THE WASTE GAME

Case Study

How Trinity College Dublin engaged students in waste-management for 160 hours in one week.

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Summary

In May 2023 **Trinity College Dublin (TCD)** worked with **Bold Donut** to pilot a sustainability game to engage and educate students and staff on the topic of waste management. The game, named **“Trinity Tops Trash”**, was designed to make learning about **“what goes in what bin”** fun and motivating. The game was distributed via the University mailing list to students and staff via a web link (playable on mobile and PC) and the results were monitored over the course of 1 week.

Key Results

- **Reach** 781 people started the game with 330 people playing one complete game level or more
- **Engagement** Average of 103 daily active players, average daily playtime of 5 mins
- **Learning** Average of 15% increase in waste knowledge climbing to 24% for players who completed half the game

Sustainability at TCD

Trinity is Ireland's leading university and has a rich 400 year history. The Trinity community includes over 20,000 students, 3,000 staff and 100,000 alumni. Trinity has also been a leader in sustainability, having held a Green Flag for campus sustainability since 2013, offering numerous sustainability courses, supporting sustainability entrepreneurship and student activism, and leading innovative research on topics from renewable energy to biodiversity and climate justice.

TCD Initiatives

- New Nearly Zero Energy Buildings
- Annual "Trash to Treasure" drive
- OneStepCloser Platform
- Student Climate Action Group & Green Campus
- Pollinator & biodiversity projects
- Green Week events incl. lectures

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About Us

Bold Donut is a Dublin-based startup founded by Kate Williams and Nathan Cruz Coulson. We create digital games to encourage sustainability engagement.

We believe that by using the fun and engaging nature of games we can help sustainability managers to engage their audiences in a variety of sustainability initiatives as part of their efforts to reduce their organisation's emissions.

Waste Management Game

Trinity Tops Trash" is the latest edition of our customisable waste-management game that is playable on any modern web browser (mobile, laptop and PC). The game is designed in the style of the most popular casual mobile games on the market - narrative puzzle games.

- Appealing visual, sound and game design
- In-game facts and rules adapted to local waste guidelines
- Fun assessments - to track progress in learning
- Customisable user avatars to increase ownership amongst players
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- 20 levels of fun 'candy crush' style puzzles with increasing complexity
- Community progress tracker emphasising collaboration and collective goals
- Leaderboards connecting daily, weekly or monthly incentives

Game Snapshots

Game Play

Screenshot from Level 2 of our latest pilot with Trinity College Dublin.

In this level, players are tasked with collecting and disposing of ramen packets correctly.

Home Page

Screenshot of the homepage where players were able to track their individual progress, their community goals, and view their avatar.

Baseline Test

An example of the drag-and-drop baseline test that establishes players knowledge of local waste-management regulations

Player Testimonials

"I am happy to see that the game does not assume the player to be "naive" or "unknowledgeable" by giving a presentation on the appropriate recycling. That is the purpose of the game - to learn from positive and negative feedback."

"It is a very nice idea and straightforward design which is easy to understand and follow. Overall, a very nice idea though and definitely a nice way to learn about the recycling process and to reduce waste."

"The game is really cute! I've had a couple of questions myself on where some items went and having to think fast during the game really drilled the correct bin into me! The gameplay is nice, the music is very soothing. Having to wash some of the items adds a nice twist and keeps the game interesting (I like that you leave the items selected). The menus remind me of a barbie flash game (this is a compliment).

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Pilot details & results

Preparation for the pilot began in December 2022. The game was designed in consultation with Jane Hackett, Sustainability Manager at TCD, in order to select appropriate waste items (there were over 40 with the capacity for hundreds more) and develop a visual style and narrative that would be attractive and appropriate for the target audience.

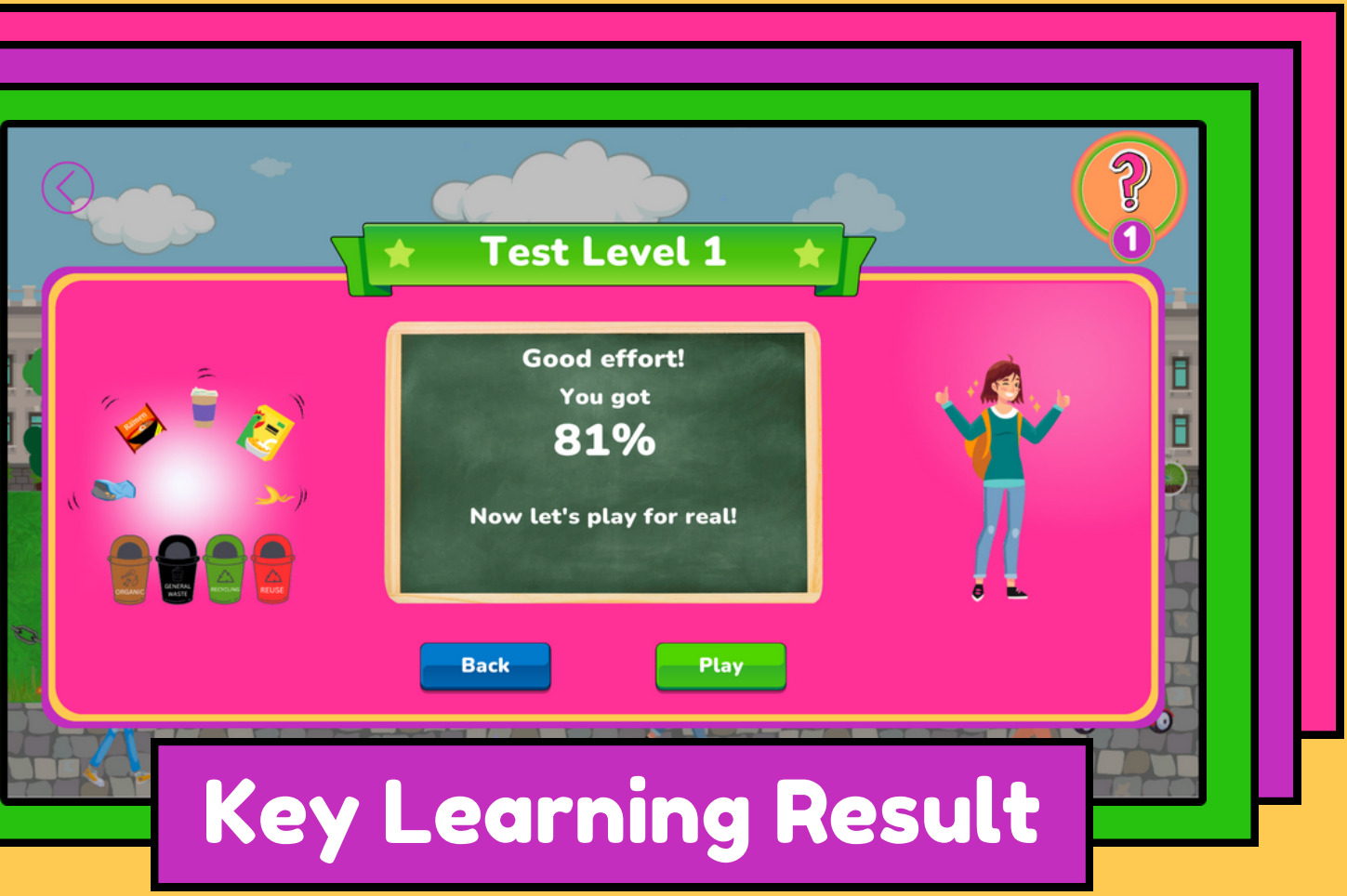
Pilot Week: 5 to 12 May 2023

Marketing

Two emails were sent out to student and staff mailing lists on the 5th of May and the 9th of May, around the end of term and exams.

The emails explained the game, provided a URL link to the game (playable on mobile and PC) and revealed the prizes available for winners. The game was also mentioned on Trinity's Instagram story and the game was advertised on campus via screens.

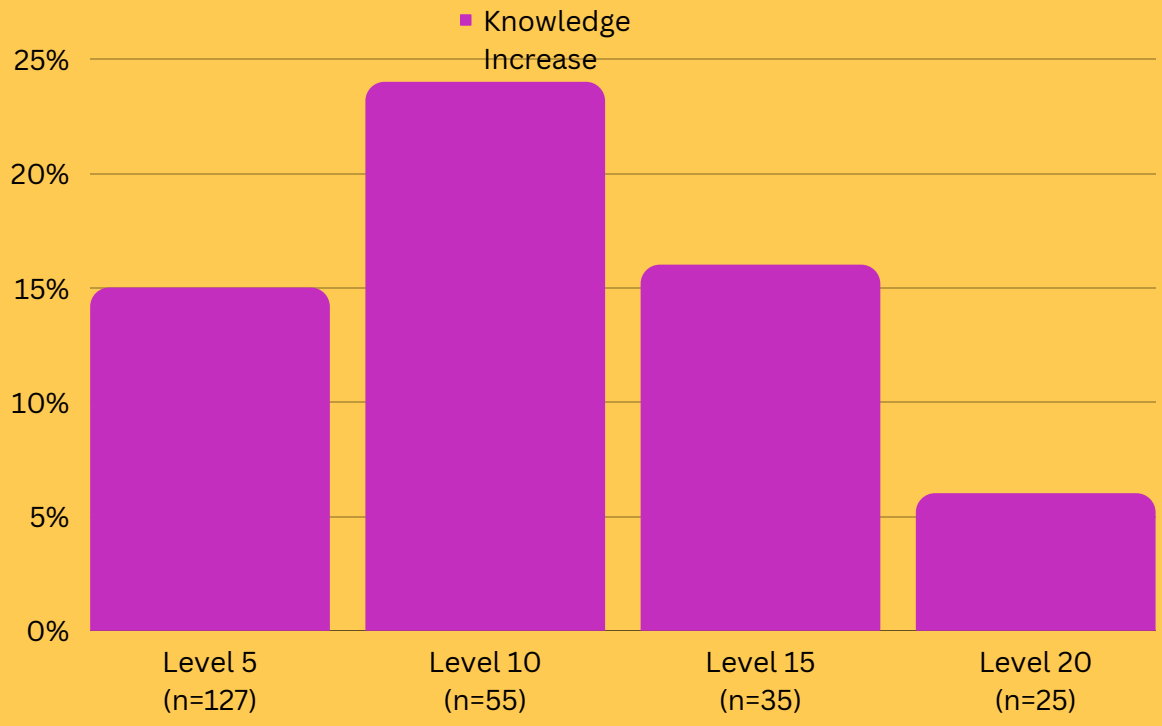
No further on-campus or digital marketing took place although several additional tactics could be used in a rollout to increase awareness (see conclusion)



Key Learning Result

Average Increase of 15% in waste knowledge, climbing to 24% with the most engaged players

Increases in knowledge are calculated by comparing the results of “baseline” knowledge quizzes before gameplay and assessment results afterwards. Players needed to achieve at least 80% correct answers before they were able to progress. Learning peaked halfway through the game (level 10 of 20) as players baseline knowledge improved.



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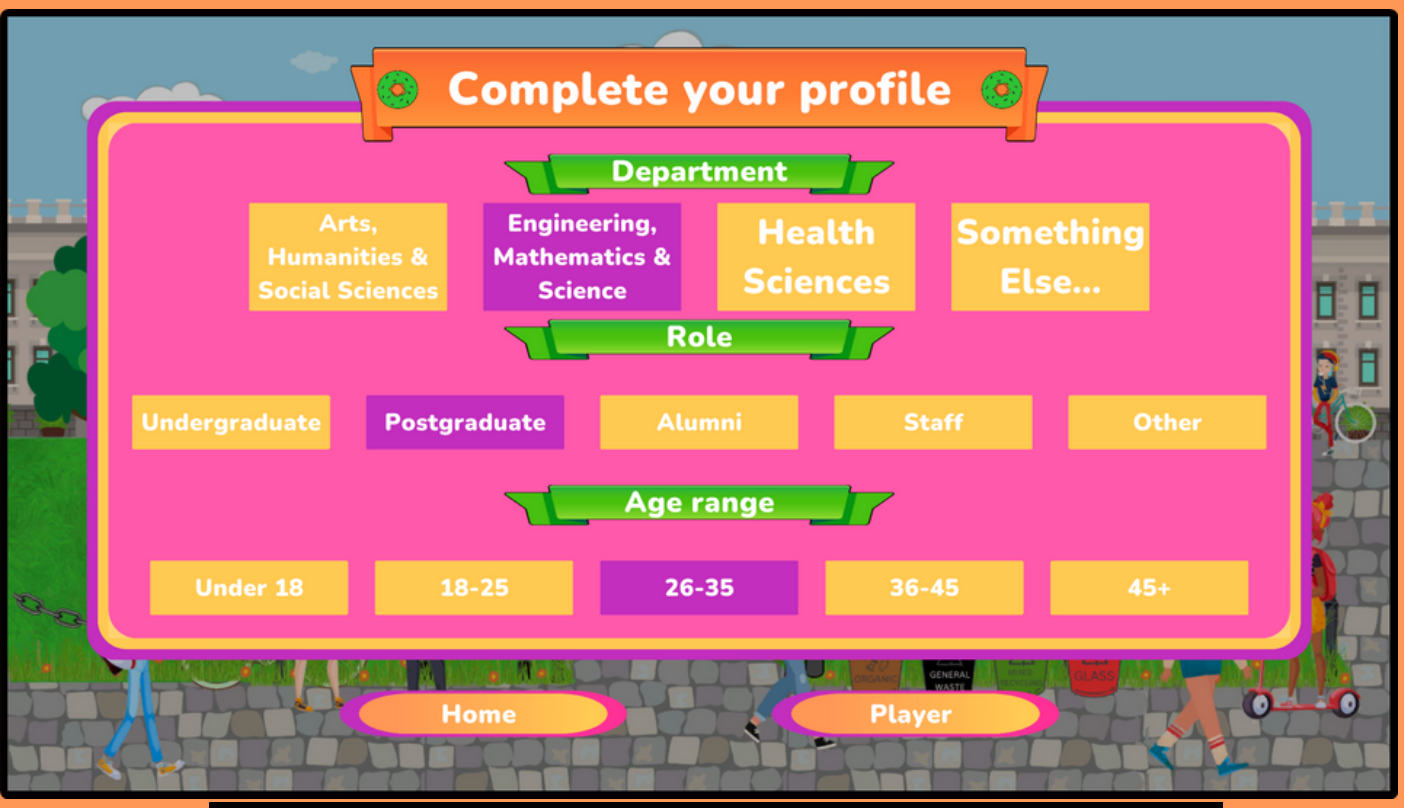


Further Insights

We collected some demographic data from a subset of players (n=142). The sample was not suitable for robust statistical analysis so these results should be considered as an illustrative example of the kind of insights we can extract from game data.*

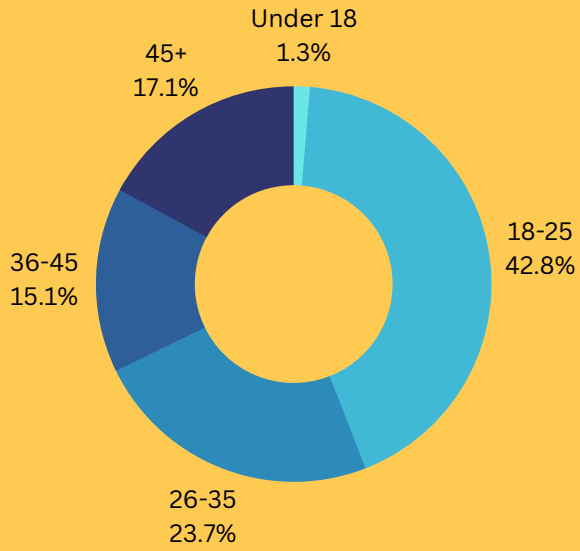
We collected information from players about:

- **Role:** undergraduate | postgraduate | alumni | staff | other
- **Community Team or Department:** arts, humanities & social sciences | engineering, mathematics & science | health sciences | something else
- **Age range:** Under 18 | 18-25 | 26-35 | 36-45 | 45+

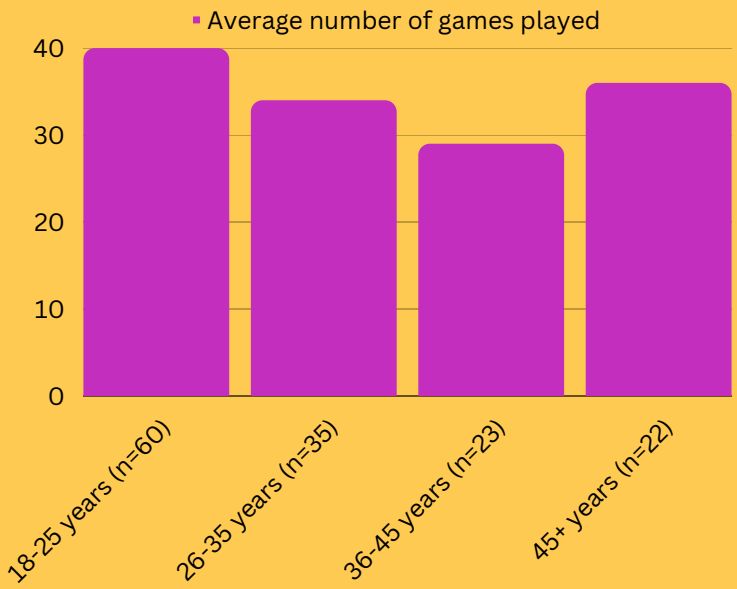
***Notes on insight data and sample characteristics:** It should be noted that with a relatively small sample size that has not been collected in a representative manner we cannot draw statistical conclusions from this data. This information was collected mainly after the staff email was sent so students are relatively underrepresented compared to the population. Analysis with higher confidence is possible with a larger and more diverse sample that is collected over a longer period of time.

Player Demographic Insights

Age Range

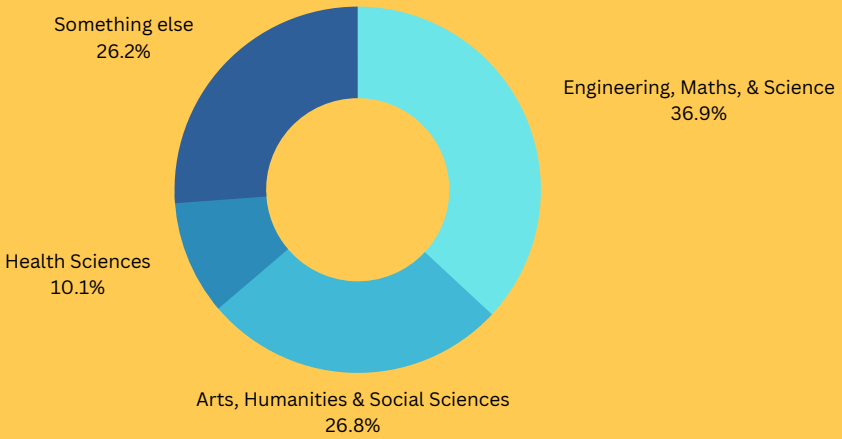


Age range: Sample breakdown



Differences in number of games played (engagement) by age

Community, Team or Department



There was a small difference between departments with Health Sciences having slightly higher baseline knowledge (89%) compared to Arts, Humanities, and Social Sciences (86%).

Arts, Humanities and Social Science saw the greatest improvement (18%) after 5 levels.

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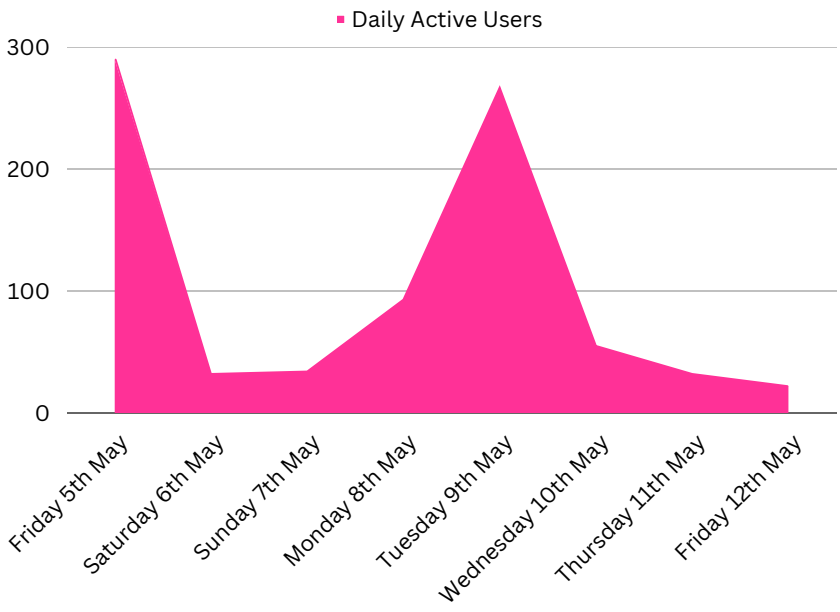
Key Engagement Results



Playtimes

Daily active players:

- Average of 103 daily active players during the pilot week
- Peaks of 290 and 267 active players on Friday the 5th of May and Tuesday the 9th of May mark when a game related email was sent.

These figures come from our logging of game sessions via a cloud platform. We are able to monitor events like players logging into the web game and in-game activity.

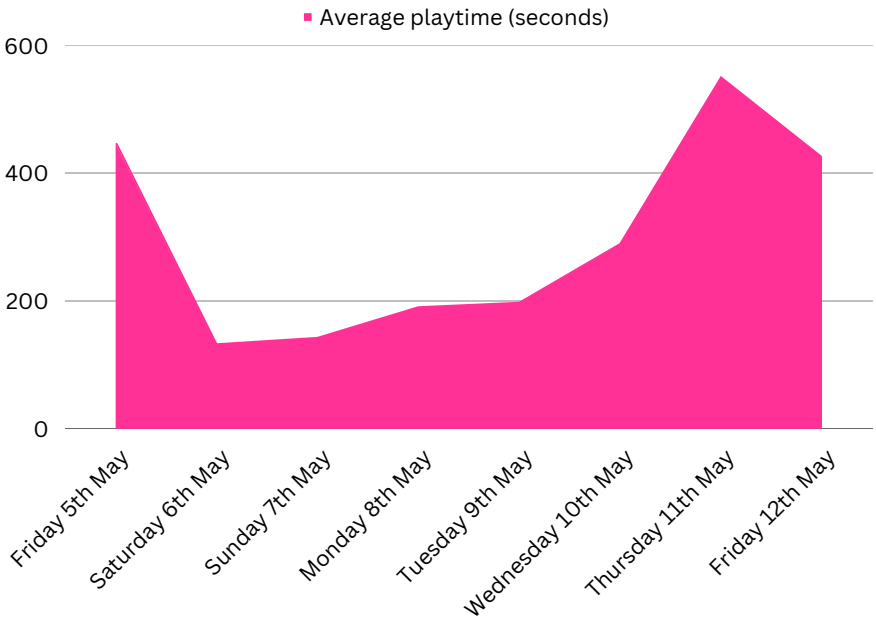
Players needed to read and agree to a privacy policy before playing the game. The privacy policy outlined how we complied with GDPR and explained how their data was protected.

Session Details

Average duration of play session:

- Overall average of 5 minutes per play session
- Peak of 9 minutes and 10 seconds

There is a significant upward trend as players who were particularly engaged played the game more as we approached the end of the pilot week and the competition.



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Conclusion

The purpose of this joint pilot between TCD and Bold Donut was to trial a sustainability game which has been designed to combine multiple elements including:

- Fun and engaging features of popular mobile casual games
- Motivational gamification techniques
- Measurable learning

The ultimate purpose of a game-based campaign like the one we trialled is to:

- Engage a wide audience
- Increase practical knowledge about sustainability
- Motivate behaviour change

Key Results

- **Reach:** 781 people started playing the game with 330 people completing one or more levels
- **Engagement:** Average of 103 daily active players, average daily playtime of 5 mins, median of 28 games played per active player, 9681 game levels played
- **Learning:** Average of 15% increased waste-knowledge climbing to 24% for players who completed half of the game.

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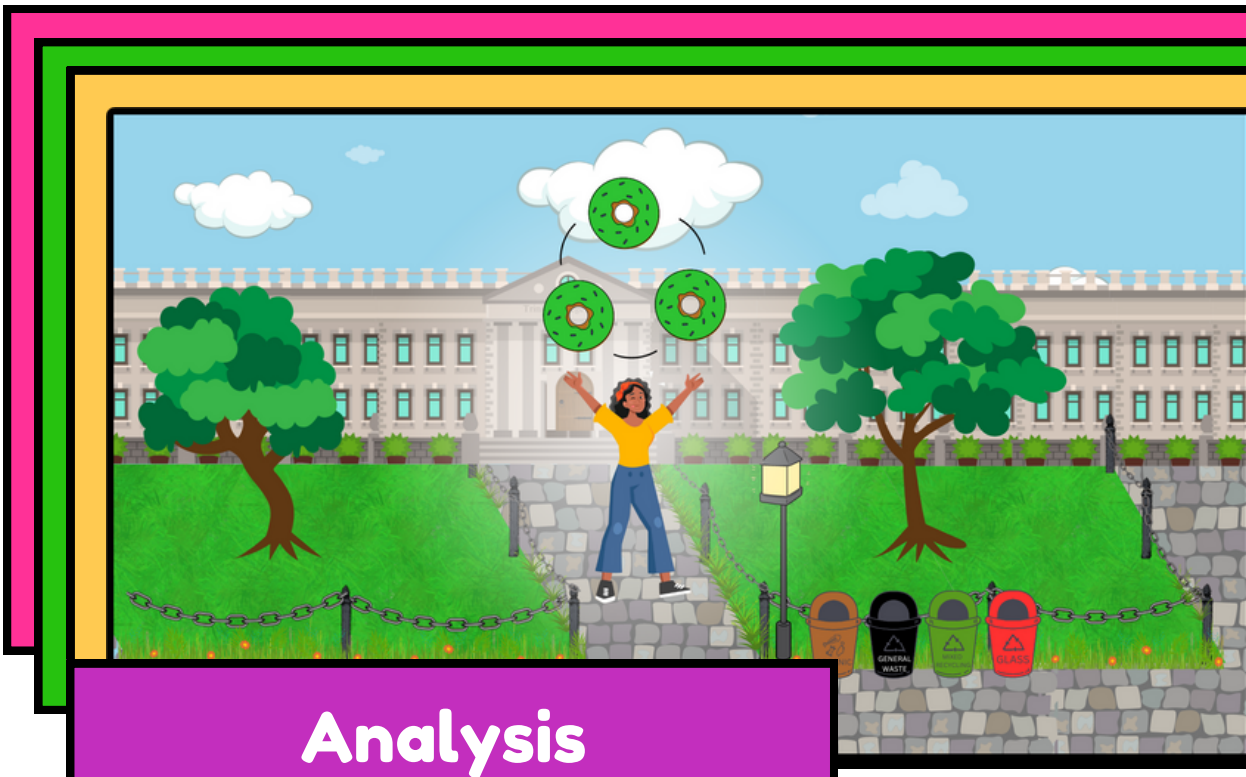

Analysis

Given the results and context of the pilot we are confident that there is significant evidence supporting the engagement and educational capabilities of the game and the game-based approach.

Next Steps

We identified a number of areas that can be improved upon as part of a larger scale and longer term rollout. Future work will focus on questions around sustaining engagement and retention of knowledge over time. These include:

- **Broader knowledge:** e.g. increase waste items from 40 to 100+ with increasing emphasis on circular waste processes
- **Granular Waste Data:** e.g. game data to reveal which waste-items players are the most unsure about to inform targeted campaigns outside of game
- **Gameplay:** Further development of the core game mechanics to increase fun and engagement
- **Marketing Plan:** e.g. posters, QR codes on bins, deeper involvement of student societies or ambassadors, student lead social media campaigns, integration into onboarding, featured during campus events.
- **Long-term measurement:** Testing knowledge after weeks or months to verify that knowledge is retained

Behaviour Change

On the ultimate goal of behaviour change, this can only be established by a study of broader scope that includes, for example:

- Independent verification of waste contamination trends
- Representative survey of stakeholders to establish the reasons behind changes in motivation

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Thank you for reading!

If you like what you've seen or you'd like to hear more about what we're up to, please drop us an email:

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