# The effects of gamification on intrinsic motivation in the context of crowdsourced civil engagement.

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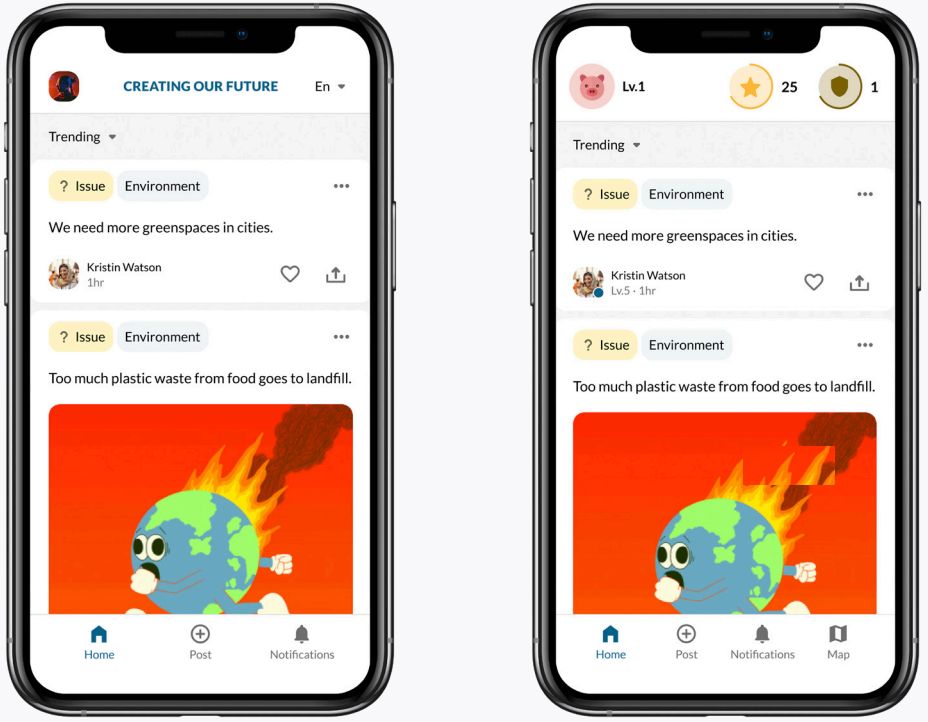
## Abstract

Civil participation levels have been in a state of decline in recent years [1]. Participation is an important aspect of an equal and fair democracy; this goes beyond voting and includes formal and informal civil activities [2]. There is great potential for digital tools (e-participation) to empower citizens to utilise the power of crowdsourcing [3, 4, 5, 6, 7]. However, increasing participation will take more than designing tools that afford participation; new ways to motivate citizens must be developed [8]. There is a growing call to develop gamified e-participation tools to increase user motivation [9, 10, 11, 12]. This paper investigates the use of gamification in the domain of a civil engagement crowdsource app (CEC).






Group A: prototype without gamification features

Group B: prototype without gamification features

## Authors Keywords

Gamification; Motivational design; Game Design; Design thinking; Crowdsource; Civic engagement;

## Overview

The first part of this paper will discuss findings from a review of literature related to the current state of civic participation, the potential of gamification to motivate civil participation, and the psychological theories behind gamification. The paper will then discuss a methodology put by Morschheuser et al. [13] towards gamification design. Finally, a test is carried out to gauge the impact of gamification upon intrinsic motivation within the domain of a civil engagement crowdsource app prototype.

## Civic Participation

Civic participation constitutes any activities a person takes to combat issues of public concern for the betterment of their community [14]. This includes participating in democratic voting, participation in community organisations in the community, and voicing one's opinions to influence government [15].

## Gamification

Gamification refers to the process of introducing gameful affordances to a product or service to influence user behaviour [12, 16]. Gamification's potential benefits include increased user motivation, satisfaction, enjoyment, optimism, social interaction, and the perception of meaningful experiences [17]. Research has identified that the effects of gamification are highly dependent upon context [16]. Compared to other domains, there is currently a research deficit on the effects of gamification in the context of civic engagement [18, 19]. Hence, it is unclear how gamified e-participation will affect user motivation [6].

## Intrinsic Motivation

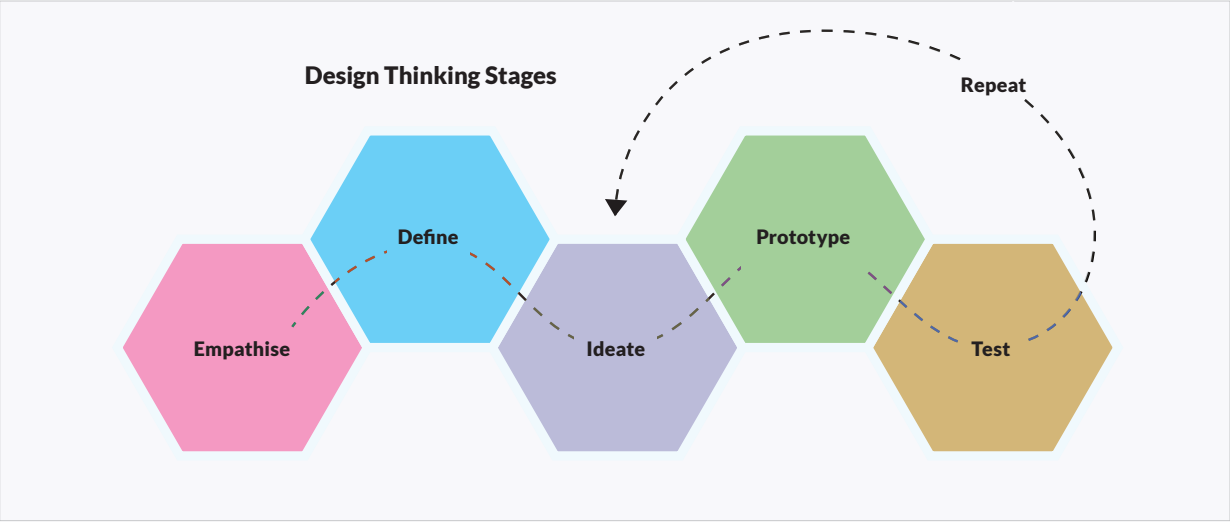
There are two types of motivation: intrinsic and extrinsic motivation. Extrinsic motivation is driven by material rewards and penalties, whereas intrinsic motivation is driven by a desire to achieve mastery, autonomy and belonging [20]. Game mechanics can be both intrinsically and extrinsically motivating. Adding game mechanics that are intrinsically motivating can reframe users'view of a task from something they have to do, into something they want to do [21]. Adding game mechanics that cause extrinsic motivation to an activity can remove intrinsic motivation [22] (Nicholson, 2012). Therefore careful consideration must be given to gamification design to avoid driving users away.

## Methodology

This paper evaluates the potential of gamification to increase intrinsic motivation within the domain of a CES app. Two versions of the app were prototyped, one with gamification and one without gamification. The research questions of this paper are:

**R1** Will gamification affect user intrinsic motivation levels when using an app that facilitates civic engagement?
**R2** What effect will pre-existing civic engagement levels and attitudes have on user intrinsic motivation levels when using an app that facilitates civic engagement?

The following hypotheses were developed and investigated to answer each research question.




**H1** Gamification will positively affect self-reported interest and enjoyment levels when using an app that facilitates civic engagement.

**H2** Gamification will positively affect self-reported perceived choice when using an app that facilitates civic engagement.

**H3** Gamification will positively affect self-reported perceived competence using an app that facilitates civic engagement.

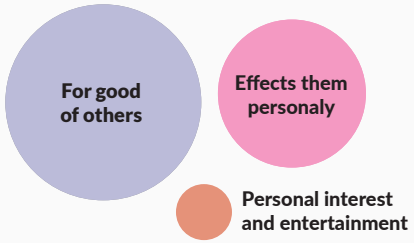
**H4** Gamification will negatively affect self-reported perceived pressure/tension when using an app that facilitates civic engagement.

**H5** High civil engagement levels are an accurate predictor that a user will find an app that facilitates civil engagement intrinsically motivating.

## The Design Process:

This study used a mixed-methods approach, using qualitative and quantitative evaluation methods. Quantitative methods evaluate metrics, whereas qualitative methods evaluate non-numerical data such as feelings and attitudes [23]. Using multiple research methods increases the validity of research findings as the negative effects of any shortcoming of a particular research method are limited [23]. Qualitative methods are suited to evaluating the effects of gamification to maximise the breadth and depth of findings [6].

Standford d.school's Design Thinking framework was used to ensure that the design was user centred [24]. There are five stages to the Design thinking framework: Empathise; Define; Ideate; Prototype; Test. Throughout the design thinking process, methodologies recommended by Morschheuser et al. were used to ensure effective gamification design [13]. Morschheuser et al. developed this methodology according to academic and industry




### Motivation Insights

The most widespread factor when it came to motivation is whether content personally effects the participant. Moral obligation to help others was also a comonly mentioned motivation. A sub group mentioned that it intersects with pesonal interest topics.

### Motivation Insights

Demonstrate to users how their actions can positively affect others. Personalise content so that it relates to users interests. things thateffect / relate to them directly.

**45%** mentioned **Rights issues**

**41%** mentioned **Housing**

**41%** mentioned **Environment**

### Widespread interests

Social issues related to equality are of most widespread concern. Housing followed by the environment are two most of the most widespead specific concerns.

### Interest Insights

To increase the probability that participants will relate to the app's content, populate the app with content related to housing, health, environment or civil rights.

**Health**

**Civil rights**

**Environment**

### Top interests

Health is most frequent top and second from the top topic, followed by civil rights. Environment is a top issue for nearly everyone. Community planning and development is most middle topic. No one selected business as #1.

### Source Insights

Friends and family is most widely used source. Most widely used social media is Instagram. (Image orientated social media). People aren't running to political groups when looking to learn about a topic.

### Emotions

- Interest
- Curiosity
- Surprise
- Frustration
- Anger
- Overwhelmed
- Sadness

### Actions

- Liking, saving & sharing
- Scan headlines
- Research further into on area / topic online
- Discus topic with friends and family

### User Behaviour

Half of people will like content. Focus on allowing liking functionality. 30% of people will post content, these sill provide content for people to like.

### Actions Insights

Solution must be quick to use, people don't have much time to sacrifice. Must be transparent, and trustworthy. Too manyoption sare overwhelming. difficult to find the right cause.

best practices specific to the design of gamification [13]. Morschheuser et al.'s methodology towards gamification design included seven stages. [13]: (1) Project preparation and requirements. (Covered by background literature review and scoping of the project); (1) Analysis of context and users; (3) Ideation of gamified system; (4) Iterative design; (5) Implementation and development; (6) Evaluation of the design; (7) Monitoring and continual improvement post launch. (Monitoring was beyond the scope of the study as time constraints ruled out a longitudinal work).

## Analysis Of Context And Users

An empathetic understanding of user motivations must be established to successfully implement gamification in an app [25]. The goal of exploratory research was to uncover motivations, needs, contexts, goals and attitudes of potential users. A qualitative questionnaire was distributed on social media to uncover potential users and gather data to inform innovation. Open questions were used to collect data on user attitudes and behaviours that quantitative research might miss [6]. The questionnaire was piloted and refined before distribution on social media.

The survey was piloted to refine the survey's design and questions and limit any unexpected errors [23]. The questionnaire gathered information about participants' behaviours, interests, attitudes, frustrations and motivations towards civic engagement. The survey recieved 24 responses.

## Exploratory Research Key Insights

- People don't have much time to sacrifice.
- Must be transparent, and trustworthy.
- Too many options can cause users to be overwhelming.
- Show how user actions positively affect others.
- Search via personal interests / or bring in some form of personalisation.
- Make it super easy to react to content.
- Try to encourage sharing and posting content

## Define and Synthesis

Exploratory research findings were used to create a user persona, jobs to be done (JTBD) use case scenario. The user persona focused on what was important; user demographic, behaviours, needs, attitudes, and motivations.

JTBD were formulated from a list of skill-based tasks mentioned by participants. Focusing on skill-based tasks ensured that tasks were suitable for gamification [26]. Two use cases were illustrated to define specific hypothetical scenarios where the product could be used. Two versions of each scenario were created, one captured a user's current experience, and the other envisioned a new scenario in which the user used the new app.

These artefacts captured and contextualised empathy for the target user and ensured effective user-centred design throughout the project [27].

"I want to do more about the environment and the housing crisis but I don't have much free time or money for that kind of thing."

Photo by Mateus Campos Felipe on Unsplash

### Shauna Persona

- Recent graduate aged 27.
- Lives in shared accomidation in Dublin.
- Income of 30k, saves as much as they can.

### Behaviours

- Scrolls social feeds for hours.
- Uses social media to keep up with friends and news
- Doesn't think they have enough time outside of work and social life to do anything else.
- Has never spoken to a politician, chats to friends instead and follows content on instagram.

### Philantropist User

- Serious fun
- Meaning
- Care-taking
- Collect & Trade
- Sharing knolledge
- Gifting / sharing

### Needs and Goals

- Friends and family are most commonly used source.
- Most frequently used social media is Instagram.
- Favours online information on social media to information from specific political groups.
- Disturbed by homeless crisis and climate change and wants to do something about it, but doesnt have much spare time or money.

### Jobs To Be Done

> "When I have a few minutes of free time I want like posts I agree with so that I feel proud and satisfied."

> "When I am feeling eager I want to create a post so that I feel proud and hopeful."

> "When I am annoyed, helpless or frustrated I want to create a post so that I feel relieved, proud and hopeful."

### Scenario 1:

Talks to friend about how they feel really frustrated and hopeless about the prospects of owning a home. Voted differently in the last election but I'm not sure of other convenient ways to voice their concerns.

### To Be:

Friend recomends new app where they can post issues and ideas and the most populat ones get passed on to the governemnt.


### Scenario 2:

Bored waiting for a bus. Has no free time or money to give to homeless charities, It's sucha big issue.

### To Be:

Check news feed to see if what's new. Likes posts raising issue of homelessness, it's such a big issue.

## Ideation Of Gamified System:

The studies approach to innovation followed the Design Council's Double Diamond approach [28]. Innovation stems were used to generate ideas that were then critiqued and refined using design lenses to produce potential solutions for the target user. Innovation stems included competitor analysis, journey mapping, existing game mechanics, and a focus group. Ideas for features were prioritised depending on estimation on relevancy to the paper's research question, potential impact, and ease of implementation.

## Existing Game Mechanics

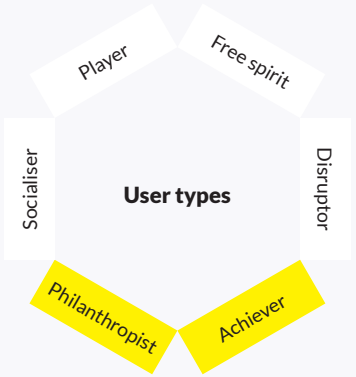
Users can be categorised into distinct user types when they play games, depending on their motivations and style of play [29]. Marczewski's Hexad framework was used to create an initial longlist of game mechanics that appealed to intrinsically motivated user types (29).

## Competitor Analysis

A list of civic tech apps provided by Julian Carbonnell was used to identify related existing apps [30]. A competitive analysis matrix was used to compare each app and establish baseline user expectations for a CES app [31]. Parameters of comparison included: type of app, notable features, and nation of origin.

### Hexad User Type Framework

Game mechanics that would appeal to philanthropist and achiever user types were focused on, as Marczewski identified these users as essential to the success of a gamified system [26].




### Key Hexad User Types

**Philanthropists**
Seeks: Purpose

- Serious fun
- Meaning
- Care-taking
- Tiered Access
- Collect & Trade
- Gifting / sharing
- Sharing knolledge

**Achievers**
Seeks: Mastery

- Hard fun
- Challenges
- Certificates
- Learning skills
- Quests
- Levels

### Longlist Of Existing Game Mechanics

**Target user Types**

- Challenges
- Certificates
- Learning skills
- Quests
- Levels
- Epic purpose
- Care taking
- Tiered access
- Collect and trade
- Gift sharing
- Sharing knolledge

**General users**

- Tutorial
- Signposting guide
- Loss aversion
- Progress feedback
- Scarcity
- Theme
- Mystery boxs
- Time pressure
- Strategy
- Flow balance
- Investemenet

### Functionality In Competitors

- Create posts.
- Give opinion on topic.
- Vote on topic.
- Idea box.
- Upvote posts.
- Find a cause for you.
- List of actions to do.
- Sign petition.s
- Donate money.

### Intrinsically Motivating Competitor Features

- Sharing knowledge, ideas and solutions, and reacting to other's ideas.
- Collaboration with other users
- Epic purpose in helping solve and raise social issues

### Intrinsically Motivating Gamification Ideas

- Consequences of actions: track progression of ideas.
- Travel to different lands through leveling.
- Avatar customisation.
- Points as rewards.
- Mystery box.
- Challenges: tough problems to crack. milestones. profile set up steps to earn points.

## User Journey Maps

User journey maps were used to break down tasks into sequential actions, with associated feelings, thoughts and frustrations [35]. Uncovering moments of frustration or delight identified opportunities for improvement, innovation and gamification [35].

## Design Lenses

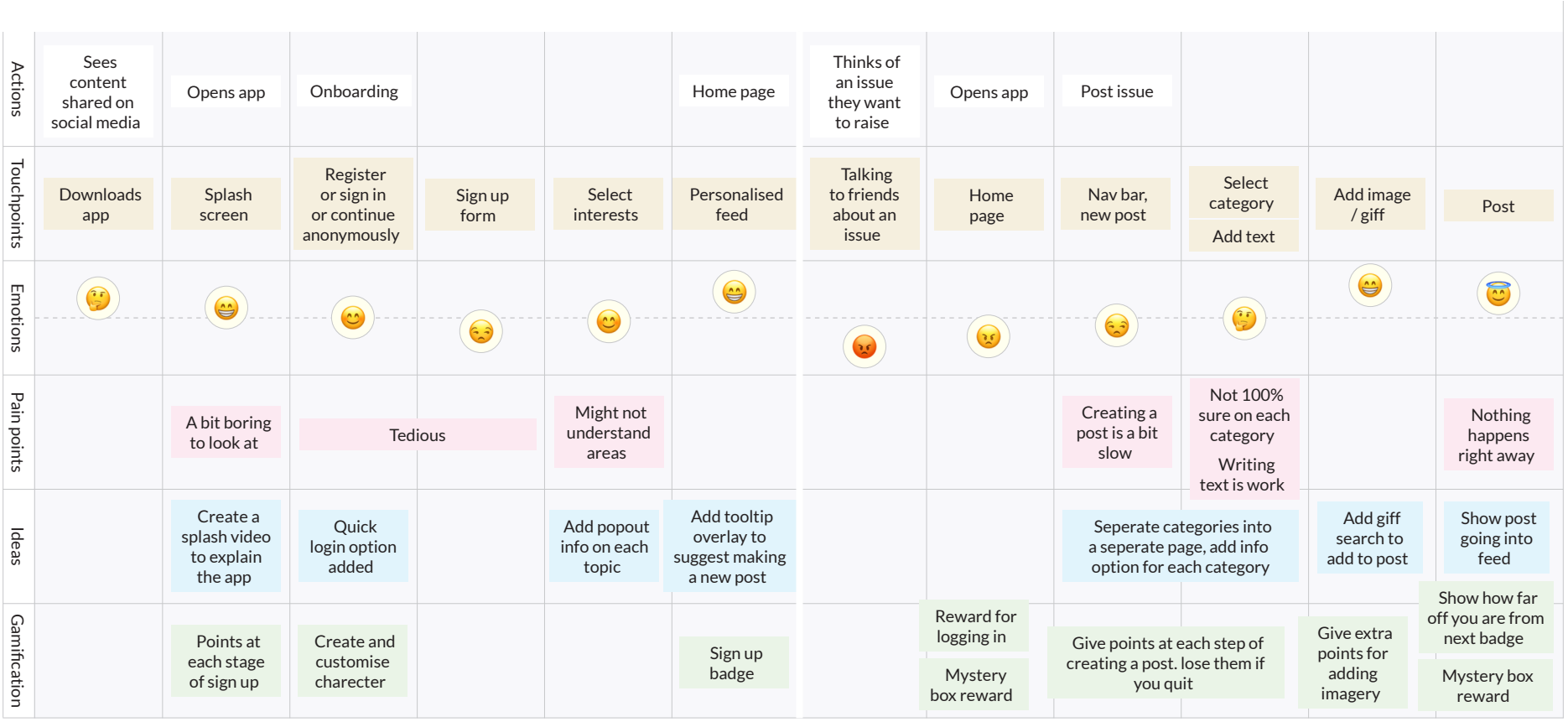
Design lenses are commonly used to assist in game design; However, they can also be used to design gamified experiences in non-game environments [36]. A series of design cards developed by game designer, Jesse Schell where used to critique gamification ideas from a range of different perspectives, ensuring that the prototype was considered and thought through [36].

## Focus Group And Guerilla Testing

A small focus group was run to innovate additional gamification ideas [13]. Focus group participants were recruited on the basis that they matched the target user persona [32, 33]. First, participants took part in a guerrilla test with the non-gamified version of the app before being tasked as a group to come up with ways to gamify the app and make it more enjoyable to use. Guerilla testing was used because it is a fast method to test early designs, allowing for user feedback to inform design iteration early in the deisgn process [33].

## Prototype

A series of prototypes were produced using the shortlist of product and gamification ideas. Initially, low fidelity paper sketches were used to test and iterate early ideas [37]. Informal guerilla testing was used to test and iteratively improve early designs [24]. Playtesting is an important step in the design of gamification [36]. Early ideas around

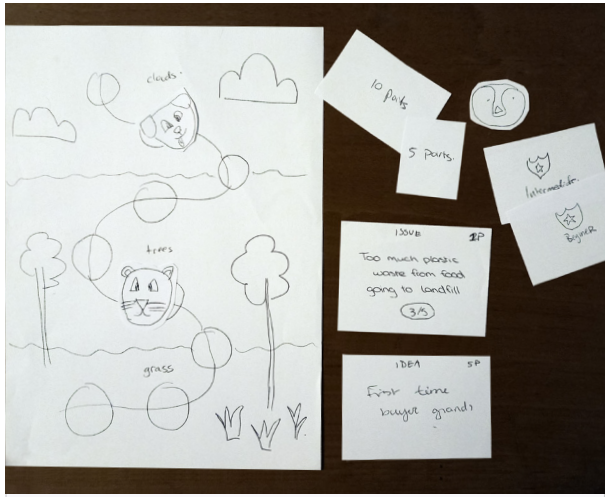



User journey map for first time use

User journey map for posting an issue

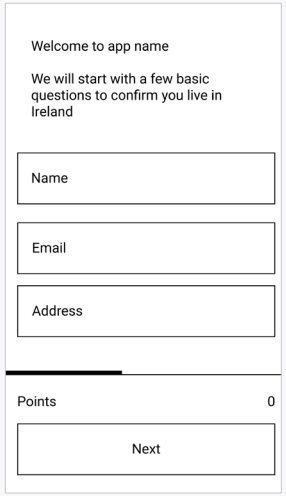
game mechanics were tested as a low fidelity board game. Early low fidelity playtesting informed the iteration and refinement of Prototype B's gamification features.

Prototype fidelity greatly impacts how users receive gamification [36]. Therefore, prototypes were produced to a high fidelity early in the project. The prototype's news feed was populated with user-generated content produced during early playtesting, adding to the prototype's fidelity.

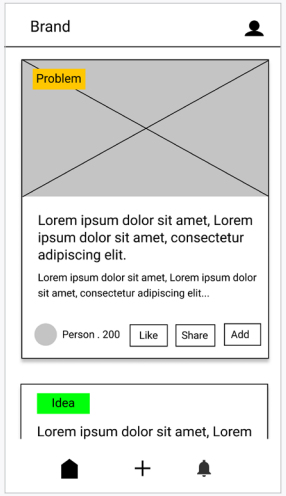



### Notes from playtesting

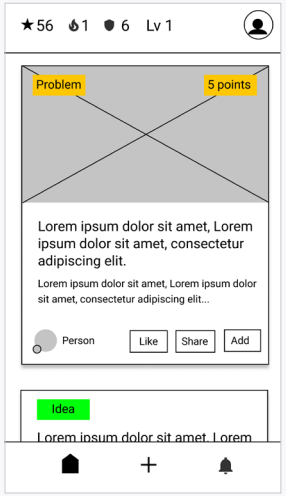
- Users found moving through levels was fun, but they struggled to understand the scoring system.
- Users enjoyed recieving unexpected bonus points.
- Users enjoyed receiving badges and characters.
- Users found it easier to think of ideas when there were already issues in the game.
- Users thought that people might rate their ideas too high, so maybe you shouldn't be able to like your ideas.
- Progression through levels was a bit fast.



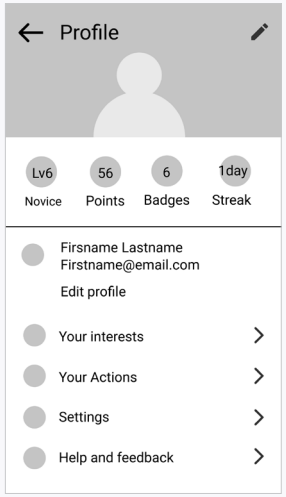

Onboarding sign up screen. Users are awarded points as they progress through onboarding.




Group A home screen, featuring a news feed of user generated posts.

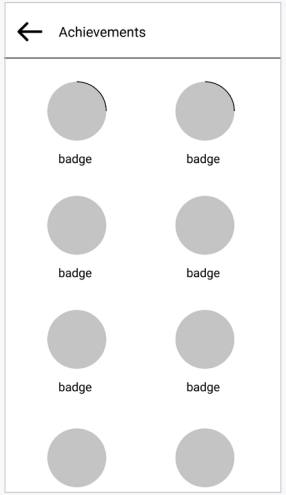



Group B home screen, featuring total points and badges in the top nav bar.



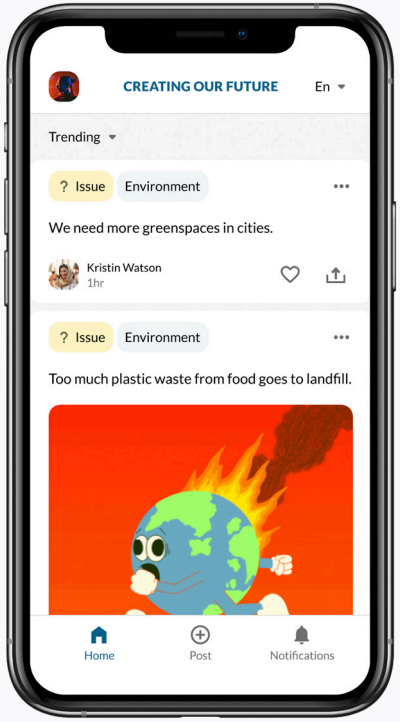

Profile screen features gamification stats. These were later moved to the home screen.


Each idea will be tagged either an idea or a issue, and the option of adding an image.



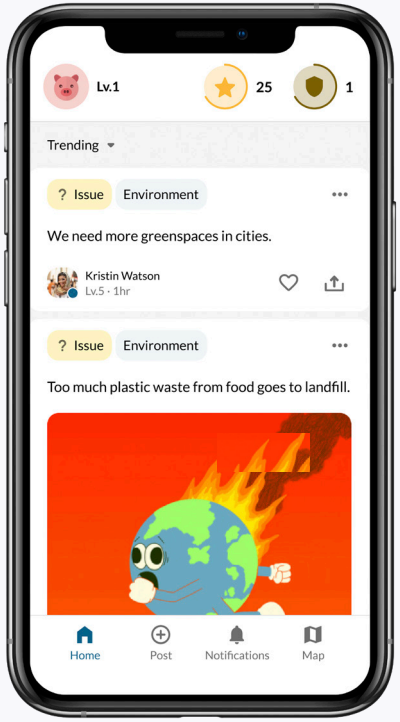

Users will be awarded badges as they complete miletones.

# Key Features In Prototype A and B



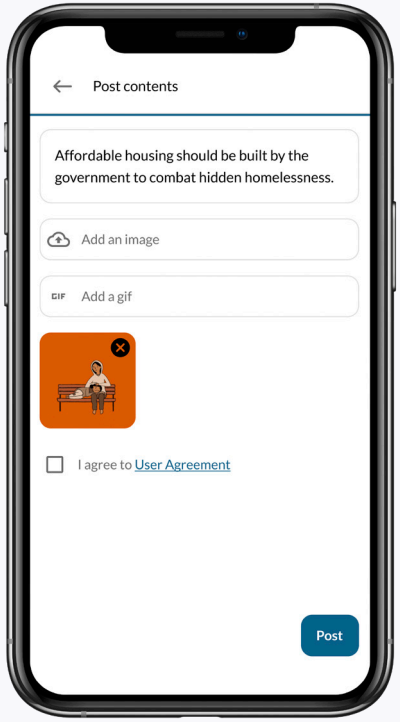

## Group A News Feed

Users can like and share other people's posts. Posts can raise a particular issue, or they can be an idea to solve an issue. In addition, users can give their posts a category, such as Environment or Housing.



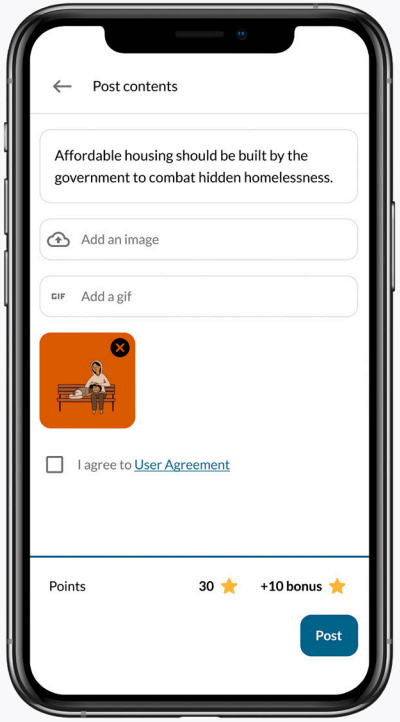

## Group B News Feed

Users can track their points, current level and badges in the app's top bar. When they open the news feed, repeat users first see their points and badges. Users are rewarded with badges for liking particular posts and awarded points for creating posts.




## Group A Create Post

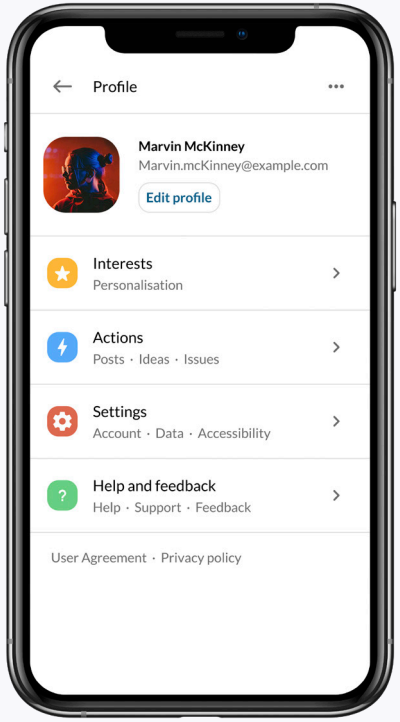
Creating posts is split over three screens; this screen shows the content screen where users can type text and add images to their posts.




## Group B Create Post

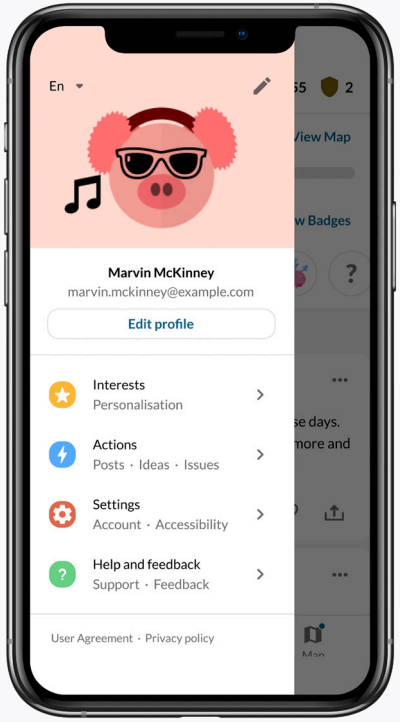
Users are rewarded with a variable number of points for creating posts. In addition, users that include a gif or image are rewarded with bonus points.

## Key Features In Prototype A and B



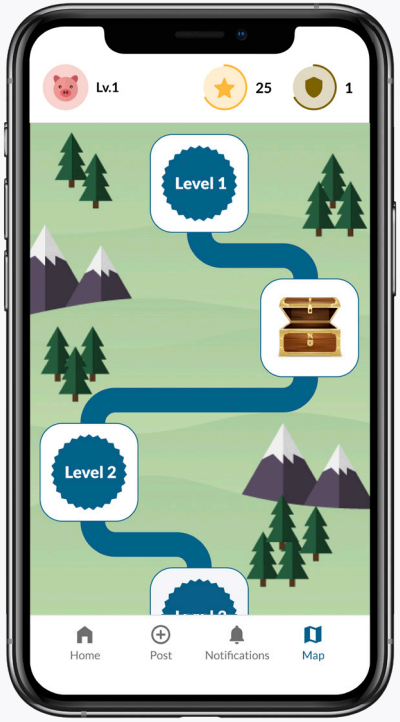

### Group A Profile

The user profile houses all of the app's utility links and settings. Users may customise their personalisation settings that inform the contents of their news feed.



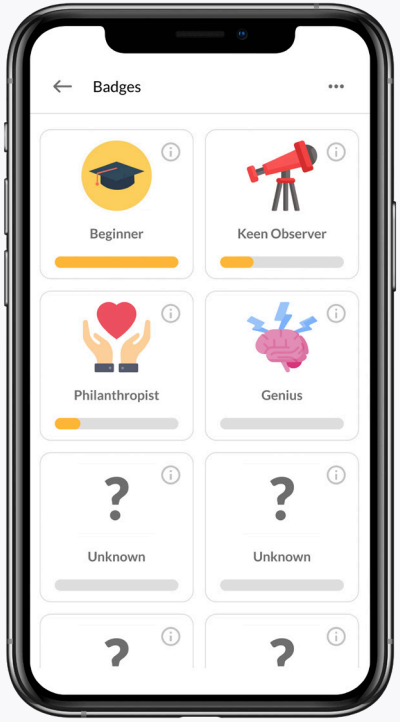

### Group B Profile

The gamified version of the profile page lets users customise their avatar. Here a pig avatar has been given a pair of headphones and sunglasses. Users can unlock outfits and accessories by discovering items on the map.




### Group B Map

Users can level up and progress through a virtual map as they gain points. Users journey through different worlds and can uncover additional rewards along the way in the form of mystery loot boxes. Rewards include extra points and items that can be used to customise users' avatar.




### Group B badges

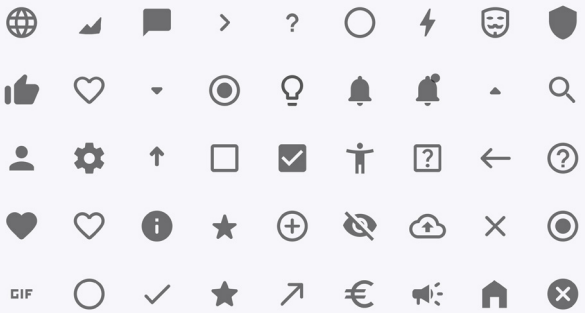
As users interact with the app, they can earn badges. In the test, participants are awarded the Beginner badge for creating a profile and the housing badge for liking posts related to housing. To maintain an element of surprise, some badges are hidden until they are unlocked.

# Design System for Prototype A and B

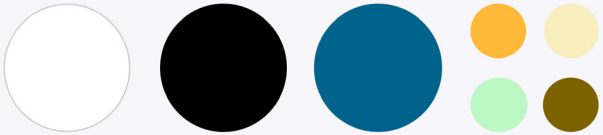
## Typeface: Lato

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

## Icons



## Colours



## Illustrations source: freepik.com



## Cards

Idea Category

Nulla Lorem mollit cupidatat irure. Laboruм magna nulla duis ullamco cillum dolor. Voluptate exercitation incididunt aliquip deserunt reprehenderit elit laborum...

Eleanor Pena
1hr

Idea Category

Nulla Lorem mollit cupidatat irure. Laboruм magna nulla duis ullamco cillum dolor. Voluptate exercitation incididunt aliquip deserunt reprehenderit elit laborum...

Eleanor Pena
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## Illustrated buttons

Portrait Button

Horizontal Button

## Buttons

Primary button

Button

Button

## Text boxes

Text input box

Title
Text input box acive

## Testing

Testing was carried out using the online user testing software Maze. The test was designed to answer the papers two hypotheses. Both versions of the prototype asked users to complete the same tasks. Participants were randomly assigned either prototype A or prototype B. Participants were presented with five tasks. Tasks were presented to participants alongside use case scenarios; participants were then asked to complete each task. After completing the tasks, participants completed a 22-item version of the Intrinsic motivation inventory Likert scale (IMI) to measure participant's levels of motivation between the prototypes [38]. Lastly, participants were asked to complete a 5-item qualitative questionnaire designed to extract additional qualitative data from participants.

Participants were recruited from social media, personal networks and the students and staff ar IADT. A screener questionnaire ensured participants were aged between 25 and 25 so that they fit the target user profile. In addition, all participants filled out a Civic Engagement scale (CES), to measure pre-existing levels of civic interest and activity [36].

## Quantitative results

A Shapiro Walks test was performed to test each scale for normality as it is suited to small sizes [reference]. The means of none normally distributed scales were calculated using Mann Whitney tests on each scale. The means of scales found to be normally distributed were calculated using independent-Samples t-tests. Each subscale failed to achieve between groups significance and H1, H2, H3 and H4 where all rejected.

A single-tailed nonparametric spearman correlation found that there was a significant positive correlation across the entire study with a significance between the CES scale and the Intrest and enjoyment IMI subscale scale.

Group B only (Gamification)

| | Context | Tasks | Features |
|---|---|---|---|
|  | You were discussing the housing crisis with your friend. They recomended downloading an app called Creating our Future so that you could express your concerns to the governemnt. | Start using the Creating our Future app and like 3 posts about homelessness. | Onboarding; News feed; Liking; Points during onboarding; Create an avatar |
|  | None of the posts in the news feed say exactly what you think. | Create a post to complain about the following problem: "Too many people are sleeping rough these days. something needs to be done, otherwise more and more people will suffer." | Post an issue; Add an image. |
| | You have recieved points for creating your post. | Proceed to the next level, and to see if you got any rewards. | Notifications; Map & levels; Loot box; Badges |
| | You have collected some new clothing items as a reward for a recent post. | Customise your avatar's outfit. | Customise the avatar |
|  | You have come up with an idea after talking to a friend of yours about the housing crisis and hidden homelessness | Create a post to share your idea. Include a gif in your post and the following text: "Affordable housing should be built by the government to combat hidden homelessness.." | Post an idea; Add an image. |
| | You have recieved points for creating your post. | Proceed to the next level, and to see if you got any rewards. | Notifications; Levels |
|  | You want to let your friend know that you came up with an idea after your chat, and want to share it with them. | Share a link to your post to your friend. | Share post |
| | Your friend thought your idea was great and shared around with more people. | Track the growing popularity of your idea. | Notifications |

## Qualitative results

As Hamari et al. [6] recommended, qualitative methods ought to be used to evaluate gamification in under researched domains. Semi-structured interviews were conducted with a random sample of participants to gather data on participants' attitudes towards Gamified CEC. Transcripts were analyzed using thematic analysis [40]. A realist approach was taken when identifying themes to focus on participants' motivations [41]. A realist approach focuses on what participants say and do instead of speculating the contextual reasons behind their behaviour and attitudes [40]. Data was first coded; then codes were grouped into themes. Lastly, similar themes were combined, and outlier codes and themes were removed from the study. A key finding from qualitative analysis was that the gamification intrinsically motivated some users but frustrated others.

## Key themes identified

- The design of the app was intuitive and easy to use.
- Primarily positive comments on the app's visual design.
- The app had relevant content and a narrow focus.
- Concerns about the abuse of anonymous posting.
- There was reluctance to join a new social media.
- Participants would welcome and use the app.
- The app lacked some social features that were expected.
- Gamification frustrated some participants.
- Gamification made for an enjoyable experience for some participants.
- The app's purpose was to allow users to engage and contribute to their community and society.

## Conclusion

Both prototypes were reported as simple and easy to use; this ensured that results were unobstructed by any usability issues. The combined qualitative analysis and qualitative analysis findings suggest that gamification may inflict more harm than good upon some individuals' experiences and drive them away from an otherwise inherently motivating app. Therefore, the study's suggestion is to avoid incorporating gamification into crowdsourced civil engagement apps.

## Acknowledgements

We thank all the volunteers, and all publications support and staff, who wrote and provided helpful comments on previous versions of this document.

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