COMP1531

Requirements & Design Report

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1. Introduction

This document outlines the requirements elicitation, analysis, and specification for Toohak, an online quiz platform designed to enhance learning through interactive quizzes. The primary stakeholders include students, teachers, and IT administrators. This document also includes use cases, validation, interface design, and a state diagram.

2. Understanding the Problem

As a team, we have been tasked by the UNSW administrators to model an alternative to existing game-based learning platforms such as Kahoot – a popular platform which allows teachers to create quizzes and games that students can join using a unique code (Kahoot, 2024).

3. Requirements

3.1. Elicitation

To begin our requirements life cycle (Sommerville, 2016), we begin by surveying our target users. Target users are people who currently use a tool like Toohak or intend to. It is to note that the following were maintained as set boundaries to uphold the scope and validity of our study:

- No members of the project group are to be interviewed
- Participants are to choose ONE platform tailor their responses
- Enforce data validation and email auto-collection to restrict responses to one per respondent and sustain accuracy
- Ask five open ended and five close ended questions

We develop a series of nine questions to ask a total of three target users to understand what problems they might have with quiz tools that are currently unsolved (refer Figure 3.1 and 3.2). We distil the findings into the following:

> **Proposed Solution:** *Toohak aims to be a comprehensive game-based learning platform that overcomes the limitations of existing solutions while enhancing the user experience. The proposed solution focuses on providing a free and accessible environment for both educators and students, offering robust features without paywalls. The platform will include functionalities such as customisable quizzes, real-time feedback, and interactive games. By prioritising ease of use, flexibility, and accessibility, Toohak will enable educators to create engaging and effective learning experiences and empower students to participate in interactive and collaborative learning activities.*

A	B	C	D	E	F	G
Timestamp	Email	Name	Are you a teacher or a student	Do you use game-based learning platforms	Please choose the platform you're most familiar with	What do you use the platform for
30/07/2024 18:41:18	shetal802@gmail.com	Chantel	Teacher	Y	Kahoot	Fun icebreakers and quick review sessions for the content taught last week
01/08/2024 07:07:12	johnsacriou@gmail.com	John	Teacher	Y	Kahoot	I teach so I use it from time to time to quiz my students.
01/08/2024 07:12:36	kristin21800@gmail.com	kristin	Student	Y	Quizlet	I use it to study for exams
02/08/2024 15:18:09	jamesliu2003@gmail.com	James	Teacher	Y	Kahoot	I tutor, so use it to create quizzes for students for particular chapters/modules.

Figure 3.1. Snapshot of User Feedback Responses

How would you rate the platform overall	Reason for your rating	What would you add to the platform	What would you remove from the platform	Other comments/suggestions/thoughts
7	Con: Paywall good features like polls etc.., Pro: Easy to setup and get students to join a kahoot	Make it free fully 😶	the_paywall@gmail.com	Great work guys □. Shoutout to shilpa. Also the previous questions says it needs to be a valid email lol. So i put my answer as an email
8	It's pretty functional for my classes. Students enjoy the interactiveness.	Their recent updates have made creating quizzes too complicated - too many functionalities I don't even use/need. Also, ability for students to rejoin and not have to lose points!	see above	N/A
8	It is a good revision tool for me, but it forces you to login and has ads..	probably view other people's flashcards without the pay wall. they make you pay to keep viewing after a while. Would be good to link a teacher to see/track progress.	I forgot my password to my old account and now i've basically lost all my notes. I should be able to retrieve my account easily.	good luck guys
7	Ease of use could be improved.	Live feedback function would be epic. I'd like to see the analytics to improve as well - make ti individualised.	ads, lags when using web app.	great work shilpa.

Figure 3.2. Snapshot of User Feedback Responses Continued

3.2. Analysis & Specification

We now consolidate the information obtained from requirements elicitation by formulating three user stories (Cohn, 2004: Smith & Jiang, 2024).

User Story 1: Forgot password or email (Kristin)

As a user (either student or educator) who has forgotten my login credentials,
I want to reset my password or recover my email easily,
So that I can regain access to the platform without hassle.

Acceptance Criteria:

- The platform provides a "Forgot Password or Email" link on the login page.
- Users can enter their registered email address to receive a password reset link or username reminder.
- The system sends an email with instructions for resetting the password or recovering the username.
- Users can follow the link in the email to reset their password securely.
- The platform confirms the successful password reset or email recovery.

User Story 2: Real-Time Feedback (John)

As a student,
I want to receive immediate feedback on my quiz responses,
So that I can understand my mistakes and learn from them promptly.

Acceptance Criteria:

- The platform provides instant feedback after each quiz submission.
- Feedback includes correct answers and explanations for wrong responses.
- Students can view their quiz performance score and detailed results.
- The feedback mechanism is user-friendly and easy to understand.

User Story 3: Analytics and Reporting (James)

As an educator,
I want to access detailed analytics and reports on student performance,
So that I can track progress, identify areas for improvement, and adjust my teaching strategies.

Acceptance Criteria:

- The platform generates comprehensive reports on quiz results and student performance.
- Reports include metrics such as average scores, question difficulty, and individual student performance.
- Educators can export reports in various formats (e.g., CSV).
- Analytics dashboards are visually intuitive and provide actionable insights.

From this, we generate two use cases (Smith & Jiang, 2024) of our proposed solution:

User Case Background	**Use-Case List**
Use Case 1: Reset password or email	
Goal in context: The user aims to reset their forgotten password or recover their email to regain access to the platform. **Scope:** The system being considered is the Toohak platform, focusing on the account recovery features. **Preconditions:** the user is logged into the Toohak platform and has a registered email address on the platform. **Success end condition:** The user successfully resets their password or recovers their email and can log into the platform. **Failed end condition:** The user is unable to reset their password or recover their email, preventing access to the platform.	Step 1: The user navigates to the Toohak platform's login page and clicks on the "Forgot Password or Email" link. Step 2: The user is prompted to enter their registered email address. Step 3: The user enters their email address and submits the request. Step 4: The system verifies the email address and sends an email with instructions for password reset or email recovery. Step 5: The user receives the email and follows the provided link to a secure page for resetting the password or viewing the recovered email. Step 6: The user enters a new password and confirms it or notes their recovered email. Step 7: The system updates the user's password or confirms the email recovery. Step 8: The user receives a confirmation message that the password has been

Primary Actor: User (student and/or educator) **Trigger:** The user selects "Forgot Password or Email" from the login interface.	successfully reset or the email has been recovered.
Use Case 2: Provide and View Real-Time Feedback	
Goal in context: Students aim to receive immediate feedback on their quiz responses to understand their performance and learn from their mistakes. **Scope:** the system being considered is the Toohak platform's quiz feedback mechanism. **Preconditions:** Student has completed a quiz on Toohak platform, and the quiz has been set up to provide real-time feedback. **Success end condition:** Student receives instant feedback on their quiz answers, including correct answers and explanations for mistakes (if any). **Failed end condition:** Student does not receive feedback, or the feedback provided is incomplete or inaccurate. **Primary Actor:** Student **Trigger:** Student submits their quiz responses.	Step 1: Student completed the quiz and submits their answers the Toohak platform. Step 2: The system processes the responses and generates immediate feedback. Students sees the feedback for each question, including correct answers and explanation for incorrect responses. Step 3: Student reviews their overall quiz score and detailed feedback provided by the system. Step 4: Student can reflect on their performance or reattempt the quiz if allowed by the quiz settings (as set by educator) Step 5: System confirms that feedback has been delivered and displayed correctly to the student.

3.3. Validation

To validate the outlined use cases (see section 3.2), we reached out our participants for feedback. The following provides a snapshot their comments:

A	B	C	D	E
Timestamp	Name	Please choose the extent to which use case 1 would adequately describe the problem we are trying to solve.	Please choose the extent to which use case 2 would adequately describe the problem we are trying to solve.	Please provide comments/suggestions/thoughts for your rating
01/08/2024 08:26:58	Shetal	9	6	use case 1 seems more aligned with the key requirements listed on the description
01/08/2024 08:27:28	Kristin	3	6	use case 1. more detailed i guess
01/08/2024 08:29:17	John	9	7	1 made most sense to me with the steps.

Figure 4.1. Snapshot of responders' comments on Use case 1 vs. Use case 2

4. Designing

Having established our problem (see section 2), we move to designing a potential solution (Sommerville, 2016).

4.1. Interface Design

We begin our design process by listing out the essential features required to meet the user requirements (see section 3). Below we note the essential capabilities for the user (refer Figure 3.1) in the form of HTTP endpoints, similar to what is described in the swagger docs (COMP1531 Gitlab, 2024).

4.2. Conceptual Modelling

We utilise a state diagram (Smith & Jiang, 2024) to conceptually model our proposed solution (refer Figure 5.2).

adminAuth:

Name & Description	HTTPS Method	Data Types	Error Returns

`/v1/admin/auth/emailDisplay`
 	
Register an admin user.
	GET	**Body Parameters:**
		`{ email, password, nameFirst, nameLast }`
		
		Return Object:
		`{ email }`
			{ error } when any of:
			
			• Email is not in a valid format (400)
			• Email is already in use (400)
			• Password is less than 8 characters (400)
			• nameFirst is an empty string (400)
			• nameLast is an empty string (400)

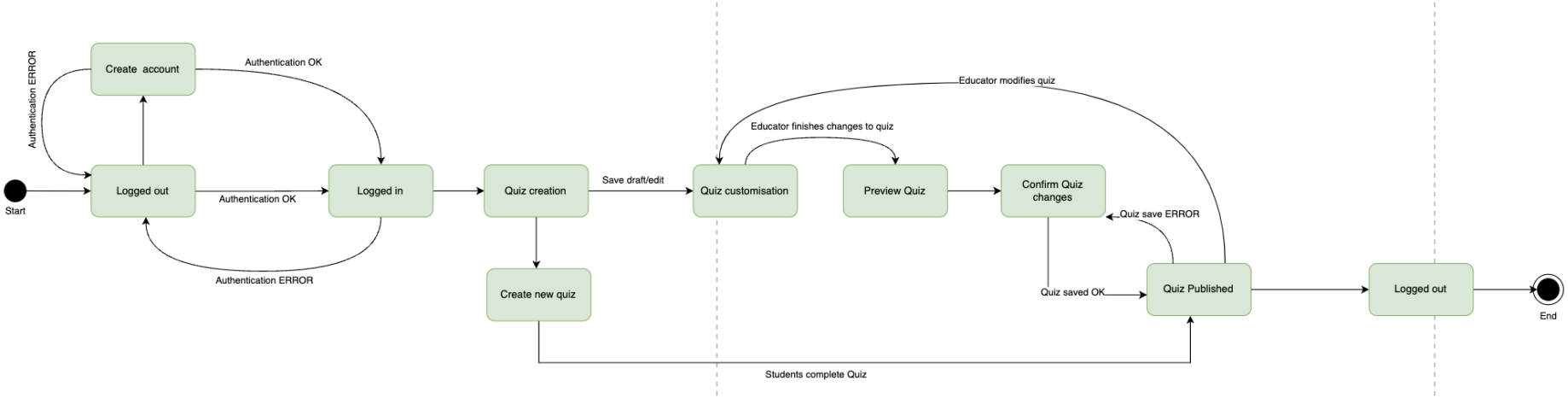

Figure 5.2. Conceptual Model- State Diagram of proposed solution Toohak

Add a song to the quiz.

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