

**PERSONALISED GAME PROGRESSION FOR CHILDREN WITH  
AUTISM TO EVOKE EMOTION REGULATION SKILL**



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

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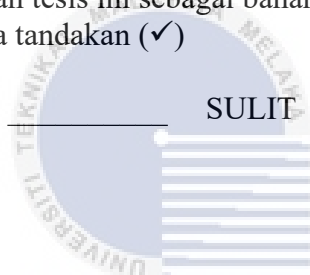
JUDUL: PERSONALISED GAME PROGRESSION FOR CHILDREN WITH AUTISM TO EVOKE EMOTION REGULATION SKILL

SESI PENGAJIAN: 2022 / 2023

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PERSONALISED GAME PROGRESSION FOR CHILDREN WITH AUTISM TO  
EVOKE EMOTION REGULATION SKILL

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This report is submitted in partial fulfilment of the requirements for the  
Bachelor of Information Technology (Game Technology) with Honours.


UNIVERSITI TEKNIKAL MALAYSIA MELAKA

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY  
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2023

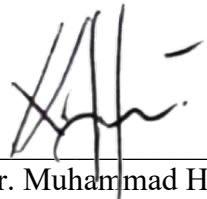
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## DEDICATION

This report is dedicated to all those who have supported and encouraged me throughout my academic journey.

To my family, whose unwavering love and constant belief in me have been my pillars of strength. Thank you for your endless sacrifices and for always reminding me of the importance of education.

To my supervisor, who have imparted their knowledge and guided me with wisdom. Your expertise and passion for teaching have shaped my understanding and opened new horizons of learning.

To my friends, who have shared countless study sessions, late-night discussions, and laughter-filled moments. Your companionship has made this journey memorable and enjoyable.

I am deeply indebted to the participants who generously dedicated their time and shared their insights for this study. Their willingness to engage in interviews for data collection was crucial in obtaining meaningful results and enriching the findings of this research.

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My heartfelt appreciation goes out to my family for their encouragement, unconditional love, and unwavering belief in my abilities. Their support, patience, and understanding have been the cornerstone of my academic pursuits, and I am eternally grateful for their presence in my life.

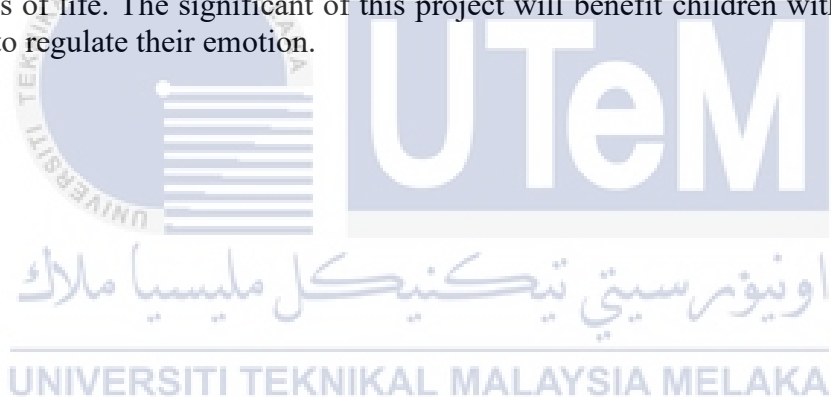
Lastly, I would like to share my gratitude to all the individuals who, directly or indirectly, contributed to the successful completion of this report. Their support, whether through insightful conversations, technical assistance, or moral encouragement, has been invaluable.

In conclusion, this report would not have been possible without the collective support, guidance, and inspiration of all those mentioned above. I am truly honoured and humbled to have had such remarkable individuals in my academic journey. Their contributions have undoubtedly shaped me as a scholar and have enriched my understanding of the subject matter.

Thank you all for being a part of this remarkable chapter in my academic life.

## ABSTRACT

This serious game project aims to create an interactive and educational game specifically designed for students with autism spectrum disorder (ASD). The game's objective is to provide a supportive and engaging environment that promotes learning and the development of essential skills for individuals on the autism spectrum. The game was used by five children at The National Autism Society of Malaysia (NASOM) Melaka. Through carefully designed gameplay mechanics, visual aids, and audio cues, the game will target areas such as social interaction, communication, cognitive abilities, and emotional regulation. By utilising evidence-based strategies and incorporating personalised features to accommodate individual needs, this serious game able to empower autism students and foster their growth and success in various aspects of life. The significant of this project will benefit children with ASD to help them to regulate their emotion.



## ABSTRAK

Projek permainan serius ini bertujuan untuk mencipta sebuah permainan interaktif dan pendidikan yang direka khas untuk pelajar yang mengalami gangguan spektrum autisme (ASD). Objektif permainan ini adalah untuk menyediakan persekitaran sokongan dan menghiburkan yang menggalakkan pembelajaran dan perkembangan kemahiran penting bagi individu yang berada dalam spektrum autisme. Permainan ini telah digunakan oleh lima kanak-kanak di Persatuan Autisme Kebangsaan Malaysia (NASOM) Melaka. Melalui mekanik permainan yang direka dengan teliti, bantuan visual, dan petunjuk audio, permainan ini akan menumpukan kepada bidang-bidang seperti interaksi sosial, komunikasi, kebolehan kognitif, dan pengawalan emosi. Dengan menggunakan strategi berasaskan bukti dan menggabungkan ciri-ciri yang dipersonalisasi untuk memenuhi keperluan individu, permainan serius ini dapat memberdayakan pelajar autisme dan membantu pertumbuhan serta kejayaan mereka dalam pelbagai aspek kehidupan. Signifikannya projek ini akan memberi manfaat kepada kanak-kanak dengan ASD dalam membantu mereka mengawal emosi mereka.



## TABLE OF CONTENTS

|   | <b>PAGE</b>  |
|---|--------------|
| <b>DECLARATION.....</b>                                       | <b>II</b>    |
| <b>DEDICATION.....</b>  | <b>III</b>   |
| <b>ACKNOWLEDGEMENTS.....</b>                                  | <b>IV</b>    |
| <b>ABSTRACT .....</b>   | <b>V</b>     |
| <b>ABSTRAK .....</b>  | <b>VI</b>    |
| <b>TABLE OF CONTENTS.....</b>                                 | <b>VII</b>   |
| <b>LIST OF TABLES .....</b>                                   | <b>XIII</b>  |
| <b>LIST OF FIGURES .....</b>                                  | <b>XIV</b>   |
| <b>LIST OF ABBREVIATIONS .....</b>                            | <b>XVII</b>  |
| <b>LIST OF ATTACHMENTS.....</b>                               | <b>XVIII</b> |
| <b>CHAPTER 1: INTRODUCTION.....</b>                           | <b>1</b>     |
| 1.1    Project Background.....                                | 1            |
| 1.2    Problem Statement.....                                 | 2            |
| 1.3    Objectives .....                                       | 2            |
| 1.4    Goals and Genre.....                                   | 2            |
| 1.5    Game Feature .....                                     | 3            |
| 1.6    Conclusion .....                                       | 3            |
| <b>CHAPTER 2: LITERATURE REVIEW AND PROJECT METHODOLOGY .</b> | <b>4</b>     |

|                                 |                                     |           |
|---------------------------------|-------------------------------------|-----------|
| 2.1                             | Introduction.....                   | 4         |
| 2.1.1                           | Literature Review Study .....       | 4         |
| 2.2                             | Genre.....                          | 8         |
| 2.3                             | Existing Games .....                | 8         |
| 2.3.1                           | AntiSpark .....                     | 8         |
| 2.3.2                           | <i>IF</i> .....                     | 9         |
| 2.3.3                           | Let's face it .....                 | 10        |
| 2.3.4                           | Comparison of Existing Games .....  | 10        |
| 2.4                             | Project methodology .....           | 11        |
| 2.5                             | Conclusion .....                    | 13        |
| <b>CHAPTER 3: ANALYSIS.....</b> |                                     | <b>15</b> |
| 3.1                             | Requirement Analysis.....           | 15        |
| 3.1.1                           | Project Requirements.....           | 18        |
| 3.1.2                           | Technical Requirement.....          | 19        |
| 3.1.3                           | Software Requirement .....          | 20        |
| 3.1.3.1                         | Unity Engine.....                   | 20        |
| 3.1.3.2                         | Adobe Photoshop.....                | 20        |
| 3.1.3.3                         | PixilArt .....                      | 21        |
| 3.1.3.4                         | Google Chrome.....                  | 21        |
| 3.1.3.5                         | Microsoft Word .....                | 22        |
| 3.1.4                           | Hardware Requirement.....           | 23        |
| 3.1.4.1                         | Personal computer .....             | 23        |
| 3.2                             | Project Schedule and Milestone..... | 23        |
| 3.3                             | Conclusion .....                    | 26        |

|  |           |
|--|-----------|
| <b>CHAPTER 4: DESIGN .....</b>               | <b>27</b> |
| 4.1 Introduction.....                        | 27        |
| 4.2 Game Architecture .....                  | 27        |
| 4.3 Game Design.....                         | 28        |
| 4.3.1 Gameplay .....                         | 28        |
| 4.3.2 Flowboard .....                        | 29        |
| 4.3.3 Level Progression .....                | 30        |
| 4.3.4 User Interface.....                    | 31        |
| 4.4 Game Art.....                            | 34        |
| 4.4.1 Design Process Validation.....         | 34        |
| 4.4.2 Game Art Design .....                  | 35        |
| 4.4.2.1 Game Art First Design Cycle .....    | 35        |
| 4.4.2.2 Game Art Second Design Cycle.....    | 36        |
| 4.4.3 Game World.....                        | 37        |
| 4.4.3.1 Game World First Design Cycle.....   | 38        |
| 4.4.3.2 Game World Second Design Cycle ..... | 38        |
| 4.4.4 Character Design .....                 | 39        |
| 4.4.4.1 Character First Design Cycle.....    | 39        |
| 4.4.4.2 Character Second Design Cycle .....  | 40        |
| 4.4.5 Camera Model .....                     | 41        |
| 4.4.6 Audio/ Sound Effect .....              | 42        |
| 4.5 Conclusion .....                         | 42        |
| <b>CHAPTER 5: IMPLEMENTATION.....</b>        | <b>43</b> |
| 5.1 Introduction.....                        | 43        |

|                                 |   |           |
|---------------------------------|---|-----------|
| 5.2                             | Creation of Game Art.....                     | 43        |
| 5.2.1                           | Production of Graphics .....                  | 43        |
| 5.2.1.1                         | Sprites .....                                 | 43        |
| 5.2.1.2                         | Game World.....                               | 45        |
| 5.2.2                           | Production of Audio .....                     | 46        |
| 5.3                             | Integration of Game Component .....           | 46        |
| 5.3.1                           | Matching Game Component Integration .....     | 46        |
| 5.3.2                           | Puzzle Game Component Integration.....        | 51        |
| 5.3.3                           | Drag and Drop Game Component Integration..... | 53        |
| 5.3.4                           | Timer Controller Integration.....             | 56        |
| 5.4                             | Game Configuration Management.....            | 57        |
| 5.4.1                           | Configuration Setup.....                      | 57        |
| 5.4.2                           | Version Control Procedure .....               | 59        |
| 5.5                             | Implementation Status .....                   | 60        |
| 5.6                             | Conclusion .....                              | 61        |
| <b>CHAPTER 6: TESTING .....</b> |   | <b>62</b> |
| 6.1                             | Introduction.....                             | 62        |
| 6.2                             | Test Plan.....                                | 62        |
| 6.2.1                           | Trial Planning Overview.....                  | 62        |
| 6.2.2                           | Consent Form.....                             | 63        |
| 6.3                             | Test Implementation .....                     | 64        |
| 6.3.1                           | Pre-Trial .....                               | 64        |
| 6.3.2                           | Trial.....                                    | 65        |
| 6.3.3                           | Post-Trial .....                              | 66        |

|  |   |           |
|--|---|-----------|
| 6.3.4                                      | Sample Questions List .....   | 66        |
| 6.4  | Test Results and Analysis .....   | 67        |
| 6.4.1                                      | Gameplay Data .....   | 67        |
| 6.4.2                                      | Data Analysis and Finding.....  | 67        |
| 6.4.2.1                                    | Finding 1: Children required assistance from teachers to play the<br>Memory Game .....  | 67        |
| 6.4.2.2                                    | Finding 2: Video Game Music enhance children emotion greatly.                           | 70        |
| 6.4.2.3                                    | Finding 3: Gameplay reward helps to improve children motivation<br>and progression..... | 73        |
| 6.5  | Conclusion .....  | 74        |
| <b>CHAPTER 7: PROJECT CONCLUSION .....</b> |   | <b>76</b> |
| 7.1  | Observation of Strength and Weaknesses.....   | 76        |
| 7.1.1                                      | Strengths .....   | 76        |
| 7.1.1.1                                    | User-Friendly Gameplay to Spark Engagement .....  | 76        |
| 7.1.1.2                                    | Good Responsive Touch Input .....   | 76        |
| 7.1.1.3                                    | Time High Score System .....  | 77        |
| 7.1.2                                      | Weaknesses.....   | 77        |
| 7.1.2.1                                    | Inadequate Sound Effects to Motivate Children.....                                      | 77        |
| 7.1.2.2                                    | Lack of Score Database .....  | 77        |
| 7.1.2.3                                    | Insufficient Accessibility Options .....  | 77        |
| 7.2  | Proposition for Improvement.....  | 78        |
| 7.2.1                                      | Enhanced Sound Design.....  | 78        |
| 7.2.2                                      | High Score Database.....  | 78        |
| 7.2.3                                      | Accessibility Options.....  | 78        |

|     |                         |           |
|-----|-------------------------|-----------|
| 7.3 | Contribution .....      | 78        |
| 7.4 | Conclusion .....        | 79        |
|     | <b>REFERENCES .....</b> | <b>80</b> |
|     | <b>APPENDICES .....</b> | <b>84</b> |



## LIST OF TABLES

|  | PAGE      |
|--|-----------|
| <b>Table 2.1 Synthesis Study and Claim .....</b>                                     | <b>5</b>  |
| <b>Table 2.2 Comparison between AntiSpark, IF... and Let's face it .....</b>         | <b>11</b> |
| <b>Table 2.3 Agile Development Cycle Descriptions.....</b>                           | <b>13</b> |
| <b>Table 3.1 Game Requirements Analysis Study .....</b>                              | <b>15</b> |
| <b>Table 3.2 Proposed Game Requirement .....</b>                                     | <b>19</b> |
| <b>Table 3.3 Technical Requirement.....</b>  | <b>20</b> |
| <b>Table 3.4 Software Requirement List .....</b>                                     | <b>22</b> |
| <b>Table 3.5 Hardware Requirements List.....</b>                                     | <b>23</b> |
| <b>Table 3.6 Project Milestone Description .....</b>                                 | <b>24</b> |
| <b>Table 4.1 Audio and Sound Effect list.....</b>                                    | <b>42</b> |
| <b>Table 5.1 Audio Production List.....</b>  | <b>46</b> |
| <b>Table 5.2 Configuration Description Table .....</b>                               | <b>58</b> |
| <b>Table 5.3 Version Control Table .....</b>   | <b>59</b> |
| <b>Table 5.4 Implementation Status List .....</b>                                    | <b>60</b> |
| <b>Table 6.1 Trial Overview Table .....</b>  | <b>63</b> |
| <b>Table 6.2 Data of recorded all gameplay time for the first Trial Process.....</b> | <b>67</b> |
| <b>Table 6.3 Data of recorded gameplay time for Memory Game. ....</b>                | <b>69</b> |
| <b>Table 6.4 Child 3 and Child 5 recorded time for both trial .....</b>              | <b>73</b> |

## LIST OF FIGURES

|   | PAGE |
|---|------|
| Figure 2.1 AntiSpark Game .....   | 9    |
| Figure 2.2 IF... Game .....   | 9    |
| Figure 2.3 Let's face it Gameplay .....   | 10   |
| Figure 2.4 Agile Development Cycle.....   | 12   |
| Figure 3.1 Unity Engine Logo .....  | 20   |
| Figure 3.2 Photoshop Logo.....  | 21   |
| Figure 3.3 PixilArt Logo .....  | 21   |
| Figure 3.4 Google Chrome Logo.....  | 22   |
| Figure 3.5 Microsoft Word Logo .....  | 22   |
| Figure 3.6 Laptop image.....  | 23   |
| Figure 3.7 Project Gantt Chart.....   | 24   |
| Figure 4.1 Game architecture layout.....  | 28   |
| Figure 4.2 Basic gameplay .....   | 28   |
| Figure 4.3 Flowboard of the game .....  | 29   |
| Figure 4.4 Level Progression flow .....   | 30   |
| Figure 4.5 Main menu interface.....   | 31   |
| Figure 4.6 Gameplay interface.....  | 32   |
| Figure 4.7 Setting interface .....  | 32   |
| Figure 4.8 Win interface .....  | 33   |
| Figure 4.9 Meeting with teachers to discuss and understand the targeted audiences. .... | 34   |
| Figure 4.10 Prototype demonstration with teachers.....                                  | 35   |
| Figure 4.11 Demonstration with one of the students .....                                | 35   |
| Figure 4.12 Walk path design .....  | 36   |



|   |    |
|---|----|
| Figure 4.13 School artwork .....  | 36 |
| Figure 4.14 Shapes artwork collection .....                                 | 36 |
| Figure 4.15 School design artwork with inclusion NASOM logo .....           | 37 |
| Figure 4.16 Simple shapes artwork .....                                     | 37 |
| Figure 4.17 Original concept of game world .....                            | 38 |
| Figure 4.18 Beach background .....  | 38 |
| Figure 4.19 Park background .....   | 39 |
| Figure 4.20 Boy expression design concept.....                              | 39 |
| Figure 4.21 Girl expression design concept .....                            | 40 |
| Figure 4.22 Expression emoticon artwork.....                                | 40 |
| Figure 4.23 Bear toy objects artwork.....                                   | 41 |
| Figure 4.24 2D perspective used in Unity Editor .....                       | 41 |
| Figure 5.1 Creation of emotion expression emoticons in Photoshop.....       | 44 |
| Figure 5.2 Creation of simple shapes in Photoshop .....                     | 44 |
| Figure 5.3 Sprite editing on Unity Editor .....                             | 45 |
| Figure 5.4 Game World creation on PixilArt website .....                    | 45 |
| Figure 5.5 Implementation Game Design, Assets and Environment on Unity...   | 47 |
| Figure 5.6 C# Script for Matching Game .....                                | 47 |
| Figure 5.7 C# Script for Matching Game cont.....                            | 48 |
| Figure 5.8 C# Script for Matching Controller.....                           | 48 |
| Figure 5.9 C# Script for Matching Controller cont.....                      | 49 |
| Figure 5.10 C# Script for Matching Controller cont. ....                    | 49 |
| Figure 5.11 C# Script for Matching Controller cont. ....                    | 50 |
| Figure 5.12 C# Script for Matching Controller cont. ....                    | 50 |
| Figure 5.13 C# Script for Matching Controller cont. ....                    | 51 |
| Figure 5.14 Implementation Game Design, Assets and Environment on Unity. 51 |    |
| Figure 5.15 C# Script for Puzzle Gameplay .....                             | 52 |
| Figure 5.16 C# Script for Puzzle Controller .....                           | 52 |
| Figure 5.17 C# Script for Puzzle Controller cont.....                       | 53 |
| Figure 5.18 Implementation Game Design, Assets and Environment on Unity. 53 |    |
| Figure 5.19 Script for Drag Drop Game Mechanics.....                        | 54 |
| Figure 5.20 Script for Drag Drop Game Mechanics cont.....                   | 54 |
| Figure 5.21 Script for Drag Drop Game Mechanics cont.....                   | 55 |
| Figure 5.22 Script for Drag Drop Game Controller .....                      | 55 |

|  |           |
|--|-----------|
| <b>Figure 5.23 Script for Drag Drop Game Controller cont.....</b>  | <b>56</b> |
| <b>Figure 5.24 Implementation Assets and User Interface (UI) on Unity.....</b>   | <b>56</b> |
| <b>Figure 5.25 Script for Timer Controller .....</b>   | <b>57</b> |
| <b>Figure 5.26 Script for Timer Controller cont.....</b>   | <b>57</b> |
| <b>Figure 6.1 Consent form that will be filled by facilitators during trial.....</b>                                     | <b>64</b> |
| <b>Figure 6.2 Teacher of Child 1 assisting during first Memory Game Task .....</b>                                       | <b>68</b> |
| <b>Figure 6.3 Teacher of Child 2 assisting during first Memory Game Task .....</b>                                       | <b>68</b> |
| <b>Figure 6.4 Child 3 able to play Memory Game Task by himself after being assisted by his teacher. ....</b>             | <b>70</b> |
| <b>Figure 6.5 Child 4 able to play Memory Game Task by himself after being assisted by his teacher. ....</b>             | <b>70</b> |
| <b>Figure 6.6 Child 5 can be seen to be very independent during the whole process of the trial.....</b>                  | <b>70</b> |
| <b>Figure 6.7 Child 1 exhibit enjoyment after playing the game.....</b>  | <b>71</b> |
| <b>Figure 6.8 Child 2 was covering her ear showing no interest with the game sound. ....</b>                             | <b>72</b> |
| <b>Figure 6.9 Child 4 do not react much during and after trial process conducted. ....</b>                               | <b>72</b> |
| <b>Figure 6.10 Child 3 trying again the game by himself to achieve better time score without his teacher's help.....</b> | <b>74</b> |

**LIST OF ABBREVIATIONS**

|              |   |  |
|--------------|---|--|
| <b>FYP</b>   | - | <b>Final Year Project</b>                      |
| <b>ASD</b>   | - | <b>Autism Spectrum Disorder</b>                |
| <b>NASOM</b> | - | <b>The National Autism Society of Malaysia</b> |



**LIST OF ATTACHMENTS**

|                   |                            | <b>PAGE</b> |
|-------------------|----------------------------|-------------|
| <b>Appendix A</b> | <b>Questionnaire</b>       | <b>64</b>   |
| <b>Appendix B</b> | <b>Consent form</b>        | <b>66</b>   |
| <b>Appendix B</b> | <b>Signed Consent form</b> | <b>84</b>   |



## CHAPTER 1: INTRODUCTION

### 1.1 Project Background

Serious games serve goals besides pure amusement, for example, instruction, skill development, or behavioural modifications. The adoption of serious games within the healthcare sector is on the rise, and studies indicate that they offer positive benefits for the emotional well-being of both children and adults. Serious games are available to address especially for children with autism spectrum disorder (ASD). A computer-based environment, like a serious game, might offer a secure setting for exercising recently learned techniques to prevent these anxiety-inducing circumstances. Moreover, there is a common assertion that children diagnosed with ASD often gravitate toward technology use and display a preference for video games over participating in social interactions (Hungen, 2014).

There is evidence that ASD children learn better through interactive visual methods. A significant effort was made to use modern technology aimed at developing computer-based systems which can be used to teach children with ASD various social and communication skills (Alves et al., 2013). Games that incorporate advancement mechanisms promote the development of empathetic reactions while simultaneously enhancing individuals' self-awareness regarding fundamental human needs and emotions (Hughes, 2014). This project involves instructing individuals in tasks related to emotion recognition, including images of in-game avatars and the incorporation of real-life character images as participants progress through various levels.

This project is expected to make a significant impact by developing a game specifically designed to assist children with autism in regulating their emotions. Recognizing the unique challenges faced by children on the autism spectrum, the game aims to provide a safe and engaging environment where they can learn effective emotional regulation techniques in a fun and interactive way.

## 1.2 Problem Statement

According to the Alves et al., (2013), certain challenges faced by individuals with ASD in recognizing emotions stem from their limited comprehension of others' perspectives, including the awareness that someone else may hold a distinct viewpoint. Carlier et al. (2020) discovered that numerous technological approaches for addressing ASD are available, encompassing computer applications, virtual reality, and robotics. Technological advancements aimed at children with ASD primarily address challenges in social interactions, particularly in the domains of emotion recognition and language skills, but only a limited number of them integrate serious games. Games can be designed to support emotion regulation by incorporating specific features and mechanics that promote emotional awareness, self-regulation, and well-being throughout the progression of gameplay.

## 1.3 Objectives

The project objectives are:

- i. To study the requirement of game progression for children with autism.
- ii. To develop a prototype that incorporated the requirement.
- iii. To evaluate the effectiveness of the game progression towards targeted users' emotion regulation.

## 1.4 Goals and Genre

The goal of this project is through game progression, ASD children will be able to understand and express their emotions. Children with autism may have difficulty regulating their own emotions. Understanding emotions allows them to better manage

their own feeling, leading to improved emotional self-regulation. This, in turn, can reduce emotional meltdowns and improve their overall well-being.

The project game genre that will be implemented is casual game. Casual games are usually designed to be easy to pick up and play, making them accessible to a wide range of players, including those with varying levels of cognitive and motor skills.

## 1.5 Game Feature

The project is a single player game that will be developed using Unity game engine. This game has straight forward gameplay with multiple game modes and levels.

- i. The target audience for this game is children with autism, both boys and girls, ranging in age from 6 to 19, with a focus on those with different functioning abilities which are low, mild and high.
- ii. The game will be developed for mobile devices, which focus on the Android operating system platform.
- iii. The game's theme revolves around progressing through levels while encouraging the expression and regulation of emotion.

## 1.6 Conclusion

This chapter serves as an important starting point for the entire game development process, providing a comprehensive overview and setting the stage for the project's scope, objectives, and game features. By outlining the game's genre, theme, and target audience, this chapter establishes the foundation upon which all subsequent decisions and design choices will be built.

## **CHAPTER 2: LITERATURE REVIEW AND PROJECT METHODOLOGY**

### **2.1 Introduction**

The process of conducting a literature review involves compiling a comprehensive and structured collection of summaries that must be guided by a central concept or theme. The literature review will be strategically organized around the backdrop of existing games and pertinent documentation.

#### **2.1.1 Literature Review Study**

The idea presented is that game level progression has the potential to evoke emotion regulation for children with autism. This claim is supported by several references. Hughes (2014) demonstrated that game progression implemented through game mechanics and avatars can increase basic human awareness of emotions such as happiness, sadness, anger, or disappointment. Additionally, Papoutsi et al. (2018) stated that mobile games show promise in enhancing emotional skills in children and adolescents with ASD. Furthermore, Hughes (2014) found that games can assist children with ASD in their social development skills.

Utilizing game level progression to enhance emotion regulation in children with autism offers several advantages. One of these is that the game can immerse children in the role of a caregiver, fostering the development of empathetic responses and heightening their self-awareness regarding fundamental human needs. Alves (2013) demonstrated that games are perceived as attractive and enjoyable by children with ASD. Serret et al. (2014) also found that children and adolescents with ASD were able to understand, play, and complete a game called JeStiMULE, resulting in improved performance. The study by Serret et al. (2014) further showed that at least 80% of the