



Toward Linking Health Behaviors to In-Game Rewards Through A Cross-Platform Gamified Ecosystem

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A preventable burden

~75%

of deaths worldwide are linked to non-communicable diseases such as cardiovascular disease, diabetes and respiratory disease

World Health Organization, 2024

Largely preventable through sustained healthy behavior that supports our wellbeing:



Physical

Walking, running, exercise



Cognitive

Learning, problem solving, mental stimulation



Social

Connecting and doing activities with others

Why engagement fades

1

Digital health solutions such as mHealth apps can support these behaviors at scale

2

But engagement drops once the novelty wears off, and most users leave

3

Personalization and gamification help, however...

Entertainment games

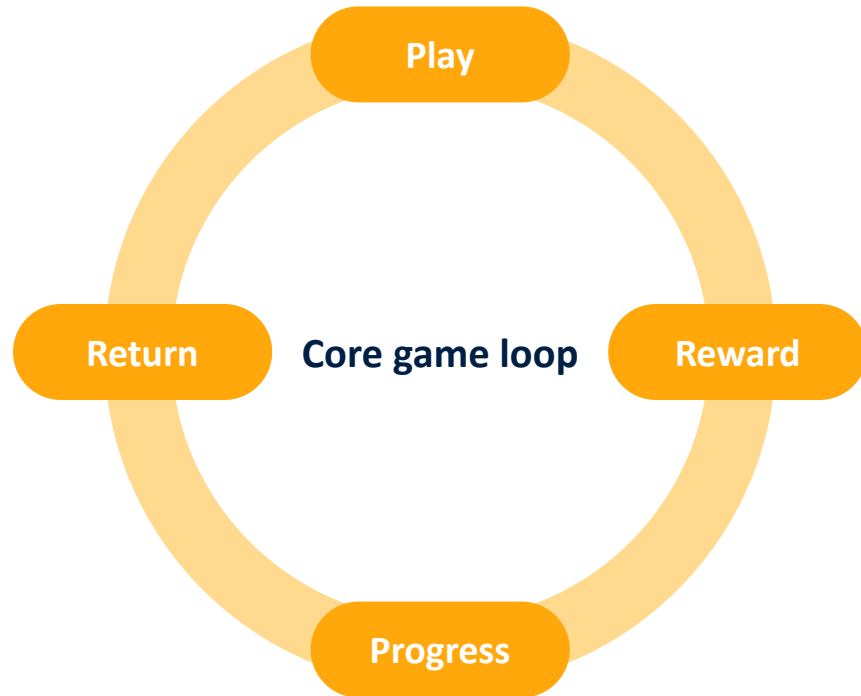
Mechanics, dynamics and aesthetics form one cohesive gameplay system. Players are intrinsically motivated to keep coming back.

Gamified mHealth apps

Points, badges and progress bars are added to health content. Engagement drops after the initial novelty effect.

Gamification borrows the elements of games, but not the gameplay that makes them engaging.

Designed to hook players



Mobile games are designed to be fun and habit-forming. Tight gameplay loops, progression, rewards and streaks keep millions of players coming back to games like Candy Crush Saga and Pokémon GO.

Dark patterns are one way to get there

Designs that exploit traits such as loss aversion, fear of missing out and social identity to keep players engaged and spending, often at the expense of their wellbeing.

Monetary

Paywalls,
microtransactions

Temporal

Streaks, timed events

Social

Guilds, invite-a-friend

Repurposing for good

Our novelty: research on dark patterns has focused on their harms. Using them for good, to promote real-world health behavior, has barely been explored.

Monetary

In games: Pay money to get past a paywall



For health: Micro-health transaction: “pay” with steps instead

Temporal

In games: Keep a login streak alive



For health: Keep a healthy-habit streak alive

Social

In games: Invite friends for in-game rewards



For health: Take on health challenges as a group

The catch: testing this needs real-world health tracking, which most game developers neither have nor want to build. **A shared platform can do that part.**

Health games exist, but...



Exergames

Built around movement, e.g.
Ring Fit Adventure



Location-based games

Walking is the gameplay, e.g.
Pokémon GO



Serious health games

Designed from the start to
promote health

However: there are very few examples of adding health and wellbeing activities to **popular commercial games people already play**. **That is our idea.**

First, we need to test it:

1 Track health activities

A platform that captures activities through sensors and apps people already use (Google Fit, Fitbit) or self-report



2 Build game prototypes

Games that turn those activities into in-game rewards



3 Test user perception

Would players want this? ← this study

The LudoHealth platform

Group

Physical Activity for Beginners

Level

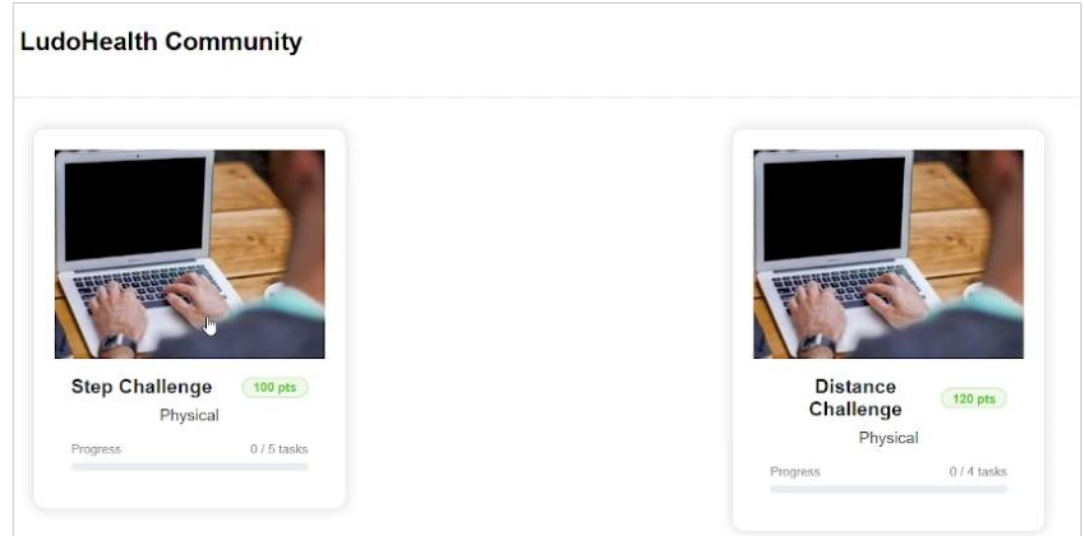
1 · Getting Started → 2 · Warming Up → 3 · Physical Challenge

Challenge

Walking Challenge · 100 points

Tasks

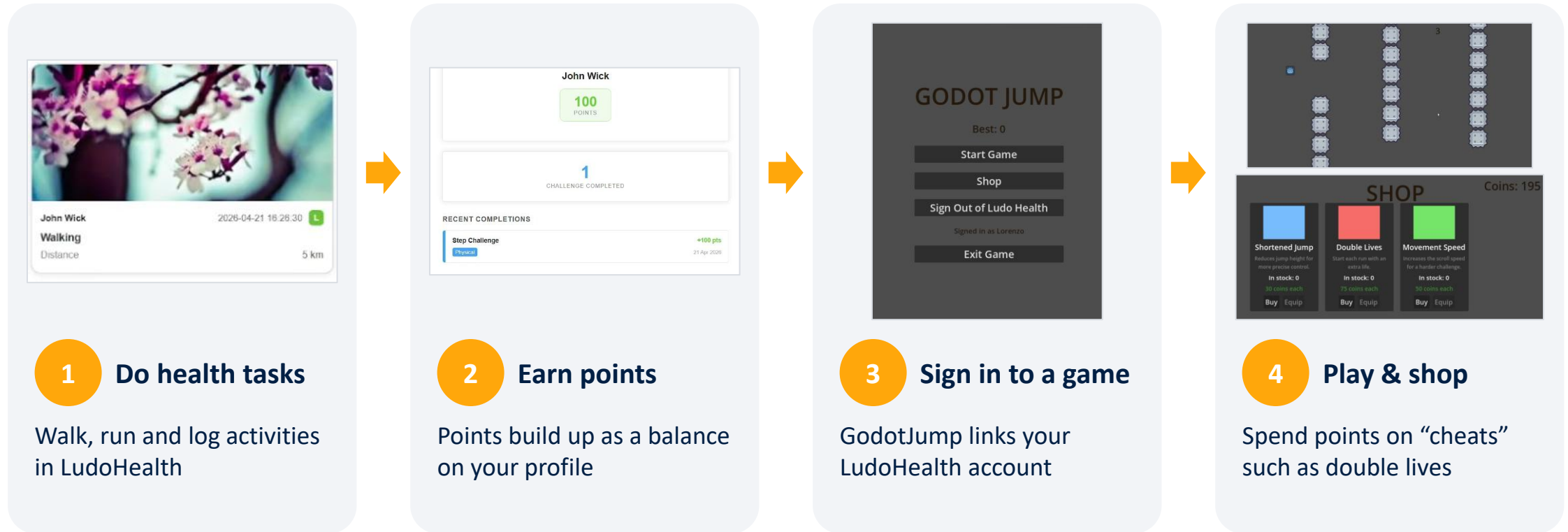
500 steps · 1,000 steps · 5,000 steps · 5 km walk



Prototype: challenges unlock level by level

Complete every task to earn the points; finish every challenge to unlock the next level. **Points form a persistent balance that any connected game can use.**

From steps to power-ups



Back to LudoHealth: each purchase is sent through one lightweight API call and the points are deducted. No engine plugin or per-game redesign needed.

User perception study

20

participants who play digital games
(convenience sample)

7-point

Likert scale, from strongly disagree to
strongly agree

10

constructs, compared pairwise with
Spearman's ρ

1

Explore

Concept video, plus optional hands-on use of LudoHealth and GodotJump

2

Rate

IMI: interest, value, effort, competence, autonomy, pressure.
TAM: perceived usefulness, behavioral intention. **Custom:**
incentive perception

3

Reflect

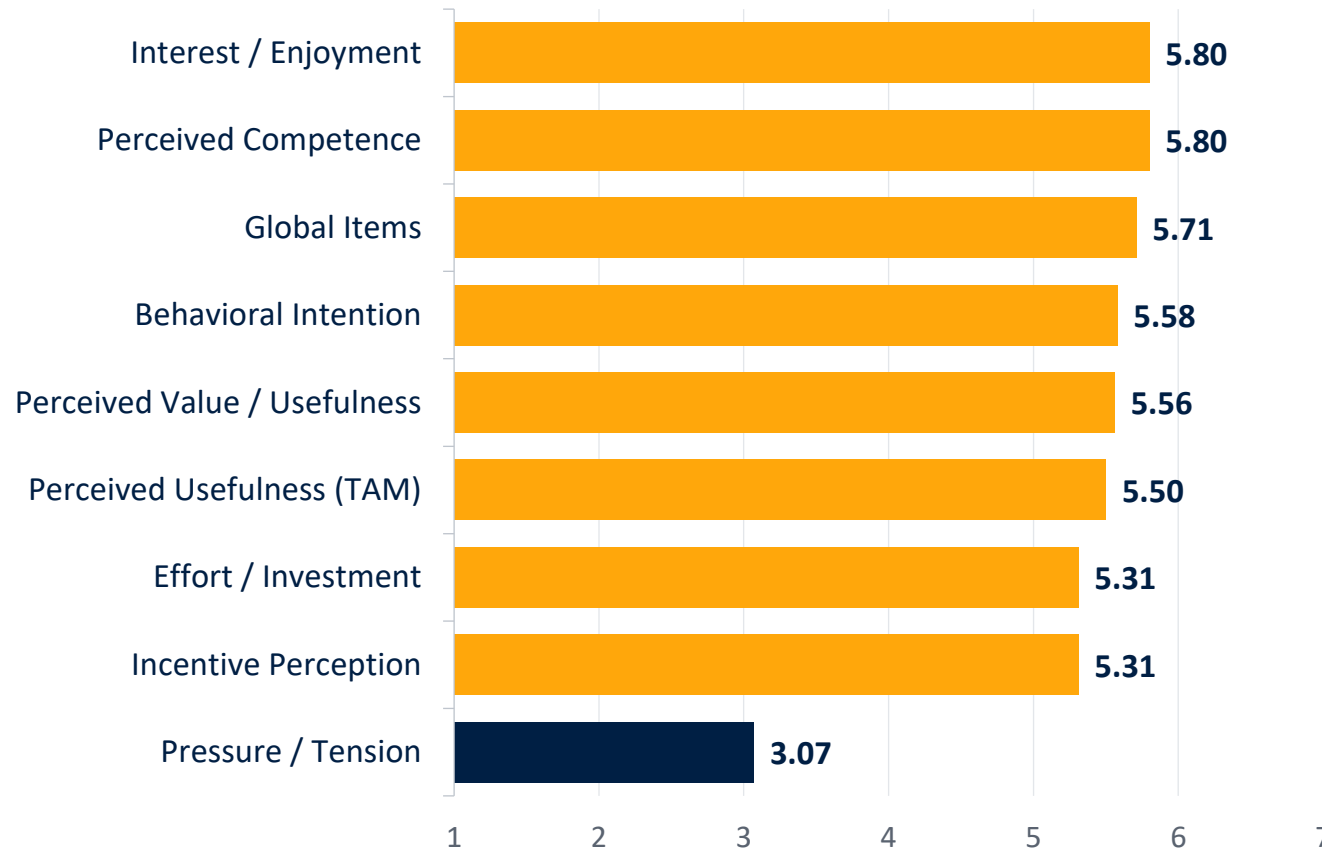
Open questions on impressions, then demographics

4

Analyse

Construct means; Shapiro-Wilk showed non-normal data →
Spearman correlations (Cohen thresholds, $p < .05$)

Positive, without pressure



Construct means on a 1–7 scale ($n = 20$); midpoint = 4

$$\rho = .889$$

Interest/Enjoyment $\leftrightarrow$ Behavioral Intention, the strongest link ($p < .001$)

34 of 45

construct pairs correlate significantly; motivation and intention move together

3.07

Pressure/Tension is below the midpoint and correlates with no other construct

Takeaways

What we learned

- Players found the concept enjoyable and useful, and said they would use it
- Interest goes hand in hand with intention to use ($\rho = .889$)
- **Low pressure:** explicit, transparent health goals may defuse the coercion usually tied to dark patterns

Limitations

- Small convenience sample ($n = 20$)
- Self-reported perceptions of a concept
- No behavioral data yet: intention is not sustained use

Next: is it feasible?

Perception is only a first step. Before any trials, we need small feasibility studies.



Real use

Do people actually use it, and do intentions turn into completed health activities?



Early health signals

Is there any first sign that the activities do something positive for health and wellbeing?



Warning signs

Any early unintended effects such as more gaming, pressure, or being active only for the rewards?

How: small studies with real users and proxies, user behavior simulations

The bigger question: is this a promising way to bring health into games?

Next: game developers

Players are interested. But how do we get from a promising concept to adoption in commercial games?



Incentives

Why would a studio add health-based rewards to its game?



Business viability

How does it fit existing business models, and who pays?



Integration

What does it take to integrate, and is a lightweight API enough?



Responsible design

Which repurposed patterns are acceptable? Together with ethics experts

How: interviews and workshops with game developers and ethics experts.

Questions?

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