

# Using DDA to improve the player experience

Matthew Azzopardi

Institute of ICT

MCAST

Malta

matthew.azzopardi.f32821@mcast.edu.mt

**Abstract**—This study has not been defined yet

**Index Terms**—DDA, Difficulty, Player Experience, Adaptive, Video Games

## I. INTRODUCTION

### A. Background

Typically when it comes to video games, developers try to keep users engaged and coming back on a regular basis, one of the ways they do this is by ensuring that the game maintains an enjoyable level of difficulty. This is because difficulty in games is a fine line between boredom and frustration, both excessive ease or overwhelming difficulty contribute to users abandoning software [1]. The problem is that no single preset difficulty can cater to every player as they will all have different backgrounds and experiences leading to differing skill levels. As such to ensure that their games remain enjoyable to most players, developers have resorted to creating several difficulty presets such as 'Easy', 'Medium', 'Hard', which often make minor adjustments to the statistics of various game elements and as a result fail at being meaningful difficulty adjustments; in addition, players that are new to a game will have no idea which difficulty is actually the correct experience for them.

Dynamic Difficulty Adjustment (DDA) allows the difficulty of a game to be adjusted in real time based on player performance and other factors, leading to a wider range of difficulty adjustments compared to traditional difficulty presets, while this system might not work well for every type of game, it has already been proven to improve the player experience and motivate players to continuously improve their own gameplay [2].

Current research focuses on using DDA to enhance the user experience by offering a tailored difficulty in an attempt to prevent boredom and frustration. While there are studies showing that high user engagement and motivation can positively affect user retention [3], it remains to be seen how DDA affects the overall user experience.

### B. Positioning

This study follows a positivist approach as player data will be gathered through player testing and surveys, it is also a deductive study as it builds upon already existing theories. The study adopts an experimental research strategy as it will compare a version of the prototype using DDA against a version of the prototype without DDA, this allows for controlled comparisons to be made.

Data will be collected from multiple participants testing the prototype in a short-term experiment making this a cross-sectional study, collected data includes player data collected by the game, survey feedback written by participants and comparisons made between statistics and responses.

In this study DDA is the independent variable because a version of the prototype with and without DDA will be tested, while the dependent variables include variables that will be measured to see how they change within the presence of DDA such as player engagement levels, performance metrics, and perceived challenge.

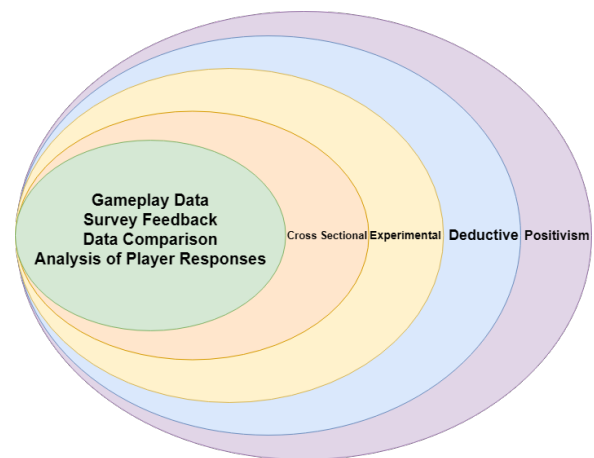


Fig. 1. Research Onion

### C. Hypothesis

This research presents the following hypothesis: The use of Dynamic Difficulty Adjustment (DDA) will help improve the player experience by reducing the boring and frustrating parts of static difficulty.

The following research questions can be identified from this hypothesis:

- How does the player experience differ in a game with DDA compared to one without?
- How does DDA influence player learning?
- What impact does DDA have on the balance between player boredom and frustration?

### D. Research Aim & Purpose Statement

The purpose of this research is to determine how the player experience is impacted by modifying various aspects of a

Check if  
still true

game based on player performance. By creating a user profile based on player actions, the game will be able to use the data gathered throughout a play session to modify the difficulty in real time. The study will use gather data through player testing and surveys to determine if DDA improves the overall player experience.

#### REFERENCES

- [1] M. Weber and P. Notargiacomo, "Dynamic difficulty adjustment in digital games using genetic algorithms," *2020 19th Brazilian Symposium on Computer Games and Digital Entertainment (SBGames)*, pp. 62–70, 2020. [Online]. Available: <https://api.semanticscholar.org/CorpusID:229703511>
- [2] J. Knorr and C. Vaz de Carvalho, "Using dynamic difficulty adjustment to improve the experience and train fps gamers," in *Ninth International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'21)*, ser. TEEM'21. New York, NY, USA: Association for Computing Machinery, 2021, p. 195–200. [Online]. Available: <https://doi.org/10.1145/3486011.3486447>
- [3] Z. Yu, M. Gao, and L. Wang, "The effect of educational games on learning outcomes, student motivation, engagement and satisfaction," *Journal of Educational Computing Research*, vol. 59, p. 073563312096921, 11 2020.