Internet Gaming Disorder

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Contents

1 Introduction

Internet games have held the attention and fascination of the Western world for over a half-century [13]. Whether you have a desire to go on a quest to save a damsel in distress, steal cars and rob gas stations, or simply create your own fantasy world, internet games provide users with endless possibilities to explore their creative side and experience a sense of escapism. In addition to these two perceived benefits, internet games are also pleasurable and use our innate desires to keep us playing [12]. A researcher by the name of Scott Rigby, Ph.D., worked with the research company, Immersyve, to identify what exactly keeps users hooked to gaming. Together, the two used behavioural data and former studies to identify three basic physiological needs that help to explain this. It was identified that internet games use humans' innate desire for competence, autonomy, and relatedness to draw popularity. Competence refers to our desire to seek control or mastery over a situation; autonomy refers to the desire for independence and control over our actions, and relatedness refers to the desire for purpose and meaning [12]. In addition to this research, it has also been found that internet games are designed to be addictive because they are created to provide users with the release of high amounts of dopamine and instant gratification [14]. With all of this knowledge in mind, this paper will describe an android application called "Inform" which was created to help users identify potential video internet concerns, access resources and support, and develop an understanding of their internet gaming usage. Inform utilizes The American Psychiatric Association's (APA) Internet Gaming Disorder Test (IGD-20) in order help users better understand their relationship to internet gaming.

The IDG-20 addresses IGD by assessing six components of addictive behavior and nine criteria for IGD:

Components Model (Griffiths, 2005)	Internet Gaming Disorder DSM-5 (APA, 2013)	
Salience	**1**	1. Preoccupation with Internet Games (The individual thinks about previous gaming activity or anticipates playing the next game; Internet gaming becomes the dominant activity in daily life.
Mood Modification	**8**	8. Use of Internet Games to escape or relieve a negative mood (e.g., feelings of helplessness, guilt, anxiety).
Tolerance	**3**	3. Tolerance – the need to spend increasing amounts of time engaged in Internet games.
Withdrawal	**2**	2. Withdrawal Symptoms when Internet gaming is taken away. (These symptoms are typically described as irritability, anxiety, or sadness, but are no physical signs of pharmacological withdrawal.
Conflict	**5, 6, 7 and 9**	5. Loss of interests in previous hobbies and entertainment as a result of, and with the exception of, Internet games.
		6. Continued excessive use of Internet games despite knowledge of psychosocial problems.
		7. Has deceived family members, therapists, or others regarding the amount of Internet gaming.
		9. Has jeopardised or lost a significant relationship, job, or educational career opportunity because of participation in Internet games.
Relapse	**4**	4. Unsuccessful attempts to control the participation in Internet games.

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Figure 1: IGD criteria [10]

This paper will address the aforementioned disorders by analyzing literature to determine the effects of playing internet games on mental health and well being the factors that cause these addictions, and potential treatments available. The research will provide a better understanding of internet game addictions and will guide the creation of an Android application centred around this topic. The development of this application will be described in detail from the user interface to the back end.

2 Objectives

Using the aforementioned diagnosis criteria for IGD, Inform aims to enlighten its users to any potential risks posed by their gaming behaviours through a brief IGD Test. Although Inform cannot diagnose users with a disorder, the application attempts to provide its users with an awareness of potential concerns linked to their internet gaming.

The goals for the development are:

- Create an Android application
- Setup and use Google Firebase to store user data
- Provide a five-point scale test and break results into varying levels of potential IGD
- Provide further resources such as self-help/peer support communities and links to provincial

supports and resources

3 Development Phases

There are many development methodologies to choose from for software development. However, for this android application, the Waterfall model seemed most appropriate and fitting. The Waterfall model requires each stage of development to be completed before proceeding onto the next. Although the Waterfall model may be a little outdated compared to other methods, it is suitable for this project where research is necessary before the development.

3.1 Research/Requirement Gathering

Due to the nature of the project, research is a must to formulate an appropriate test. This includes obtaining:

- Potential factors that affect an individual to develop this gaming disorder
- Symptoms associated with gaming addiction
- Literature review of various gaming and internet addictions/disorders to formulate questions
- Ways to cope or manage the addiction
- Support lines and centers focused on internet gaming addictions

3.2 Database

Google Firebase will be set up and used for its authentication API to create a login system. The database will also be used to store the test answers from the user.

3.3 System Design

Interface: User-friendly and clean interface. Elements will be spaced out so it is not cluttered.

Navigation: The navigation should be easy to navigate through as well as intuitive. There will be a navigation bar located on the side of the application.

Text: The text colour should be appropriately be chosen so it is easy to read. The text should be

concise and comprehensive so all users can understand.

Colour: Both the text and the background colours should complement each other, readability is key.

3.4 Workflow

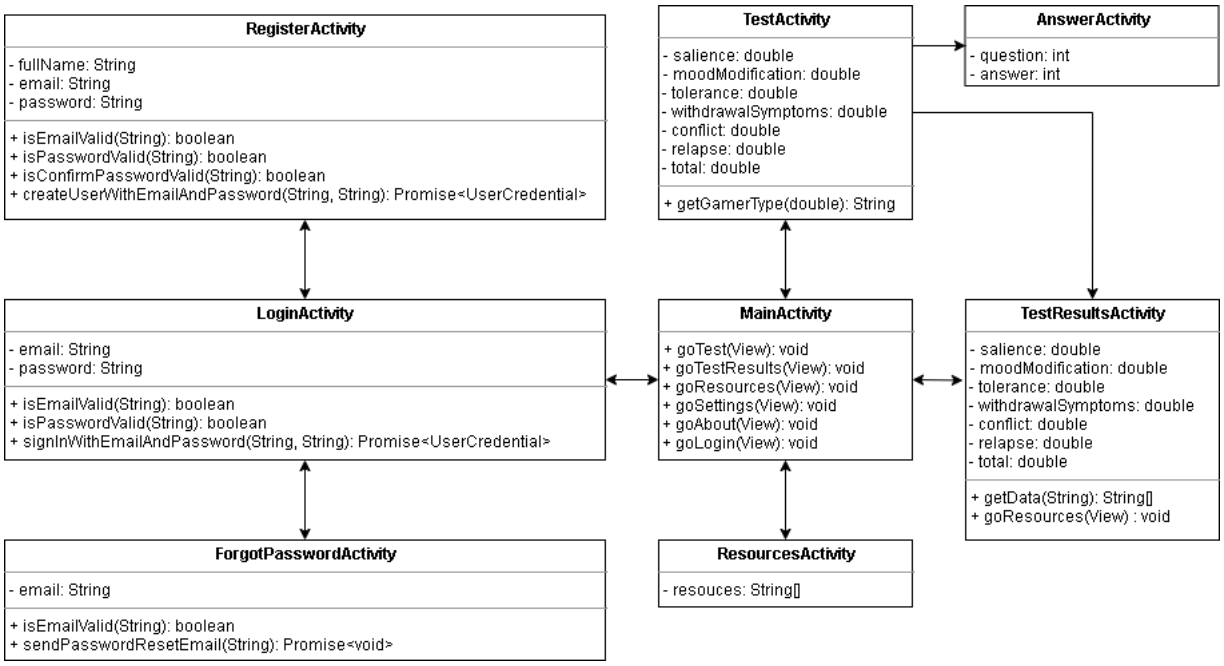

Figure 2: UML diagram of the application structure.

4 Background

This section will provide an understanding of what an addiction may be defined as and how it affects individuals. Having a better understanding of mental disorders makes it easier to tackle the problems associated with them.

4.1 Mental Health

"Flourishing mental health has been defined as a combination of feeling good and functioning effectively resulting in high levels of mental well-being [5]." To flourish may be perceived as an individual without any mental illnesses [4] however, this is not always the case. In Keves' research, two types of well-being were established: emotional and subjective [6]. Emotional well-being looked

at whether an illness or disorder was present based on various symptoms while subjective well-being was how the individual felt about themselves. It was found that individuals that higher self-esteem also had a higher degree of well being. Before further exploration of the effects of internet games on mental health, it is worth mentioning Seligman's PERMA model for mental health. Five main factors affect individuals well being according to Seligman [11]:

- Positive Emotion: the feeling of happiness and joy
- Engagement: to be completely engaged in an activity
- Relationships: to build strong relationships that bring the individual happiness
- Meaning: a sense of purpose
- Accomplishments: a goal that is met that brings satisfaction

4.2 Mental Health Applications

According to the National Institutes of Health, every year, the number of mental health applications in the App Store and Play Store increases. Because of the convenience and anonymity [7] of such applications, individuals may find it easier to seek help. Common trends in mental health applications include: self-management applications, applications for improving thinking skills, skill training applications, illness management, supported care, passive symptom tracking, and data collection.

Each application has its own strengths over others which allow for users to choose based on their preferences. For example, one application can provide a direct approach with coping techniques or a mood logger. While others can be passive and collect data through smart phone sensors which can be used develop better support.

The are many mental health application available in both the App Store and the Google Play Store.

Daylio Journal: It is a diary application that includes a mood tracker. Statistics about moods and activities can be viewed.

MindShift CBT: This application is design for individuals struggling with anxiety through a strategy called Cognitive Behavioural Therapy (CBT). It provides tools such as quick relief, thought

journal, copying techniques, setting habits, and goal setting.

Moodpath: Similar to MindShift, Moodpath's methods are based on CBT. It is primarily used to help with individual's struggling with depression however, can be used for anxiety as well. Features include a mood journal, supportive insights, audio and written exercises, and mindfulness techniques.

4.3 DSM-5

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) are guidelines used to diagnose various known mental disorders. From the APA website, the DSM "provides a common language for clinicians to communicate about their patients and establishes consistent and reliable diagnoses that can be used in the research of mental disorders [1]".

5 Research

5.1 IGD-20 Development

The guidelines of the DSM-5 have been further studied to develop the IGD-20 test used to assess an IGD. The validity of this test was collected from 1003 gamers all over the world with an average age of 26 years. The twenty questions of the IGD-20 were derived from nine criteria from the DSM-5 based on six different factors: salience, mood, modification, tolerance, withdrawal, conflict and relapse [10]. Salience, mood modification, tolerance, withdrawal, and relapse were components used to formulate three questions each while conflict was used for the remaining five. According to the APA, the IGD was developed based on an "active gaming lifestyle" over the span of 12-months. Furthermore, the APA states that in order to diagnose an individual with IGD, at least five of the nine criteria must be met. In order to determine the varying degrees of IGD, a latent profile analysis (LPA) was done. The LPA is a technique used to determine patterns among similar people based on answers provided [9]. This resulted in five different classes. In addition, another test was in order to determine the cut-off points between the varying levels of IGD. **Figure 3** presents the five classes along with the six dimensions of IGD.

	Casual gamers (N = 192)	Regular gamers (N = 487)	Low risk high-engagement gamers (N = 104)	At risk high engagement gamers (N = 167)	Disordered gamers (N = 53)	Overall test	
						Wald χ^2	*p value*
Salience, (min 1, max 5, mean 2.81 (SD = 0.93)), Mean (SE)	1.84 $(0.05)_a$	2.64 $(0.04)_b$	3.67 $(0.08)_c$	3.38 $(0.06)_d$	4.36 $(0.10)_e$	286.5	<0.001
Mood Modification**, (min 1, max 5, mean 3.06 (SD = 0.98)), Mean (SE)	2.28 $(0.07)_a$	3.06 $(0.05)_b$	3.55 $(0.11)_c$	3.38 $(0.08)_c$	3.95 $(0.12)_d$	91.5	<0.001
Tolerance, (min 1, max 5, mean 1.97 (SD = 0.74)), Mean (SE)	1.50 $(0.05)_a$	2.09 $(0.03)_b$	3.34 $(008)_c$	2.60 $(0.06)_d$	3.89 $(0.12)_e$	184.6	<0.001
Withdrawal Symptoms, (min 1, max 5, mean 2.29 (SD = 0.87)), Mean (SE)	1.27 $(0.04)_a$	1.90 $(004)_b$	2.75 $(0.09)_c$	2.46 $(0.07)_d$	3.83 $(0.11)_e$	243.9	<0.001
Conflict, (min 1, max 5, mean 2.18 (SD = 0.81)), Mean (SE)	1.40 $(0.04)_a$	2.01 $(0.03)_b$	2.14 $(0.07)_b$	3.10 $(0.06)_c$	3.60 $(0.09)_d$	770.1	<0.001
Relapse, (min 1, max 5, mean 2.35 (SD = 0.83)), Mean (SE)	1.57 $(0.05)_a$	2.25 $(0.04)_b$	2.40 $(0.08)_b$	3.00 $(0.06)_c$	3.78 $(0.13)_d$	364.9	<0.001

*Means having different subscript letters are different on at least p<.05 level according to the pairwise Wald χ^2 test of mean equality for latent class predictors in mixture modeling (http://bit.ly/NNCxju).
doi:10.1371/journal.pone.0110137.t007

Figure 3: The six dimensions and five classes of IGD [3].

5.1.1 IGD Test

As aforementioned, nine criteria of the DSM-5 was used in order to develop the IGD-20 test containing twenty questions to assess and IGD.

6 Development

This section will describe the process undertaken for the development of the project. This will include the application structure and its communication with the database and other forms of services. In addition, any limitations and alterations will be documented.

6.1 Application Structure

When the project objective was specified, the goal was to use the waterfall development model to plan the project. Due to the nature of the data flow, the research and test must be formulated before the development of the application. This approach made the most sense for a life cycle such as this. In addition, with 11 weeks for completion of the project, it was perfect where the requirements were short and well understood. In the waterfall model, each phase must be completed before the next making it difficult to go back to adjust anything in the conceptualization phase. This is not a problem because this project is not object-oriented so there will be very minimal adjustments made.

	Salience	Mood Modification	Tolerance	Withdrawal Symptoms	Conflict	Relapse
1. I often lose sleep because of long gaming sessions.	.61					
7. I usually think about my next gaming session when I am not playing.	.57					
13. I think gaming has become the most time consuming activity in my life.	.67					
8. I play games to help me cope with any bad feelings I might have.		.87				
2R. I never play games in order to feel better.		.60				
14. I play games to forget about whatever's bothering me.		.76				
3. I have significantly increased the amount of time I play games over last year.			.56			
9. I need to spend increasing amounts of time engaged in playing games.			.64			
15. I often think that a whole day is not enough to do everything I need to do in-game.			.59			
4. When I am not gaming I feel more irritable.				.75		
10. I feel sad if I am not able to play games.				.71		
16. I tend to get anxious if I can't play games for any reason.				.82		
5. I have lost interest in other hobbies because of my gaming.					.59	
11. I have lied to my family members because the amount of gaming I do.					.65	
19R. I know my main daily activity (i.e., occupation, education, homemaker, etc.) has not been negatively affected by my gaming.					.47	
17. I think my gaming has jeopardised the relationship with my partner.					.52	
20. I believe my gaming is negatively impacting on important areas of my life.					.70	
6. I would like to cut down my gaming time but it's difficult to do.						.61
12. I do not think I could stop gaming.						.50
18. I often try to play games less but find I cannot.						.66

Empty cells represents the factor loadings that are fixed to 0; all other factor loadings are significant at least at $p<.001$. Cronbach's alpha of the total 20 items of the Internet Gaming Disorder Test is.88.
doi:10.1371/journal.pone.0110137.t003

Figure 4: The IGD-20 test [10].

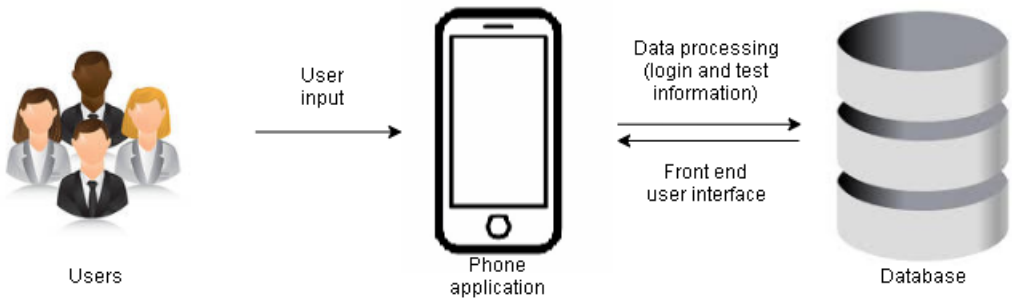

Figure 5: Basic diagram of the project structure.

6.2 Application Development

As of present, iOS and Android hold a combined 98% of the world's mobile market share [8]. So the obvious choice in operating systems had to be one of the two. Android development was done

in the past so it was chosen as the main operating system to develop for. There are a few things that lead to this decision of programming in Java with Android Studio:

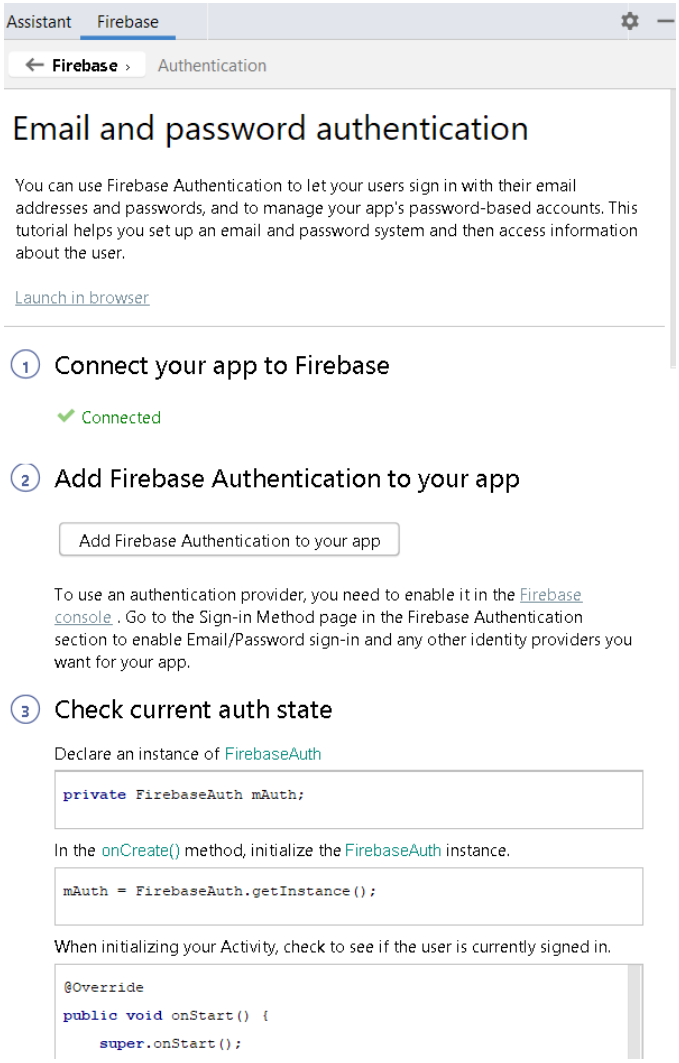

Figure 6: Android Studio's Firebase integration assistant.

Firebase Integration Support: Android Studio makes it easy to connect to Google Firebase through its easy to use Firebase plugin. It allowed for an easy way to create and register the application with Firebase. Also, it provided configuration files and Firebase SDKs to use with ease.

Interface: Android Studio's interface was specifically designed to use for Android development so it was the obvious choice. Other IDEs such as Eclipse or NetBeans had great functionality when programming in Java, it provided more of an all-round approach instead. Furthermore, Android Studio provides its built-in emulation system that allows for easy testing which makes it far superior

to other IDEs.

Programming Language: iOS development was primarily done in C, which there was very little experience of. Java was taught in school which made it the preferred programming language to use.

7 Result

This section will describe the result of the application. This includes the design and implementation of each activity within the application as well as how the application communicates with the database in order to retrieve user information. Because it is designed on a smartphone, the user interface was made to be simple and intuitive to use for any type of audience. This makes it easy to navigate the main dashboard where all features are accessible.

Android Studio was used as the IDE for Android development. Java was chosen as the main programming language for this project mainly due to experience but also due to the considerable amount of resources online. The secondary language used was XML. This was used in conjunction with Java to design the view of the application. The two languages together were used to create nine different activities which will be described below.

7.1 Activities

To put it simply, an Android activity is just one screen of an application. This section will describe the function of each activity and how it interacts with the back end.

7.1.1 Register Activity

This activity is required for users to create an account. Upon creation, the user will be redirected to the login page and the user's information such as email, full name, and a unique identifier (UID) are added to a Cloud Firestore database. This allows for data to be stored to the user through their UID (Figure 7). There is also a link to the Forgot Password activity where users can reset their password through an email link.

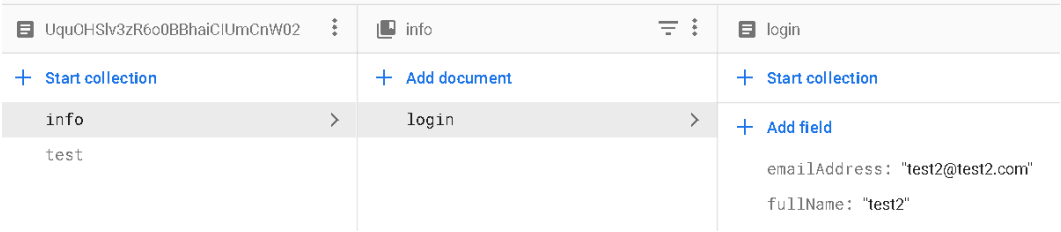

Figure 7: Example of user data stored to Cloud Firestore upon registration.

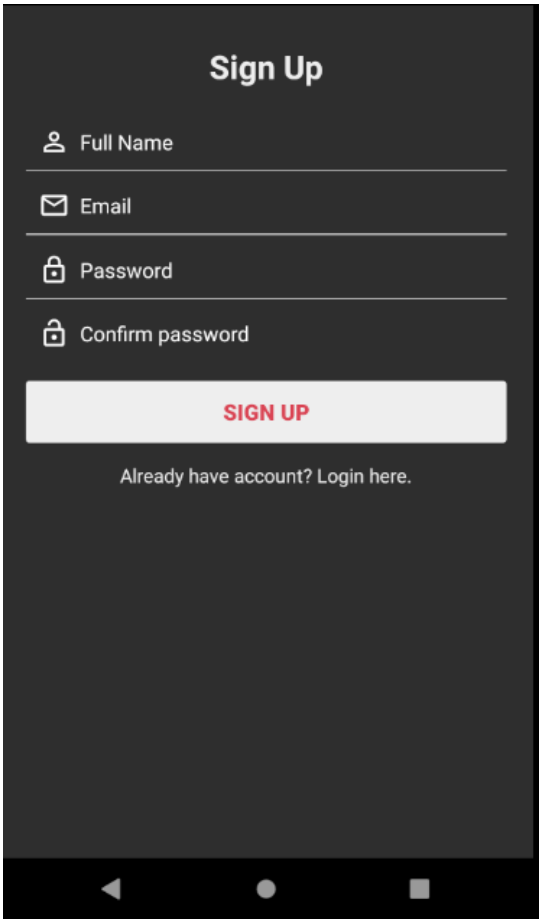

Figure 8: Register Activity

7.1.2 Login Activity

After registration, the user will be able to log in through this screen. This activity allows users to sign in to access the features of the application. There is a link to the registration activity for users that do not have an account. This uses Firebase's built-in authentication system shown in **Figure 5**.

Identifier	Providers	Created	Signed In
test2@test2.com		Mar 10, 2020	Mar 10, 2020
test1@test1.com		Mar 10, 2020	Mar 10, 2020
testtest@test.com		Mar 18, 2020	Mar 18, 2020

Figure 9: Example of Google Firebase's authentication system.

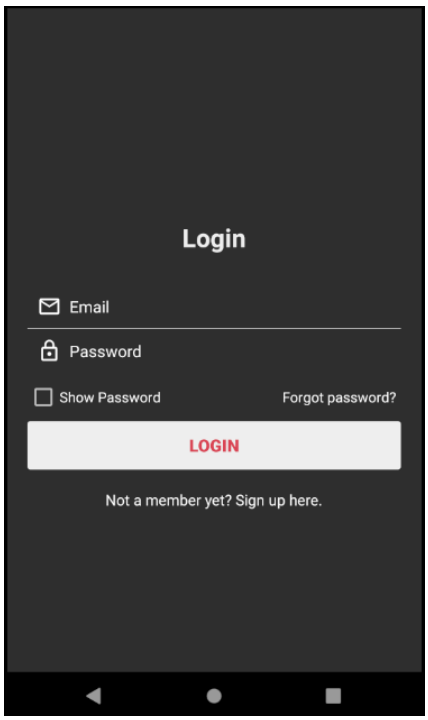

Figure 10: Login Activity

7.1.3 Forgot Password Activity

This activity uses Google Firebase's built-in API to perform a password reset. The API also includes email verification and change which is implemented in the Settings activity. This activity can be accessed from the login screen.

```
// send password reset to Firebase
mAuth.sendPasswordResetEmail(forgotPasswordEmail).
    addOnCompleteListener(ForgotPasswordActivity.this, new
    OnCompleteListener<Void>() {
    @Override
    public void onComplete(@NonNull Task<Void> task) {
        if (task.isSuccessful()) {
            startActivity(new Intent(getApplicationContext(),
                LoginActivity.class));
            return;
        }
    }
});
```

Listing 1: Google Firebase API for password resets.

7.1.4 Main Activity

The main activity is used as the main link to all other activities. As shown in **Figure 10**, the test, test result, resources, settings, and about activity are all accessible from the main dashboard. The main activity uses bright colours for each menu item however, the colours chosen are to ensure there is a clear contrast to the adjacent items.

7.1.5 Test Activity

The test activity provides the main functionality of the application. The users are taken to a twenty question test to assess their IGD. This activity uses functions to manipulate the underlying XML

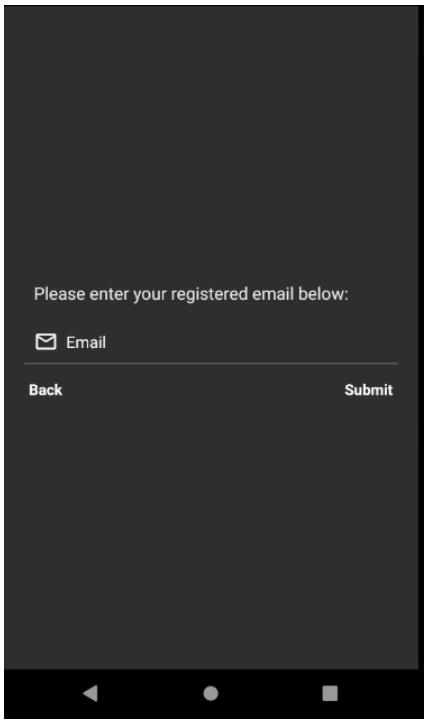

Figure 11: Forgot Password Activity

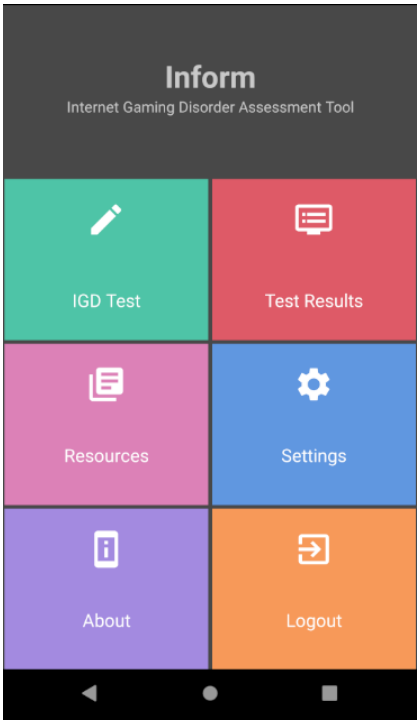

Figure 12: Main Activity

file to create the test. Upon completion, the result is calculated for each dimension of the IGD-20 and stored into the database.

```
FirebaseFirestore db = FirebaseFirestore.getInstance();
String userUID = FirebaseAuth.getInstance().getCurrentUser().getUid();
DocumentReference documentReference = db.collection("users").document(
    userUID).collection("test").document("results");

Map<String, Object> user = new HashMap<>();
user.put("Salience", salience);
user.put("Mood modification", moodModification);
user.put("Tolerance", tolerance);
user.put("Withdrawal symptoms", withdrawalSymptoms);
user.put("Conflict", conflict);
user.put("Relapse", relapse);
user.put("Total score", totalScore);
```

Listing 2: The result of the six dimensions of IGD stored in the Cloud Firestore.

```
if (totalScore > 0 && totalScore < 41.37) user.put("Gamer type", "Casual");
else if (totalScore >= 41.37 && totalScore < 57.83) user.put("Gamer type", "
    Regular");
else if (totalScore >= 57.83 && totalScore < 67.34) user.put("Gamer type", "
    Low-risk");
else if (totalScore >= 67.34 && totalScore < 77.43) user.put("Gamer type", "
    At-risk");
else if (totalScore >= 77.43) user.put("Gamer type", "Disordered");

documentReference.set(user).addOnSuccessListener(new OnSuccessListener<Void
    >() {
    @Override
    public void onSuccess(Void aVoid) {
        startActivity(new Intent(getApplicationContext(),
            TestResultsActivity.class));
        Log.e("Add to database: ", "Success");
    }
});
```

Listing 3: Distinguishing between the five gamer profiles based on results.

7.1.6 Test Result Activity

The test result activity is where the user will be redirected upon the completion of the IGD-20 test. This screen retrieves the data stored from the test and puts it in a comprehensive guide for users to read and gain further insight. **Figure 12** (left), displays the IGD score and the breakdown of it. This serves as an overview of the users' results. **Figure 12** (middle), describes the breakdown further so users can gain an understanding of each of the six dimensions and determine which one they struggle in. **Figure 12** (right), describes the five gamer classes. Overall, these three screens make up the test result activity which allows the user a better understanding of their results.

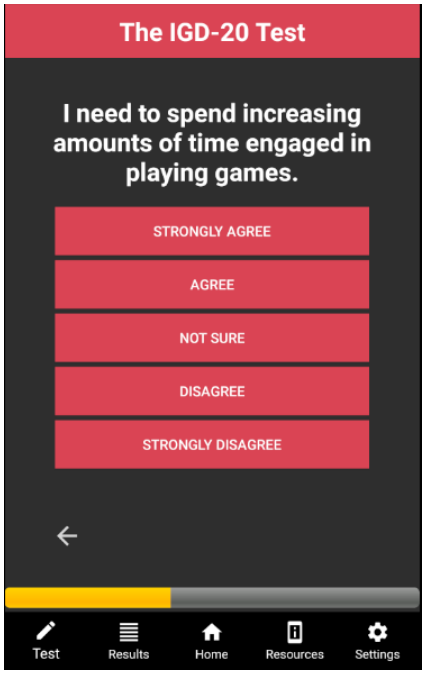

Figure 13: Test Activity

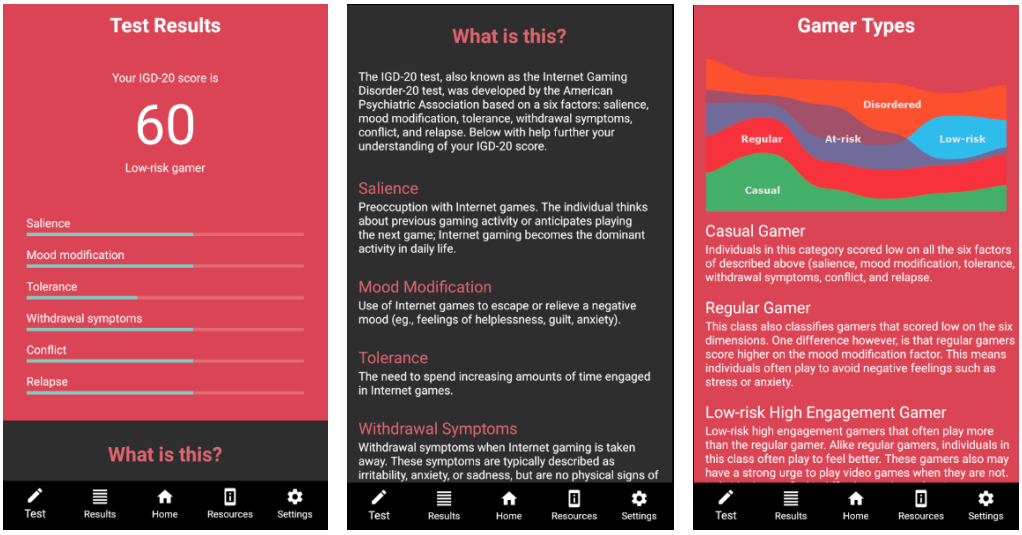

Figure 14: Test Result Activity

7.1.7 Resources Activity

The Resource activity provides various resources for individuals that are seeking help regarding their gaming addiction.

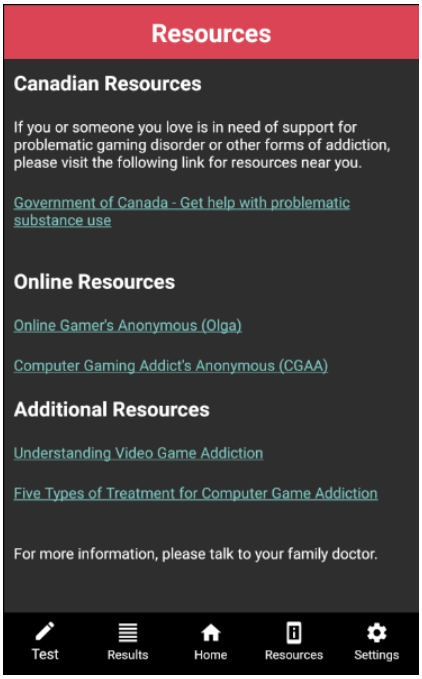

Figure 15: Resources Activity

7.1.8 About Activity

The about activity simply has a description of the application and its purpose.

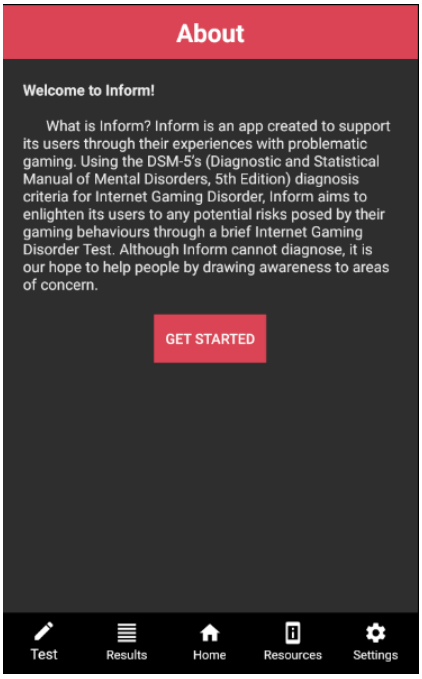

Figure 16: About Activity

7.1.9 Settings Activity

This activity provides a way for users to change their email or password through the Firebase API.

```
var user = firebase.auth().currentUser;
var newPassword = getASecureRandomPassword();

user.updateEmail("user@example.com").then(function() {
  // Update successful.
}).catch(function(error) {
  // An error happened.
});

user.updatePassword(newPassword).then(function() {
  // Update successful.
}).catch(function(error) {
  // An error happened.
});
```

Listing 4: Using the Firebase API to set a new user email address and password.

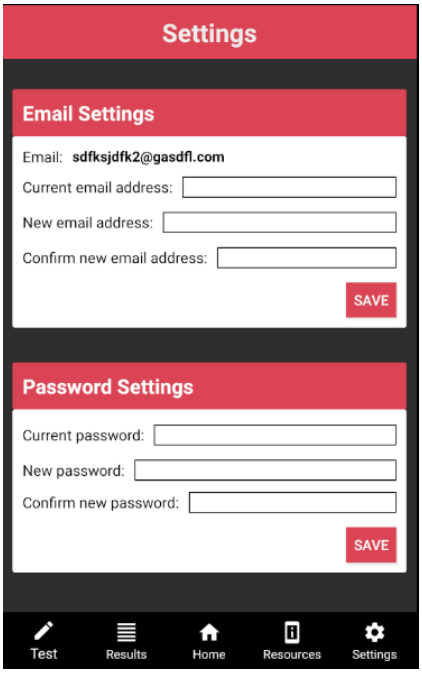

Figure 17: About Activity

7.2 Design

The main goal of the design was to keep it clean and simple. In a Human-Computer Interactions course taught by Gurdeep Singh Grewal, it was taught that user interfaces should be intuitive and easy to navigate. The language used should be easy to understand, free of technical terms. The concept of usability was stressed to fit the users' needs. This section will focus on user interface design as well other aspects of design such as usability and colour schemes.

7.2.1 Color scheme

According to Nick Babich, colour is the second most important aspect of an application, just behind the functionality. The color scheme should consist of a primary colour, and a secondary colour [2]. As seen in **Figure 11**, the black and red was chosen as the primary and secondary colour respectively. Babich also mentions that keeping a simple array of colours make it easy on the eyes and prevents distractions while reading. Colour contrast also plays a big role in making text easy to read for users. White was used as the text colour in the application. It provides a high contrast in comparison to the dark background to make it stand out.

7.2.2 User Interface

The user interface was made to be as simple as possible. Alike the colour scheme, adding too many components to the interface would only distract the user. Every component added only performed one task.

7.2.3 Navigation

Figure 18: Navigation Bar

The navigation bar contains five items: test, results, home, resources, and settings. Each item redirects the application to the corresponding activity.

7.2.4 Usability

Jakob Nielsen developed ten principles called the usability heuristics by which user interfaces should accomplish.

Visibility of system status: Various toast messages are shown to allow the user to understand what the system is doing.

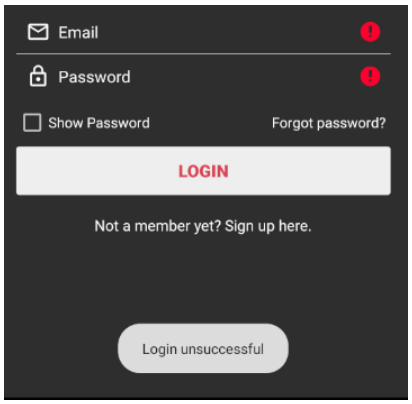

Figure 19: Toast message displaying that the login is unsuccessful.

Match between system and the real world: The system uses terms that is familiar and easy to understand. Buttons are a common concept in the real world making it instinctive to users.

User control and freedom: The test activity is an example of this where users are able to undo their answers by going back.

Consistency and standards: All components are kept consistent so users do not get confused about the function. Text fonts and sizes are kept consistent as well.

Error prevention: Errors messages are present wherever possible. This notifies the user of any errors that occur.

Recognition rather than recall: The test result activity provides a way for users to review their test results and its description without having to remember every detail.

Flexibility and efficiency of use: Users are able to hide their password during the login screen. The test results are broken down which gives the user an easier time understanding. In addition, when using the navigation bar to navigate away from an incomplete test page, a prompt appears to avoid loss of data.

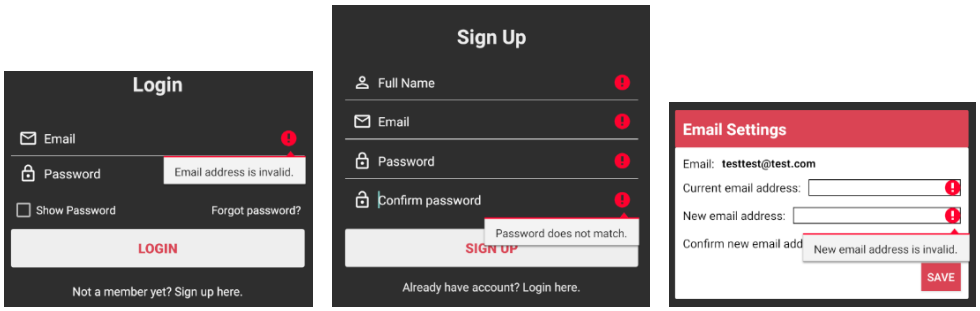

Figure 20: Examples of visibility of status

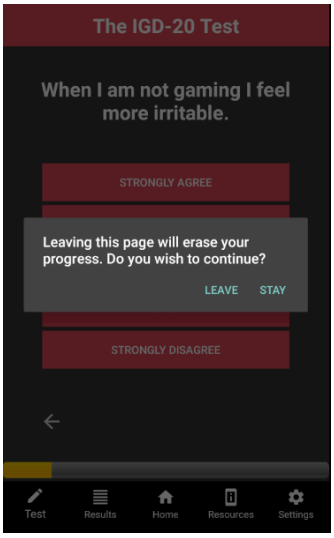

Figure 21: Example of unsaved progress prompt

Aesthetic and minimalist design: Buttons and text fields were placed only where they were needed. Each component has one and only one function so it is not confusing to use.

Help users recognize, diagnose, and recover from errors: In addition with error icons as shown in **Figure 16** and 17, the system also displays what exactly is being rejected so users can fix them.

Help and documentation: The description of the six dimensions are provided to help users understand the breakdown of their result. When users attempt to view test results without prior completion of the test, they are prompted.

7.3 Database

The Cloud Firestore is a NoSQL database based in the cloud. Data stored in this database are represented by collections and documents. Upon user registration, each user is given a unique identifier known as the UID. This UID is used as the 'document' name which is stored under the 'users' collection.

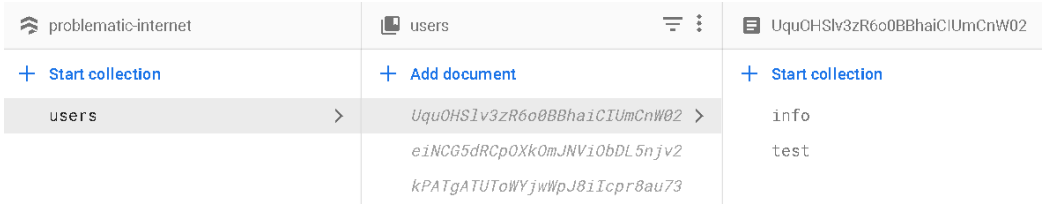

Figure 22: Structure of Cloud Firestore

Furthermore, each document further stores two collections: one for the user's account details and one of the test results. Here is where the application retrieves information from to display the result breakdown in the Test Result activity.

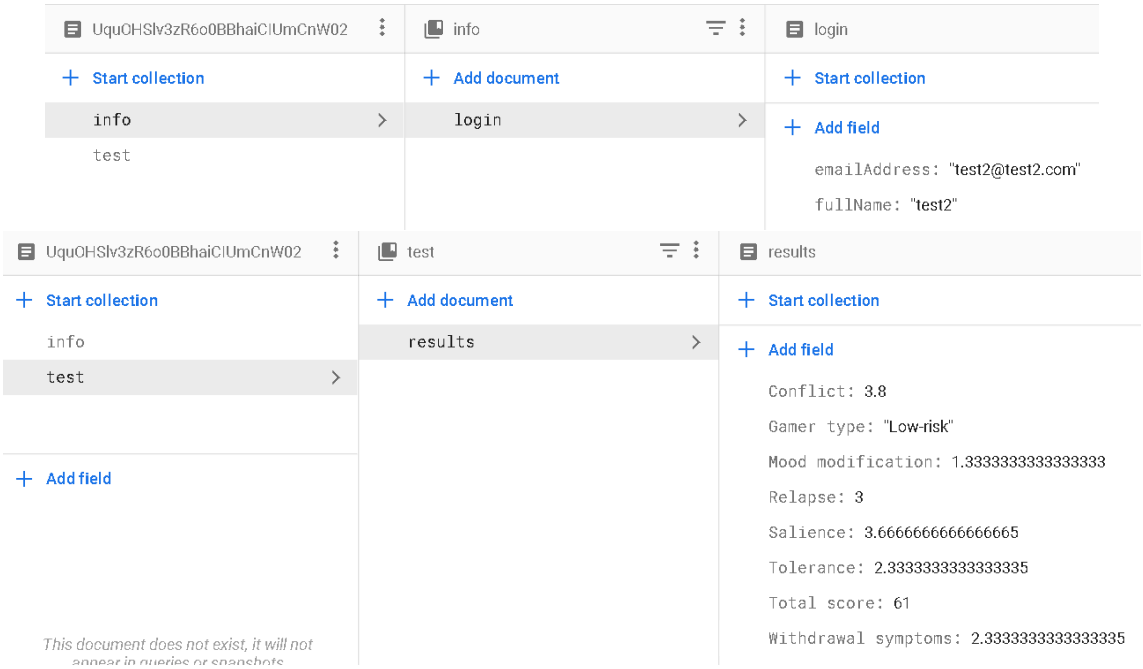

Figure 23: Login information and test results stored under each user's UID

References

[1] American Psychiatric Association. *DSM–5: Frequently Asked Questions*. https://www.psychiatry.org/psychiatrists/practice/dsm/feedback-and-questions/frequently-asked-questions.

[2] Nick Babich. "The Underestimated Power Of Color In Mobile App Design". In: ().

[3] Halley M. Pontes, Orsolya Király, Zsolt Demetrovics, Mark D. Griffiths. *The Conceptualisation and Measurement of DSM-5 Internet Gaming Disorder: The Development of the IGD-20 Test*. 2014. URL: https://journals.plos.org/plosone/article/figure/image?size=large&id=info:doi/10.1371/journal.pone.0110137.t007.

[4] Felicia A Huppert and Timothy TC So. "Flourishing across Europe: Application of a new conceptual framework for defining well-being". In: *Social indicators research* 110.3 (2013), pp. 837–861.

[5] Christian Jones et al. "Gaming well: links between videogames and flourishing mental health". In: *Frontiers in psychology* 5 (2014), p. 260.

[6] Corey LM Keyes. "The mental health continuum: From languishing to flourishing in life". In: *Journal of health and social behavior* (2002), pp. 207–222.

[7] National Institute of Mental Health. "Technology and the Future of Mental Health Treatment". In: ().

[8] Marko Milijic. "CRAZY Android vs iOS Market Share Discoveries in 2020". In: ().

[9] LK Muthén and BO Muthén. "Mplus user's guide. Eight edition". In: *Los Angeles, CA: Muthén & Muthén* (1998).

[10] Halley M Pontes et al. "The conceptualisation and measurement of DSM-5 Internet Gaming Disorder: The development of the IGD-20 Test". In: *PloS one* 9.10 (2014).

[11] Martin Seligman. "PERMA and the building blocks of well-being". In: *The Journal of Positive Psychology* 13.4 (2018), pp. 333–335.

[12] TeachThought Staff. *Why People Play Video Games*. https://www.teachthought.com/learning/why-people-play-video-games/. 2017.

[13] Meridith Watkins. *Video Game Addiction Symptoms and Treatment*. https://americanaddictioncenters.org/video-gaming-addiction. 2019.

[14] Han-Ting Wei et al. "The association between online gaming, social phobia, and depression: an internet survey". In: *BMC psychiatry* 12.1 (2012), p. 92.