

SUPER YOUTH: DESIGN AND EVALUATION OF AN AI-POWERED MOBILE APPLICATION FOR PERSONALITY INSIGHT AND SOCIAL SKILLS DEVELOPMENT THROUGH SCENARIO-BASED LEARNING

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ABSTRACT

A high percentage of Americans, over two-thirds of the national population of teens and young adults, feel that they lack a sense of security in themselves. Notably, such individuals often lack daily and consistent practice in confronting complex yet common life dilemmas. Super Youth is the app that precisely targets and reveals each individual's personality and thinking style when presented with a challenging social scenario that they will encounter occasionally. Flutter, the ChatGPT API, and Firebase Auth all help to generate social scenarios for the user [1][2]. By adjusting the app's layout to fit within the screen, it can display information concisely on a single screen. A survey was presented to a group of individuals to test how the app helped them improve their social skills. I noticed that most users requested that the app cover more social skills, as they did not feel that it targeted their specific weaknesses.

KEYWORDS

Social Skills Training, Personality Analysis, AI-Based Education, Mobile Application

1. INTRODUCTION

Numerous adolescents and college students struggle with effectively communicating their emotions and needs to others and possess limited self-awareness skills. Such complications while navigating through a dynamic society introduce stress, social isolation, and other harmful effects [3]. Without true harmony of collaboration, the inability to identify one's own thoughts and feelings, an individual would not function in a socially appropriate manner.

All three sources implemented group activities and structured learning through various contexts common in everyday life. The SPARK initiative introduced in source 1 utilized group discussions and teacher-led activities for students to develop problem-solving, decision-making, and emotional regulation skills [4]. However, not everyone can improve within the context of group discussions, as most don't dive deep enough to solve the root cause of conflicts. Similarly, the iThriveSim game used historical scenarios as a means of applying role-playing social skills to practical conditions [5]. Historical scenarios are somewhat outdated and may not line up well with today's language and common cultural practices. Through guided activities and structured planning, such as using the calendar, students can manage stress and their mental health through

David C. Wyld et al. (Eds): ACSTY, MLSC, SVC, AIBD, ITCSS, ADCOM, NATP, SOFE – 2026

pp. 167-178, 2026. CS & IT - CSCP 2026

DOI: 10.5121/csit.2026.160413

the Neolth app. Even though mental health and stress management are crucial for improving self-control skills, they don't actively apply specifically to social scenarios. Super Youth provide a hands-on experience with countless AI-generated, real-world common scenarios for individuals to practice through dialogue-based conversations. Moreover, the gamified system, such as XP and levels, motivates individuals to improve their emotional reasoning of themselves and others.

To address a lack of effective communication and social skills, I introduced a method for users to practice navigating through complex and challenging social scenarios that they could encounter in their daily lives [6]. Users can learn based on feedback from generated hypothetical social scenarios tailored to address the most crucial skills: conflict resolution, self-awareness, and coping skills. Super Youth provide challenging daily scenarios for users to develop the habit of a problem-solving and negotiation mindset. However, most institutions overlook crucial topics such as self-awareness and conflict resolution skills, resulting in a number of individuals being unable to effectively address their problems.

I conducted a survey on a group of individuals who tested my app Super Youth to evaluate the helpfulness of the app in improving social skills and essential feedback on app functions. I published the app and recruited 5 individuals who never used the app before to use it. What I discovered from the experimental results was that the audience believed that I needed to cover more social skills. On the survey, 60% voted for a 5, representing most likely, on a question regarding the scope of social skills covered. Thus, the experiment highlighted promising results for the app to continue incorporating social skills.

2. CHALLENGES

In order to build the project, a few challenges have been identified as follows.

2.1. System Authentication and Security

The system adopts a secure authentication mechanism based on email and password login, implemented through Firebase Authentication. User passwords are hashed and encrypted by Firebase Auth and securely stored on Google's servers, significantly reducing the risk of account compromise. To further strengthen protection against unauthorized access and potential hacking attempts, the system can additionally integrate two-factor authentication (2FA) via Firebase Auth, providing an extra layer of security for user accounts and data [7].

2.2. Scenario Relevance and Skill Feedback

The generated scenarios are designed to reflect common real-world situations by using prompts that are specifically tailored to experiences users are likely to encounter. This approach helps ensure that the scenarios align with targeted social skills. Feedback from users indicates how effectively these skills are understood and applied within each scenario, revealing strengths or gaps in social interaction. If scenarios are found to be inaccurate or insufficiently helpful, the prompts can be refined so that the ChatGPT API produces scenarios that more clearly and explicitly correspond to the intended social skills.

2.3. User Interface and Learning Experience

Survey results indicate that the app's user interface does not negatively impact the user's learning experience. Participants rated the interface as streamlined and clean, with an average score of 4.2 out of 5, suggesting that the design supports usability and engagement rather than hindering

learning. To further improve the interface, future iterations could incorporate design research and best practices inspired by established educational platforms such as Khan Academy and Duolingo, which are known for their intuitive and learner-centered designs.

3. SOLUTION

The splash screen is the first screen the user encounters when they open the app. In the background, the app requests Firebase Authentication to check if the user has recently logged in. If so, the app navigates to the home screen. Otherwise, the app directs the user to the login screen. Once the user has entered their correct login credentials, they are taken to the home screen.

From the home screen, the user can access the units, which takes them to a unit screen of listed social scenarios to try. On the unit screen, the user can choose a text-based scenario to try, taking them to the try screen. In the background of the try screen, ChatGPT generates a social scenario to be displayed on the app to the user. The user enters their response to the scenario and submits. The app sends the user's submission to the ChatGPT API, which analyzes their responses. Once the responses are analyzed, the API returns the information to the app, which directs the user to the feedback screen containing the feedback generated by the ChatGPT API.

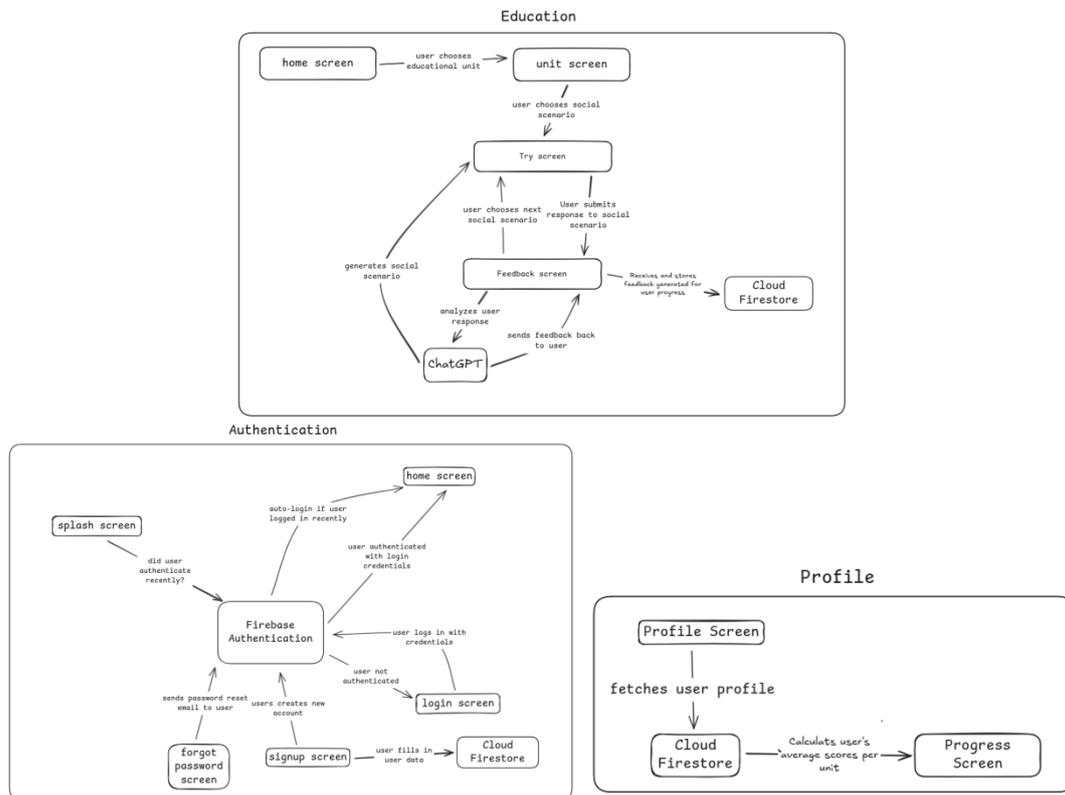


Figure 1. Overview of the solution

Authentication verifies the user's identity to prevent users from manipulating other users' data. It allows users to access and change only their own user data. Cloud Firestore was used to store user data in a database [8]. I utilized Firebase Authentication, which securely verifies and stores login credentials.



Figure 2. User interface of the Super Youth application showing the scenario selection screen

```

Future<void> signUp({
  required String email,
  required String password,
  required String firstName,
  required String lastName,
  required String username,
}) async {
  try {
    final credential = await _auth.createUserWithEmailAndPassword(
      email: email,
      password: password,
    );
    await _db.collection('users').doc(credential.user!.uid).set({
      //creating documents
      'email': email,
      'firstName': firstName,
      'lastName': lastName,
      'username': username,
      'xp': 0,
      'level': 1,
      'createdAt': FieldValue.serverTimestamp(),
    });
  } finally {
    notifyListeners();
  }
}

```

Figure 3. Code structure illustrating the user authentication workflow implemented with Firebase Authentication

Signup is the function my code runs to create a new user and store their credentials in my Firebase Authentication instance. Parameters for the sign-up method involve the user's email, password, first name, last name, as well as the username to be sent to Cloud Firestore. A try-catch block is used in case of any errors that may occur during authentication, such as if the Firebase server is down. Since the authentication runs in the background of the app, async is used as well as await to wait until the action is completed. User info is collected from the corresponding

document in Cloud Firestore, extracting their names, username, level, and XP, the game data for the app. `FieldValue.serverTimeStamp()` stores the time at which the account was created, or the user signed up. The data is again stored in Cloud Firestore. Finally, `notifyListeners` is used to signal a change in app state, i.e. users have logged in.

The education portion of the app is to provide practical experience for users to learn important skills for conflict resolution, self-awareness, and coping skills. The user answers what they would do in a hypothetical social scenario, which is generated by ChatGPT [9]. The user's response is sent to ChatGPT, where it analyzes the user's response to the social scenario. ChatGPT then generates feedback that is returned to the user based on their performance in the social scenario, informing the pros and cons of the user's actions in the hypothetical social scenario, storing the feedback in Cloud Firestore to save the user's progress throughout the app [10].

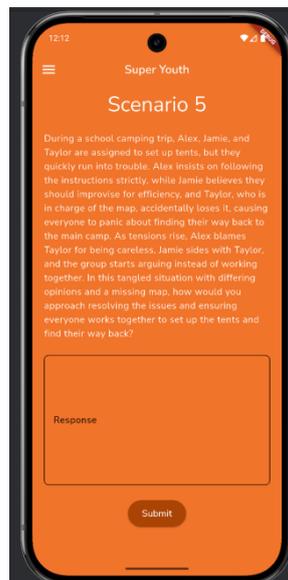


Figure 4. Example of an AI-generated social scenario presented to the user for response input

```
Future<Map<String, dynamic>> generateContent(String unitTitle) async {
  try {
    final request = ChatCompletionText(
      maxToken: 1800,
      model: Gpt4oChatModel(),
      messages: [
        Map.of(
          "role": "system",
          "content":
            "act as an educational content creator for teenagers. "
            "You make engaging and meaningful educational content "
            "for a teen learning platform. ",
        ), // Map.of
        Map.of(
          "role": "user",
          "content":
            "Generate an unique social scenario about $unitTitle in 3-5 sentences asking the user what they would do in that situation "
            "Create only one paragraph for the social scenario. Set the difficulty of the scenario by using unusual situations e.g. not
        ), // Map.of
      ], // ChatCompletionText
    );

    final response = await openAI.onChatCompletion(request: request);
    //If choices is null, don't run it, use the ? after the variable
    final message = response?.choices?.first?.message;
    if (message != null) {
      return Map.of({"scenario": message.content});
    } else {
      return Future.error('Error generating content. No response. ');
    }
  } on Exception catch (e) {
    return Future.error('Error generating content: $e');
  }
}
```

Figure 5. Core function for AI-driven scenario generation and asynchronous API interaction

generateContent() is the function used to provide the scenarios, taking in a parameter of unit title, generating scenarios based on the unit. The future void data type identifies the function as another method that occurs in the future, as it needs to be sent to ChatGPT to generate scenarios, achieved through the ChatCompleteText method. A list of messages is used to provide a map of the prompt used by the ChatGPT API to generate scenarios, where it lists out the role as the system for the prompt, and the user for the prompt to provide the type of scenario. After the ChatCompleteText() method, a final response signifies that the message generated by ChatGPT cannot be amended. Then, await is used as time is needed for the action to happen upon calling OpenAI.onChatCompletion to generate the scenario. Of course, errors may occur, such as the OpenAI server being down, so a Try and Catch block is used, where an error message would display “Error generating content”.

The Profile system in my app enhances user experience through the gamification of important features: the XP bar and the progress screen. This allows the user to see what they have accomplished in the app. Cloud Firestore stores the fetched user progress data to calculate the XP bar and user average scores for each unit based on their responses to the social scenarios [15].

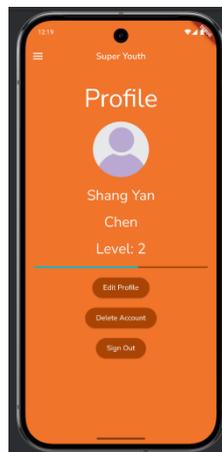


Figure 6. User profile and progress visualization interface displaying level and experience points

```
child: Consumer<AuthenticationProvider>(
  builder: (context, auth, _) {
    String firstName = auth.userData?['firstName'];
    String lastName = auth.userData?['lastName'];
    int level = auth.userData?['level'];
    int xp = auth.userData?['xp'];

    return Container(
      margin: EdgeInsets.only(top: 35),
      child: Container(
        margin: EdgeInsets.symmetric(horizontal: 20),
        child: Column(
          spacing: 20,
          mainAxisAlignment: MainAxisAlignment.start,
          children: [
            Text(
              "Profile",
              style: Theme.of(context).textTheme.displayLarge,
            ), // Text
            if (!_isEditing) ...[
              Image.asset("assets/blank_avatar.webp", width: 125),
              Text(
                firstName,
                style: Theme.of(context).textTheme.headLineLarge,
              ), // Text
              Text(
                lastName,
                style: Theme.of(context).textTheme.headLineLarge,
              ), // Text
              Text(
                "Level: $level",
                style: Theme.of(context).textTheme.headLineLarge,
              ), // Text
              _buildXPBar(level, xp),
            ],
          ],
        ),
      ),
    );
  },
);
```

Figure 7. Profile management and experience-point calculation logic implemented in the application

The consumer gathers the user data from the `AuthenticationProvider`, such as the first and last name, level, and XP, and displays it in the profile screen. Then the user profile data is shown in a column widget, arranged vertically, positioned at the top of the screen with `MainAxisAlignment.start` with spacing of 20 pixels between each widget. Then a list of widgets known as children is placed inside the column widget, displaying the profile, avatar, or profile picture, first name, last name, level, and XP. The `_buildXPBar()` method takes in the user's current level and XP and returns a horizontal progress bar displaying the XP percentage. The conditional statement `if !isEditing` determines if the profile screen is currently in the editing state. If we are not currently editing the profile, the default profile screen is displayed with the user data information. However, when the edit profile button is clicked, the `isEditing` function becomes true, signifying that the profile is being edited based on the user's data.

4. EXPERIMENT

An experiment conducted would examine the accuracy of users' responses and actions to the hypothetical social scenarios. Based on the results, I can conclude whether the app provides a meaningful learning experience and significantly challenges the users' social skills.

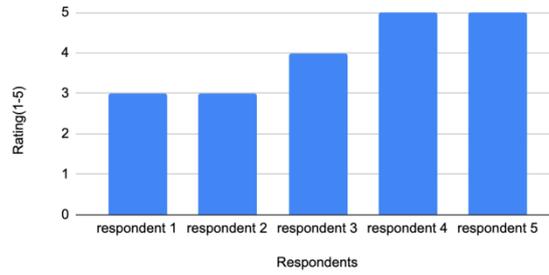
1. Would you say the generated social scenarios in the app are realistic?
2. Would you say the generated social scenarios in the app challenge your social skills?
3. How accurate and helpful was the feedback to your response? Did you learn anything from it?
4. Do you feel discouraged by the average score rating in the progress screen?
5. Are the hypothetical social scenarios provided easy to understand?
6. Do you think that the app covers too few life skills for teens and young adults?
7. Would you say the app was fun, engaging, and motivating to use?
8. Would you say the average score rating helped pinpoint areas where you need more practice?
9. Was the app confusing to use and navigate? Can the user interface and experience be improved?
10. Were any of the scenario's age-inappropriate or too violent?

I decided to ask these questions because I desired to record others' feelings using the app and their own critique on the design, layout, and content.

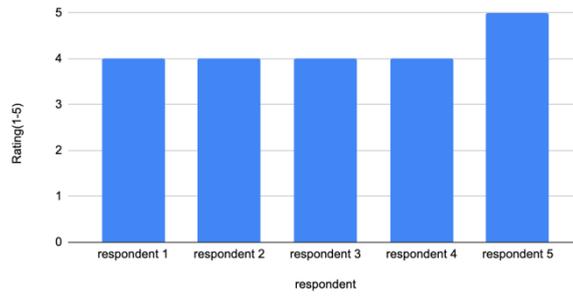
	Input	Expected Output	Actual Output
1	Would you say the generated social scenarios in the app are realistic?	5 (Very realistic)	4
2	Would you say the generated social scenarios in the app challenge your social skills?	5 (Very challenging)	4.2
3	The feedback screen for each of my scenario responses was helpful and accurate. I definitely learned from it.	5 (very helpful)	3.6
4	Do you feel discouraged by the average score rating in the progress screen?	1 (No)	3.4
5	Are the provided hypothetical social scenarios easy to understand?	5 (Yes, app featured new content)	3.6
6	The app should cover more social skills for teens and young adults.	5 (The app should cover more social skills)	4.4
7	The app was fun, engaging, and motivating to use.	5, very fun and motivating	4
8	The average score rating helped me pinpoint areas where I need to improve.	5 (feedback rating was helpful)	3.2
9	The app experience felt streamlined and clean. I had no confusion navigating through the app.	5 (clean and easy to navigate)	4.2
10	None of the scenarios were age-inappropriate or demonstrated violence.	5 (app is teen-friendly)	4.6

Figure 8. Summary of user survey results evaluating scenario realism, feedback quality, and usability

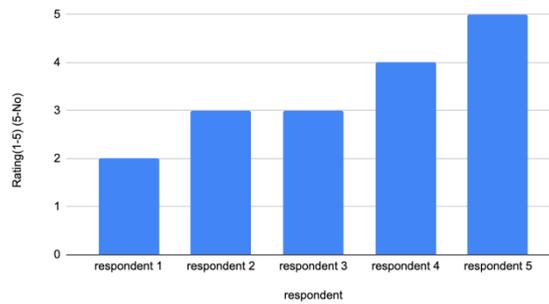
Accuracy of App Scenarios Based On User Responses



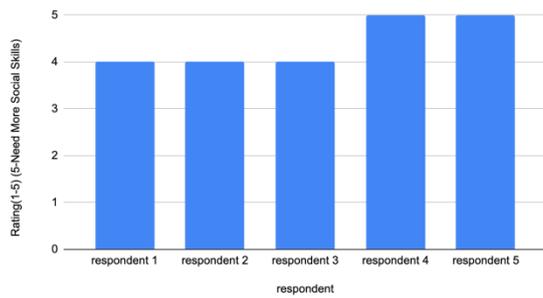
Whether or Not The App Challenges Social Skills According to User Responses



Average Score Rating Based On User Feedback



User Response To The Range of Social Skills



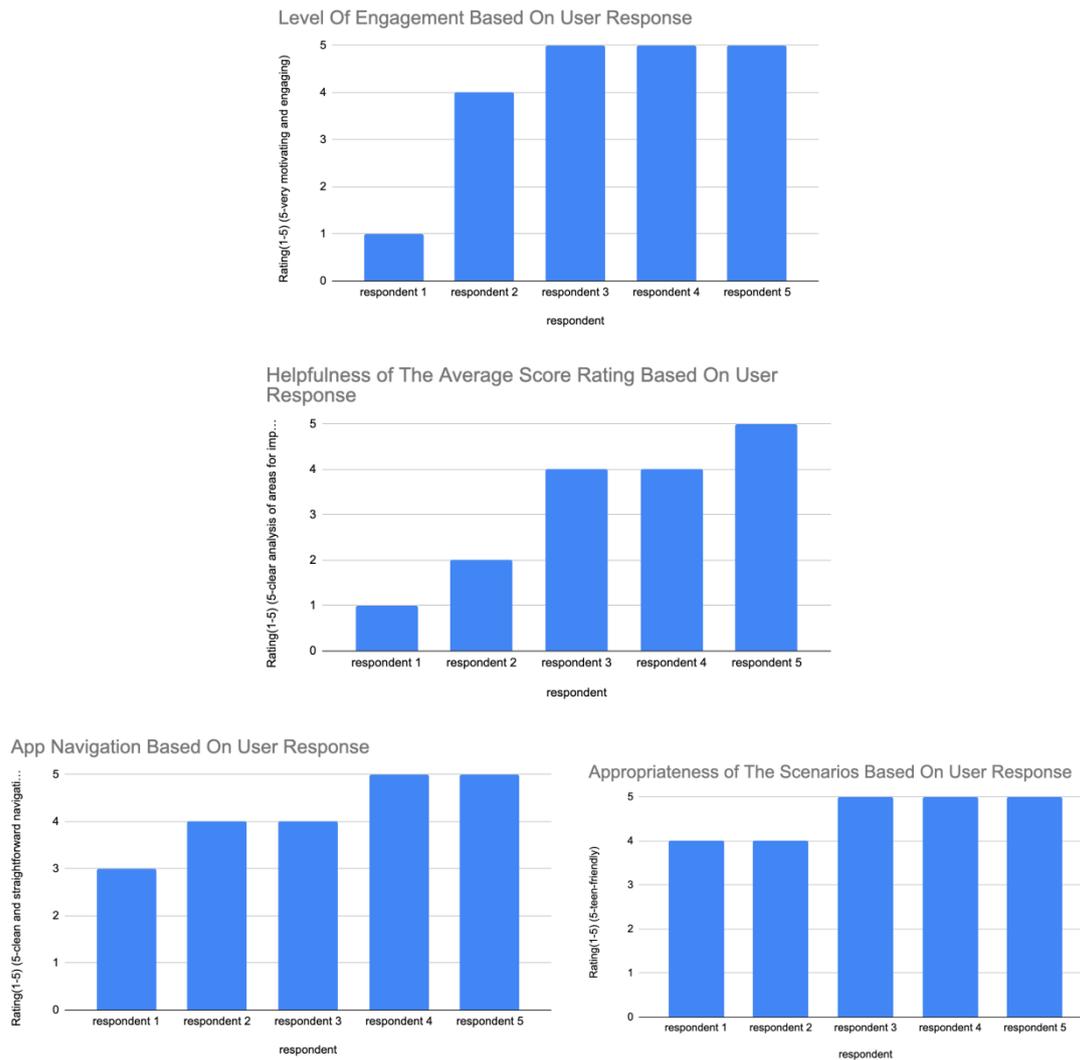


Figure 9. Mean Likert-scale scores for each evaluation question collected from the user study (n = 5)

Average score per question:

1. Would you say the generated social scenarios in the app are realistic? 4
2. Would you say the generated app scenarios in the app challenge your social skills? 4.2
3. The feedback screen for each of my scenario responses was helpful and accurate. I definitely learned from it. 3.8
4. Do you feel discouraged by the average score rating in the progress screen? 3.4
5. Are the hypothetical social scenarios provided easy to understand? 3.6
6. The app should cover more social skills for teens and young adults. 4.4
7. The app was fun, engaging, and motivating to use. 4
8. The average score rating helped me pinpoint areas where I need to improve. 3.2
9. The app experience felt streamlined and clean. I had no confusion navigating through the app. 4.2
10. None of the scenarios were age-inappropriate or demonstrated violence. 4.6

Average score for all the questions: 3.94

Question 6 provided me insight into how far I've developed on this project based on user feedback. Most of my survey responders believed that the app should cover more social skills.

This way, I know exactly where to polish and revise in my app rather than revising the whole UI. The last question ensures that individuals feel safe answering the AI-generated content social scenarios without offense. With everyone responding with 5s (the app felt safe without any violent content), I realized that my app is user-friendly to a wide range of audiences.

Questions 4 and 8 had the worst responses. Apart from both scoring the lowest, I was genuinely surprised by how my users felt discouraged from the average rating process, as I didn't expect them to find the average score rating to be so disturbing. Believing that the average score rating should help users improve their social skills as par with the objective of Super Youth, I was concerned that individuals highlighted that the average score rating was not accurate enough in pinpointing areas of improvement, which degrades the quality of the app's AI-generated content feedback.

5. RELATED WORK

This research paper is titled "Social and emotional learning during early adolescence: Effectiveness of a classroom-based SEL program for middle school students," written by various researchers at the University of South Florida, Stephen Ferrante from the SPARK Initiative, Inc., and the Group Victory LLC [11].

The SPARK Initiative focuses on the Pre-Teen Mentoring Curriculum, which covers essential skills that help teens transition to middle school. The curriculum's goal is to foster communication, problem-solving skills, decision-making, emotional regulation skills, and resilience. The SPARK teachers utilized group activities, discussions, and games designed to help students learn the desired skills taught in the curriculum.

There are similarities and differences between my app and the SPARK curriculum. My app shares a few similarities with the SPARK curriculum, such as featuring common everyday scenarios in a Q&A format, similar to the discussions present in the SPARK curriculum. Moreover, skills in the article align closely with those present in my app: decision-making, emotional regulation, and problem-solving.

However, unlike SPARK curriculum activities, Super Youth utilize a scoring or XP system to provide a more immersive and entertaining experience to younger individuals. User progress is also personalized in a way that is private and not shared with others, unlike the discussion activities of SPARK.

An advantage Super Youth has over the SPARK curriculum is the incorporation of generative AI. AI-generated content and feedback provide a personalized review of social skills to develop and maintain.

The title of the research paper is "Using games to ignite teens' civic and social and emotional learning" written by Susan E. Rivers and Michelle C. Bertoli at the iThrive Games Foundation in Newton, Massachusetts [12].

The iThrive Sim project is a game-based curriculum that focuses on developing socio-emotional skills in students through role-playing games set in various historical and civic scenarios. This curriculum combines social-emotional learning with civics and history with the goal of teaching effective communication and critical decision-making. iThrive Sim was created to improve learning and provide hands-on experiences for students in high school civics and history classes.

Super Youth lessons are gamified and structured in Q&A format, where users respond to everyday social scenarios. This is parallel to the gamified hands-on experience of iThriveSim's

historical scenarios. Both Super Youth and iThriveSim teach the same skills: problem-solving, decision-making, and effective communication.

However, Super Youth is run by AI-generated content for both the questions and feedback, unlike those of iThrive Sim, which are human-made gamified lesson plans. My app features varied and common social scenarios, not limited to history and civics, like in iThrive Sim.

An advantage Super Youth has over iThriveSim is the varied and common everyday scenarios that teens might encounter in their lives. Super Youth also only focus on socio-emotional learning without including other subjects.

This scholarly source is titled “A Digital Mental Health Solution to Improve Social, Emotional, and Learning Skills for Youth: Protocol for an Efficacy and Usability Study” [13].

It was written by several faculty members of the Department of Informatics and Health Data Science and the Department of Psychiatry and Behavioral Science at the University of Miami Miller School of Medicine, FL, USA.

The team used an app called Neolth to provide stress and mental health support to teens in various schools for the paper’s study. The app provides guided activities, a practice calendar, and activity reminders for the students to help manage their stress and improve mental health.

My system provides a gamified experience through AI-generated social scenarios focusing on self-awareness and emotional regulation skills. Because the social scenarios are AI-generated, the amount of content is diverse and virtually infinite. The Neolth app is unique in that it includes the school’s staff as part of the student’s individualized mental health plan. Neolth focuses on using planning through calendars and reminders to manage stress, rather than AI-generated content scenarios.

Super Youth is better than Neolth because my app provides common social scenarios for individuals to practice anytime to train the skills when they encounter them in real life. Moreover, my app features more social scenarios than Neolth, as it covers financial literacy and conflict resolution skills.

6. CONCLUSIONS

Super Youth, with its instant feedback and realistic AI-generated scenarios, comes with potential limitations. For one, the social scenarios may be repetitive due to the nature of AI-generated content. Moreover, the app barely features elements that promote encouragement rather than answering questions, resembling nothing very entertaining or fun, just answering questions.

If more time were allocated, I would gamify scenarios e.g. a video of the scenario and character plays out. Each video stops to ask a question, “What would they do?” based on the user's response. Making the scenarios more encouraging and more hands-on experience mimics the live action role-playing method to improve students’ self-awareness in social situations in real time.

Drawbacks and improvements are considered in every aspect of my project. Some limitations involve scenarios that may not completely fit with the unit content, such as financial literacy scenarios that do not ask the user to calculate their spending and determine their choices, but rather a more psychological take on a financial situation, only highlighting the user’s decisions. Additionally, the app could entertain users more by providing a gamified experience to enhance user experience. Currently, the app only provides a bare-bones structure of a question-answer format [14]. The app does not provide power-ups or anything entertaining to the user. The

content of the scenarios in each unit may contain unfamiliar skills that disrupt the learning process, resulting in confusing scenarios. Given more time, I would add interactive lessons such as a video that plays out the given scenario, and then a question would pop up asking the user what they would do. Conversely, I can also create a question-answer format, but instead of providing scores, the scenario adapts to the user's response and continuously provides questions based on the user's response until the conflict in the social scenario is resolved. Considering rebuilding the app, I would think about reducing the scenario feedback to fit within the screen, since sometimes the feedback provided exceeds the screen height.

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