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Iteration 3 Report - T17C EGGS

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1. Introduction

Introduction

The life cycle of any software is highly dependent on its user base. Hence, to ensure that the life cycle of a quiz based application like Tookhak is fulfilled, it is not stressed enough that ongoing developments have to both be frequently made and also tailored to the specific wants and needs of players. As a result of this, our team has created a list of questionnaires to ask a diverse group of users before taking their feedback to guarantee improvements for our software. Throughout every step of function planning the users' voice is thoroughly immersed in the process, through the form of feedback received from them, especially in phases of elicitation and user validation. All this is done to ensure the longevity and viability of Tookhak.

User Interview

In order to better understand the current reception as well as the future developmental direction of the Toohak, 3 users of differing backgrounds were interviewed on their thoughts on using the application. The users were first given a 3 minute run-through followed by a 7 minute free exploration time where they could create their own quiz, or join a quiz session made by a team member. Following this, a series of questions were asked regarding the application's usability, functionality, and potential future features they would like to see. Their responses are then summarised as User Stories in Section 2 of this report.

The questions asked include the following:

Are the existing solutions for a quiz creator sufficient? Why/why not? What feature/functionality would you like to see in Toohak?

Are the functions intuitive to use, do you think and individual with no user experience can use the features effectively

Do you find it accessible for your needs, any suggestions on how to improve it?

As a player do you think Tookhak is an engaging method of learning? If not what features can we add to maintain player engagement

Planning User Cases & Acceptance Criteria

Through the user interviews, 3 user cases targeting one specific chosen feature derived from the interviews were developed, and their acceptance criteria listed, which can be found in Section 3 of this report. The planning aims to address the features through consideration of the following points:

- functionality

- Input outputs
- Function logistics (i.e. inputs, outputs)
- Usability
- Other considerations

Post planning interview

After the planning period was completed, another round of interview with the same candidates was conducted to determine whether or not the new function would address the relevant concerns raised initially, and if there were any further thoughts and concerns.

2. Interview and User Stories

2.1. Interviewee 1 : Emily, High School Student

After being questioned, the user would like to see the development of a feature that would increase the overall engagement of Toohak players. Whilst she did acknowledge that Toohak satisfied the basic functionality of quiz-taking software in an intuitive and user-inclusive manner, most of her critiques came when asked specifically about player engagement. Again and again, she stated that the display of the quiz interface for the players was dull, particularly denoting boredom as she waits for a quiz session to begin (move from the lobby state to the question answer stage). She asked for a way for the software to both capture and retain her attention throughout the entirety of the game, stating that such features would result in an increased level of concentration that would consequently lead to a better learning environment. Hence, she suggested a number of features to be added to the software to compensate for this with some of them listed below:

- Background music throughout the entirety of the quiz
- Individual colour themes for the quiz display in order for the quiz to be more vibrant
- The ability to choose player avatars in order to breed interest and discernibility between the players

User story

A user finds the display of players quite dull and would like to see the implementation of an avatar. They stated that if this feature were to be implemented they would be more likely to reuse the software since such a unique feature would likely increase their level of engagement whilst also sparking a level of competitiveness between their peers.

2.2. Interviewee 2: Ethan, Tutor

After being asked on his thoughts on the general usability of Toohak and how the application could be implemented in a classroom, he responded that the program may need several improvements before it could be properly integrated into the classroom. One of the things he has pointed out is that applications for quizzing improve learning and knowledge retention in students, but the lack of customisable features may mean that students may not focus as well. When asked for the specifics of the features, he suggested customizability in UI and background music to improve engagement, and allowance for open ended answers. He also made the valuable suggestion that allowing players to register accounts that track their responses on topics over time rather than playing anonymously could encourage long-term learning as well, and potentially evolve Toohak into a classroom tool similar to Moodle.

From his thoughtful response, a key list of features are of below:

- Background music and customizable UI
- Other answer types i.e. one word or open-ended answers
- Long-term player registration

User story

A teacher finds the quiz session to be unengaging for the students and would like to see improvements in the quiz atmosphere through the addition of background music. If the feature is implemented, students are much more likely to engage and learn through the application in a classroom setting

2.3. Interviewee 3: Jake, University Student

Jake, a college student, told us during our interview that Tahook needed an improved question bank. He stated that although he considers Tahook to be more participatory and interesting than more conventional study techniques like reading textbooks, the restrictions of the existing question bank severely limit Tahook's usefulness as a teaching tool. Jake underlined that knowledge goes deeper when there are thorough explanations provided for every answer, as opposed to only learning the right answers by heart.

Jake also brought attention to Tahook's lack of a progress monitoring function. He expressed a great need for this feature, seeing it as an easy-to-use, visual tool that would enable him to track his progress in studying various courses over time. According to Jake, this quality would be crucial in determining his areas of strength and need.

Additionally, Jake suggested the integration of a discussion forum for each question or quiz within Tahook. He believes that such a forum would greatly enhance the learning experience by enabling students to engage in discussions, share insights, and collaborate in understanding complex topics. Jake envisaged this forum as a space for threaded discussions, moderated to ensure content quality, and seamlessly integrated with the quiz interface to encourage a collaborative and supportive learning environment among students.

3. User Cases & Acceptance Criteria

3.1. Function 1: Avatar Update

Given the three respondents' feedback, the development for a player avatar was placed into the planning phase. The following provides a brief description of the function's purpose, usage and outcome.

Name	Avatar update
Summary	Allows guest players to change their avatar
Rationale	While using the applications many guest players have commented on the dull and lacklustre of the user interface, with many specifically denoting its lack of engagement during the entirety of the quiz period. As a result of this, the implementation of a personalisation feature will allow players to edit their character avatar display either with an image URL upload or a premade avatar within the system. Creating an increased level of distinguishability between players as well as providing a new feature for them to toy with within the lobby. This will hopefully create a level of engagement and focus, that many teaching staff requires from their student. As a result of this, hopefully, the software life can be prolonged due to an increase in user base resulting directly from increased user engagement.
Users	Only players
Preconditions	Players must have joined a valid Session, allowing them to collect a valid playerId
Basic course of events	<ol style="list-style-type: none">1. Players use a personalisation URL and enter the personalisation page2. Players may then use either an image URL from their local file to change their avatar or select3. .The software Updates the player avatar to the preferred image, the software also switches the colouration display4. After the personalisation is complete the user will be returned to the quiz lobby in which they can view their avatar along with the avatars belonging to different players

Alternative paths	<ol style="list-style-type: none"> 1. In step 2 if the player clicks one of the premade avatars it will switch to that 2. In step 2 if the player instead decides to click on the upload photo option and uploads their image url then their avatar will change to that of the image they have uploaded. If however, the file type of the image that they choose to upload does not match that of an image file, they will be asked to upload another photo
Postconditions	Player's avatar display will change to their provided image, this avatar should be viewable to every individual within the quiz lobby

User Acceptance

Under the guidance of the interviewee, the following acceptance criteria were developed to assess whether the development of the avatar update function was successful or not.

Acceptance Criteria	Description
Avatar Creation	Users should be able to change their avatar based on an image URL. The software should allow users to upload their URLs from their local data store.
	If the user chooses not to upload a photo they can select from a wide range of premade avatars
	If a player chooses not to change their avatar at all they will be automatically assigned a random premade avatar, hence there shouldn't be an option where a player is left without an avatar
Catching invalid usage	Players that try to upload a photo that doesn't match the image format will be blocked from doing so
Display	Avatar should be visible to all students when in the quiz Lobby screen as well as the final scoreboard display
	Premade avatars should also be vibrant and distinguishable from one another in order to avoid any confusion between the players in the lobby
Diversity	The amount of premade avatars available should match the maximum player limit for a quiz

Player choice	Avatar changes should not be permanent and if a player decides that they dislike their choices which promotes flexibility.
Usability	Minimal loading time should occur between the pages
	The user interface to change the avatar should be instinctive and easy to use
User Engagement	Players should only be able to change their avatars during the LOBBY stage of the session. This will ensure that engagement will be maintained throughout the entirety of the quiz
User safety	Ensure that the use of the avatar feature will not result in profanity

Post planning interview

After the planning period was completed to determine whether or not the new function would address the Figure of engagement the user acceptance and user case were reviewed alongside the previous interviewee before being followed with the questions listed below:

- Will this new avatar feature satisfy the concern regarding the lack of engagement between students?
- Are there any further thoughts and concerns that could impact either the admin's or the player's usage of Tookhak?

User evaluation overview:

The interviewee recognises that the following feature will increase the user's engagement if implemented correctly, however, to further increase the focus of players she suggests that even more quiz features should be implemented such as a colour theme or even just background music that would last the entirety of the quiz. Pressing concerns were also brought up regarding the inappropriate use of the image upload feature, suggesting that it may not create a suitable environment for both the players and the admin. They would like to see a way to mitigate the potential impact of this risk. But other than that they are thoroughly impressed with its diversity and usability.

As a result of the feedback, the user acceptance criteria were modified to address the potential for profanity under the **user safety** heading. But since there was no straightforward way to address any of the provided feedback specifically within the avatar update function, it was agreed upon that a future feature that would allow admins to kick players that misuse the avatars would be established. This can also be said about other user engagement features that was recommended.

The original avatar function was then put into the development planning phase, as demonstrated by the function specifications in Figure 1 below, and the Avatar Update state diagrams can be found Figure 1.3 in Section 4.

Function name	HTTP method	Parameters	Return type	Exceptions	Description
/v1/player/{playerId}/avatar	PUT	Thumbnail url/avatarId: string playerId: number	{ } - empty object	400 - invalid playerId 400 - url must begin with http or https 400 - url must end in jpg, jpeg or png 400 - invalid avatarId	A URL that allows players to change their avatar based of a given url

Figure 1 - for further detail refer to swagger file in branch it3/ALL/swaggerUpdate/v0

3.2. Function 2: Background music

The following provides a brief description of the function's purpose, usage and outcome.

Name	Admin Quiz Music Select
Summary	Allows admins to add and change the background music for of a quiz
Rationale	Many interviewees have commented on the dull and lacklustre of the user interface, with many specifically denoting its lack of engagement during the entirety of the quiz period. As a result of this, the implementation of a customisation feature will allow admins to select a quiz background music out of a range of music loops to be played during session, adding to the engagement of players.
Users	Only admins who own the quiz
Preconditions	All quiz sessions must be in 'END' state, and the admin is one of the owners of the quiz

	A selection of around 6 system music is stored and available
Basic course of events	<ol style="list-style-type: none"> 1. Admin goes to the quiz modify page 2. Admin selects from a drop down a selection of different predefined background music 3. There is an option for the admin to preview the background music 4. After the admin is with the happy music selection they select update quiz 5. When the quiz enters QUESTION_OPEN, the music plays
Alternative paths	<ol style="list-style-type: none"> 1. Same as above but instead of through quiz modify, it's in quiz create
Postconditions	The music will be looped from start to end of quiz session, audible to all players who join

User Acceptance

Under the guidance of the interviewee, the following acceptance criteria were developed to assess whether the development of the avatar update function was successful or not.

Acceptance Criteria	Description
Music Selection	A selection of 6 different music loops are available for the admin to choose from
	A selection of 'no background music' is also available
	The music is looped nonstop from start of the session, until the 'END' state

Catching invalid usage	Admin must be an admin of quiz in order to arrive at the quiz customisation page
Display	Avatar should be visible to all students when in the quiz Lobby screen as well as the final scoreboard display The music should be playing to all students when quiz is accepting answers for a question
Diversity	The premade music should have a range of styles and tones

Post planning interview

Similar for the Avatar Update function, the Music Selection function criteria and plan was presented to the interviewees again to gauge their level of interest in the feature with the following questions:

- Will this new avatar feature satisfy the concern regarding the lack of engagement between students?
- Are there any further thoughts and concerns that could impact either the admin's or the player's usage of Tookhak?

User evaluation overview:

The interviewees were satisfied with the feature in its ability to increase user engagement. However, one suggested that the music also should not be too loud or distracting, but should be more fun and relaxing. In light of this, an extra user acceptance criteria is added under **volume**. Another also suggested the addition of customisable music, but also mentioned that like Avatar Update it could pose some issues with User Safety such as accidental exposure to profanities in selected music, as well as copyright. For this, it was decided that it may be a potential implementation after the initial Music Select function.

Following this, the Music Select function was advanced into the development planning phase, as demonstrated in the function interface table below.

Function name	HTTP method	Parameters	Return type	Exceptions	Description
<i>Route</i>					

adminQuizMusic <i>/v1/admin/quiz/{quizid}/music/{musicid}</i> }	GET	tokenId (header): string quizId (path): number musicId (path): number	{ } - empty object	401 - invalid token 403 - invalid quiz id / user does not own this quiz 400 - all sessions must be in 'END' state	A URL that allows for admin to choose between a few preset background music loops for their quiz
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3.3. Function 3: Player Forum Discussion

The following provides a brief description of the function's purpose, usage and outcome.

Name	Player Forum Discussion
Summary	Discussion forum for each quiz question in Toohak to facilitate collaborative learning
Rationale	Inspired by COMP1531's Ed Forum, a discussion forum would enable students to strengthen their understanding and retention of quiz material through peer engagement, sharing of insights, and clarifying questions.
Users	Players in a QuizSession
Preconditions	Player must have submitted an answer to the question and viewed the answer. The player can then choose to enter the discussion or go to the next question.
Basic course of events	<ol style="list-style-type: none"> 1. Player joins a Quiz session 2. After submitting their answer, the ANSWER_SHOW state transitions to DISCUSSION_FORUM if this feature is enabled. 3. Players can view existing discussions for a specific question submitted by other players for this question in the present or the past
Alternative paths	<p>Following Step 3,</p> <ol style="list-style-type: none"> 1. Players can opt to skip the DISCUSSION_FORUM and proceed to NEXT_QUESTION, OR

	2. Players can return to QUESTION_OPEN to revisit the question after the discussion.
Postconditions	This function does not allow players to add or edit any comments in the forum. It only allows them to view the existing discussion

User Acceptance

Under the guidance of the interviewee, the following acceptance criteria were developed to assess whether the development of the avatar update function was successful or not.

Acceptance Criteria	Description
Visibility and Accessibility	The discussion button / link should be clearly visible and accessible immediately after a question is answered, and players should not require additional instructions to locate this feature.
Functionality / Ease of Use	Players should be able to post new comments, reply to existing comments, and view all discussion threads related to a question without error or delay.
User Engagement	There should be measurement trackers for active discussion, such as the number of comments or recent activity to draw users into conversation.
	An upvoting system could be implemented to rank the most useful discussions to the 'top' so they are seen first by players.
	User participation in discussions could be encouraged through integration of badges and/or collectables for active contributors.
Content Moderation	Players should have the ability to report inappropriate comments or discussions. These comments should be flagged for review by the admin of the quiz and not immediately visible in the discussion until reviewed.
Data Persistence	All discussions should be saved and retrievable in future sessions.
Performance	The discussion forum should load quickly and handle multiple users without significant lag or downtime.
	The user interface to change the avatar should be instinctive and easy to use

Post planning interview

After the planning period was completed to determine whether or not the new function would address the issue of lack of learning. User acceptance and user case were reviewed alongside the previous interviewee before being followed with the questions listed below:

- Will this feature of viewing the forum help you to learn better?
- Are there any improvements to be made for this feature?

User evaluation overview:

The interviewee recognised the merits of the feature in its ability to allow individuals to learn better from this forum. However, a pressing concern was that the discussions were not appropriate as Jake wanted to promote an environment of inclusivity where discussions are respectful of diversity and different perspectives. He was afraid that he would be exposed to discussions filled with anger and name-calling. Jake instead wants discussions that are purely for learning.

As a result of the feedback, the user acceptance criteria were modified to address the potential for profanity under the **content moderation** heading. This allows users to report any comment they would like using a different function. Furthermore, if many inappropriate comments are made by a user, they can be removed permanently and can not longer participate in a discussion forum,

4. Future Iterations & State Diagram

All Figure 2 below shows the function interface for the new implementations for future iterations. Figure 3 showcases the Avatar Update Function state diagram, and the state diagram can be seen in Figure 4. Figure 5 showcases the functions in Swagger.yaml which is updated in branch *it3/ALL/swaggerUpdate/v0*.

Figure 2: Function interface for above functions

Function name	HTTP method	Parameters	Return type	Exceptions	Description
Personlisation <code>/v1/player/{playerId}/avatar</code>	PUT	Thumbnail url/avatar enum: string playerId: number	{ } - empty object	400 - invalid playerId 400 - url must begin with http or https 400 - url must end in jpg, jpeg or png 400 - invalid avatarId	A URL that allows players to change their avatar based of a given url

adminQuizMusic /v1/admin/quiz/{quizid}/music/{musicid}	GET	tokenId (header): string quizId (path): number musicId (path): number	{ } - empty object	401 - invalid token 403 - invalid quiz id / user does not own this quiz 400 - all sessions must be in 'END' state	A URL that allows for admin to choose between a few preset background music loops for their quiz
playerForumView /v1player/{playerId}/{questionId}/forum	GET	tokenId (header): string questionId (path)	{questionId: number, discussion: [threadId: number, comments: string[]]}	401 - Invalid token 400 - Quiz Session state must be FORUM_DISCUSSION	A URL that allows players in a quiz session to view the forum discussion for a question of the quiz

Figure 3: Avatar Update State Diagram for the future version of Toohak

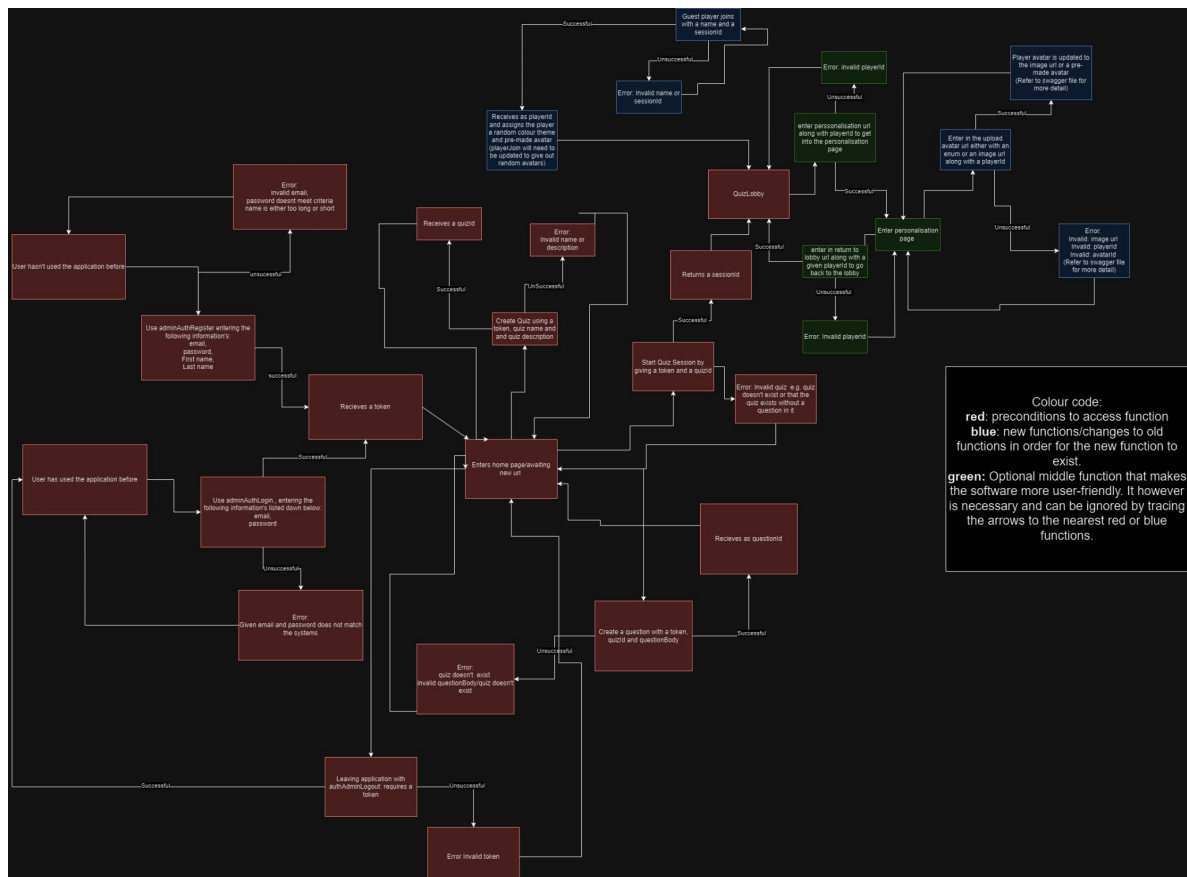


Figure 4: State Diagram for the current version of Toohak, link: <https://drive.google.com/file/d/18nyB2Y2y1xgdpZhWHB9noJx2u3KSEp0Y/view?usp=sharing>

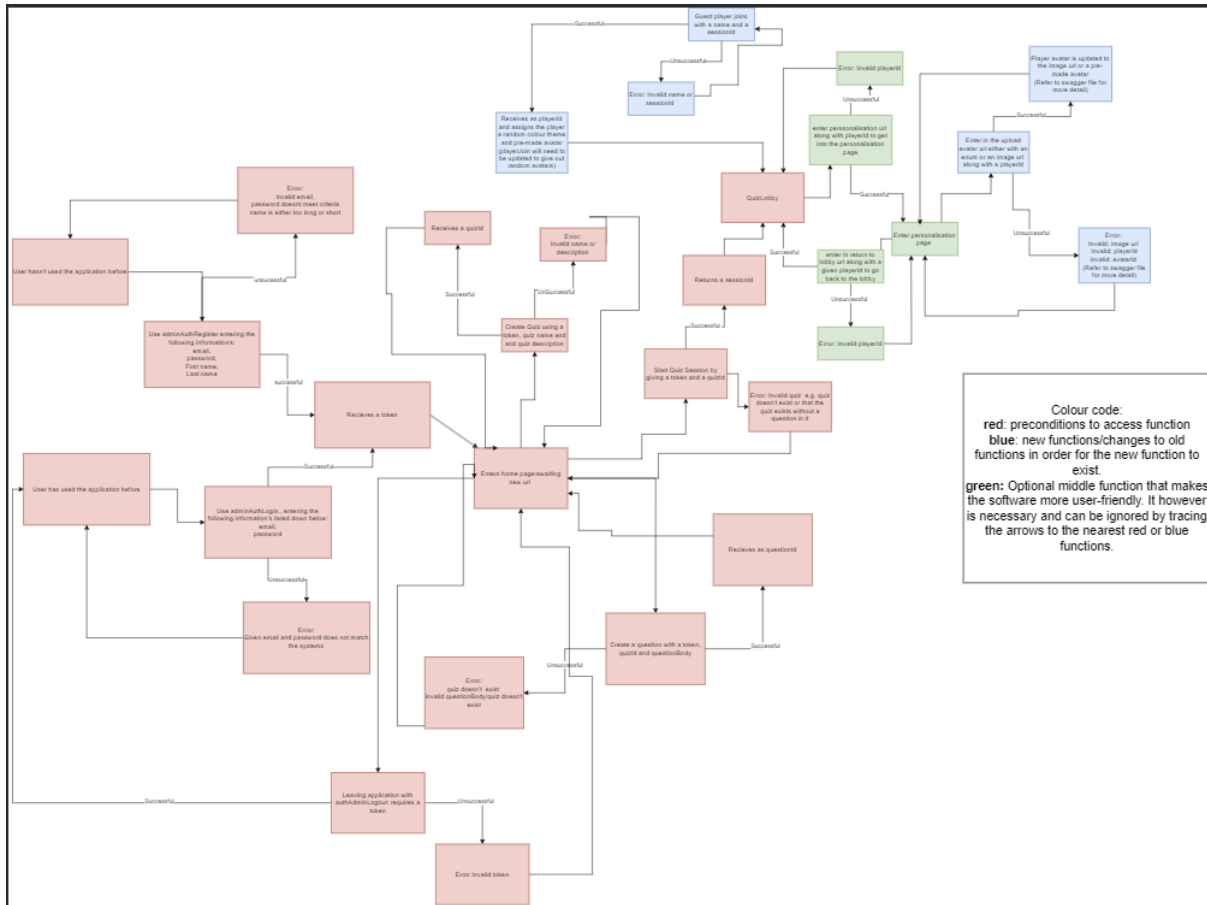


Figure 5: updated Swagger.yaml that can be found in it3/ALL/swaggerUpdate/v0

Iteration 4 (Planning) Iteration 4 functions are purely used for planning and demonstrations purposes only

PUT	/v1/player/{playerId}/avatar	Avatar update	✓
GET	/v1/admin/quiz/{quizId}/music/{musicId}	Background music	✓
GET	/v1/player/{playerId}/{questionId}/forum	view previous forum chats	✓

5. Conclusion

Conclusively, the dedication to user-based development of Toorak can ensure its lifecycle. Whilst the implementation of three functions is not enough to guarantee this, the overall environment, frequent user engagement and feedback immersion, are what will create successful softwares in the end. Thus, through the future applications of processes such as elicitation, user validations and user acceptance during software productions phases, thorough and catered implementations can be achieved to guarantee a viable user base for any coding systems.

