

ENGAGING OLDER ADULTS IN LANDSCAPE DESIGN: USING GAMIFICATION TO IDENTIFY GREEN SPACE PREFERENCES

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ABSTRACT

Traditionally, the marketing industry uses gamification strategies to increase engagement, activity, and retention for a product. The technique integrates elements of game design into non-game activities. Although often used on digital platforms, analog equivalents create opportunities to expand the approach into more diverse contexts, including landscape design and planning for traditionally underrepresented demographics, including older adults.

Master's students in the Landscape Architecture Orientation II Studio and Ph.D. students in the Design and the Built Environment program at Clemson University facilitated two gamification workshops with the residents of the Clemson Downs retirement community to better understand their landscape priorities for a hypothetical green space. The first workshop had 5 participants while the second workshop had 10 different participants. Master's students integrated the results into their site design concepts and shared their designs with the community in an informal poster session. The workshop conclusions were also evaluated for consistency across the two groups. A focus group discussion that included a voluntary sample of participants from both workshops allowed residents to give feedback on the process.

Results indicated that the residents enjoyed the gamification strategy, and the game accurately captured their preferences. Additionally, the student projects reflected the results of the engagement workshop. Comparisons between the two gaming sessions demonstrated consistent results, albeit with some variability.

Integrating gamification strategies into engagement workshops offers additional opportunities to efficiently identify older adults' landscape priorities. The technique reduces the time required to meet with stakeholders, accommodates those of diverse physical and cognitive abilities, and creates an atmosphere of fun that encourages participation. Additionally, the game allows the results to be tabulated in real time, allowing for more specific discussion and consensus building.

Keywords

Gamification, Co-Design, Stakeholder Engagement, Older Adults

1 INTRODUCTION

Since the 1970s, stakeholders have been increasingly active in shaping the built environment. Although there were early efforts, such as Sanoff's *Design Games* (1979), to develop strategies to create immersive active engagement, most participatory exercises utilized passive methods such as surveys and interviews, which were primarily used to gather input for experts to make design decisions. In the 1980s, practitioners began to emphasize the importance of community participation by empowering historically marginalized communities to express their desires, needs, and values in decisions affecting the built environment (Hester, 1984; Hester, 2006, p. 509). These efforts aimed to leverage the insights, creativity, and unique experiences of future users by involving them directly in the planning process.

Participatory design has since become integrated into most professional design and planning practices that work on public-facing projects. Typically introduced early in the design process during the concept and schematic design phases, participatory design involves engaging stakeholders through facilitated activities to identify goals, constraints, and opportunities. While widely adopted, many participatory methods have become standardized and formulaic, potentially limiting their potential (De la Peña et al., 2017).

Co-design emphasizes deeper collaboration, creativity, and engagement than traditional participatory design. As a form of co-creation, co-design allows non-experts to contribute meaningfully throughout the design process, applying what Sanders (2008) calls "collective creativity." While like participatory design, co-design implies a more active role in shaping outcomes for projects affecting the built environment. In *Design as Democracy* (2017), the authors advocate for rethinking traditional participatory methods to better reflect the social context of each project. Co-design, in this sense, is iterative and adaptive moving from defining parameters to collaboratively solving problems (Steen, 2013). For co-design to reach its potential, designers must create engaging and accessible activities that facilitate meaningful and efficient transfer of information between stakeholders and professionals.

While public participation in civic decision-making has grown, aided by digital technologies that make engagement more accessible and scalable, motivating citizens to participate remains a challenge (Resek, 2024; Hassan et al., 2019). Gamification involves applying game elements to real-world contexts and offers a promising solution by creating a more entertaining and enjoyable environment. Games simulate real-world dynamics, helping participants understand complex systems, scenarios, and user needs (Sanoff, 1979). While analog games have long been used, digital gamification has surged in popularity with technological advances and adoption in industries like marketing (Deterding et al., 2011). Indeed, digital games have become integrated into everyday life, from ESports to health tracking on smart watches. In design processes, gamification can enhance stakeholder engagement, knowledge sharing, and decision-making (Thiel, 2016; Mayer, 2009). However, to be effective, it must be tailored to participants' contexts and expectations, recognizing that outcomes will vary depending on the modality of the activity (Thiel, 2016).

Although video games dominate the gaming world, analog games, especially board games—are also gaining popularity. A 2023 Statista survey (2023) found that 72% of women and 59% of men enjoy board games, with consistent, positive interest across generations. Beyond enjoyment, the physical and social aspects of board games enhance communication and information exchange. Board games are interactive media that convey meaning through components and gameplay (Brown & MacCallum-Stewart, 2020). The research shows that players of physical games performed better, took more time, and communicated more than those using digital counterparts (Brown & MacCallum-Stewart, 2020). With all of the benefits of digital games, the application of analog games, specifically to landscape architecture and design, remains underexplored.

In design, gamification should be purposeful, motivational, and engaging. It can help clarify complex issues, promote social learning, and foster shared understanding (Ampatzidou et al., 2018). Games can also support collective reflection on spatial challenges and build a common environmental vision (Devisch et al., 2016). Despite its benefits, barriers such as limited expertise, resource constraints, and skepticism, especially among older adults, can hinder adoption. Well-designed game elements can reduce these barriers by balancing fun, inclusivity, and reflection (Devisch et al., 2016). Gamified approaches can also lower costs and time while democratizing design through co-creation (Kavouras et al., 2023).

As the global population ages (World Health Organization, 2015), designers must consider how the built environment can support older adults' health and well-being. While medical advances have extended functionality and societal contribution, aging still brings challenges (Finlay et al., 2015; Joshua, 2017). Designers, planners, and decision-makers can help mitigate some limitations and improve their health and well-being through designing the built environment. To succeed in this mission, communication is essential to better understand open space priorities, desires, and requirements for aging populations. Older adults have unique challenges when engaging not only in the landscape but also in the design process. Due to broad differences in mobility, motor skills, and cognitive ability, communicating with older adults to exchange information requires innovative, adaptable, and tailored strategies.

Older adults report the design of the built environment and familiarity with technology create barriers to social engagement. Kochtitzky et al. (2011) reported that unsuitable building design, transportation limitations, lack of access to sidewalks, and inaccessible curbs limit community participation. Similarly, Levasseur et al. (2020) found that physical health and proximity to events and places of social engagement can deter older adults from participation. Digital and technological literacy is also a challenging barrier for older adults and can reduce the desire to take part in co-design activities including serious games (Song, 2021; Khalili-Mahani et al., 2020). Personalized strategies need to be developed to adapt to users with unique challenges, such as cognitive decline or physical limitations (Rodgers, 2018).

1.1 Literature Review

Across the reviewed studies, scholars adopt diverse terminologies to frame their gamified or participatory methodologies, reflecting both theoretical foundations and practical aims. Some explicitly refer to their approaches as serious games, as in Christina Ampatzidou et al. (2018) and Peng et al. (2024), emphasizing educational and real-world objectives. De Andrade et al. (2020, 2023) use geogaming to highlight location-based, interactive gaming for youth engagement in environmental and architectural futures. Ehab et al. (2023) and Muehlhaus et al. (2023) define gamification as integrating game design elements, challenges, rewards, and feedback into non-gaming contexts to enhance participation and motivation. Others focus on design philosophies: Boffi (2021) and Jiang et al. (2020) use co-design or user-centered design where game mechanics support pedagogy and collaboration. Even where gamification is not explicit, as in Newbold et al. (2023) or Olyaei et al. (2022), game-based logic underpins participatory aims.

In the studies reviewed, the concept of "game" is framed through a range of lenses, from theoretically grounded models to pragmatic, outcome-driven definitions. In more conceptually developed accounts, games are structured systems of rule-bound play, feedback, and goal-oriented outcomes. Muehlhaus et al. (2023) highlight the elemental tetrad, mechanics, aesthetics, story, and technology, as key to games as participatory communication systems that foster trust and learning.

Other studies adopt a functional view, presenting games as tools for engagement, visualization, or motivation. Ampatzidou et al. (2018) define games as structured experiences aimed at predetermined goals, especially in serious games for educational or civic purposes. Fox et al. (2022) describe gamified decision-support systems using 2D and 3D environments for real-time feedback. Peng et al. (2024) present serious games as immersive simulations enhancing satisfaction and participation. Kavouras et al. (2023) describe game-based planning as an interactive simulation that lowers participation barriers, while Zhang et al. (2022) use avatars, leaderboards, and fantasy in their "ideaGardener" tool to structure innovation.

The goal of all these processes is to give design agency back to the stakeholders and rely on their intimate site or contextual knowledge to influence the development of the built environment. To effectively achieve these outcomes, designers and facilitators need to engage participants early in the project. Zhang et al. (2022) explain that people are the experts in their lives, outcomes should benefit stakeholders, participatory experiences should be engaging and rewarding, and gamification should start in the discovery phase of the project.

1.2 Research Objectives

This research evaluates a case study at the Clemson Downs retirement community in Clemson, SC, to test a method of information transfer with older adults using gamification. This case study will present the

work from a service-learning design studio (1st year, 2nd semester Master of Landscape Architecture (MLA) students) of a hypothetical project for a green space at the Clemson Downs retirement community that integrates gamification into the project's discovery phase. The research team and students created a card game that helped identify the community's priorities, which students used to identify site parameters for design.

The case study aims to demonstrate how gamification can reduce barriers to communication in older adults. Older adults have diverse accessibility requirements for engagement, including mobility, time requirements, gross motor skills, and potentially cognitive impairment. We propose that games can mitigate these barriers by increasing interest, offering an accessible modality of engagement, time efficiency, and creating an equitable environment that offers more agency to the stakeholders to lead the design discussions.

2 METHODS

The game was designed to identify the priorities of Clemson Downs retirement community residents for an open space to be designed by 1st year, 2nd semester MLA students in a foundations design studio. The modality of the game is an in-person card game that is played over six rounds at stakeholder engagement workshops.

2.1 Workshop and Focus Group Details

Clemson Downs residents were engaged in two workshops. The participants were selected by a flyer distributed by the staff of Clemson Downs. Participation was voluntary with the requirement participants must be over 65 years of age and be able to consent without the need for a representative. Workshop 1 had 5 participants and was held at the Clemson Downs facility. The data from Workshop 1 was used for the student designs. The second workshop was held one month later at the Clemson Downs facility and had 10 different participants. One additional resident participated in both workshops, but the data for this participant was only collected in Workshop 1. Snacks and breaks were provided during the workshops.

In both workshops, the design team presented the research goals, workshop goals, educational goals, the concept of gamification, and the project brief for a hypothetical project to the participants. The site for the project was described and presented through an aerial map and recorded video of the site. The project brief for the student design was as follows:

This project aims to create a design for the future development of the Clemson Downs Green Space.

'Located in the magnificent Upcountry of South Carolina, Clemson Downs is Clemson's only privately owned continuing care retirement community. We offer multiple care options from Independent Living apartments to Skilled Health Care to enrich your unique experience so you can delight in life's journey without having to leave our pastoral campus for additional care.' ~Clemson Downs, 2024

*For this project, students will establish a project concept, identify site opportunities and constraints, and identify measurable project goals. Using engagement workshops, site inventory, research, analysis, activities research, and in-class readings, students will develop defensible designs with concept-compatible programs. The design should provide a well-defined and functional **entry sequence**, accessible and intuitive **circulation**, purposefully located **comfort amenities**, and concept-compatible **programs**. The design should create programs that are appropriately dimensioned to accommodate the desired activity and create a comfortable, functional, and memorable experience for the Clemson Downs Community.*

2.2 Game Design

The students created a card game to identify the residents' priorities for the green space. They created a six-round card deck. Themes for the rounds and card topics within each round were determined by the students through studio discussions, game critiques, and practice game play. Rounds were colored-

coded, and round order was determined by using student colleagues from a separate studio as participants in the practice game play. Between each session of practice game play, participants gave feedback to the research team. It was determined that playing the rounds from broader topics to more specific topics improved the efficiency and legibility of the game.

The card decks were designed in the application Canva with the following characteristics (Figure1):

- Color-coded for each round with text
- Dimensions: width of 4 inches, a height of 6 inches
- Text: 1/8 inch in height
- Content: descriptive title, descriptive image, social ratings categories, service ratings categories

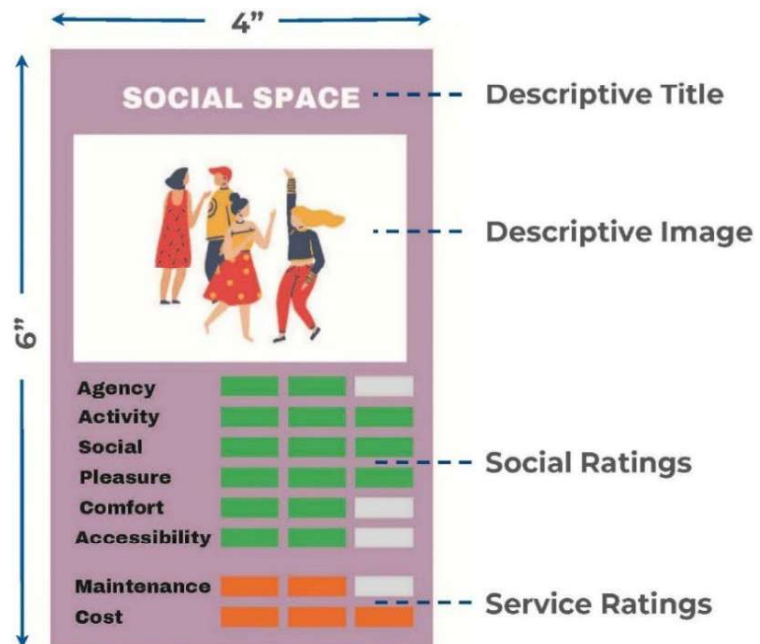


Figure 1. Sample card from Round 1 (2024). Figure by authors.

The *social* and *service* ratings categories are graphically represented with one block signifying a low level of the category and three blocks representing a high level of the category. In the *social* ratings, the level (one block/low, two blocks/medium, or three blocks/high) suggests that the topic of the card offers, supports, or conveys the designated level of the element signified by the *social* rating. In the *service* ratings, the level (one block/low, two blocks/medium, or three blocks/high) suggests that the topic of the card requires the designated level of effort signified by the *service* rating. These ratings were determined by the students through studio discussions, game critiques, precedent research, and practice game play. The ratings were meant to be a general guide to assist the participants playing the game in understanding the benefits of their selection and the corresponding maintenance and monetary requirements.

2.3 Game Play

The card game was played over six rounds with discussions between each round (Figure 2). The rounds were played from broader concepts to more specific concepts. The round order is as follows:

- Round 1- Overall Concept (5- Cards)- Inclusive Space, Social Space, Recreational Space, Meditative Space, and Ecologically Friendly
- Round 2- Overall Program (5-Cards)- Gathering Space, Active Recreation Space, Pollinator Garden Space, Peaceful / Private Garden Space, and Event Space
- Round 3- Site Character (5-Cards)- Site Character cards were titled Pastoral, Formal, Sensory, Open Lawn, and Smaller Spaces
- Round 4- Site Materials (5-Cards)- Site Materials cards were titled Contemporary Paver, Pastoral Gravel, Natural Stone Patio, Concrete, Pour-In-Place Rubber
- Round 5- Site Amenities (7-Cards)- Water Feature, Benches, Covered Space, Tables, Exercise Equipment, Gaming Areas, Walking / Running Trails

- Round 6- Site Safety (5-Cards)- Lights, Accessible Signage, Handrails / Guides, Emergency Box, Cameras.

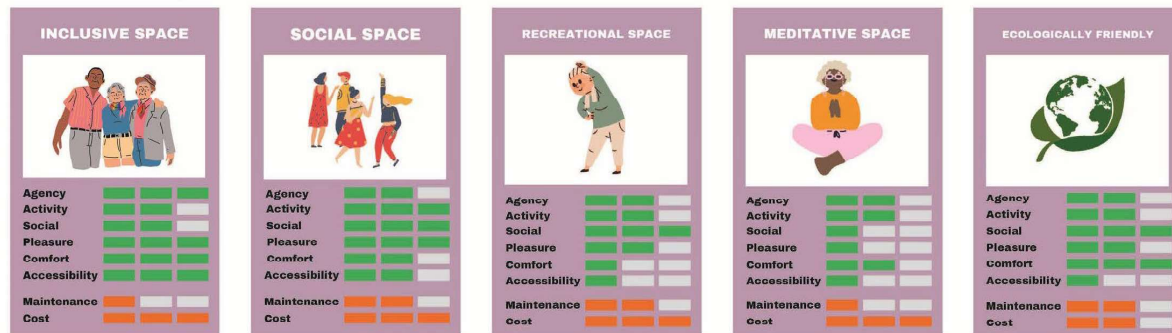


Figure 2. Sample round (2024). Figure by authors.

The research and student team facilitated the game (Figure 3). Before gameplay commenced, the team explained the game and a practice round was played. In Workshop 1, facilitator 1 explained the rules, prompted game activity, and led discussions between each round. Facilitator 2 aggregated the results for each round. Facilitators 3 and 4 took pictures and notes during the discussions. Facilitators 5 and 6 took turns dealing and collecting the cards for the rounds. In Workshop 2, facilitator 1 explained the rules, prompted game activity, and led discussions between each round. Facilitator 2 aggregated the results for each round. Facilitator 3 took pictures and notes for the discussions between each round.

At the start of each round, participants hold and review each card for the given round. Participants are allowed to ask any clarifying questions. Once players were ready, Facilitator 1 asked the participants to play their top priority for the category. The participants played their cards simultaneously. The dealer then gathered the cards marked each one with a '1' and handed the cards to facilitator 2 to aggregate the results in a developed Excel file. Facilitator 1 then asked the participants to play their second priority. Again, participants laid down their second card simultaneously. The cards are gathered, marked with the number '2,' and then handed to Facilitator 2, where they are added to the Excel file. This continued until all cards were played in each round. The numbers on the cards are summed in the Excel file (Equation 1). The descriptive title with the lowest score is the highest priority, while the descriptive title with the highest total score is the lowest priority. Facilitator 1 announced the results to the participants and prompted a discussion. The discussions were recorded, and notes were taken.



Figure 3. Engagement workshop (2024). Photo by authors.

2.4 Priority Analysis

Priorities for each round were ranked and reviewed for consistency. Special attention was given to the top three priorities for each round. Students were free to take priority scores and evaluate them within the context of the site analysis and discussions with the stakeholders. The priorities were used to inform the site designs. The designs were evaluated for programs that addressed the identified priorities. For this study, the work of two of the three participating students was evaluated.

The research team also evaluated the priorities between Workshop 1 and Workshop 2 and identified similarities and differences. However, due to scheduling constraints between the first and second workshops, the MLA students only used the information from Workshop 1 for their designs. Additionally,

results from the two workshops were not combined due to the different numbers of participants for each workshop. Site designs were presented to the Clemson Downs residents during an informal poster session.

2.5 Focus Group

A focus group was held one month after the semester concluded and after the students presented their designs. The purpose of the focus group was to evaluate the effectiveness of the workshop and to see what was successful and what adjustments can be made. A total of 10 workshop participants attended the 90-minute discussion. The participants were voluntary from both workshops. The research team presented the students' work, comparison analysis from the two workshops, and asked questions to prompt discussion. The conversation was recorded, and notes were taken. The research team performed a thematic conversation analysis using Braun and Clarke's method as a foundation (Braun and Clarke, 2006). Using natural language processing tools for qualitative analysis, we input the transcription of the workshop into Microsoft CoPilot and prompted the model to perform a thematic conversation analysis (Lee, 2024). The research team reviewed the generated classifications and revised the themes as needed to ensure the results accurately represented the stakeholder responses.

The questions and follow-up questions from the focus group are as follows:

1. How did you find the experience of the game and workshop?
 - a. Was it easy to understand?
 - b. Was it enjoyable?
2. Were you able to communicate your landscape preferences?
 - a. What motivated you or prevented you from expressing your opinions and ideas?
3. What were some benefits of participating in the workshop?
4. How could we improve the experience for you or others?
5. How could we improve the experience for you or others?
 - a. What other activities do you think might be more helpful?
6. How does the student work communicate your ideas?

2.6 Equations

$$RP = ct \cdot n + c \cdot \# + c1 \cdot \# \dots \dots (1)$$

RP stands for round priority. *ct* stands for card title. *n* stands for the card score between 1 and 5 for all rounds except for round 5 that is between 1 and 7.

3 RESULTS

Results from Workshop 1 are identified as follows with the highest probability listed first and the lowest priority listed last. For the raw scores see Table 1.

- Round 1- Overall Concepts: Social Space, Inclusive Space, Ecologically Sensitive, Recreation Space, Meditative Space
- Round 2- Overall Program: Pollinator's Garden, Gathering Space, Event Space, Private Space, Activities Space
- Round 3- Character: Small Space, Sensory Space, Open Lawn, Formal Space
- Round 4- Materials: Concrete Paving, Natural Stone Paving, Contemporary Paving, Pastoral Gravel, Poured-In-Place Rubber
- Round 5- Amenities: Covered Spaces, Walking and Running Trails, Benches, Exercise Equipment / Gaming Areas / Water Features, Tables
- Round 6- Safety: Handrails, Lighting, Security Cameras / Emergency Alert Stations, Signage

Results from Workshop 2 are identified as follows with the highest probability listed first and the lowest priority listed last. For the raw scores see Table 2.

- Round 1- Overall Concepts: Inclusive Space, Ecologically Sensitive, Social Space, Meditative Space, Recreational Space
- Round 2- Overall Program: Private Space, Gathering Space / Pollinator's Space, Event Space, Activities Space
- Round 3- Site Character: Sensory Space, Small Space, Pastoral Space, Open Lawn, Formal Space

- Round 4- Site Materials: Natural Stone Paving, Contemporary Paving, Concrete Paving, Poured-In-Place Rubber, Pastoral Gravel
- Round 5- Site Amenities: Water Feature, Benches, Covered Areas, Tables and Chairs, Walking and Running Trails, Gaming Areas, Exercise Equipment
- Round 6- Site Safety: Handrails, Lighting, Emergency Alert Stations, Security Cameras, Signage

Table 1. Workshop 1- Priority scores with 5 participants- Table by Authors

ROUND ONE							
CARD TITLE	Inclusive Space	Social Space	Meditative Space	Recreational Space	Ecologically Friendly		
Total Score	12	10	22	17	14		
ROUND TWO							
CARD TITLE	Informal Gathering Space	Active Recreation Space	Pollinator Garden Space	Peaceful/Private Space	Event Space		
Total Score	14	19	9	18	15		
ROUND THREE							
CARD TITLE	Formal Space	Pastoral Space	Sensory Space	Open Lawn	Smaller Spaces		
Total Score	23	11	13	18	10		
ROUND FOUR							
CARD TITLE	Pastoral Gravel	Contemporary Paver	Concrete	Natural Stone Patio	Poured-In-Place Rubber		
Total Score	17	12	9	16	23		
ROUND FIVE							
CARD TITLE	Covered Space	Benches	Tables	Exercise Equipment	Gaming Areas	Water Feature	Walking/Running Trails
Total Score	13	19	27	22	22	22	15
ROUND SIX							
CARD TITLE	Accessible Signage	Handrails Guides	Cameras	Lights	Emergency Box		
Total Score	21	11	15	13	15		

Table 2. Workshop 2- Priority scores with 10 participants- Table by Authors

ROUND ONE							
CARD TITLE	Inclusive Space	Social Space	Meditative Space	Recreational Space	Ecologically Friendly		
Total Scores	18	34	35	39	24		
ROUND TWO							
CARD TITLE	Informal Gathering Space	Active Recreation Space	Pollinator Garden Space	Peaceful/Private Space	Event Space		
Total Scores	24	43	24	21	38		
ROUND THREE							
CARD TITLE	Formal Space	Pastoral Space	Sensory Space	Open Lawn	Smaller Spaces		
Total Scores	41	29	18	35	27		
ROUND FOUR							
CARD TITLE	Pastoral Gravel	Contemporary Paver	Concrete	Natural Stone Patio	Poured-In-Place Rubber		
Total Scores	38	18	27	20	32		
ROUND FIVE							
CARD TITLE	Covered Space	Benches	Tables	Exercise Equipment	Gaming Areas	Water Feature	Walking/Running Trails
Total Scores	28	27	37	62	50	26	43
ROUND SIX							
CARD TITLE	Accessible Signage	Handrails Guides	Cameras	Lights	Emergency Box		
Total Scores	36	16	34	22	27		

The top three priorities of Workshop 1 and Workshop 2 were consistent. Below, we identified the top three priorities (not in any order) for each round. Discrepancies between the workshops are in bold.

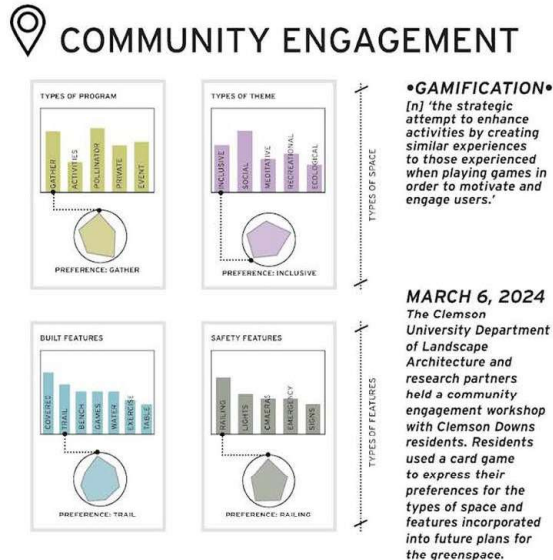
- Round 1- Social Space, Inclusive Space, Ecologically Sensitive
- Round 2- Overall Program: Pollinator's Garden, Gathering Space, **Private Space, Event Space**
- Round 3- Character: Sensory Space, Small Space, Pastoral Space
- Round 4- Materials: Natural Stone Paving, Contemporary Paving, Concrete Paving,
- Round 5- Amenities: **Water Feature**, Benches, Covered Areas, **Walking and Running Trails**
- Round 6- Safety: Handrails, Lighting, Emergency Alert Stations

The students identified their top design priorities through an overview of site inventory, site analysis, gamification workshops, precedent studies, and stakeholder discussions. The students were tasked to take the aggregated and scored results from the first workshop (Table 1) and create diagrams analyzing the results (Figure 4). Their design priorities are as follows:

Student 1 Themes: Gather, Inclusive, Trails, and Railings (Figure 4)

Student 2 Themes: Accessible, Ecological, and Engaging (Figure 4)

Student 1 Priorities



Student 2 Priorities

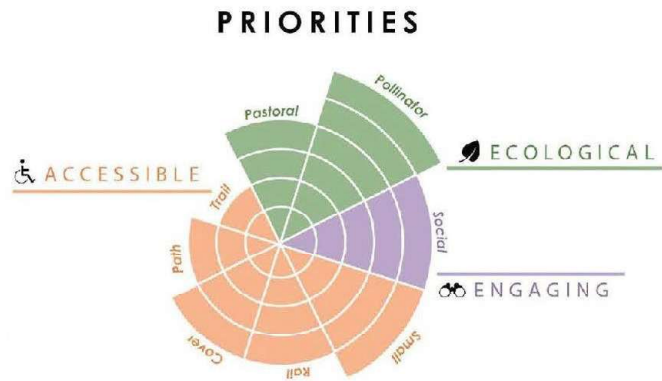


Figure 4. Student priorities (2024). Figure by Kia Koopman and Celia Castellano.

Students took their identified stakeholder priorities and overlaid the programs and elements on the site. The students looked for opportunities and conflicts between the identified priorities and physical site constraints and parameters. The designs of the green space highlighted elements that address the priorities identified through their research and stakeholder engagement.

Student 1 identified four areas for intervention connected by a trail network. The design created four distinct environments: the prairie, the brook, the terraces, and the grove. The applied priorities included inclusive covered gathering spaces, planting designs that function ecologically, including daylighting a brook and using native plants that attract pollinators, and hardscape elements that are accessible, including handrails and raised vegetable planters that allow for increased engagement for those with mobility limitations (Figure 5). Comfort amenities include places to sit and places to socialize.

Student 2 also identified four areas of interest. Each area was strategically designed to engage residents for a specific season. The design created inclusive social spaces that function ecologically, hardscape elements that are paved for easy access, and plenty of opportunities to sit and rest in the landscape (Figure 5). Additionally, special attention was given to sensitive planting schedules that fostered habitat for animals and insects throughout the year. To create a more immersive and engaging experience, student 2 created a 'Citizen Scientist' program that allows residents to identify and document what is in bloom and what animals, birds, and insects are attracted to the designed areas.

The designs were shared with the stakeholders at an informal poster session and during the focus group discussion.

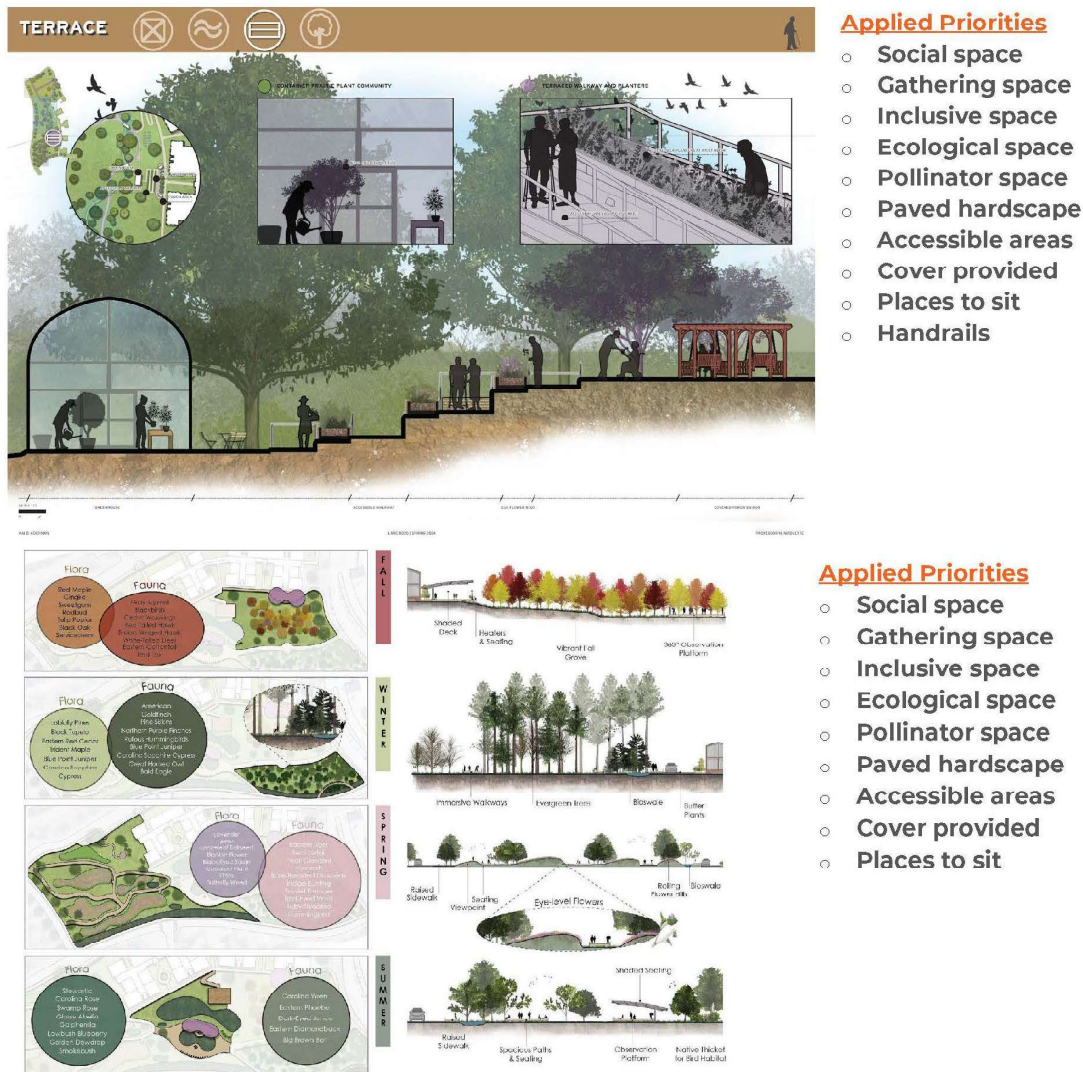


Figure 5. Student design examples (Student 1-Top; Student 2-Bottom) (2024). Figure by Kia Koopman and Celia Castellano.

4 DISCUSSION

4.1 Synthesis of Key Results

4.1.1 Moving Beyond Traditional Engagement Exercise

The objective of this research is to demonstrate an engagement strategy that moves beyond traditional fact-finding exercises and creates an immersive and empowering experience for the stakeholders that gives them agency in the design process. As mentioned in the literature review section, games should have the following elements:

- Application to real-world situations with real-world objectives
- Structured exercises with rules, goals, and real-time feedback
- Mechanics that enhance participation, collaboration, and motivation through challenges and rewards
- Game play lowers participation barriers- (See section 4.1.2)

The card game produced by the research team successfully achieves these criteria. Although hypothetical, the card game applies gaming elements to the physical design of a green space. It is a

structured game with the goal of developing priorities for the defined green space and offers real-time results at the conclusion of each round. Although there is no individual or definitive winner of the game, the results and corresponding discussions between the participants serve as a reward to motivate the participants. The conversations also highlight the collaborative approach between participants and begin to build consensus towards a common goal.

4.1.2 Reducing Barriers for Older Adult Engagement through Gamification

The game was intentionally designed to lower the barriers of participation for attendees. The game was played at Clemson Downs and did not require participant transportation off site or extensive equipment to be brought to the site. Many of the participants no longer drive and accommodations would have to be made to bring them to the location of the research team. Although we brought a portable projector and screen to display the background presentation, all the necessary equipment can be transported in the back of a standard vehicle and set up by one individual.

From discussions with the administration at Clemson Downs, it was made apparent that the residents have full schedules. An excessive time commitment would reduce interest and impact previously planned social engagements of the residents. Although this is not necessarily an issue limited to older adults, living in an assisted living community offers less control by residents to plan their meals and schedule their social events. With these parameters in mind, the time requirement for the game is minimal and can be played in 1 to 2 hours including discussions. Additionally, real-time results eliminate the necessity of scheduling a follow-up meeting to convey and explain the aggregated results. Furthermore, the short timeframe of game play would be more accessible for those with mild cognitive impairments, such as memory loss, to participate more fully due to real-time results and immediate discussions after each round.

The analog format of the game removes the need for digital devices, and only a limited level of motor skills is required to hold and play the large cards. Also, there was not a need for participants to move or write, which is sometimes required for traditional sticky-dot and notecard exercises. We did not have any participants with noticeably debilitating visual, hearing, or cognitive impairments. However, the cards were designed with a large, easy to read typeface with a contrasting background for ease of viewing. The cards would need to be adapted to accommodate a blind participant.

4.1.3 Participant Feedback and Thematic Analysis

In the focus group discussion, stakeholders and facilitators evaluated the effectiveness of the workshop, the game, the role of student facilitators, and the influence of participant feedback on design outcomes. Key themes from the workshop participants are as follows:

- Iteration and information: The inclusion of practice rounds and background information was essential for game efficiency, successful gameplay, and relevant information transfer
- Facilitation: Student facilitators and game cards played a key role in guiding gameplay through informal discussions
- Empowerment: Participants felt encouraged to share honest feedback and saw their contributions reflected in the final designs.
- Now what?: There was a desire by participants to make the hypothetical project a reality

The background information including the site video, project brief, the gamification process, and a practice round was essential. Participants were allowed to ask questions and clarify aspects of the project and gameplay during the introduction phase. However, the residents wanted a more thorough understanding of the site. Although, we presented a video walk-through of the site to accommodate those with mobility challenges, participants that were capable wanted to physically walk the site with the students and discuss the unique details of the landscape.

The design of the game offered needed structure but also allowed for flexibility and nuance through post-round discussions. The student facilitators were essential in this process. They were a source of information but also a vehicle for participants to engage in storytelling and reminiscing that brought richness to the knowledge transfer and workshop experience.

The visual images on the cards also helped participants understand the overall topic while not dictating design outcomes, however the *social* and *service* rating elements on the cards were overly complicated

and mostly ignored. The ratings elements may have been counterproductive and will need to be adjusted or removed in future iterations of the game. Additionally, while the variety of options presented on the cards were appreciated, some found the number of options excessive and overwhelming. An additional round of distillation and refinement is warranted.

The real-time results dictated between rounds stimulated community dialogue that added clarity and understanding to the priority scores. The discussions also prompted personal memories that grounded the workshop through lived experience. Participants described the workshop as fun and thought-provoking, and many felt empowered to think critically about their living environment. The experience prompted deeper thinking and awareness about their community's open space. One participant mentioned:

- *"[The experience] made me look around a lot more and [think about] what I would like to see"*

Some residents perceived the experience as a visioning exercise. One resident exclaimed:

- *"If we don't dream big, we'll never accomplish big things."*

Many residents have participated in traditional stakeholder engagement exercises in the past. It is common for the Clemson Downs community to engage with Clemson University students and research initiatives, some of which involve engagement workshops. Those who had participated in workshops in the past expressed appreciation for the ability to aggregate and discuss results in real-time. These same participants noted that the gameplay was more dynamic than the traditional activities, such as writing thoughts on note cards and scoring images and comments with sticky dots.

Areas to improve the overall experience focused on the student designs and future outcomes. Although the student designs were well received and the residents saw their ideas in the results, many were discouraged that the exercise was hypothetical. Accessibility and practical design emerged as critical elements for the residents during the workshop. Their design priorities focused on inclusive programs and accessible spaces with hardscape materials suitable for all abilities. Participants were excited to see these elements reflected in the student work. However, there was a desire to understand the economics and feasibility to build some elements of the projects even though it was clearly articulated at the beginning of the process that estimation of probable cost and design implementation was outside the scope of the student projects.

4.2 Implications for Academic Studios and Professional Practice

This case study offers important strategies and lessons learned that can be applied to stakeholder engagement in academic design studios and professional practice. For gamification to be successful, careful attention and rigor must be applied to understanding stakeholder demographics, potential limitations and needs, and how results will be measured and communicated in real-time through game play. If these elements are successfully executed information transfer through a gamified engagement workshop can achieve these beneficial outcomes:

- More inclusive engagement
- Increased enjoyment can aid in participation and consensus building
- Accelerated information transfer
- Real-time results ready for discussion
- Reduction in the number of required stakeholder meetings

Taken together, there is potential to save time and money without the loss of information. These extra resources can be directed to other aspects of a studio or professional project.

Possible limitations or considerations for studios and professional practice:

- More rigorous research of the stakeholder population is required
- More time and money required early in the process to develop the game at a professional level of craft
- Time required in the workshop to explain and achieve acceptance of gamification as a new engagement strategy

Educators and practitioners will need to compare the possible benefits and burdens to evaluate if gamification is suitable for an identified project.

4.3 Limitations and Future Research

There are several limitations with this study. We were only able to find 15 volunteers to participate in the study. A larger sample size would improve the outcomes. Similarly, a larger studio enrollment combined with a larger stakeholder group would allow for a direct comparison between traditional and gamification techniques and design outcomes. Given the nature and time constraints of academic design studios, we were unable to integrate gamification more intimately into the design phase of project, specifically related to location and scale of programs and design elements. There is an opportunity to address this concept in future studies. We also did not focus on the integration of gamification into design pedagogy in this study, but there is ample opportunity to do so in the future. Although we focused on older adults, this strategy can also be adapted to engage other demographics with unique participation requirements.

5 CONCLUSION

Gamification improved engagement and enjoyment for Clemson Downs residents participating in a stakeholder workshop for a hypothetical green space in their community. Residents were empowered to communicate their ideas and priorities to the student designers. Gamification offered an engaging and accessible strategy that minimized mobility requirements due to the modality and design of the game cards and offered real-time results resulting in a shorter time requirement regarding duration and number of workshops. The shorter time requirement and minimal number of necessary workshops allows for maximum accessibility for residents on tight schedules. Additionally, the short time frame of the workshop is optimal to maintain energy levels and focus of the participants for each round of the game and corresponding discussions. The stated dynamic gameplay as compared to traditional engagement exercise also helped to maintain attention.

The aggregated data between the workshops confirmed consistent game results and community priorities. The experiences and conclusions were similar across the two workshops with different participants. Accurate information exchange was verified with the Clemson Downs community residents' approval of the final designs that integrated the key community priorities of accessibility, safety, and inclusion.

This case study offers a technique for academic instructors and professional practitioners to strategically engage traditionally underrepresented groups with unique engagement challenges by thoughtfully designing games and exercises that accommodate potential barriers to participation. The initial investment of these strategies can be offset by improved efficiency throughout the process, allowing more time to develop designs and programs.

REFERENCES

- Ampatzidou, C., Gugerell, K., Constantinescu, T., Devisch, O., Jauschneg, M., & Berger, M. (2018). All work and no play? Facilitating serious games and gamified applications in participatory urban planning and governance. *Urban Planning*, 3(1), 34–46.
- Statista Ltd. (2023). *Board game popularity by gender US 2023: Popularity of board games in the United States during the third quarter of 2023, by gender* [Dataset]. <https://www.statista.com>
- Statista Ltd. (2023). *Board games popularity by generation US 2023: Popularity of board games in the United States during the third quarter of 2023, by generation* [Dataset]. <https://www.statista.com>
- Boffi, M., Pola, L., Fumagalli, N., Fermani, E., Senes, G., & Inghilleri, P. (2021). Nature experiences of older people for active ageing: An interdisciplinary approach to the co-design of community gardens. *Frontiers in Psychology*, 12, 702525.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Brown, D., MacCallum-Stewart, E., & Kapell, M. W. (Eds.). (2020). *Rerolling boardgames: Essays on themes, systems, experiences and ideologies*. McFarland.
- Clemson Downs. (2024). <https://www.clemsondowns.com>
- de Andrade, B., Poplin, A., & Sousa de Sena, Í. (2020). Minecraft as a tool for engaging children in urban planning: A case study in Tirol Town, Brazil. *ISPRS International Journal of Geo-Information*, 9(3), 170. <https://doi.org/10.3390/ijgi9030170>

- Andrade, B., Crowley, S., Cocco, C., & McNally, B. (2023). A videogame for architectural design? Minecraft for young people to imagine desirable climate futures. In *International Conference on Videogame Sciences and Arts* (pp. 150-165). Cham: Springer Nature Switzerland.
- Peña, D., Allen, D. J., Hester, R. T., Hou, J., Lawson, L., & McNally, M. J. (2017). Design as democracy: Techniques for collective creativity. Washington, DC.: Island Press.
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011, September). From game design elements to gamefulness: Defining "gamification". In *Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments* (pp. 9-15). ACM.
<https://doi.org/10.1145/2181037.2181040>
- Devisch, O., Poplin, A., & Sofronie, S. (2016). The gamification of civic participation: Two experiments in improving the skills of citizens to reflect collectively on spatial issues. *The Journal of Urban Technology*, 23(2), 81–102.
- Ehab, A., Burnett, G., & Heath, T. (2023). Enhancing public engagement in architectural design: A comparative analysis of advanced virtual reality approaches in building information modeling and gamification techniques. *Buildings*, 13(5), 1262. <https://doi.org/10.3390/buildings13051262>
- Finlay, J., Franke, T., McKay, H., & Sims-Gould, J. (2015). Therapeutic landscapes and wellbeing in later life: Impacts of blue and green spaces for older adults. *Health & Place*, 34, 97-106.
- Fox, N., Serrano-Vergel, R., Van Berkel, D., & Lindquist, M. (2022). Towards gamified decision support systems: In-game 3D representation of real-world landscapes from GIS datasets. *Journal of Digital Landscape Architecture*, 2022(7), 356–364.
- Hassan, L., Dias, A., & Hamari, J. (2019). How motivational feedback increases user's benefits and continued use: A study on gamification, quantified-self and social networking. *International Journal of Information Management*, 46, 151–162.
- Hester, R. T. (1984). *Planning neighborhood space with people* (2nd ed.). Van Nostrand Reinhold Co.
- Hester, R. T. (2006). *Design for ecological democracy*. Cambridge, MA: MIT Press.
- Jiang, Y., Jachna, T. J., & Dong, H. (2020). Game for complete care: A means of connecting 'user-centered design' with sustainability. *Sustainability*, 12(24), 10555.
- Joshua, L. (2017). *Aging and long term care system: A review of finance and governance arrangements in Europe, North America, and Asia-Pacific*. Washington, D.C.: World Bank Group.
- Kavouras, I., Sardis, E., Protopapadakis, E., Rallis, I., Doulamis, A., & Doulamis, N. (2023). A low-cost gamified urban planning methodology enhanced with co-creation and participatory approaches. *Sustainability*, 15(3), 2297.
- Khalili-Mahani, N., De Schutter, B., Mirgholami, M., Holowka, E. M., Goodine, R., DeJong, S., McGaw, R., Meyer, S., & Sawchuk, K. (2020). For whom the games toll: A qualitative and intergenerational evaluation of what is serious in games for older adults. *The Computer Games Journal*, 9(2), 221–244.
- Kochtitzky, C. S., Yen, I. H., Freeland, A. L., & Hooker, S. (2011). Ensuring mobility-supporting environments for an aging population: Critical actors and collaborations. *Journal of Aging Research*, 2011(2011), 138931.
- Lee, V., van der Lubbe, S. C., Goh, L. H., Valderas, J. S. (2024). Harnessing ChatGPT for thematic analysis: Are we ready? *Journal of Medical Internet Research*, 26, e54974. <https://doi.org/10.2196/54974>
- Levasseur, M., Routhier, S., Clapperton, I., Doré, C., & Gallagher, F. (2020). Social participation needs of older adults living in a rural regional county municipality: Toward reducing situations of isolation and vulnerability. *BMC Geriatrics*, 20(1), 456.
- Mayer, I. S. (2009). The gaming of policy and the politics of gaming: A review. *Simulation & Gaming*, 40(6), 825–862.
- Muehlhaus, S. L., Eghtebas, C., Seifert, N., Schubert, G., Petzold, F., & Klinker, G. (2023). Game.UP: Gamified urban planning participation enhancing exploration, motivation, and interactions. *International Journal of Human-Computer Interaction*, 39(2), 331–347.
- Newbold, K. B., Valaitis, R., Phillips, S., Alvarez, E., Neil-Sztramko, S., Sihota, D., Tandon, M., Nadarajah, A., Wang, A., Moore, C., Orr, E., & Ganann, R. (2023). Enhancing physical and community mobility in older adults with health inequities using community co-design (EMBOLDEN): Results of an environmental scan. *Canadian Geriatrics Journal CGJ*, 26(1), 23–30.

- Olyaei, G., Khanmohammadi, R., Talebian, S., Hadian, M. R., Bagheri, H., & Najafi, M. (2022). The effect of exergaming on cognition and brain activity in older adults: A motor-related cortical potential study. *Physiology & Behavior*, 255, 113941.
- Peng, X., Li, J., Tang, H., & Luo, Q. (2025). Gamified interaction and urban regeneration: An analysis of serious game participation in rural architectural transformation and its influential factors. *Journal of Asian Architecture and Building Engineering*, 24(4), 2464–2478.
- Resek, C. L., Siniscalchi, P. P., Caetano, B. P., Oliveira, K. W. R., Paula, M. M. V., & Souza, J. M. (2024). Gamification of Citizen Participation: A Systematic Mapping. *IEEE Transactions on Games*, 16(1), 1–15.
- Rodgers, P. A. (2018). Co-designing with people living with dementia. *CoDesign*, 14(3), 188–202.
- Sanders, E. B. N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *Co-design*, 4(1), 5–18.
- Sanoff, H. (1979). Collaborative design processes. *JAE*, 33(1), 18–22.
- Song, Y., Qian, C., & Pickard, S. (2021). Age-related digital divide during the COVID-19 pandemic in China. *International Journal of Environmental Research and Public Health*, 18(21), 11285.
- Steen, M. (2013). Co-design as a process of joint inquiry and imagination. *Design Issues*, 29(2), 16–28.
- Thiel, S. K. (2016, May). A review of introducing game elements to e-participation. In *2016 Conference for E-Democracy and Open Government (CeDEM)* (pp. 3–9). IEEE.
- World Health Organization. (2015). *World report on ageing and health*. World Health Organization. <https://www.who.int/publications/i/item/9789241565042/>
- Zhang, Z., Patricio, R., Carella, G., & Zurlo, F. (2022). Supporting a sustainable and engaging online transition for co-design through gamification. *Sustainability*, 14(11), 6716.