Busara
Groundwork
■ LITERATURE REVIEW

Oberoi, Zeena[1]

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Using gamification to enhance development:

how game elements can contribute to sustainable development in the Global South

LITERATURE
REVIEW

Busara

Author affiliations:
[1] Busara

Copyedited by:
Aarti Nair

Designed by:
Anthony Mogaka
Lynette Gow

Table of contents

Figures and Tables

Abbreviations and acronyms

PBL   points, badges, and leaderboards

KII   key informant interview

Introduction

Games, in their various forms, stand as prime examples of human interaction, decision-making and learning. From the playground to the boardroom, games have long captured our attention and shaped our behavior in subtle yet decisive ways. Across cultures and geographies, games have manifested in structured play and are finely woven into the fabric of everyday activities and social interactions. Games permeate lives overtly and covertly, shaping choices and perceptions, often without the player's conscious awareness. Consider, for instance, the implicit rules and incentives embedded within seemingly mundane tasks such as shopping, exercising, or even navigating social relationships. These 'hidden games' operate on the periphery of our awareness, exerting a subtle yet potent influence on our choices and behaviors.

In this realm of games, "Gamification" has come to be understood as the application of game design in non-game contexts,[1] where individuals participate in a complex web of incentives, nudges, and feedback loops that steer them toward certain behavioral outcomes. Whether it's the gamified elements of loyalty programs enticing consumers to spend more or the gamified design of fitness apps motivating users to exercise regularly, the pervasive presence of games in our lives underscores their profound impact on human behavior.

Observing this relationship between individuals and gamification reveals a rich interplay of human cognition and social dynamics. Understanding and harnessing these underlying mechanisms hold immense potential for development practitioners seeking to effect positive change by leveraging the gamification of everyday life.

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1 Johnson et al. (2016), Werbach and Hunter (2020)

What does this Groundwork offer?

Through this Groundwork, we offer foundational insights for development practitioners seeking to understand and navigate the integration of gamification and behavioral science into their work. It delves into gamification's multifaceted uses and characteristics and how gamified elements can be incorporated into development initiatives, especially in the Global South.

In this report, we further explore how gamified interventions can be deployed to foster learning, encourage healthy behaviors, promote engagement, and facilitate social cohesion within communities. Additionally, it examines how insights from behavioral science can inform the design and implementation of these interventions, ensuring they are engaging and effective in eliciting desired behavioral outcomes among target populations.

Such a research agenda is important for two reasons. Firstly, it recognizes the inherent power of gamification as an engaging and motivating tool for behavior change, particularly in environments where traditional methods may fall short. By leveraging the intrinsic appeal of games, practitioners can enhance the effectiveness of interventions aimed at promoting health, education, financial literacy, and other critical outcomes in low-income communities. Secondly, incorporating behavioral science principles ensures that gamified programs are engaging and tailored to the target population's socio-cultural contexts. By understanding cognitive biases, heuristics, and social dynamics, practitioners can design interventions that resonate with individuals' motivations, preferences, and constraints across different contexts, increasing their effectiveness and sustainability.

Methods

This Groundwork has built upon findings from a comprehensive literature review and key informant interviews (KIIs) in collaboration with CIAT in 2023. The literature review and KIIs set out to answer the following questions:

1. **What does research tell us about gamification, and how can development practitioners apply gamification in the Global South?**
2. **What is the interaction between and learning aspects of gamification for behavioral science?**
3. **What use cases of gamification currently exist in the Global South, and how do they fare?**

We accessed existing open-source databases and search engines, including Google, Google Scholar, and Elicit, to source materials from various disciplines, including behavioral science, psychology, anthropology, economics, public health, agriculture, sociology, and game development. Search terms included 'gamification' or 'game design' in combination with 'behavioral science' or 'development.' We prioritized reviewing roughly 43 sources, including books, working papers, and academic articles.

For the KIIs, we conducted semi-structured interviews with organizations, researchers, and game developers from East Africa and beyond, focusing on the uses of gamification within the agricultural sector. Insights from that study have also been incorporated into this Groundwork.

Limitations

One significant limitation of this Groundwork is the scarcity of information and use cases originating from the Global South. Most existing literature and case studies on gamification primarily focus on experiences and implementations in the Global North, overlooking the unique challenges and contexts in the Global South. This knowledge gap hinders our ability to fully understand gamification's potential applications and effectiveness in addressing development issues prevalent in these regions.

Apart from KIIs, the absence of diverse perspectives and insights from stakeholders in the Global South limits the inclusivity and relevance of the findings presented in this report. The lack of empirical studies and real-world case examples from sectors such as agriculture further restricts our understanding of the practical implications and outcomes of gamification initiatives in these areas.

While theoretical frameworks and conceptual discussions are valuable, empirical evidence from actual implementations is essential for validating hypotheses and assessing the impact of gamification on behavior change, productivity, and community development across sectors in the Global South. Addressing these limitations requires a concerted effort to prioritize research and collaboration with stakeholders from the Global South, including individuals from local communities, policymakers, game developers, behavioral scientists, and development practitioners. By actively involving these voices in designing, implementing, and evaluating gamification interventions, we can ensure that our approaches are contextually relevant, culturally sensitive, and effective in driving positive change in these regions.

Background

History of gamification

Gamification has a long history of use across diverse socio-temporal contexts; however, certain vital developments and influences have shaped its meaning today.

A pivotal juncture in the history of gamification was the exploration of psychological concepts, notably the notion of flow introduced by Csikszentmihalyi in 1975. Flow theory delves into the optimal experience achieved when individuals are fully immersed in a task, characterized by intense focus, intrinsic motivation, and a sense of timelessness. Csikszentmihalyi's insights highlighted the importance of structured tasks with clear goals, rules, feedback mechanisms, and challenges matched to one's skills—an idea that resonates deeply in gamification discourse.[2] This concept underscores the potential for gamified experiences to engross users' attention, foster engagement, and create deeply satisfying experiences.[3]

Another significant thread in the history of gamification emerges from video game-based learning. Scholars like Tom Malone and James Paul pioneered research demonstrating the educational potential of video games at a time when video games were perceived as simple entertainment. Malone's early work at MIT showcased how children could learn effectively through video games, challenging conventional notions of learning environments. Malone built upon these ideas, eventually coming up with his theory of intrinsically motivating instructions (1981).[4] Following his lead, researchers like James Paul explored the learning mechanisms embedded within popular entertainment games, such as the Tomb Raider series, revealing the profound educational

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2 Csikszentmihalyi (2008)
3 Reeves and Read (2009)
4 Malone (1981)

opportunities hidden within gaming experiences.[5] These insights expanded the horizon of gamification beyond entertainment, positioning it as a potent tool for education and skill development. These learning mechanisms will be explored in detail later on in this Groundwork.

Simultaneously, the emergence of the "Serious Games" movement in 2002 marked a milestone in the evolution of what gamification could embody. Spearheaded by Ben Sawyer and David Reetsky, this initiative brought together diverse sectors, including academia, industry, and the military, to explore the potential of fully functional games for educational and simulation purposes. By harnessing the immersive and interactive nature of games, Serious Games demonstrated their efficacy in training, decision-making, and scenario planning across various domains.[6]

The modern concept of gamification was crystallized in the early 2000s with the establishment of companies like Conundra and Bunch Ball.[7] These pioneers sought to apply game mechanics and design principles to consumer products and business operations, recognizing games' inherent appeal and motivational power. While early attempts like Conundra faced challenges, they laid the groundwork for subsequent innovations in gamification platforms. Bunch Ball, for instance, introduced one of the first gamification platforms in 2007, pioneering the integration of game mechanics, such as scoring and rewards, into business contexts.[8] These developments marked a turning point in the perception of gamification, positioning it as a strategic tool for enhancing user engagement, driving behavior change, and achieving business objectives.

However, despite its widespread adoption, the term "gamification" has not been without criticism. Some scholars, such as Thompson, Bogost, and

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5 Khaitova (2021)
6 Ibid.
7 Ibid.
8 Ibid.

McGonigal, have highlighted alternative descriptors such as serious games, persuasive games, and alternate reality games, which capture different facets of gamified experiences.[9] Additionally, Werbach notes concern that the term "gamification" may oversimplify the complexities of effective game design, potentially undermining its significance in specific contexts.[10] Occasionally, gamification is met with skepticism or not treated with the seriousness of its potential. Consequently, some practitioners explore alternative language to convey the depth and impact of their gamification efforts to avoid misconceptions or trivialization.

Today, gamification is a dynamic and multifaceted field with far-reaching implications across different sectors. Kevin Werbach, an associate professor at the Wharton School of Business, University of Pennsylvania, outlines that gamification encompasses a set of tools—such as points, levels, badges, ratings, and missions—that create a sense of play and engagement. Gamification leverages game design technologies to structure and organize these elements effectively. By applying gamification to non-play contexts, such as business operations or training, organizations can tap into the inherent appeal of games to drive motivation, engagement, and desired outcomes. As gamification continues to evolve, it bridges the gap between play and productivity, offering innovative solutions to complex challenges and unlocking new possibilities for human engagement, research, and development.

Why is gamification of interest to development practitioners?

Gamification in behavioral science holds significant importance for several reasons. Firstly, it offers a novel approach to understanding and influencing human behavior. By integrating game elements into real-world contexts,

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9 Thompson et al. (2010), Bogost (2007), McGonigal (2011)
10 Werbach and Hunter (2020)
11 Werbach and Hunter (2020)

gamification provides a platform for studying how individuals interact with incentives, feedback mechanisms, and social dynamics, shedding light on the underlying motivations driving human actions.

In the development context, gamification offers a powerful tool for promoting positive behavioral change and addressing complex social challenges. By leveraging the motivational and engagement factors inherent in games, development practitioners can design interventions that inspire action, encourage learning, and foster community participation. Gamification can potentially make development initiatives more accessible, engaging, and effective, particularly in settings where resource constraints and cultural barriers may limit traditional approaches.

Furthermore, gamification facilitates collaboration and co-creation, enabling stakeholders to actively participate in designing and implementing interventions tailored to their needs and preferences. This is especially salient in instances where gamification is used for market segmentation and data collection purposes, where gamified elements are essentially used to interpret community values and processes while enabling end users to determine how the data is used and implemented. By fostering a sense of ownership and empowerment among community members, gamified approaches can promote sustainable development outcomes and foster long-term behavioral change.

In short, gamification in behavioral science offers a promising avenue for advancing development efforts by harnessing the power of gamified elements to drive positive social impact. As such, it warrants attention and investment from researchers, practitioners, and policymakers seeking innovative solutions to global development challenges.

Understanding gamification

While games and gamification share similarities, they are distinctly different concepts.[12] Games typically involve structured rules, objectives, and player interactions within a defined environment, fostering a sense of competition or cooperation. In contrast, gamification applies game-like elements to non-game contexts, enriching experiences and incentivizing desired actions without constituting a full-fledged game. This distinction highlights the versatility of gamification, which can adapt to diverse settings and objectives while harnessing the power of games.[13]

Deterding et al. emphasize the transformative potential of gamification, describing it as a means to instill "gamefulness" in activities where traditional gameplay is absent.[14] By infusing elements like progression, achievement, and feedback into everyday tasks, gamification imbues them with qualities reminiscent of games. This approach broadens the scope of gamification beyond entertainment, positioning it as a strategic tool for enhancing user engagement, learning outcomes, research, and productivity across various domains. So, what exactly is gamification?

Types of gamification

Werbach categorizes gamification into four distinct categories, each tailored to specific objectives and contexts [see figure 1.3].[15]

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12 Deterding et al. (2011)
13 Ibid.
14 Ibid.
15 Ibid.

Organizational Benefit

Internal   External

Communities ←——————————————→ **Individuals**

Crowdsourcing   Behavior Change
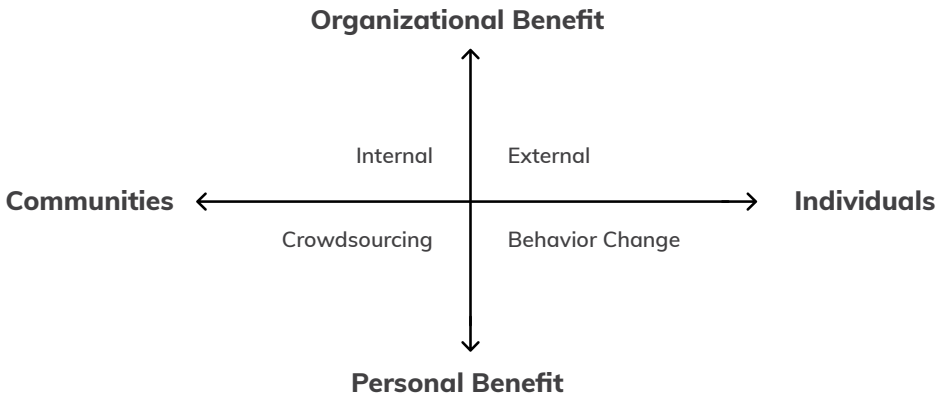
Personal Benefit

Figure 1.3: Relationship Between Gamification
Categories (source: Werbach and Hunter (2020), p. 5.)

Internal gamification involves using gamification techniques within organizations to boost productivity, foster innovation, and cultivate camaraderie amongst employees. Companies implement game elements such as points, badges, and leaderboards (PBL) to enhance employee engagement and satisfaction. Notably, internal gamification operates within a pre-existing community of employees, leveraging shared corporate culture and aspirations for advancement. However, successful internal gamification relies on aligning with existing management and reward structures, offering additional incentives beyond core job requirements to sustain motivation and participation.

External gamification focuses on engaging customers or potential customers through gamified experiences driven by marketing goals. Businesses deploy gamification strategies to deepen customer relationships, increase engagement with products or services, and cultivate brand loyalty. For instance, rewarding users with badges for active participation or integrating gamified elements

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15 Ibid.

into marketing campaigns can effectively enhance customer retention and stimulate interest in products or services.

Behavior change gamification aims to instill beneficial habits within populations to achieve positive societal outcomes. Whether encouraging healthier lifestyle choices, facilitating better educational experiences, or promoting sound financial decisions, behavior change gamification relies on leveraging game mechanics to motivate individuals. Through challenges, rewards, and progress tracking, gamification fosters sustained engagement and adherence to desired behaviors over time.

Crowdsourcing gamification harnesses the collective intelligence of crowds to solve complex problems or accomplish tasks. Platforms like Kaggle offer challenges to individuals or teams, incentivizing participation through rewards and recognition. By gamifying the crowdsourcing process with virtual medals, rankings, and community engagement features, these platforms create an environment conducive to collaborative problem-solving and continuous improvement.

Werbach's (2020) framework offers valuable insights into the diverse applications of gamification, spanning organizational and societal contexts. Each category presents unique opportunities for driving engagement, productivity, behavior change, and innovation, highlighting gamification strategies' versatility and potential impact.

Elements of gamification

Understanding the fundamental elements of gamification is essential for anyone seeking to leverage its potential. By identifying gamification elements, practitioners can effectively harness them to achieve desired outcomes, such as ideal behaviors, and tailor gamification strategies to specific goals and target audiences.
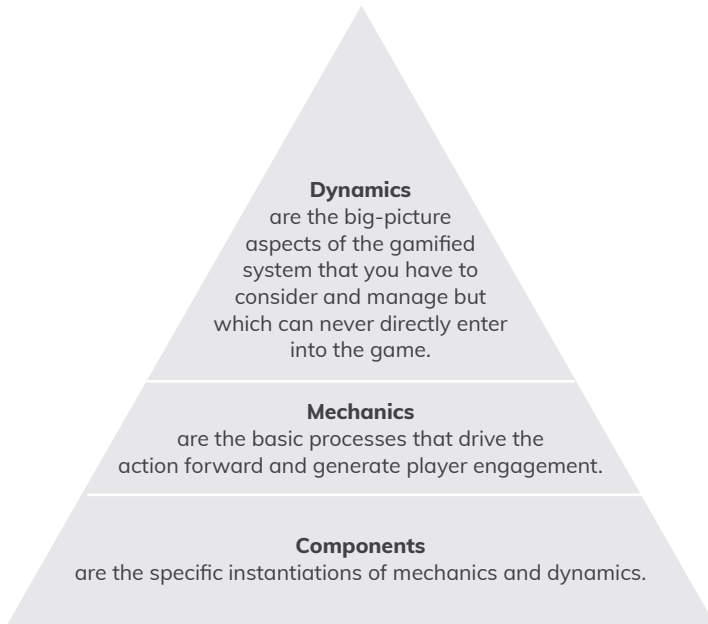
The pyramid figure contains the following text:

Dynamics
are the big-picture aspects of the gamified system that you have to consider and manage but which can never directly enter into the game.

Mechanics
are the basic processes that drive the action forward and generate player engagement.

Components
are the specific instantiations of mechanics and dynamics.

Figure 4.3: The Game Element Hierarchy
(source: Werbach and Hunter (2020), p. 71.)

According to Werbach, the **dynamics** of gamification encompass overarching elements that are not explicitly incorporated within a gamified system but rather those that define and guide the direction of the system as a whole.[16]

The following is a list of game dynamics compiled by Werbach[17]:

1. Constraints (limitations or forced trade-offs)
2. Emotions (curiosity, competitiveness, frustration, happiness, etc.)
3. Narrative (a consistent, ongoing storyline)

16 Ibid.
17 Ibid.

4. Progression (the player's growth and development)
5. Relationships (social interactions generating feelings of camaraderie, status, altruism, etc.)

To better understand this, imagine a development project using gamification to promote community health. In this case, dynamics could include how incentives align with project objectives, the emotional impact of feedback on participants' engagement, the narrative thread that ties together various project activities, the progression of participants' learning and skill development, and the relationships formed among community members through collaborative efforts.

These dynamics play a crucial role in shaping the overall experience and outcomes of the gamified intervention. Constraints, emotions, narrative coherence, progression pathways, and social interactions all contribute to the effectiveness of the gamified approach in achieving its goals.

Secondly, game **mechanics** are the fundamental elements driving progression and engagement within a gamified system. Here are ten fundamental game mechanics identified by Werbach[18]:

1. Challenges (puzzles or other tasks that require effort to solve)
2. Chance (elements of randomness)
3. Competition (one player or group wins, and the other loses)
4. Cooperation (players work together to achieve a shared goal)
5. Feedback (information about how the player is doing)
6. Resource acquisition (obtaining functional or collectible items)
7. Rewards (benefits for some action or achievement)
8. Transactions (trading between players, directly or through intermediaries)
9. Turns (sequential participation by alternating players)

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18 Ibid.

10. **Win states** (objectives that make one player or group the winner—draw and loss states are related concepts)

Every mechanic fulfills one or more of the outlined dynamics. For instance, rewards can fulfill a player's sense of progression, and cooperation can foster emotions of fulfillment.

Lastly, **components** are the specific aspects of mechanics and dynamics that vary across gamification. Below is a list of 21 components identified by Werbach and researchers from the University of Limerick, Ireland.[19]

1. Achievements (defined objectives)
2. Avatars (visual representations of a player's character)
3. Badges (visual representations of achievements)
4. Boss fights (especially hard challenges at the culmination of a level)
5. Collections (sets of items or badges to accumulate)
6. Combat (a defined battle, typically short-lived)
7. Content unlocking (aspects available only when players reach objectives)
8. Gifting (opportunities to share resources with others)
9. Leaderboards (visual displays of player progression and achievement)
10. Levels (defined steps in player progression)
11. Points (numerical representations of game progression)
12. Quests (predefined challenges with objectives and rewards)
13. Social graphs (representation of players' social network within the game)
14. Teams (defined groups of players working together for a common goal)
15. Virtual goods (game assets with perceived or real-money value)
16. Infinite gameplay (allowing constant play)

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19 Ibid.

17. Progression bar (a numeric or visual representation of progress toward completing a mission)
18. Search and discovery (several distinct paths toward mission completion)
19. Time constraints (racing against the clock)
20. Tangible rewards (in-game progress converted into currency, products, or services)
21. Negative scoring

Some of the most popular components in gamification are Points, Badges, and Leaderboards (PBL). PBLs are frequently associated with gamification to the point where they're sometimes equated with gamification. However, while they serve as an initial step, they do not encompass the entirety of gamification. To fully optimize the benefits of gamification, it's necessary to extend beyond PBLs to the many components mentioned above.[20]

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20 Ibid.

Gamification and behavioral mechanisms

Gamification is deeply rooted in behavioral mechanisms and has emerged as a powerful tool for driving engagement, motivation, and behavioral change across various domains. Right from the effectiveness of video games in shaping behavior through contingency programming, where players interact with systems designed to reinforce desired actions.[21] To leverage the success of games to address societal challenges, gamification has been recognized for its potential in areas such as education, mental health, and environmental awareness.[22] What are these behavioral mechanisms that lead to successful gamification?

Deterding et al. delineated five levels of game design elements that influence game-playing behavior, ranging from molecular elements like schedules of reinforcement to molar elements such as conceptual models and overall strategies (see Table 1).[23] Understanding these elements is crucial for designing compelling gamified experiences tailored to specific behaviors and user preferences.

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21 Skinner (1984)
22 McGonigal (2011)
23 Ibid.

Table 1. source: Deterding et al. (2011).

Levels (game design elements)	Description	Description
Game interface design patterns	Common, successful interaction design components and design solutions for a known problem in a context, including prototypical implementations	Badge, leaderboard, level
Game design patterns and mechanics	Commonly reoccuring parts of the design of a game that concern gameplay	Time constraints, limited resources, turns
Game design principles and heuristics	Evaluative guidelines to approach a design problem or analyze a given design solution	Enduring play, clear goals, variety of game styles
Game models	Conceptual models of the components of games or game experience	Mechanics-Dynamics-Aesthetics (MDA) framework; challenge, fantasy, curiosity, game design atoms, Core Elements of Gaming Experience (CEGE) framework
Game design methods	Game design-specific practices and processes	Playtesting, playcentric design, value conscious game design

On the other hand, player taxonomy, exemplified by Bartle's player personality types, offers insights into different player behaviors, including killers, achievers, explorers, and socializers.[24] Bartle's player personality types, as elucidated by Sheldon and Kapp, provide valuable insights into the diverse motivations and preferences exhibited by individuals engaging in gaming environments.[25] These personalities encompass a spectrum of player archetypes, each characterized by distinct behavioral patterns and goals within the gaming ecosystem.

Killers are players driven by competition and action-oriented gameplay. They thrive on challenges and seek opportunities to outperform opponents, often

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24 Sheldon (2011), Kapp (2012)
25 Ibid.

prioritizing victory and dominance over social interaction. For killers, the thrill of triumph and the pursuit of mastery are primary motivators, driving their engagement with competitive gaming scenarios.

Achievers, on the other hand, are motivated by extrinsic rewards and accomplishments. They derive satisfaction from achieving goals, acquiring in-game rewards, and progressing through levels or ranks. Achievers are often characterized by their dedication to completing tasks, collecting achievements, and attaining status symbols within the gaming community.

Explorers exhibit a curiosity-driven approach to gaming, seeking novel experiences, hidden secrets, and uncharted territories within virtual worlds. These players are motivated by the desire for discovery and exploration, often immersing themselves in expansive game environments to uncover new content, mechanics, or narrative elements. Explorers value the journey of exploration as much as the destination, relishing the sense of wonder and discovery that accompanies their exploratory endeavors.

Socializers prioritize interpersonal connections and social interaction within gaming communities. They enjoy collaborating with others, forming alliances, and fostering relationships with fellow players. Socializers are often drawn to multiplayer experiences that facilitate communication, teamwork, and camaraderie, valuing gaming environments' sense of belonging and community.

By tailoring gamification strategies to align with the motivations and preferences of different player personalities, development practitioners can enhance the effectiveness and sustainability of their interventions. Acknowledging and accommodating these diverse player archetypes enriches the overall gamified experience, fostering greater player engagement, participation, and satisfaction.

Beyond player types, Caillois's patterns of play taxonomy provide a broader framework for categorizing different types of play, including competition (Agôn), chance (Alea), role-playing (Mimicry), and disorientation (llinx).[26] McGonigal further identified four critical attributes of video games that contribute to their immersive and motivating nature: virtuoso optimism, tight social fabric, blissful productivity, and epic meaning.[27] When harnessed through gamification, these behavioral mechanisms can foster a sense of urgency, collaboration, and fulfillment, facilitating the attainment of flow states conducive to learning and engagement. McGonigal's assertion that video games cultivate virtuoso optimism, foster tight social fabric, promote blissful productivity, and encourage the pursuit of epic meaning underscores the transformative potential of gamification in addressing societal challenges.[28]

Hence, by aligning gamification strategies with Caillois's patterns of play taxonomy and leveraging the motivational attributes identified by McGonigal, practitioners can create immersive and culturally relevant experiences that tackle issues within education, healthcare, agriculture, and beyond, empowering individuals and creating meaningful behavior change. Leveraging behavioral mechanisms through gamification enables practitioners to drive positive behavioral outcomes and promote social progress across communities.

26 Kapp (2012)
27 McGonigal (2011)
28 Ibid.

Practical applications of gamification

Knowledge: learning and teaching

Gamification has emerged as a promising strategy for enhancing knowledge and learning experiences across sectors such as education, healthcare, and insurance. It is not confined to a singular theory of learning or design model, but rather behaviorism, constructivism, experiential learning, and collaborative learning all offer diverse perspectives on the process of learning.[29] For example, a study conducted in Brazil in 2017 devised a framework for identifying students' gamification profiles, shedding light on the fundamental motivations driving engagement in gamified learning among the digital age generation.[30] This study revealed that motivation can differ for multiple players, and it is essential to identify these to create a more holistic learning model. Different learning theories, hence, should be integrated into the game design to accommodate the diverse ways people learn. Below are some examples of gamification being applied for learning and teaching in both classroom and non-classroom settings:

Classroom examples of gamified learning:

In the healthcare sector, gamification has been extensively used as a learning platform to recreate context-specific scenarios for training healthcare professionals. An example of such a platform is the 2020 study in Kenya, which employed a smartphone-based game to simulate emergency medical scenarios. The game evaluated the proficiency of healthcare professionals

29 Gamification in education
30 Freitas et al. (2017), Busara and CIAT (unpublished)

in managing such situations. The study additionally explored the effects of repeated gameplay on the participants' learning outcomes.[31]

Non-classroom examples of gamified learning:

In the insurance sector, gamification has been employed to simplify the technical terminology used in insurance practices, making it more accessible to consumers. For instance, researchers at UC Davis developed SimPastoralist, a game utilized in Northern Kenya to demonstrate the mechanics of livestock insurance. The game proved successful in enhancing the adoption of insurance products once introduced to the market.[32]

Similarly, gamification has been used to track and assess risk-based attitudes and creditworthiness. Kucheza, a Netherlands-based gaming company, has done this in Nigeria through a game called "FarmingForward," where participants engage in learning activities centered around far. Through simulations, players navigate agricultural ventures financed by credit funds, learning to manage resources and generate profits. This game presents an opportunity to understand and mitigate the present bias effect, wherein individuals tend to prioritize immediate, smaller rewards or loans over long-term future benefits.[33]

Alternatively, gamification has also been deployed to address existing social norms. Gamification strategies based on social norms aim to educate players on cooperation and financial management advantages and promote mindset shifts to adapt to evolving social contexts. For instance, "ChakraView," a simulation game developed in India, provided players with scenarios involving challenges like family illness and the high costs of weddings, common factors contributing to farmer debts and suicides in the country.[34] In this case,

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31 Tuti et al., (2020), Busara and CIAT (unpublished)
32 Busara and CIAT (unpublished)
33 Busara and CIAT (unpublished)
34 Neeti Solutions (2023), Busara and CIAT (unpublished)

gamification was used to simulate group dynamics, facilitating the formation of new beliefs and injunctive norms.

As seen above, gamification offers educators, development practitioners, and behavioral scientists a powerful tool for creating dynamic and compelling learning experiences. By leveraging game elements like personalized feedback, progress tracking, rewards systems, and motivational principles, gamified learning environments can inspire users, drive engagement, facilitate knowledge retention, and ultimately enhance learning outcomes.

Research: data collection

Gamification can be a powerful tool for research across different disciplines by engaging participants in data collection activities in a fun, interactive, and rewarding manner. Below are some ways gamification can be used for research purposes:

Gamified Surveys and Questionnaires: Traditional surveys and questionnaires can be gamified by incorporating elements such as progress bars, levels, social graphs, and rewards. Participants earn points or achievements for completing survey questions or providing insightful responses or can see what others in their community have done, encouraging active participation and increasing survey completion rates. This is explored in detail by Mavlanova-Triantoro, Gopal, and Benbunan-Fich (2017), who look at how data quality, such as data on an individual's personality, can be improved through gamification.[35]

Interactive Simulations and Scenarios: Gamified simulations and scenarios can be used to collect data on decision-making processes, behavior patterns, and problem-solving skills. Participants navigate virtual environments, making choices and facing consequences that provide researchers valuable

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35 Mavlanova-Triantoro, Gopal and Benbunan-Fich (2017)

insights into their attitudes, preferences, and decision-making strategies. For example, a study conducted in Laos in 2020 aimed to understand the gendered influences on decision-making concerning agricultural processes. The study presented men and women with different scenarios incorporating new farming practices and technologies and collected data on how each gender proceeded to make decisions.[36]

Mobile Apps and Games: Researchers can develop mobile apps and games that collect data passively or actively while users engage with the application or game. For example, fitness apps may collect data on users' exercise habits and health metrics, while educational games may assess participants' learning progress and cognitive skills.

Community Challenges and Competitions: Gamified challenges and competitions can be organized to encourage community participation and data collection. Participants compete against each other or work together to achieve collective goals, earning rewards or recognition for their contributions. This approach fosters a sense of community engagement and encourages data sharing and collaboration.

Virtual Laboratories and Experiments: Virtual laboratories and experiments can be gamified to engage participants in scientific research activities. By creating immersive and interactive virtual environments, researchers can conduct experiments, collect data, and analyze results in real time, allowing for more dynamic and engaging research experiences.

Citizen Science Initiatives: Gamification can be used to crowdsource data collection through citizen science initiatives, where members of the public contribute to scientific research projects. Participants can collect data on various phenomena, such as wildlife sightings, environmental changes, or

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36 Larson et al. (2020)

health trends, using gamified apps or platforms that provide instructions, feedback, and rewards. For example, Hernandez-Aguilera, Mauerman, and Osgood look at how to leverage farmer self-reporting (through data collection in the form of games) of weather events to calculate climate risks in insurance settings.[37]

Overall, gamification offers innovative and effective ways to collect data by engaging participants in meaningful activities while generating valuable insights for researchers. By incorporating game elements into data collection processes, researchers can increase participant engagement and data ownership, improve data quality, and advance our understanding of human behavior and social dynamics.

Product marketing: market research and segmentation

Gamification is further employed as a strategy for product marketing, offering organizations innovative ways to engage with consumers, build brand loyalty, and increase usage and uptake of products and programs.

Organizations can create interactive experiences that captivate audiences and differentiate their products in competitive markets by integrating game elements into marketing campaigns. One of the ways this is done is through interactive experiences such as contests, quizzes, and challenges. These activities entertain consumers and encourage them to participate and interact with the brand actively. For example, a healthcare company may launch a "Health Challenge" where participants compete to achieve specific healthcare goals using the organization's products or toolkits. Such challenges not only showcase the efficacy of the products but also foster a sense of community among participants, driving engagement and brand advocacy.

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37 Hernandez-Aguilera, Mauerman and Osgood (2020)

Players can be incentivized to emulate desired consumer behaviors, such as making purchases and sharing content within their reference networks or referrals. By offering rewards, badges, or points for completing these actions, companies can motivate consumers to take desired actions while reinforcing brand loyalty. For instance, an agriculture retailer may offer exclusive discounts or freebies to customers who complete specific tasks, such as referrals or sharing photos of themselves using the agriculture tool over social media (such as Facebook or WhatsApp).

Another use of gamification in product marketing is through storytelling. Organizations can create narrative-driven games or virtual experiences that allow consumers to explore the organization's story, values, and products in a fun and engaging way. For example, the game SimPastoralist used various outcome simulations to raise awareness about livestock insurance in rural communities in Northern Kenya.[38] A non-digital example is Steinke & van Etten's physical card game tested in Honduras, called "AgroDuos." The game aimed to understand farmer decision-making through a choice experiment model (card game) when it comes to plant breeding to help farmers make more optimal choices.[39]

38 Busara and CIAT (unpublished)
39 Steinke and van Etten (2017), Busara and CIAT (unpublished)

Adapting gamification elements to the Global South

It is essential to undertake a thoughtful design process to effectively implement gamification, especially when integrating gamification into socio-cultural and temporal contexts beyond the Global North. This approach is necessary to ensure heightened adoption rates and sustained engagement with gamified tools by local communities.

Tailoring gamification elements to fit the Global South context

Tailoring gamification elements to fit the context of the Global South necessitates considering the region's unique socio-cultural, economic, and infrastructural conditions. Below are examples of how gamification elements could be adapted to fit the Global South context.

Dynamics: To effectively implement gamified interventions, practitioners must establish clear objectives and priorities. These objectives serve as the foundation for the gamification process, guiding the identification of desired outcomes and key performance indicators.

During this process, cultural sensitivity is essential to ensure that the gamified elements are respectful and relevant to the target audience. Practitioners must conduct thorough research and engage with community stakeholders to gain insights into the cultural and social norms, traditions, and sensitivities that may impact the design and implementation of the gamified intervention.

This could include incorporating culturally relevant themes, symbols, and narratives into the game mechanics and components to enhance participant

engagement and immersion. Practitioners should further prioritize objectives that address the unique needs and challenges the target population faces within their socio-economic and cultural context. This may include promoting behaviors or attitudes valued within the community, such as environmental stewardship, health-seeking behavior, or community cohesion.

Mechanics: Once the objectives are defined, practitioners must delineate target behaviors essential for achieving these goals. This entails identifying specific actions or tasks that participants must undertake to support the intervention's overarching objectives (dynamic), whether a desired emotional response, a particular narrative, or a relationship. For instance, in a health promotion initiative, target behaviors may include adopting healthier lifestyles, seeking preventive healthcare services, or adhering to prescribed treatment regimens. Another example in the insurance context is understanding policy terms and conditions, regularly paying premiums, and promptly filing claims in the event of an insured loss.

In this context, practitioners need to comprehensively understand the characteristics, motivations, and goals of the players or participants who will engage with the gamified intervention. This involves understanding their demographics, cultural backgrounds, literacy levels, access to technology, and prevailing socio-economic conditions. By gaining insights into the target audience, practitioners can tailor the dynamics of the gamified experience to resonate with the needs and preferences of the specific context. Below are some examples:

Challenges: Introduce challenges relevant to the daily lives and experiences of participants in the Global South. For example, in an educational game promoting financial literacy, challenges could focus on budgeting skills or entrepreneurial activities commonly practiced in local communities.

Chance: Incorporate elements of randomness that reflect the uncertainties and unpredictabilities often faced by individuals in the Global South. For instance,

in a game addressing agricultural sustainability, random weather fluctuations or market price changes could simulate real-world challenges farmers face.

Cooperation: Emphasize the importance of collaboration by designing mechanics that require players to work together as a community to overcome obstacles or achieve objectives. For instance, it builds upon existing community events, social systems, and reference networks to drive behavioral change.

Incorporating unifying values like community values or family structures into the gaming elements of the tool can enhance its relatability and acceptance within communities.[40]

Components: Gamification components such as rewards (badges) and quests must reflect the existing social and economic conditions of the context. For example, Kapp highlights the importance of balancing difficulty levels to maintain learner engagement, ensuring that tasks are neither too easy nor too challenging.[41] This is especially important when working with low-income communities, where access to adequate and appropriate resources is scarce, and literacy levels might be low. Maintaining motivation becomes critical in ways that might not be replicable in higher-income and literacy communities.

Similarly, in regions with limited digital infrastructure, practitioners may opt for gamified interventions delivered through low-tech channels such as community gatherings, printed materials, or radio/TV broadcasts. Additionally, practitioners may need to adapt game mechanics and dynamics to accommodate variations in literacy and digital literacy levels. This could involve simplifying language, utilizing visual aids, or providing audio instructions to enhance accessibility and comprehension for diverse audiences. Moreover, cultural sensitivities and norms must be considered when designing game dynamics to ensure they align with local values and belief systems.

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40 Oliveira (2015)
41 Kapp (2012)

Distribution strategies should involve trusted authority figures such as village heads and farming groups to enhance the game's adoption further. Incentivizing game usage with rewards tailored to the specific location, value chain, and social conditions relevant to farmers can also bolster engagement.[42]

Through our collaboration with CIAT, we conducted KIIs with key game developers in East Africa to understand how they have adapted game components to fit local contexts.[43] Below are some key takeaways from their experiences:

Usiku Games and Leti Arts have highlighted several significant challenges in the gamification landscape. Firstly, a notable hurdle is the insufficient investment allocated to outreach efforts. This funding deficiency directly impacts the game's marketing, resulting in limited awareness among the target audience. Consequently, user engagement remains low, significantly diminishing the potential impact of the game.

Moreover, another major obstacle is the persistent issue of limited access to data. In regions with low data usage, games reliant on internet connectivity face significant barriers. Not only do these games struggle to function correctly, but collecting user data becomes a daunting task. As a result, games designed for research purposes or market segmentation initiatives encounter substantial setbacks due to the challenges posed by low internet connectivity. Organizations such as Kuza Biashara have offered portable WiFi technology in such limited data-accessible regions. East-West Seeds has explored offline gaming options over alternative platforms like radio broadcasts for audio games.

Additionally, the relatively low penetration of smartphones further complicates the possibilities of gamification. Gamification is restricted to those forms

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42 Oliveira (2015)
43 Busara and CIAT (unpublished)

compatible with feature phones or third-party tablets. To counter this, Usiku Games suggests that games accessible via USSD and feature phones are most suitable for farmers, particularly in regions with limited network connectivity and scarce internet access. Similarly, HTML5 progressive web applications, shared over WhatsApp or Telegram, are commonly utilized on smartphones, tablets, and PCs, which works in cases where downloading applications from a game store platform is not possible.

Games only accessed via play store (Google or Apple store) also present a barrier to access for farmers without email addresses. This is an issue faced by Leti Arts, who, when deploying the game "Hello Nurse" to train nurses on handling Malaria cases, encountered a problem with users not being able to download the game because they did not have Google accounts. Leti Arts trained users to create a Google account to counter this. They also provided the application's .apk file, android's standard application format, to the nurses, who could share it with their colleagues using "Xender, " which allows users to share apps without downloading.

> *"Our Client (USAID) expected that the game we were building could solve everything, forgetting the fact that the people we were targeting had an IT gap and were not tech savvy."* **- Leti Arts.**

Leti Arts further uploaded their application onto Gara Store, a play store developed for the African audience, which does not ask for an email address when signing up. Gara Store further allows users to use mobile money to buy applications on the platform rather than relying on a credit or debit card.

Implementing more complex simulations, which often require extensive training and are only compatible with third-party tablets, is also a hurdle in communities with lower literacy levels and limited smartphone access. Implementing such games necessitates field officers to conduct on-site training sessions for users, introducing complexities and logistical challenges that can hinder successful implementation efforts. For example, *Kuza Biashara* used

field agents to help farmers navigate their gamified platform. However, this is not always a sufficient solution. East West Seeds collaborated with Kucheza in Nigeria to introduce the "Farming Forward" game. This initiative aimed to enhance the role of smallholder farmers in the agricultural value chain by fostering an entrepreneurial mindset, enhancing financial literacy, and promoting collaboration among farmers. In this model, field trainers facilitated the game sessions, assisting farmers in navigating through the tablet-based interface. However, the initiative was not fruitful:

"We did a pilot with Kucheza (a Netherlands-based gaming company)… [it turns out] the game was too complex. Farmers needed help on how to navigate and play the game… We had to force the farmers to finish the game. I felt that this was too complicated. While it helped impart knowledge on financial planning and record keeping, there has to be a lighter way to do it. If we have to train farmers to play a game, then we could resort to our normal demo farm approach" **- East-West Seeds.**

Participatory game development

Besides adapting game elements to specific contexts, successful gamification involves understanding users' unique needs and preferences. Tailoring gamified experiences to align with participants' interests and learning styles enhances their relevance and effectiveness.

Hence, involving relevant stakeholders in participatory game development is crucial from the outset of the game design process. Game development should adopt an iterative approach, integrating context-sensitive design and taking into account social and cultural norms during the game's piloting phases.[44]

Upon game deployment, the platform should facilitate direct feedback and recommendation mechanisms, where participants and developers have an

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44 Haruna et al. (2019)

open line of communication. The gamified tool should feature options for user-driven improvements at no additional cost. For instance, there should be mechanisms to report errors in local languages. or on-the-ground support, such as field agents, should be available to train users on how to use the game effectively. This approach ensures sustained and appropriate usage of the game over time.[45]

Adapting gamification to specific contexts is essential for the successful implementation and longevity of gamified programs. As highlighted by Burke, conducting a thorough needs analysis is crucial to assess the suitability of gamification and grasp the potential extent of community engagement. Gamified solutions must be designed to align with users' existing objectives and are structured logically to maximize effectiveness. By prioritizing user goals over instructional design, gamification can be tailored to meet the unique needs of diverse populations, ultimately enhancing its impact and sustainability.[46]

45 Busara and CIAT (unpublished)
46 Burkey (2014)

Conclusion

Over the years, gamification has become an important tool for development practitioners and behavioral scientists. It offers a multifaceted approach to addressing complex challenges and fostering positive change. Gamification harnesses intrinsic game elements to drive engagement, learning, and behavior change among diverse communities. Through this strategic integration of game dynamics and mechanics, practitioners can design contextually relevant interventions, effectively promoting desirable behaviors and outcomes.

One of the critical strengths of gamification lies in its ability to tap into fundamental human desires and motivations, such as competition, achievement, and social interaction. By incorporating elements like challenges, rewards, and social features, practitioners can create immersive experiences that captivate and motivate participants. This engagement is crucial in development contexts where traditional approaches may struggle to resonate with culturally, economically, and infrastructurally diverse and disadvantaged communities.

Gamification offers a robust framework for addressing specific behavioral challenges within development projects. For example, in health interventions, gamified platforms can encourage adherence to medication regimens, promote healthy lifestyle choices, and facilitate patient education. By leveraging game mechanics like progress tracking, feedback, and social support, practitioners can empower individuals to take control of their health and well-being, ultimately leading to improved health outcomes.

Additionally, gamification enables practitioners to tailor interventions to the unique socio-cultural contexts of their communities. By understanding local norms, values, and preferences, practitioners can design gamified experiences that resonate with participants and foster meaningful behavior change. This localized approach enhances the relevance and effectiveness of interventions, ensuring that they are culturally sensitive and contextually appropriate.

Moreover, gamification offers a cost-effective and scalable solution for addressing development challenges on a large scale. Through digital platforms and mobile applications, practitioners can reach remote and marginalized communities, delivering interventions directly to those who need them most. This accessibility is particularly critical in regions with limited access to resources, such as traditional healthcare and educational systems, where gamified interventions can fill crucial gaps in service delivery.

Beyond its practical applications, gamification also holds promise as a research tool for studying human behavior and decision-making in real-world contexts. By analyzing data generated from gamified interventions, practitioners can gain insights into participant engagement, preferences, and outcomes, informing future program design and implementation. This iterative approach allows for continuous improvement and optimization of interventions based on empirical evidence and participant feedback, allowing participants greater data ownership.

Overall, gamification represents a transformative approach to development, offering innovative solutions to complex challenges and empowering individuals and communities to thrive. By harnessing the motivational power of gameplay and integrating it into interventions, practitioners can drive meaningful behavior change, promote positive outcomes, and ultimately contribute to the sustainable development of societies worldwide.

Despite the strides made in gamification, there remains a long road ahead. While theoretical frameworks and concepts serve their purpose, the need for real-world applications in the Global South is imperative to validate the ideas put forth in this Groundwork. As gamification undergoes further advancements and refinement, closely following its transformative potential in the Global South will be important and exciting.

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About Busara

Busara is a research and advisory organization, working with researchers and organizations to advance and apply behavioral science in pursuit of poverty alleviation. Busara pursues a future where global human development activities respond to people's lived experience; value knowledge generated in the context it is applied; and promote culturally appropriate and inclusive practices. To accomplish this, we practice and promote behavioral science in ways that center and value the perspectives of respondents; expand the practice of research where it is applied; and build networks, processes, and tools that increase the competence of practitioners and researchers.

About Busara Groundwork

Busara Groundwork lays the groundwork for future research and program design. As think pieces, they examine the current state of knowledge and what is needed to advance it, frame important issues with a behavioral perspective, or put forward background information on a specific context.

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