint goal for the demo.

8. Design Diagrams



Access Practice Tests

As a user

So that I can take a
ENGR 216 practice test

I want to access a
system that allows me
to attempt and submit a
practice test with
feedback

Practice Problems		Practice Tests	Results	
Practice Test 1		85/100		
Practice Test 2		82/100		
Practice Test 3		93/100		
Take New Practice Test				

Student View Personal Progress

As a student


so that I can see what
area I need to work on

I want to be able to view
the questions I got right
and wrong

Practice Problems

Practice Tests


Results




Practice Summary

Questions Correct: 45


Questions Practiced: 52

Back to Practice 

Topics Practiced



Question Type



Creation of Admin Role

As an Admin,
So that I can log into
the admin home
page

I want to be able to
sign in with my TAMU
google account

ENGR 261 Practice Problem Generator

Login:

Question Templates

As a teacher,

I want to be able to add a
new practice question
template,

So that I can continuously
update the questions that
are given to students as the
curriculum changes.

Question Templates Student Results

Template Text

Given a ball rolling down the hill, if the mass of the ball is [m]kg and the slope of the hill is set at [a] degrees, what is the acceleration of the ball when the ball has rolled [d] meters down the hill?

Variables

[m, a, d]

Submit

Administrator promoting accounts to professor

As an administrator,
so that I can manage
accounts with professor
privileges,

I want to be able to
promote tamu accounts
to professor status

Roles	Question Templates	Student Results
Olivia Lee	admin	▼
Casey Kung	admin	▼
Owen Shultz	teacher	▼
Leo Gonzalez	student	▼
Sam Lightfoot	student	▼
Ethan Nguyen	student	▼

Navigation/Back Buttons

As an user,

so that I can go back
to previous pages,

I want
navigation/back
buttons for ease of
movement between
the pages.

Practice Problems Practice Tests Results

Topics:

☐ motion equations

☐ velocity

☐ acceleration

☐ circular motion

Question Types:

☒ multiple choice

☐ definition

☒ free response

Submit

Back

9. Documentation of Changes

- **Changes to Design:**
 - We added a submission table to keep track of user submissions as a joint table between questions and users. It is shown in our database diagram above.
 - Our pages look different from the lo-fi prototypes since we wanted to prioritize functionality over styling, but we will work on improving styling this sprint.
- **Changes to Cucumber Tests:**
 - **Question Templates**
 - Changed wording for question template feature file to fit format for submitting template
 - **Student Progress**
 - Added a table with for existing submissions to make sure the cucumber scenario would run with data
 - Changed login step wording to be unique in order to attach submissions to user
 - **Practice Tests**
 - Updated practice test feature user story scenarios to comprehensively test and align with the new test format, as past practice tests cannot be shared with students. Revised scenarios, and changed the scenario steps within, to the following:
 - Successfully generate and complete a practice test
 - Attempt to generate a practice test without any topics or question types selected

10. Evaluations of Code and Test Quality

Smells

- Control Parameter
 - This was found in our User implementation. We have a long list of parameters, hindering readability, so to fix this we should reduce the number of parameters in our User implementation.
- Data Clump
 - This was found in our OAuth implementation. It means that we have multiple variables used together in multiple places in a program, making code harder to understand, maintain and change. To fix this we should combine variables into a single object.
- Duplicate Code
 - This was found in numerous different files. To fix this, we should make a function for the duplicate code and call the function in the multiple areas that the duplicate code was found in.
- DuplicateMethodCall
 - This was found in numerous different files. To fix this we would need to store the value called by the function and then use this to manipulate data instead of calling the function each time.
- Feature Envy
 - This was found in numerous different files. This occurs when a class uses another class's methods excessively. To fix this, we must extract the method from the other class and move it to the class that uses it excessively.
- HighComplexity
 - This was found in numerous different files. This occurs when a function is too convoluted and can be fixed by breaking it up into multiple functions.
- InstanceVariableAssumption
 - This was found in numerous different files because an instance variable wasn't properly initialized. This can be fixed by making sure to initialize all variables.
- IrresponsibleModule
 - This was found in numerous different files. This occurs when a module is responsible for too many things, and can be fixed by breaking it down into smaller modules.
- NilCheck
 - This was found in numerous different files. It indicates poor handling of nil values through the use of too many nil? values, so code should be adjusted to reduce this and use guard clauses early on.
- TooManyInstanceVariables

- This was found in numerous different files. If a class has too many instance variables, it has too many responsibilities and should be broken up or the amount of instance variables should be reduced.
- TooManyStatements
 - This occurs when a method performs too many tasks, and can be fixed by breaking down methods into smaller focused methods.
- UncommunicativeVariableName
 - This was found in numerous different files. To fix this we must adjust the variable names so they are more descriptive.
- UtilityFunction
 - This was found in numerous different files. Utility functions are too generic and can lead to duplication or a lack of context, so they should be encapsulated within appropriate classes/modules with clearer context and responsibility.
- VeryHighComplexity
 - This was found in numerous different files. This occurs when a function is extremely convoluted and can be fixed by breaking it up into multiple functions to reduce complexity.

Style Offenses

- Style issues were addressed with rubocop, there were no issues that could not be fixed either by “rubocop -a” or reading the offenses and manually fixing them.

Coverage

- Cucumber
 - 24 scenarios (2 undefined, 22 passed)
 - 152 steps (3 undefined, 149 passed)
 - Line Coverage: 93.98% (312 / 332)
- Rspec
 - 132 examples, 0 failures
 - Line Coverage: 98.8% (328 / 332)
- **Details:** With our efforts to write effective tests we were able to get above 90% test coverage for both Cucumber and RSpec testing.

11. Customer Meeting

- **Meeting Date:** 02/03/2025
 - **Meeting Time:** 3:00 PM
 - **Meeting Place:** Zoom
 - **Summary:** We discussed the current iteration of our deployed branch, went over completed stories from the previous sprint, as well as how it can improve. Our client said everything looks good, just make sure that the deployment works as expected.
-
- **Meeting Date:** 02/10/2025
 - **Meeting Time:** 2:45 PM
 - **Meeting Place:** Zoom
 - **Summary:** I showed our client the current deployment, with correctly seeded data this time, as well as the stories being developed for this sprint. Everything was approved, but the client highly recommended adding back buttons for the pages to allow for easier navigation.
-
- **Meeting Date:** 02/21/2025
 - **Meeting Time:** 2:45 PM
 - **Meeting Place:** Zoom
 - **Summary:** I showed the client our finished sprint 2 MVP, and she was very happy with the new functionalities, specifically the question template for instructors as well as practice tests. We discussed the next sprint's goals of styling and adding a few more functionalities and everything was approved.

12. BDD & TDD

CUCUMBER TESTS

Feature: Admin promotion

As an administrator,

so that I can manage accounts with professor privileges,

I want to be able to promote tame accounts to professor status

Scenario: Admin views list of accounts

Given I am logged in as an administrator

And I click "View Accounts"

Then I should be on the accounts page

And I should see a list of all accounts and their roles

Scenario: Admin promotes an account to professor

Given I am on the view accounts page

And there is an account with the student role

When I select instructor in the role dropdown

And I click Update Role in that row

Then the selected account will have the instructor role

Feature: Instructor creates a new question template

As an instructor

I want to create a new question template

So that I can add it to the database

Background:

Given I am logged in as an instructor

Scenario: Successfully create a new question template

Given I am on the custom template page

When I fill in "Question Template Text" with "Sam applied (F) newtons of force to a ball that is (m) grams. What is the ball's acceleration?"

And I fill in "Equation" with " F / m "

And I fill in "Variables (comma separated)" with "F, m"

And I fill in "Answer Format" with " $a = F / m$ "

Scenario: Navigate back to the instructor homepage

Given I am on the custom template page

When I click on "Back to Instructor Homepage"

Then I should be on the instructor home page

Feature: Login as Admin

As an admin,

so that I can access the admin homepage,

I want to log in using my @Tamu Google account.

Scenario: Login as admin with valid tamu email

Given I am on the welcome page

And I have an admin account

And I click "Login with Google"

Then I will be on the Admin Homepage

Scenario: Login as admin with invalid credentials

Given I am on the welcome page

When I have an invalid admin account

And I click "Login with Google"

Then I should be on the welcome page

And I should see a message "Please login with an @tamu email"

Scenario: Login as admin with invalid credentials

Given I am on the welcome page

When I have an invalid admin account

And I click "Login with Google"

Then I should be on the welcome page

And I should see a message "Please login with an @tamu email"

Feature: Practice Test Functionality

As a user

So that I can take a ENGR 216 practice test

I want to access a system that allows me to attempt and submit a practice test with feedback

Background:

Given a predefined question exists

Given another predefined question exists

Given I am logged in with a valid tamu email

Given I visit the practice tests page

Scenario: Successfully generate and complete a practice test

Given I select the topics "Velocity" and "Accuracy and precision of measurements, error propagation"

And I select the question types "Definition" and "Free Response"

And I submit the form

Then I should be redirected to the practice test generation page

Given I should see multiple randomly selected problems

And I should see multiple input fields to submit my answers

When I answer all the questions

And I submit my practice exam

Then I should see my score

And I should receive feedback on my test answers

Scenario: Attempt to generate a practice test without any topics or question types selected

Given I don't select any topics

And I don't select any question types
When I submit the form
Then I should see the message "No questions available for the selected criteria."
And I should be redirected to the practice test form page

Feature: Question Templates

As a teacher,
I want to be able to add a new practice question template,
So that I can continuously update the questions that are given to students as the curriculum changes.

Background:

Given I am logged in as an instructor

Scenario: Teacher wants to add a new practice question template

When I click the add a new practice question button
Then I am prompted to enter the template and submit

Feature: Select Instructor

As a student,
so that I protect information about my practice problems from my instructor,
I want to be able to choose whether to opt into identifying my instructor.

Scenario: A student selects their instructor

Given I am logged in as a student
And I am on the profile view
When I click the dropdown menu of CSCE 216 instructors
And I select my instructor
And I click the 'Save Instructor' button
Then the selected instructor will be opted in to view my practice problem results

Scenario: A student does not select an instructor

Given I am logged in as a student
And I am on the profile view
When I do not select an instructor from the dropdown menu of CSCE 216 instructors
And I do not click 'Submit'
Then my instructor will not be opted in to view my practice problem results

Feature: Student View Personal Progress

As a student
So that I can see what areas I need to work on
I want to be able to view the questions I got right and wrong

Background:

Given I am logged in

Scenario: Student wants to view question progress

Given the following submissions exist:

Topic	Question	Correct?
Velocity	What is gravity?	false
Velocity	What is gravity?	false
Velocity	What is gravity?	false
Velocity	What is gravity?	true
Acceleration	What is gravity?	true
Acceleration	What is the formula for acceleration	false
Acceleration	What is the formula for acceleration	false
Acceleration	What is the formula for acceleration	true

When I navigate to the progress page

Then I should see my overall performance

And I should see my performance by topic

RSPEC TESTS

Admin Controller

describe 'GET #index' do

it 'assigns the correct instance variables and renders the index template' do

Admin Roles Controller

describe 'GET #index' do

it 'assigns @users and @roles' do

describe 'PATCH #update_role' do

context 'with valid parameters' do

it 'updates the user role and redirects to admin roles path' do

context 'with a non-existent user' do

it 'raises an ActiveRecord::RecordNotFound error' do

InstructorHomeController

describe 'GET #custom_template' do

context 'when the user is an instructor' do

it 'returns a successful response' do

it 'renders the custom_template template' do

context 'when the user is not an instructor' do

it 'redirects to the root path' do

it 'sets an alert message' do

describe 'POST #create_template' do

```
context 'when the user is an instructor' do
  it 'creates a new question template' do
  end
context 'when the user is not an instructor' do
  it 'does not create a new question template' do
  end
  it 'redirects to the root path' do
  end
  it 'sets an alert message' do
  end
end
```

Practice Tests Controller

```
describe 'POST #create' do
  context 'when submitting topics and types' do
    it 'saves the selected topics and question types in session' do
    end
    it 'handles empty selections' do
    end
  end
describe 'GET #practice_test_generation' do
  context 'when generating practice tests' do
    it 'fetches the correct topics and question types based on session' do
    end
    it 'retrieves a valid question set' do
    end
    it 'stores questions in session' do
    end
  end
  context 'when no questions match the criteria' do
    it 'redirects to the practice test form' do
    end
  end
describe 'POST #submit_practice_test' do
  context 'when submitting a correct answer' do
    it 'redirects to the results page' do
    end
    it 'records a correct submission' do
    end
    it 'stores test results in session' do
    end
  end
  context 'when submitting an incorrect answer' do
    it 'redirects to the results page' do
    end
    it 'records an incorrect submission' do
    end
    it 'stores test results in session' do
    end
  end
  context 'when submitting a text-based answer (case-insensitive)' do
    it 'accepts correct answers with different letter cases' do
    end
    it 'rejects incorrect answers' do
    end
  end
describe 'GET #result' do
  it 'renders the results page with correct variables' do
  end
end
describe "#generate_random_values" do
  it 'generates random values for all variables' do
  end
end
describe "#format_template_text" do
  it 'formats the template text with given values' do
  end
end
describe "#evaluate_equation" do
  it 'evaluates the equation with given values' do
  end
end
```

it 'returns nil when equation has invalid syntax' do

SessionsController

context 'when UID and provider are present' do
 context 'with a valid @tamu.edu email' do
 it 'creates a new user with admin role and redirects to admin_path' do

UsersController

POST #save_instructor
 when a valid instructor is selected
 updates the current_user with the selected instructor
 when an invalid instructor ID is given
 does not update the user and sets an error flash message
describe 'GET #progress' do
 context 'when user has submissions' do
 it "assigns user" do
 it "assigns total_submissions" do
 it "assigns correct_submissions" do
 it "assigns correct accuracy" do
 it "assigns topic names correctly" do
 context 'when use has no submissions' do
 it "assigns user" do
 it "assigns total_submissions to 0" do
 it "assigns correct_submissions to 0" do
 it "assigns correct accuracy to 0" do
 it "assigns topic names to be empty" do