Enhancing Serious Games With Analytics

by Alec Robinson

Introduction

This study explores the use of game analytics within a serious game or user training game. According to Su (2021) “The core of player analytics is to analyze the game behavior and specific preferences and guide the right direction of game development”. The researched work examines how this can be integrated with a serious game to provide the player with responsive feedback. The definition of a serious game according to Djaouti (2010) is “any meaningful use of computerized game/game industry resources whose chief mission entertainment is not.”

Output

To ensure the most useful feedback was being delivered to the user two data collection systems were used, Unity analytics (Unity, 2025) and JSON files. The major benefits of using Unity analytics are the long-term data storage capabilities, this is utilised to store different users’ results and useful to see how they perform compared to others. However its downfall is its ability to provide immediate and formative feedback, this can be overcome with the addition of JSON file storage. Its strength is the speed of information as it can be used to provide the user with custom, fast and informative feedback based on their current playthrough. According to Kickmeier-Rust (2014) his study found that specific types of formative feedback, such as CbKST-based feedback, can significantly affect a learner’s outcome. Therefore, it is of the utmost importance to ensure that the system provides detailed written feedback.

References

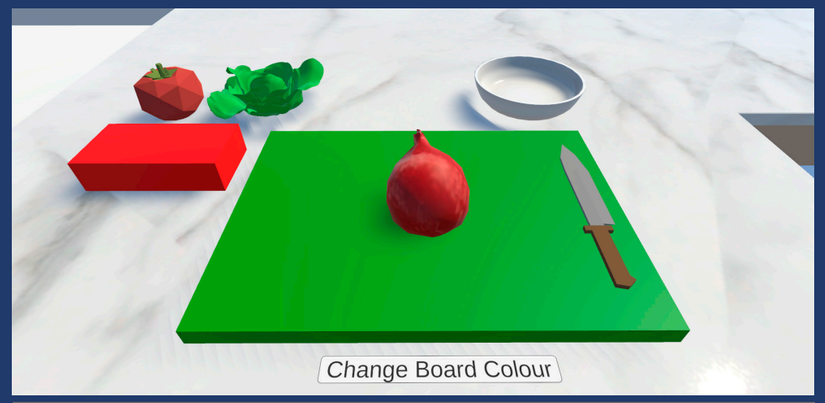
Djaouti, D., Alvarez, J., Jessel, JP., Rampnoux, O (2011). Origins of Serious Games. In: Ma, M., Oikonomou, A., Jain, L. (eds) Serious Games and Edutainment Applications. Springer, London. pp. 25–43. Doi: https://doi.org/10.1007/978-1-4471-2161-9_3 Accessed: 01/2025

EmeraudeEscape (2025) Available at: https://emeraude-escape.com/en/format/ai-based-serious-game/ Accessed: 05/2025

Johnson, C.I., Bailey, S.K.T., Van Buskirk, W.L. (2017). Designing Effective Feedback Messages in Serious Games and Simulations: A Research Review. In: Wouters, P., van Oostendorp, H. (eds) Instructional Techniques to Facilitate Learning and Motivation of Serious Games. Advances in Game-Based Learning. Springer, Cham. Doi: https://doi.org/10.1007/978-3-319-39298-1_7 Accessed: 05/2025

Results

Below are a few images of the type of data that was collected, and how it is displayed to both the user and the developer.



First Attempt		Second Attempt	
Chopping Items Correct	✗	Chopping Items Correct	✓
Burger Sauce Correct	✗	Burger Sauce Correct	✓
Frying Items Correct	✗	Frying Items Correct	✓
Closed The Fridge	✓	Closed The Fridge	✓
Put Cheese On Burger	✗	Put Cheese On Burger	✓
Completed All Prep	✓	Completed All Prep	✓
Plated Burger Correct	✓	Plated Burger Correct	✓
Time Taken	1:4	Time Taken	1:5

1. You incorrectly chopped a Onion using a Yellow coloured chopping board. Next time use a Green chopping board.
2. You incorrectly mixed the sauce ingredients. Remember to follow recipe
3. You forgot to close the fridge after taking the burgers out

When looking at the results that were recorded, they further back up the point Johnson (2017) made that the addition of explanatory feedback shows better improvement than just corrective feedback.

Methodology

To bridge the gap between these two major game categories the choice was taken to integrate Unity analytics (Unity, 2025) into a custom-built serious game. A virtual culinary training game was created with the intention of capturing vital decisions the user makes by logging them using Unity analytics (Unity, 2025). “Research on feedback content seems to suggest that process (explanatory) feedback is more beneficial than outcome (corrective) feedback.” (Johnson, 2017). To enable this, a JSON file feedback system was also included to provide explanatory feedback to the user during gameplay.

Conclusion

Concluding on the research that was completed my dual system with both Unity analytics (Unity, 2025) and JSON, allows for support of both long term and in game analysis. A small limitation that was encountered during this project was pre scripted feedback, this can potentially be improved with the addition of AI. Giving AI feedback would allow for more personalised feedback, possibly resulting in even better improvements in the user. A company that is currently exploring this is EmeraudeEscape (2025) “AI can synthetize the data retrieved (time spent, answers given at each stage) to provide the learners with a performance summary.

References

Kickmeier-Rust, M., Hillemann, E. & Albert, D. (2014) Gamification and Smart, Competence-Centered Feedback: Promising Experiences in the Classroom. In: International Journal of Serious Games, 1(1). Doi: https://doi.org/10.17083/ijsg.v1i1.7 Accessed: 05/2025

Su, Y., Backlund, P. & Engström, H. (2021) Comprehensive review and classification of game analytics. SOCA 15. pp. 141–156. Doi: https://doi.org/10.1007/s11761-020-00303-z Accessed: 05/2025

Unity (2025) Available at: https://unity.com/products/unity-analytics Accessed: 02/2025