Understanding the Dynamics of Trust in Location-Based Games as Hybrid Spaces: The Players' Perspective

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Abstract

Location-based games (LBGs) merge digital play with physical environments, creating hybrid spaces that require players to navigate complex trust dynamics. Despite their global popularity, LBGs introduce unique challenges around fairness, safety, and privacy, spanning interactions among players, game systems, local communities, and non-players in shared public spaces. To examine how trust is perceived, built, and sustained in these environments, we conducted in-depth interviews with 26 players of four major LBGs: Pokémon GO, Monster Hunter Now, Ingress, and Pikmin Bloom. Using reflexive thematic analysis, we identified dynamics of trust across four trustor–trustee relationships: player–system, player–player, player–community, and player–non-player in five key aspects: fair play, location privacy, online vetting, hybrid interaction, and public play. Drawing on our findings, we propose a trust model for analyzing and designing trust in LBGs as hybrid spaces, and we outline design implications aimed at strengthening trust building and sustaining trustworthy interactions across the LBG ecology.

CCS Concepts

• **Human-centered computing → Empirical studies in HCI**.

Keywords

Location-based Game, Trust, Hybrid Space, Reflexive Thematic Analysis

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1 Introduction

Location-based games (LBGs) are a type of multiplayer mobile game that uses the Global Positioning System (GPS) to embed digital play into the physical spaces that humans inhabit. LBGs effectively turn real-world environments into interactive game worlds by encouraging players to explore their physical surroundings and interact with others through physical co-presence and collaborative game tasks. Since their debut, LBGs (e.g., *Pokémon GO* [70], *Pikmin Bloom* [67], *Monster Hunter Now* [69], *Ingress* [68]) have accrued tens of millions of global players, and have had significant cultural and commercial impact [37, 88]. More importantly, LBGs exemplify *hybrid spaces* [18], where digital interactions and physical environments intertwine, increasingly mediating human–computer interaction (HCI) across digital–physical boundaries [20].

Playing games is an integral part of social life. Games foster interaction, cooperation, and shared experiences [62]. Yet despite their popularity, LBGs remain underexplored in terms of trust—an element that is essential to HCI [33]. While trust in hybrid work settings has gained considerable attention [40, 72], we know far less about trust in hybrid gameplay contexts, which include digital-physical interactions with strangers and location-based, dynamic outdoor mobility and social interactions [4, 21, 100]. Trust is expected to play a critical role in LBGs: it may shape players' willingness to engage in shared physical spaces with strangers, influence how they manage privacy when revealing personal data, and affect the cohesion of community coordination [4, 35, 39, 43].

However, the dynamics of trust have not yet been systematically investigated in LBGs. Unlike online digital games [5, 52, 83, 95], LBGs require players to negotiate trust simultaneously across intertwined digital and physical realms, thus warranting a dedicated investigation [19, 20]. Further, investigating trust in LBGs is essential for understanding the sociality of hybrid spaces [20] and for ensuring safe and sustainable participation. Given the multifaceted nature of trust [1, 65, 71], we adopted an exploratory approach [89] to gain an empirical understanding from LBG players' lived experiences. Specifically, we ask the research question: *How do players perceive and negotiate trust in LBGs as hybrid spaces?*

We conducted in-depth interviews with 26 players across four popular commercial LBGs: *Pokémon GO*, *Monster Hunter Now*, *Ingress*, and *Pikmin Bloom*. Through reflexive thematic analysis [9], we gained empirical insights into how players build and sustain trust across four trustor–trustee relationships: player ► system, player ► player, player ► community, and non-player ► player. Specifically, we revealed five key trust aspects and nuanced dynamics of trust in the LBG ecology, including fair play, location privacy, online vetting, hybrid interaction, and public play.

Our findings reveal the key role of player communities as digital-physical hybrid trust infrastructures. They mediate fairness, safety, and privacy across digital platforms (e.g., Discord, Facebook, Reddit) and physical interactions. Further, we surfaced a perspective that extends beyond the player as trustor: notably, how non-players perceive and respond to players in public spaces, often resulting in tensions around social presence and acceptability of hybrid gameplay in public. Based on these findings, we propose a trust model that maps multi-actor trust relationships in LBGs and outlines design implications.

In sum, the present research makes the following contributions:

- an empirical understanding of how LBG players build, negotiate, and sustain trust across multiple relational dimensions, including with the game system, other players, player communities, and non-players;
- a trust model for LBGs as hybrid spaces, capturing four trustor–trustee relationships that unfold across both physical and digital settings. The model shows how these relationships collectively shape key trust aspects, including fair play, location privacy, online vetting, hybrid interaction, and public play. It can be used as an analytical lens and design framework for future LBG research and development;
- four design implications for trustworthy LBG systems, including game behavior modeling for pairing and player reputation, supporting player awareness and control over location privacy, embedding community-led governance into hybrid moderation workflows, and enabling locally sensitive and socially aware gameplay.

2 Contextualize LBG probes: *Pokémon GO*, *Ingress*, *Monster Hunter Now*, and *Pikmin Bloom*

In this study, we focus on four mobile LBGs as research probes [7]: *Pokémon GO*, *Ingress*, *Monster Hunter Now*, and *Pikmin Bloom* (see Figure 1). The cross-game approach—selecting multiple games (usually three to five) from the LBG genre to examine shared characteristics—is established in LBG research and offers meaningful insight into genre-level dynamics [17, 23, 47]. Among LBGs, *Pokémon GO* has the largest player base [88] and serves as a widely used research probe for understanding social interactions [73, 96, 102]. To broaden this context, we included three additional popular LBGs (i.e., *Ingress*, *Monster Hunter Now*, and *Pikmin Bloom*). *Ingress* offers a strategy-driven gameplay with mature player community governance; *Monster Hunter Now* represents a fast-paced, combat-oriented LBG with rapidly expanding global communities; and *Pikmin Bloom* provides a casual, wellness-focused form of locative play.

To be clear, all four games share the core LBG mechanics: GPS-based mobility, hybrid online-offline interaction, multiplayer interaction, and active online communities on platforms such as Discord, WhatsApp, Telegram, and Campfire [66]. While they share the common nature of hybrid gameplay, they differ in aesthetic style, social focus, and intellectual property (IP). This leads to distinct player experiences [98] which may enrich our understanding of the trust dynamics. As trust dynamics are underexplored in LBGs, to take a first step, we use these four games as research probes to identify common trust dynamics and to open avenues for future studies engaging a wider range of LBGs. We contextualize the four games through the theory of the core gameplay loop [32], summarizing their primary mechanics below.

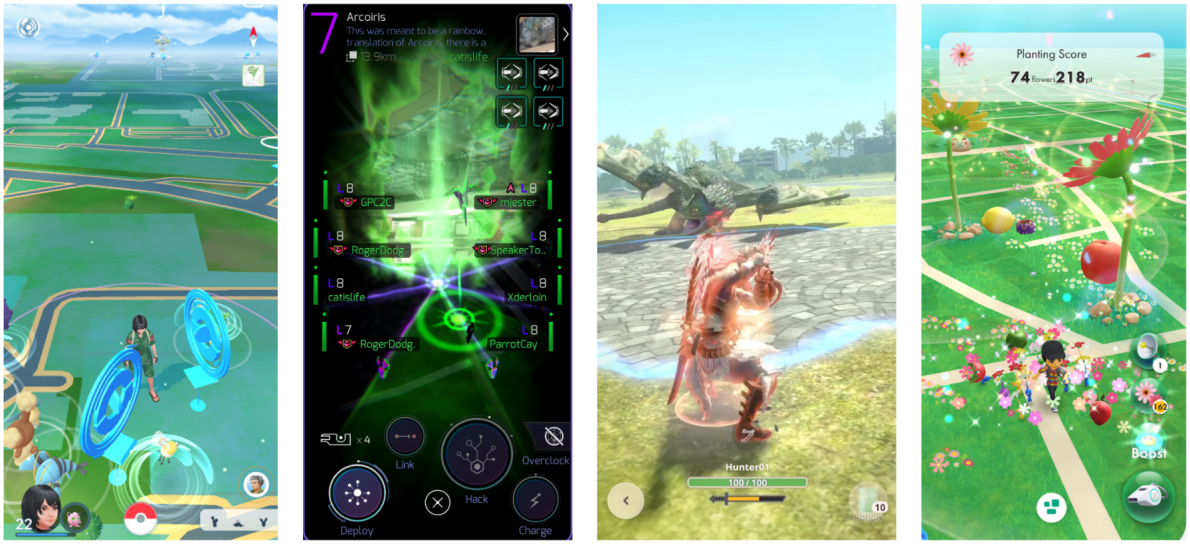
- *Pokémon GO* [70]: Built on the Pokémon IP, it centers on exploration and collection. Players capture Pokémon, evolve them, and engage in gym and raid battles that promote local, cooperative play [99].
- *Ingress* [68]: A strategic, team-based game where players join one of two factions to capture and link real-world "portals," fostering large-scale coordination and territorial control.
- *Monster Hunter Now* [69]: Combines Capcom's Monster Hunter IP with real-world exploration, emphasizing short, cooperative combat sessions against computer-controlled monsters and massive opponents.
- *Pikmin Bloom* [67]: Encourages walking and environmental engagement by growing Pikmin and planting digital flowers along players' routes, focusing on casual, aesthetic, and wellness-oriented play.

3 Background

In this section, we outline how our work builds on three key areas of related research: (1) LBGs as hybrid spaces, (2) trust in digital games and online communities, and (3) theoretical foundations of trust.

3.1 Location-Based Games as Hybrid Spaces

Having introduced the four LBGs examined in this study, we now situate them within the broader concept of hybrid spaces to highlight how their digital-physical nature shapes trust dynamics. Researchers have argued that hybrid spaces might challenge conventional understandings of trust in society, redefining how people interact and collaborate in these digital-physical interconnected environments [19]. LBGs are typical examples of hybrid spaces. Unlike traditional multiplayer digital games, which occur primarily in virtual environments, LBGs require players to navigate a blend of



(a) (b) (c) (d)

Figure 1: User interface for (a) *Pokémon GO*, (b) *Ingress*, (c) *Monster Hunter Now*, (d) *Pikmin Bloom*.

online coordination (e.g., through group chats on digital platforms like Discord) and attend in-person meetups [4]. This integration of online and offline interactions, combined with the use of real-world locations, introduces new layers of complexity to interpersonal trust dynamics.

Meanwhile, prior research has highlighted diverse trust concerns in LBGs. Beyond play among family and friends [45], LBGs often involve collaboration and co-presence among strangers [73], creating unique social and safety challenges. Bhattacharya et al. [4] examined group interactions in *Pokémon GO* and identified issues such as meeting unfamiliar players in person, risks of theft, travel to unsafe or unfamiliar locations, traffic hazards, and concerns about being outdoors after dark. Similarly, Blasiola et al. [6], in their study of *Ingress*, emphasized privacy and spatial disruption concerns, including inadvertent intrusion on non-players' spaces.

More recently, Duval et al. [25] explored how LBGs intersect with trust in crowdsourced data collection through participatory design. Related work on location-based services beyond the gaming context has also discussed trust-related topics such as privacy, safety, and ethics [15, 27, 34, 53, 56, 75, 84]. While existing research provides valuable theoretical insights, much of it lacks empirical understanding of the trust dynamics in LBGs [2]. Building on prior literature that proposed design guidelines for LBGs from ethical and social perspectives [39, 87], our study extends this line of work by explicitly introducing design implications grounded in the dynamics of trust.

3.2 Trust in Digital Games and Online Player Communities

Previous research in digital games and online communities has explored how trust emerges from collaboration, communication, and shared goals in virtual environments [29, 52, 95, 97]. In online multiplayer games, repeated co-play and dependable behavior build interpersonal trust, even among strangers [95, 97]. These dynamics are especially evident in guild-based structures or team settings, where long-term social ties and norms support cooperative play. Trust in player communities has also been studied in relation to community moderation, platform governance, and fairness enforcement [5, 38, 83]. Features such as player reporting, reputation systems, and moderator interventions can help maintain a sense of fairness and safety in digital gaming [74]. However, LBGs embed gameplay in hybrid spaces that span both online and offline interactions. Players coordinate in digital group chats and subsequently meet in physical locations, blurring the line between virtual presence and real-world embodiment.

Understanding trust in LBGs thus requires moving beyond a purely digital gaming lens and considering LBGs as sociotechnical systems that unfold across physical and digital spaces. In other words, trust might become not only a technical or interpersonal concern but a spatially and socially situated process. Similar dynamics have been observed outside gaming. For example, on hospitality platforms like Couchsurfing, users rely on online profiles, reviews, and messaging to establish a sense of familiarity and credibility before transitioning to offline interactions [90]. Similarly, in ad hoc travel groups, online communication has been shown to support trust-building among temporary companions who coordinate shared itineraries or activities [103]. In both cases, digital interactions help lay the groundwork for offline cooperation in contexts where participants often start as strangers.

While LBGs share this hybrid dynamic, blending online coordination with in-person engagement, they differ in important ways. Unlike travel or hospitality scenarios, which are typically episodic, goal-oriented, and time-bounded, LBGs foster ongoing, location-dependent, and community-sustained relationships. Players may repeatedly interact in the same neighborhoods, forming persistent local networks where trust builds over time through repeated

encounters, community moderation, and collective enforcement of norms. In this sense, LBGs offer a more durable and recursive context through players' long-term co-presence in hybrid spaces.

3.3 Theoretical Foundations of Trust

Trust is a broad topic. To scope our analysis of trust in LBGs, we outline key theoretical models that inform our understanding of trust relationships in socio-technical systems [78]. Trust has long been studied across disciplines and shared common understandings of the theoretical foundations [81], including economics, psychology, sociology, and HCI. This work draws on these foundational theories to inform the investigation of trust in LBGs from an HCI perspective.

Mayer et al. [58] define trust as *"the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party."* This trust theory reveals three core perceived trustworthiness factors: ability, integrity, and benevolence, which have been central in evaluating trust across interpersonal and organizational settings. Building on this foundation, subsequent work has extended trust theory into various domains. Interpersonal trust [80] typically refers to trust between individuals and is often based on repeated interaction and personal evaluation of trustworthiness [1, 58, 79].

Additionally, dispositional trust has been recognized as an individual's generalized tendency to trust others, independent of specific contexts or actors [60]. Another relevant stream of literature is team trust, which highlights how trust emerges in groups that collaborate toward a common goal. Breuer et al. [10] emphasize that team trust is built through coordinated action, shared goals, and mutual support—dynamics that resonate with collaborative play in LBGs, especially when players gather in physical space and rely on each other for safety or success. Institutional trust refers to an individual's belief that an organization or system (e.g., a platform, game company, or governing body) will act competently and ethically in upholding norms and responsibilities [79].

Many of these theories converge on the notion of trust as a risk-taking behavior in conditions of uncertainty [58, 65]. In this vein, the trustor–trustee relationship is central: the trustor is the one who takes a risk, while the trustee is the one being trusted to act appropriately. This trustor–trustee relationship provides a useful lens for analyzing trust relationships in the LBG context. However, traditional applications of the trust model often assume the separation of online and physical environments [10], which differ markedly from the hybrid of digital-physical settings of LBGs. Hence, our work aims to critically apply prior trust models to this novel context, with the goal of validating, extending, or rethinking them in light of hybrid space dynamics.

4 Method

To understand the trust perceptions among LBG players, we conducted in-depth, semi-structured interviews. In total, we recorded approximately 1,030 minutes of audio, which were transcribed with Zoom's automatic captions and then manually corrected. To analyze the data, we used reflexive thematic analysis [9] mediated by the software MAXQDA 24[1] to code the data, tease out themes, and *commonalities* among our participants. This resulted in five themes presented in a summary table (See Table 2). In this section, we will describe our method in detail.

4.1 Participants

After obtaining Institutional Review Board (IRB) approval, we posted participant recruitment posts via social media platforms, including Reddit and Instagram, targeting participants who were actively playing LBGs. The recruitment post briefly described the study's objectives and included a screening survey that collected demographic information and LBG play history (i.e., the specific games they were playing, frequency of play, and length of engagement). To be eligible, participants had to be 18 years or older, be actively playing at least one of the four focal LBGs, and be proficient in English to participate in the interview.

Given the qualitative nature of our study, our goal was not to produce generalizable claims about the large LBG player population, but rather to capture a diverse range of experiences in order to begin a stepwise approach to generalizability in future studies. Accordingly, we first employed convenience sampling [28], recruiting participants on a first-come, first-served basis. We also used purposive sampling [28] to intentionally include players from different demographic backgrounds [51, 86] and play contexts. We began data analysis in parallel to interview sessions, concluding recruitment when data saturation was reached—that is, when no new themes emerged from subsequent interviews.

In total, we interviewed 26 participants (12 women, 12 men, and 2 non-binary), ranging in age from 22 to 67 and from 6 countries. Participants were playing one or more of the following LBGs: *Pokémon GO*, *Ingress*, *Monster Hunter Now*, and *Pikmin Bloom*. Ten participants were engaging with multiple games, providing valuable insights into cross-game commonalities and nuances that further enrich our analysis. The player distribution broadly reflects the real-world dominance of *Pokémon GO* in the LBG market [61]. All participants had played LBGs for at least one year, and the majority (20 of 26) reported daily engagement. A summary of participant demographics is presented in Table 1. To protect participants' privacy, all names used in this paper are pseudonyms.

4.2 Interviews

We used an in-depth semi-structured interview format [11], which enabled open-ended yet guided conversations about participants' perceptions of trust in LBGs. All 26 interviews were conducted by the first author via Zoom, with audio recorded for transcription. We also took notes during each interview to support later analysis. During the interviews, the researcher encouraged the participants to elaborate through follow-up questions such as "Why?" to clarify reasoning and "How?" or "What?" to elicit specific examples. For example, if a participant mentioned feeling uneasy about meeting another player in person for the first time, a follow-up question would be, "Can you share an example?" and "Why did you decide to take that risk?"

The interview questions were centered on three core categories: (1) How trust was built during gameplay, for example, what it was

[1] https://www.maxqda.com/new-maxqda-24

Table 1: Summary of interview participants' demographic information and their engagement with LBGs

Pseudonym	Gender	Age	LBGs Played	Country	Years of Play	Play Frequency
Alice	Woman	47	PoGo	USA	>3	Daily
Will	Man	34	Ingress	USA	>3	Daily
Kate	Woman	31	PoGo, MHN, Pikmin Bloom	UK	>3	Daily
Amy	Woman	47	PoGo	USA	>3	Daily
Kelly	Woman	65	PoGo, Pikmin Bloom	USA	>3	Daily
Dan	Man	39	PoGo	USA	>3	Daily
Gary	Man	33	PoGo, MHN, Ingress	USA	>3	Daily
Tony	Man	22	Ingress	Austria	>3	4–6 days/week
Sarah	Woman	44	PoGo	Germany	1–2	Daily
Gina	Woman	38	PoGo	Canada	>3	Daily
Rita	Non-binary	24	PoGo	Germany	>3	Once a week
Jim	Man	33	PoGo	UK	>3	Daily
Emma	Woman	39	PoGo	Germany	>3	Daily
Joan	Woman	65	PoGo	USA	>3	Daily
Anna	Woman	28	PoGo, Pikmin Bloom	Spain	>3	Daily
Mike	Man	28	PoGo	USA	>3	Daily
Simon	Non-binary	29	PoGo, MHN	USA	>3	4–6 days/week
Mark	Man	67	PoGo	UK	>3	Daily
Julia	Woman	28	PoGo	USA	>3	4–6 days/week
Emily	Woman	32	PoGo, MHN	Canada	>3	Daily
Frank	Man	38	Ingress	Germany	>3	Daily
Erik	Man	38	PoGo, MHN, Ingress	Canada	>3	Daily
Bob	Man	36	Ingress, Pikmin Bloom	Canada	>3	4–6 days/week
Jack	Man	47	PoGo, Ingress	USA	>3	2–3 days/week
Lucy	Woman	39	PoGo, Pikmin Bloom	USA	>3	Daily
Gat	Man	30	PoGo	USA	>3	Daily

Note: PoGo = Pokémon Go; MHN = Monster Hunter Now; LBGs = Location-Based Games.

like to encounter or cooperate with strangers and what factors shaped their sense of trust or distrust, (2) How trust was sustained over time, including frictions or challenges that arose and how they managed these situations, and (3) Any memorable moments, positive or negative, that stood out as shaping their sense of trust in LBGs. Refer to Appendix A for the list of interview questions. Importantly, we did not impose a fixed scope of trust aspects to bias participants; instead, we invited participants to reflect on their behaviors and interpretations of trust as it related to gameplay in LBGs.

In this way, we were able to surface participants' own lived experience, and later situate these perspectives within existing theoretical frameworks from HCI and trust literature, highlighting areas of alignment as well as points of divergence. We also informed participants with experience in multiple LBGs to primarily focus on the commonalities across games, and to specify the game name when sharing game-specific experiences. Each interview lasted approximately 60 minutes. Participants received a $30 digital Amazon gift card as compensation for their time.

4.3 Data Analysis

We conducted an RTA following Braun and Clarke's six-phase framework [9], which has been widely used in game research [49, 91, 92]. This approach emphasizes the active and interpretive role of the researcher, treating coding and theme development as recursive, reflective processes rather than mechanical procedures. Our analysis was informed by established theories and models, particularly the three factors of perceived trustworthiness [58] and the analytic lens of trustor–trustee pairs [10]. Rather than treating these as a fixed set of codes, we used them as conceptual lenses to inform our interpretation of participants' lived experiences. To balance theoretical grounding with openness to novel insights, we employed a hybrid deductive–inductive coding strategy [77]. In practice, we began with preliminary codes (`ability, integrity, benevolence, trustor, trustee`) informed by prior trust literature, and expanded or contextualized them with inductive codes identified in the data.

The first author led the coding and iteratively developed preliminary themes. The second and last authors actively engaged in reviewing subsets of the data, refining themes, and critically discussing and merging interpretations. Consistent with the principles of reflexive thematic analysis of Braun et al. [9], we did not calculate inter-rater reliability (IRR). Our primary goal was not to reach coding consensus but to generate rich, reflexive interpretations through collaborative engagement and iterative reflection that can be built on by future researchers. Through these collaborative discussions, we integrated a top-down, theory-driven approach with

a bottom-up, data-driven approach to construct a nuanced understanding of trust in this context. We present the detailed analytic process below.

4.3.1 Familiarization with the Data. The first author familiarized the data by reading all interview transcripts while taking analytic memos. This phase focused on developing a holistic sense of the content and identifying early patterns related to trust, such as system reliability, safety, and social coordination.

4.3.2 Generating Initial Codes. Initial coding was conducted in MAXQDA 24 using line-by-line *in vivo* coding to stay close to participants' language. Following the hybrid deductive–inductive approach described above, the first author generated preliminary codes that were informed by theory and grounded in data. Deductive coding was guided by two complementary theoretical lenses: (1) the trustor–trustee pair framework [10], which provided a structural lens to identify the directionality of trust relationships (e.g., player–player, player–system); and (2) the three factors of perceived trustworthiness (ability, integrity, and benevolence) [58], which support us interpreting participants' accounts of trust. These theoretical constructs were not applied prescriptively but were critically examined against the data to assess their relevance in this context. Through this process, we identified new inductive codes to complement the established framework. For example, participants' concerns about delayed or missing system feedback led to the identification of "responsiveness" as an additional factor of perceived trustworthiness in LBGs.

4.3.3 Constructing Initial Themes. The first and second authors revisited the data and analytic memos to ensure coherence within themes, as well as distinction between them. In the second coding cycle, the first author applied *pattern coding* to group related codes into broader conceptual categories. For example, codes like "reporting fatigue," "distrust in system detection," and "long response times" were clustered into a candidate theme concerning institutional trust regarding game fairness. Similarly, codes referencing local player coordination, online vetting, and community rule enforcement informed themes around community-based trust.

During collaborative discussions among the three authors, we resolved any disagreements through data-grounded discussions. For instance, we discussed whether players' frustration with the persistent presence of spoofing players reflected institutional distrust (toward the malfunctioning game system) or community trust (reliance on fellow players to report and remove rule-breakers). By revisiting relevant excerpts and comparing analytic memos, we reached a consensus on the dynamic interplay between these two forms of trust. Rather than treating them as separate categories, this analytic exchange led us to conceptualize institutional and community trust as interdependent dimensions within our coding scheme.

4.3.4 Reviewing Themes. All themes were collaboratively reviewed by the research team in weekly meetings. The first, second, and last authors discussed the developing themes to ensure coherence within and distinction between them. This iterative process involved merging overlapping themes and refining conceptual boundaries. For instance, we discussed and agreed that player–player trust themes refer to trust dynamics at the individual level between specific players, such as when players decide to play together or share location information; while player–community trust themes capture collective trust dynamics that emerge within larger groups, such as community coordination, shared rule enforcement, and collective knowledge-sharing.

4.3.5 Defining and Naming Themes. Themes were further refined to capture not only descriptive patterns but also the underlying relational and structural dynamics of trust. For example, we merged two preliminary themes: *Players Conducted Prior Online Interaction Before Meeting* and *Players Met Without Prior Interaction* into a broader theme, *Risk Taking and Managing Behaviors about Location Exposure Among Players*.

4.3.6 Producing the Report. In Section 5, we report these themes as subsection titles, each used to structure our analysis of the nuanced trust dynamics surfaced through participants' lived experiences.

5 Findings

This section presents five interrelated themes (Table 2) as subsection titles. These themes capture the dynamics of trust in LBGs across both digital and physical spaces, spanning multiple trustor–trustee relationships (e.g., player-game system, player-player, player-player community, and non-player-player). Together, the themes illustrate how trust in LBGs is multi-dimensional, manifesting in issues including fair play enforcement, location privacy, interactions with unfamiliar players, sustaining long-term trust, and navigating tensions with non-players in shared spaces. To note that, findings reflect the commonality among LBGs, rather than being tied to a single game. Only when game-specific dynamics emerged (e.g., private zone in *Pikmin Bloom*), we highlight them explicitly.

5.1 Players Shift Institutional Trust from the Game System to the Player Community on Fair Play Enforcement

5.1.1 Loss of Trust in the Game System's Rule Enforcement. In general, participants valued fair play in LBGs but distrusted the game system in enforcing the rules. To promote fair play, LBGs define rules[2] that forbid location spoofing and maintaining multiple accounts, and promise to ban rule-breakers. Despite these guidelines, many participants (20/26) still noticed rule breakers. To keep fairness, participants attempted to report them through the in-game support system. Unfortunately, none of them received a response from the game system, and they continued to see those rule-breakers actively participating in LBGs:

> *I did report this player many times. But I haven't heard anything back after a year till now. It is like a monologue... Others told me that reporting is just wasting my time, very pointless. (Rita)*

In addition to their disappointment with the game system's poor *responsiveness*, players began to doubt the game system's *integrity* in enforcing rules, and its *benevolence* to act in the interest of fair play. Mike, for example, expressed frustration with the lack of follow-through after repeated reports:

[2]Game rules and guidelines are listed on game websites. For instance, for *Pokémon GO*: https://niantic.helpshift.com/hc/en/6-pokemon-go/faq/1797-niantic-player-guidelines/

Table 2: Summary of themes, subthemes, and trustor–trustee relationships.

Theme (T)	Subtheme	Trustor-trustee Pairs
T1: FairPlay Players shift institutional trust from the game system to the player community on fair-play enforcement	**T1.1** Loss of trust in the game system's rule enforcement	Player ▶ Game system
	T1.2 The player community steps up to enforce fair play	Player ▶ Community
T2: LocationPrivacy Risk taking and managing behaviors about location exposure among players	—	Player ▶ Game system Player ▶ Player
T3: OnlineVetting Players establish trust with other players through online vetting and initial interaction	—	Player ▶ Player Player ▶ Community
T4: HybridInteraction Players sustain trust through in-person co-presence and online coordination	**T4.1** Co-presence and the embodied practice of trust	Player ▶ Player
	T4.2 Online communication for coordination and knowledge crowd-sourcing	Player ▶ Community
T5: PublicPlay Tension between players and non-players in shared space	—	Non-player ▶ Player

> *Rule breakers are still around, so I doubt the game just doesn't mind if someone is cheating? And they don't even bother to do a thing for us players who care about fairness. (Mike)*

Some participants also questioned the game system's *ability* to enforce rules effectively. This concern stemmed from the nature of hybrid-space gameplay in LBGs, which occurs across both digital and physical spaces. In other words, they believed the game system could not effectively monitor these hybrid-space activities as a remote system. Amy explained:

> *I just don't think it (the game system) can detect spoofing and multiple accounts effectively. It is unlike online video games, where cheating behaviors can be easily monitored in the digital environment. I feel the game system is unable to really see, catch, or confirm whether someone is cheating or not. Because the game needs to be really watched in person, like following the players to check whether they are using multiple devices or spoofing other locations. You know, some spoofing apps are just so smart, they can fake a normal walking speed on the map. (Amy)*

Although participants initially expected that rule enforcement should be the responsibility of the game system—forming an institutional trust relationship in which the game system acts as the *trustee* and the player as the *trustor*—they perceived the game system as lacking trustworthiness across responsiveness, integrity, benevolence, and ability.

5.1.2 The Player Community Step Up to Enforce Fair Play. Over time, participants realized their player community tends to be more trustworthy in ensuring fair play, and thus spontaneously form the *trustor-trustee* relationship between the player and the player community. In our context, player communities refer to localized groups of players who are geographically proximate and stay connected through online group chats (e.g., Discord, WhatsApp), where most game-related coordination and communication take place. Participants introduced that the size of player communities usually ranges from 20 to 50 players, and can go up to 200 people in more populated areas. Many participants (18/26) transformed their reporting behavior from the in-game reporting system to local group chats. Our participants often highlighted the quick *responsiveness* of the player community with one example being:

> *I reported something or someone in our Discord, and other members responded and discussed the case right away. Once, I suspected a player might be holding three accounts because they had very similar game handles. I asked in the Discord if anyone knew who it was. Since we often play together, some people, usually moderators, could match Discord usernames with game handles. Very soon, we identified the person and warned him to stop or he would be removed from the group. (Dan)*

This kind of collective and fast responsiveness reflects how rule enforcement in the player community which often coordinated by moderators in group chats. Each community has one or a few moderators, who are players who volunteer to take the leadership roles of the community. Gary, a moderator, shared his experience:

> *Once other players notice someone might be breaking the rules, they report it in the chat and ping me. I try to handle it as soon as I see the message. We look for the player together, see if this person is in the chat, and I will also observe their gameplay. For example, if I confirm they're spoofing, I remove them from the group and announce their game handles so we avoid playing with these players. (Gary)*

Moderators like Gary, who were deeply embedded in their communities and engaged with players both online and offline, were well-positioned to verify suspicious behavior. Moderators can take swift action by removing rule-breakers from local group chats,

thereby limiting their access to information and excluding them from organized play. Even if the game system does not ban rule-breakers' accounts, players believed this social exclusion (i.e., not being able to attend group play events) was a powerful consequence. In this way, players perceived trustworthiness, including *integrity*—valuing the rules and enforcing them, and in community members', especially the moderators' *benevolence*—their willingness to take on the extra responsibility of supporting fair play. However, the community's *ability* remains limited, as it lacks the institutional authority to impose in-game penalties:

> *I believe the players in my community care a lot about the rules, and we do work hard to enforce them. Especially our moderators. They don't have to do all these extra things, but they still volunteer to handle rule-breaking cases. However, the best we can do is remove someone from our group chat if they joined before. That is useful but still limited in action. I mean, their game accounts are still there. (Will)*

While participants found the player community trustworthy in managing fair play, its enforcement ability remained complementary rather than a substitute for the game system.

5.2 Risk Taking and Managing Behaviors about Location Exposure Among Players

LBGs continuously track players' real-world locations as part of gameplay. Overall, participants expressed trust that the game system would adhere to its stated data privacy policies. As Frank explained:

> *I trust the game will protect our data as promised. I only allow it to use my location while I'm playing. Many apps on my phone knows my location these days, I guess it is fine. (Frank)*

However, locative play creates a unique risk of exposing one's physical whereabouts to other players:

> *LBGs are a paradise for stalkers. Every trace you leave on the game map becomes a clue: they can start to guess where you live and when you might show up somewhere. It can be really scary. (Anna)*

Like Anna said, LBG players' activities in the game map can leave "*traces*" and be seen by other players through location-tagged item exchange and active logs.

Because in-person gameplay is a central part of LBGs, it is often easy to match a player's in-game username with their real-world identity. In other words, location exposure in LBGs is rarely anonymous. Furthermore, LBG players often engage with the game as part of their daily routines: most participants (24/26) reported frequently visiting in-game landmarks located near their homes or workplaces—places they considered to be "sensitive locations" (Nathan). As a result, the traces that players leave on the game map can allow others to infer their real-world daily routines and identify sensitive locations, such as their home or workplace. Emily recalled a disturbing incident in her local group chat where a player tried to publicly guess another player's home address based on game activity:

> *Someone in our group chat put it through other players' handles and tried to basically tell everyone, hey, guess where this person lives, and then try to ask people to approve that. Obviously, people aren't gonna respond to that, and this person was kicked out, but the fact that they've put another person's home address is too scary. (Emily)*

Similarly, Simon acknowledged how his workplace could be inferred by unfamiliar players from his frequent use of a landmark at the workplace:

> *It is always in the back of my mind. I have a stop in Pokémon GO, and it is reachable from my desk at work. I will, very frequently, send everybody gifts from that stop, so I can gain more rewards. Multiple days in a row, I think, wow, if other players ever find this stop, they'll figure out pretty quickly this is where I work because it's the only office building near the stop. (Simon)*

Including Simon, many participants (19/26) said they were actually unfamiliar with their "in-game friends" in real life, and thus, location exposure could be disturbing. Yet despite the location exposure risk, players continued to engage in gameplay that reveals real-world routines and locations. Sarah explained that her willingness to take this risk stemmed from the belief that the potential for social connection and in-game progress outweighed the perceived dangers:

> *I am aware it can be risky to let other players, especially most are strangers to me, know where I am and which places I frequently visit. But I guess I tend to believe they are good people, as nothing too bad has happened till now. Playing together with other players is helping me level up, so I am okay with taking the risk. (Sarah)*

Although participants generally accepted this trade-off as a necessary part of LBG gameplay, it did not mean their concerns disappeared. Beneath this apparent tolerance for risk, all participants expressed a need to mitigate the tension between location-based gameplay and location privacy. Five participants who play *Pikmin Bloom* appreciated the "private zone" design in the game: players can choose customizable areas on the game map where their movement is automatically concealed by other players. However, no more game features are reported by participants designed to protect location privacy. Instead, a few participants adopted self-regulatory strategies to manage the risks. Anna, for instance, avoided forming predictable patterns:

> *I consciously avoid a routine so it is impossible (for others) to understand my movement patterns. (Anna)*

Rita modified how she sent location-tagged items:

> *I try not to send gifts from around my home. If I really want to, I only send them to people I know well in real life or people far away, like international players, so there's no threat as they are very far away from me. (Rita)*

In this context, trust operated as a form of social infrastructure—informal, relational, and co-constructed—through which players (as *trustors*) navigated the tension between game participation and location privacy by relying on other players (as *trustees*). This trust

relationship enabled continued engagement in gameplay, despite the system's limited structural protections for location-related vulnerabilities.

5.3 Players Establish Trust with Other Players Through Online Vetting and Initial Interaction

The collocated multi-player mechanism results in players gathering in groups to gain specific goals in the game (e.g., complete EX raid battles in *Pokémon GO*). Players often coordinated meet-ups in online group chats and gathered at real-world locations for the planned game events. However, assembling a group of pre-acquainted players is not always possible. Many participants (19/26) stated they play with "new faces" (Alice), whom they had not previously met in the real world.

For instance, for Alice and Emma, being in the same group chat is not enough for them to establish trust to meet strangers in real life. Alice shared that she had to chat with them and transfer them from strangers to acquaintances before their real-world meet-ups:

> *I am wary of strangers. If someone I had not played with before invited me to play together, I'd be like, Oh, hey, if we want to meet up in real life, we at least talk a bit online first. We have to introduce ourselves. I at least have to know you are not a weird or dangerous person. If we became online friends before meeting in real life is the best situation. I feel more comfortable meeting them. (Alice)*

Similarly, Emma emphasized the importance of knowing the person before real-world meet-ups and shared her rule:

> *I suggest a photo exchange with the person after a brief chat, and I will look at their photo. I have a rule: if I couldn't fight you or run away from you, I'm not meeting you by myself. I just do not want to put myself at any risk, you know, being a single woman, I need to be careful to protect myself. (Emma)*

This online vetting behavior is evidenced by many participants (16/26) when they coordinate with other players for meet-ups. And to some participants (7/26), the size of meet-up groups matters. They feel safer in larger groups than in one-on-one meet-ups with a new face. For instance, Gina said:

> *I just say no to all one-on-one invitations from people I have never met before. Unless I have a group of people with me, 6 or 7 would be the best. (Gina)*

Additionally, most participants (23/26) mentioned they tend to plan meet-ups with new faces in public places during the daytime only:

> *If I play with a group of friends, time and place do not matter much. I am okay meeting friends late at night, maybe at someone's home or workplace. But if it is a gathering with people I have never met before, to make everyone feel comfortable, I would suggest meeting and playing at a public place, a more crowded one, and during the day only. (Sarah)*

In contrast, when players encountered each other by chance in real-world locations without prior online contact, they often kept their distance and refrained from engaging, remaining socially disconnected despite physical co-presence. Kate described such a situation:

> *I just moved here this month. Last week, I came across a group gathering and playing Pokémon GO. I was a lot more cautious as I knew no one here: I sat nearby and not too close to them, and just focused on my game and did it silently without making eye contact or talking to them. (Kate)*

Online group chats served as an important bridge for connecting with unfamiliar players before meeting in person. Trust between individual players was often built from online to offline, and starting from the shared player community, to smaller event-based gatherings, and then to individual relationships. While being in the same group chat did not always automatically generate a "leap of faith" between strangers, these online group spaces offered a foundation for familiarity, enabling players to assess each other and set personal boundaries before engaging face-to-face.

5.4 Players Sustain Trust Through In-Person Co-Presence and Online Coordination

Starting from as strangers, many participants (17/26) described building long-term play relationships with other players, oftentimes even forming friendships that extended beyond LBGs (e.g., going shopping, having drinks together). These interpersonal trust and social bonds were not built overnight; instead, they were developed and sustained through repeated, hybrid interactions—both in real-world physical co-presence and in online group chats. Over time, players began to reinforce trustworthiness in one another.

5.4.1 Co-presence and the Embodied Practice of Trust. As with many multiplayer games, participants said they were developing interpersonal trust through repeated in-game collaboration. Over time, this trust was sustained in their perceptions of each other's *ability* (i.e., strategic thinking and gameplay competence), *integrity* (i.e., punctuality and consistently showing up for group events), and *benevolence* (i.e., offering support to help others improve their performance):

> *When we play more times together, I will feel more and more confident about this player's strategy, also very sure they will show up as we planned, and of course, we will always help each other to win together. (Lucy)*

Beyond in-game collaboration, participants described developing trust through embodied, real-world care for each other's physical safety. Unlike traditional video games, LBGs unfold in public physical space, where players must divide their attention between the game interface and their real-world surroundings. This dual focus introduces physical risks that are not present in typical digital play. While LBGs may include generic safety prompts (e.g., "stay alert"), they are unable to detect or respond to real-time hazards such as traffic, uneven terrain, or crowded environments. These limitations in games highlight the importance of co-present peers, whose awareness and actions become crucial to ensuring one another's safety.

Many participants (23/26) described behaviors among co-located players that supported physical safety — such as calling out obstacles, warning about traffic, or physically guiding teammates who were distracted by the game. Emily described this shared vigilance:

> *The person walking in the front would shout to the group, 'Be careful! We're crossing the street now, mind your step,' or 'Red lights coming up.' Many times, we just drag others' arms to remind them to stop or avoid some bumps. This is how we keep everyone safe. (Emily)*

These moments of co-presence and mutual protection were central to how trust developed among players. Such actions reflected not just practical cooperation, but a shared sense of responsibility. Trustworthiness emerged through in-situ physical awareness (*ability*), reliable participation in group activities (*integrity*), and small but kind gestures of care during play (*benevolence*). Rather than being limited to digital skill or in-game roles, interpersonal trust was also reinforced through the embodied practice of co-playing in the physical world, where players blended game-based collaboration with mutual attention to each other's safety.

5.4.2 Online Communication for Coordination and Knowledge Crowdsourcing. Online communication also sustained trust towards the player community by enabling the exchange of knowledge and the coordination of gameplay. Outside of organized group events, solo play in LBGs is sometimes perceived as dangerous. Julia described abandoning a new LBG landmark after realizing the area felt unsafe:

> *I saw a new stop nearby and got off the bus to find it. But the area was just bushes and empty roads, no people or buildings. It didn't feel safe, so I gave up halfway. (Julia)*

To navigate such uncertainty, players often turned to online group chat. Group chats became hubs for sharing local knowledge, evaluating conditions, and advising others on where and when to play. As Tony explained:

> *I'm in a local group chat. Before a group event or solo play, I usually ask: Is it okay to play there? Others will say things like, yeah, it is safe, or don't go alone at night, or take a few people with you. (Tony)*

Some communities developed more structured forms of knowledge-sharing. Rita described how she relied on a crowd-sourced document when visiting a new place:

> *The first time I went to [place name], I found a PDF shared by a big local group. It lists safe and dangerous places to play. That stuff's not on Google Maps. I felt more secure because of it. (Rita)*

In addition, players used online channels to coordinate gameplay in ways that accounted for others' needs. For example, groups often adjusted walking pace or route difficulty based on who planned to attend. These informal conversations signaled a shared willingness to accommodate one another, which helped sustain trust within the player community:

> *I trust my community a lot. I believe we always consider everyone's needs, so it feels great knowing that if I ever need support, people will be there. For players who can't walk fast or feel low on energy, we plan an easier route and fewer battles. (Simon)*

These practices show how trust was reinforced through ongoing situational knowledge sharing (reflecting ability), offering guidance to keep others safe (demonstrating benevolence), and adapting plans to align with shared expectations (showing integrity).

5.5 Tension Between Players and Non-Players in the Shared Space

Playing LBGs often leads to encounters with non-players in shared spaces, requiring players to balance the enjoyment of the game with the need to limit negative impact on non-players. Kelly recalled an incident where her group, while playing *Pokémon GO*, became too loud and inadvertently disturbed those around them, leading to a situation where the police were called:

> *There was a group event. We all came together, and someone, maybe living around, called the police because they didn't know why 20 people all clamored into their neighborhoods. I felt sorry that we made that happen. We were just too excited and forgot there are people who do not play the game live here. (Kelly)*

Resonating with Kelly's experience, Joan's situation underscores the importance of respecting privacy in public spaces. LBGs such as *Pokémon GO* and *Monster Hunter Now* feature AR cameras that let players capture AR elements against real-world scenes. Joan shared her experience when using this feature, noting that taking AR photos often prompts confusion from non-players:

> *When I use AR cameras, I am holding the phone, looking at this or looking at that. You know these are not places for tourists, so it can look weird. People would look at me a little funny and suspiciously. Some people would ask: Did you include my face or my child's face? What are these pictures for? So I'll just show them the screen and say, I'm just playing a game. You never know if somebody is gonna be totally upset with me or road rage, so I feel better being careful. Now, I only take AR photos in nature. (Joan)*

As Joan shared, taking AR photos in LBGs can appear suspicious to non-players, as it has the potential to harm their privacy. Joan's experience indicates that non-players are out of context in the players' gameplay, which can lead to misinterpretation of their intentions and result in tension between both parties.

6 Discussion

In this section, we discuss our findings in relation to prior work on trust in LBGs, digital gaming, and hybrid sociotechnical systems. We structure the discussion around three aspects: (1) the fluidity of trust in LBGs as hybrid spaces, (2) a proposed trust model for LBGs and its design implications, and (3) the transferability of insights from LBGs to non-gaming hybrid environments.

6.1 Fluidity of Trust in LBGs as Hybrid Spaces

We revealed fluidity in both institutional and interpersonal forms of trust in the context of LBGs. This fluidity operates across two dimensions: across online and offline, and between different trustor–trustee

relationships, each inherently rooted in the hybrid space nature of LBGs. Importantly, we highlight the hybrid player community as a central mediator of trust, extending prior work in digital games that has focused primarily on player–system [31, 59, 95] or player–player [22, 100] relationships.

6.1.1 Fluidity of institutional trust. In most online multiplayer games, the game system acts as the primary institution enforcing fair play [31]. In LBGs, however, players questioned this role in enforcing game rules (`T1: FairPlay`, Sec 5.1). They described the game system as unresponsive to reports, highlighting *responsiveness* as an additional trustworthiness dimension beyond ability, integrity, and benevolence [58]. Additionally, players questioned the game system's ability to detect cheating behaviors such as location spoofing or multi-accounting, though LBGs have technical mechanisms to detect such cheating behaviors [48]. We argue that this perception might not reflect the game system's technical limitations, but rather an asymmetric information [24]: players believed that cheating behaviors in LBGs are often required for in-person observation; yet the game system, functioning as a remote online service in the digital space, did not show real-world visibility and demonstrate that it is effectively monitoring these behaviors.

As institutional trust in game systems eroded, players shifted their trust towards player communities. Unlike online digital games, where player communities typically operate in digital spaces [74, 82], LBGs give rise to hybrid player communities that bridge online coordination with offline, in-person gatherings. We argue that the perceived trustworthiness of the player community stems from its *hybrid presence*: physical co-presence during gameplay allows direct observation of player behaviors, while online channels facilitate coordination, collective verification, and ongoing information exchange. However, although players fluidly shift institutional trust from the game system to the player community, this does not mean that the player community can substitute for the game system. On the contrary, the player community can only mitigate harms caused by cheating behaviors because it lacks the authority to enforce in-game penalties (e.g., account suspensions or bans). This finding underscores the need for better interoperability between player communities and game systems so they can work complementarily to support fair play.

6.1.2 Fluidity of interpersonal trust. Our findings show that interpersonal trust in LBGs is not built solely through direct gameplay but is built through the hybrid structure of the player community. Unlike in conventional online games, where in-game interaction is often the starting point of trust building [22, 29], LBG players frequently collaborate with unfamiliar others in the real world, which warrants them to build initial trust beforehand. In this context, the hybrid community plays a key role by providing a safe space for online vetting before in-person encounters (`T3: OnlineVetting`, Sec 5.3). When players met strangers offline without prior interaction, they often remained co-present but kept their distance. In contrast, even brief online contact (e.g., via Discord or WhatsApp) made players feel comfortable approaching and interacting. Beyond initial trust building, both player–player trust and player–community trust in LBGs are maintained through hybrid online–offline interactions (`T4: HybridInteraction`, Sec 5.4). In addition to this online–offline fluidity, trust toward the player community as a collective and trust toward individual players are also intertwined [10, 85]: player–player relationships often unfold within broader community trust structures, while community-level trust dynamics, in turn, shape and reinforce trust between individuals.

6.2 Toward a Trust Model for LBGs as Hybrid Spaces and Design Implications

Building on our findings, we propose a domain-specific trust model tailored to LBGs as hybrid spaces (see Figure 2). The model highlights that trust in LBGs is: (1) multi-layered, involving multiple actors—players, the game system, player communities, and non-players—who form four types of trustor–trustee relationships (player ► system, player ► community, player ► player, and non-player ► player); (2) spatially hybrid, unfolding across both physical and digital spaces; and (3) interconnected, as these trust relationships collectively shape key trust aspects such as fair play, location privacy, online vetting, hybrid interaction, and public play.

The proposed model is intended to support both the *analysis* and *design* of LBGs from a trust perspective. Theoretically, it offers a vocabulary and structured lens for examining trust in LBGs as hybrid spaces, functioning as a checklist for evaluation. It can also serve as an initial coding framework, while still allowing for new inductive insights (e.g., new Trust Aspects). Practically, the model can guide design in two complementary ways: (a) by *strengthening* the existing arrows between Trustor–trustee Pairs and the Trust Aspects represented in the model (e.g., strengthening player ► system trust in Fair Play), and (b) by *introducing new* arrows when requiring additional trust support (e.g., adding player ► system trust in Hybrid Interaction). We present four design implications, grounded in our empirical findings and prior literature, to demonstrate how the model can help guide the development of features that support trustworthy LBG design.

***Design Implication 1**: Game Behavior Modeling for Pairing and Player Reputation*

This implication targets adding player ► system trust in both Online Vetting and Hybrid Interaction. Our findings show that trust in the game system played little role in (a) initial trust building during online vetting (`T3: OnlineVetting`, Sec 5.3), and (b) sustaining trust through hybrid interaction (`T4: HybridInteraction`, Sec 5.4). Players felt that the game system provided little support for vetting strangers and long-term collaboration, even though online games have introduced techniques of player behavior modeling to support pairing and grouping [30]. Yet LBGs have not adopted such mechanisms, despite the heightened stakes of meeting unfamiliar players offline.

We therefore propose that LBGs incorporate system-level features that proactively assist players in initial trust formation. Examples include providing optional, privacy-preserving indicators such as mutual player connections, play frequency in the same area, or preferred play style, complementing existing community-driven online vetting practices in chat-based coordination. Beyond initial vetting, system support is also needed for trust maintenance. Reputation and rating mechanisms have long been used in gig work services (e.g., peer ratings in Uber [94]) and in online communities to promote cooperative behavior [8, 42, 76]. LBGs could adapt these

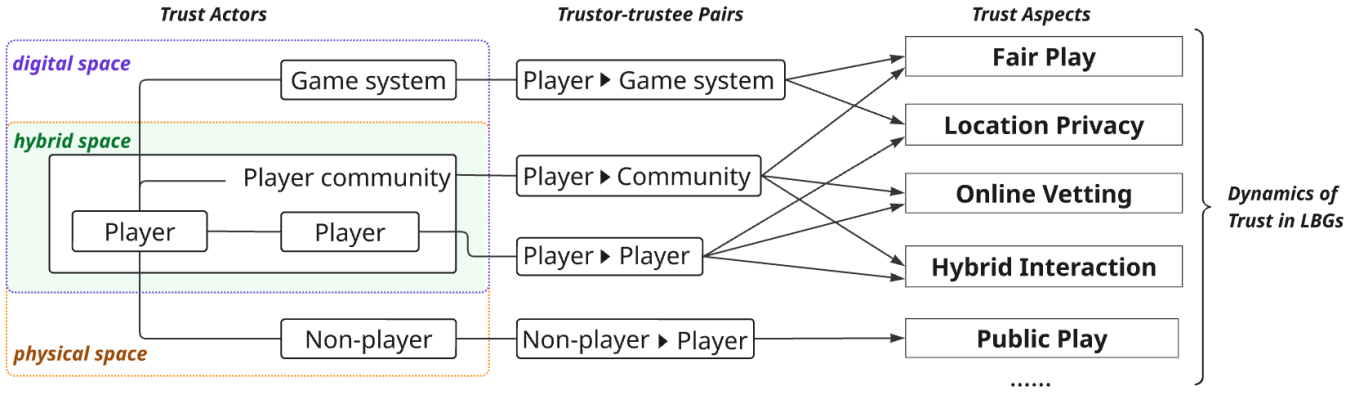


Figure 2: Proposed "Actor-Pair-Aspect" Trust Model for LBGs as Hybrid Spaces. The model illustrates the key trust actors in LBGs, their spatial distribution, and the associated trustor–trustee relationships, showing how these connect to the main trust aspects identified in our findings. Together, these elements describe the dynamics of trust in LBGs.

ideas to hybrid spaces by offering lightweight trust signals based on consistent participation, respectful behavior, and verified co-presence in physical locations. Such system-generated signals can function as an authentic third-party layer of trust, supporting ongoing collaboration and reducing the burden on community-based moderation alone.

***Design Implication 2**: Supporting Player Awareness and Control over Location Privacy*

This implication targets strengthening player ▸ system trust in Location Privacy. While privacy risks in hybrid spaces are well documented [64], our findings (`T2: LocationPrivacy`, Sec 5.2) show that LBGs offer little meaningful support for helping players understand or manage what others can infer from their location traces. Players trusted the system's data policy, but lacked transparency and control over interpersonal privacy risks—such as revealing home, workplace, or daily routines.

To this end, LBGs should adopt context-aware privacy management, going beyond static settings. Systems could detect potentially sensitive patterns (e.g., repeated activity from the same location) and issue lightweight prompts inviting players to hide, mask, or generalize that data [36]. Additional controls, such as time-shifting shared actions, coarse-graining coordinates, or temporary "stealth modes," would allow players to modulate their visibility depending on social context. Across these features, systems must balance usefulness and intrusiveness, offer clear explanations of what is visible to whom, and allow players to revise settings as situations change.

***Design Implication 3**: Embedding Community-Led Governance into Hybrid Moderation Workflows*

This implication targets strengthening player ▸ community trust in Fair Play. Our findings (`T1: FairPlay`, Sec 5.1) show that hybrid player communities are often viewed as more effective than the game system in enforcing fair play. This aligns with prior work demonstrating that community-led moderation improves trust and compliance in online games [5, 16, 46]. However, because LBGs operate across both digital and physical space, the online communities cannot directly observe many cheating behaviors. This hybrid nature limits the reach of purely digital moderation.

We therefore propose a co-governance model that formally incorporates community-led observation and reporting into LBG moderation workflows. Experienced players could take on optional, verified steward roles—nominated by peers or validated through gameplay history—to identify issues during collocated play, contextualize system-generated flags, and escalate cases for platform review. Unlike traditional online moderation, these roles would operate across modalities, combining in-person observation with online documentation through channels such as Discord or WhatsApp. Recognizing and legitimizing this hybrid moderation could improve responsiveness, reduce friction in trust recovery, and better support fairness in contexts where system visibility is limited. At the same time, such approaches carry risks, including biased enforcement, exclusion of newcomers, or overreach by socially dominant players. Prior work cautions that community moderation must balance empowerment with safeguards [83]. Thus, any co-governance structure should include transparency, collective checks, and clearly bounded authority to ensure fair and inclusive practice.

***Design Implication 4**: Enabling Locally Sensitive and Socially Aware Gameplay*

This implication targets strengthening non-player ▸ player trust in Public Play. Our findings (`T5: PublicPlay`, Sec 5.5) show tensions related to trust issues between players and non-players, echoing prior LBG research documenting negative experiences [3, 57, 87].

Building on Ardito et al.'s [3] LBG design guideline to "consider social conventions," future LBGs can incorporate features that respond to surrounding social norms. Recent advances in location-aware and adaptive narratives [55] provide promising strategies for tailoring gameplay to social conventions and policies, thereby mitigating inappropriate gatherings, noise, or disturbance in public space. In this approach, the LBGs can use locative narrative cues to nudge players toward appropriate and respectful behaviors, fostering greater harmony in public play and improving non-players' trust perceptions of LBG activity. For example, in residential zones, the LBG could adaptively reduce the required number of players

for group battles and tailor the narrative to emphasize quieter interactions. Technically, this design can be implemented by adding social context tags (e.g., school, residential area, religious sites) to landmarks on the game map and using these tags to dynamically adjust relevant gameplay parameters. Such mechanisms could modify elements like required team size for battles, in-game reminder messages, or narrative cues, allowing the system to tailor gameplay to the surrounding social environment.

6.3 Transferability of Insights From LBGs Beyond Gaming Contexts

Although our study is grounded in the specific domain of LBGs, the trust dynamics we identified are rooted in the broader nature of digital–physical hybridity [20], and are therefore relevant to a wider class of hybrid sociotechnical systems—systems that blend digital infrastructures with embodied, real-world interaction. Such environments include extended reality platforms [64], the metaverse [54], and various forms of location-based social networks [13]. Across these domains, similar trust concerns emerge around privacy, safety, fairness, and the mediating role of communities [20, 26]. Our findings provide empirical nuance to these shared trust aspects by illustrating how trust is built and negotiated in hybrid spaces. In this sense, our findings offer conceptual transferability beyond gaming. First, Fair Play (`T1: FairPlay`) parallels community-based moderation and rule enforcement in other hybrid systems. Second, Online Vetting (`T3: OnlineVetting`) and Hybrid Interaction (`T4: HybridInteraction`) resemble trust dynamics in non-gaming contexts that involve real-world encounters among strangers, such as community meetups or location-based gig work. Third, the dynamics of Public Play (`T5: PublicPlay`) extend to issues of social acceptability in hybrid environments like the metaverse [41, 44] and shared augmented reality [101], where non-users also inhabit the same physical space.

At the same time, we call for caution when applying our findings beyond LBGs. Some trust dynamics in LBGs stem from domain-specific conditions. First, interacting with strangers in public spaces is central to LBGs; while this dynamic appears in hybrid workplace onboarding [40], location-based gig platforms [50], and dating apps [14], it rarely happens in hybrid environments where participants already know one another well (e.g., family-based AR experiences [63] or classroom-based hybrid learning [93]). Second, LBGs are typically free-to-play, whereas other hybrid systems involving monetary transactions (e.g., gig platforms or commercial metaverse economies) introduce economic trust considerations that require extra analysis. Finally, insights related to Location Privacy (`T2: LocationPrivacy`) assume frequent physical movement through space. This assumption holds in many hybrid systems involving locative social interactions in outdoor urban areas, but not in more static hybrid environments such as offices or classrooms.

Overall, we posit that the trust dynamics identified in LBGs, as well as the trust model derived from them, provide a foundation for understanding trust in the broader landscape of hybrid sociotechnical systems. Nonetheless, we encourage further research in diverse hybrid contexts beyond gaming to deepen and refine this understanding.

7 Limitations and Future Work

While this study offers valuable insights into trust dynamics in LBGs, several limitations remain, each of which suggests directions for future research.

Limitations of the participant sample. First, we did not balance the sample from each LBG. Ten participants had experience with two or more LBGs, allowing them to offer perspectives from multiple games that enriched our understanding of cross-game commonalities. Nevertheless, because 22 out of 26 participants played *Pokémon GO*, reflecting its real-world dominance in the LBG market [61], the findings may be disproportionately influenced by experiences from that game. While this does not undermine our aim to reveal trust dynamics in LBGs as hybrid spaces, future research could extend this work by conducting comparative studies across different LBGs with a more balanced number of participants from each game.

Additionally, our participant sample consisted primarily of experienced LBG players. Their deep familiarity with gameplay mechanics, community norms, and social practices may not reflect the perspectives of novice or infrequent players. Because all participants were active players at the time of the study, our sample may also reflect a survivorship effect [12]: individuals who experienced severe trust breakdowns or disengagement may have already left the LBGs and thus were not represented. Future research could include both new and former players to develop a more holistic understanding of how trust is built, challenged, and either maintained or lost over time. Additionally, most participants were based in Western countries, and our findings may therefore reflect cultural norms that are not globally representative. Future work should investigate how trust dynamics in LBGs differ across cultural and geographic contexts by recruiting participants from more regionally diverse locations. Further, this study captures trust dynamics solely from the perspective of players. Given that players are the primary actors who navigate, negotiate, and sustain trust within LBG ecosystems, their perspectives are essential to understanding how trust unfolds across hybrid spaces. However, future studies could incorporate insights from developers, non-players, and security or support teams involved in the game systems to build a more holistic understanding of trust in LBG environments.

Extending research methods. While our qualitative approach (i.e., in-depth semistructured interviews) allowed us to collect rich data grounded in players' lived experiences, future work could include field studies in which researchers directly observe players in situ [4].

Additionally, to complement qualitative methods, future work could collect and analyse quantitative data through large-scale surveys [23], behavioral trace analysis [30], or social network studies [29]. These approaches would allow researchers to examine the prevalence, distribution, and clustering of trust behaviors at scale. In particular, we encourage future work to quantitatively investigate the four perceived trustworthiness factors identified in this study (i.e., ability, benevolence, integrity, and responsiveness) and four trustor-trustee pairs to help identify specific areas where LBGs or hybrid-space systems could be improved. Accordingly, future studies should recruit larger participant samples to robustly support quantitative analyses.

Investigate trust in other LBGs. Although our findings were derived from a cross-game approach [17, 23, 47], caution is still required when applying them to all LBGs. Our analysis focuses on shared mechanisms (e.g., online coordination and offline gatherings), rather than on detailed game-specific features. As LBGs continue to evolve as a growing genre, our study serves as a foundation for examining trust dynamics in other LBGs, potentially reaffirming and extending our findings and design implications.

8 Conclusion

Our study investigated trust in LBGs through in-depth semi-structured interviews with 26 players, revealing how trust unfolds across four trustor–trustee relationships: player ► system, player ► player, player ► community, and non-player ► player. These relationships shape trust in key aspects, including Fair Play, Location Privacy, Online Vetting, Hybrid Interaction, and Public Play. Building on these empirical insights, we propose a trust model for LBGs as hybrid spaces, designed to support both the analysis of trust and the design of trustworthy LBGs. We further outline four design implications grounded in our findings: game behavior modeling for pairing and player reputation, supporting player awareness and control over location privacy, embedding community-led governance into hybrid moderation workflows, and enabling locally sensitive and socially aware gameplay. Our findings offer transferability to broader hybrid sociotechnical environments, while requiring cautious interpretation beyond the gaming context. As hybrid digital–physical environments become increasingly prevalent, our work provides a foundation for future research on how trust is built, shifted, and sustained across overlapping digital and physical realms.

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A Interview Questions

Would you like to spend approximately 40—60 minutes sharing your location-based gaming experience regarding the safe and trust aspects? Please let me know at any point if you do not want to answer these questions, and we can skip to the next question. Your personal information will not be disclosed to anyone outside of the research team. You may stop the interview at any time. Your participation in this study is voluntary, and your decision not to participate in the interview has no bearing on your relationship with the university. You will receive a 30 USD Amazon gift card after this interview.

Can I audio-record the interview? It is confidential, so if a name is mentioned, we will anonymize it. **Yes / No** (start recording if yes; ask if you can take notes if no)

Note: *For participants who have experience with multiple location-based games, the interview will primarily focus on shared experiences and common mechanisms across these games. Nonetheless, if you wish to discuss any game-specific experiences, please specify the name of the game when doing so.*

(1) Building Trust during Hybrid Gameplay

Focus: First encounters, cooperation, initial impressions, and factors that influence trust or distrust.

Motivation & Play Context.

- Why do you play these location-based games? (e.g., friends invited you, exercise, fandom, socializing, etc.)
- What kinds of collaborative or group activities do you usually play (e.g., raids, team hunts)?
- Where do you usually play, and with how many people? Who are they?

First Encounters with Other Players.

- Do you play with players you have never met before?
- Why or why not do you play with strangers?
- How do you first encounter other players (in-game events, chat apps, social media, public places)?
- Do you usually chat with strangers online before meeting them in person?
  - Can you describe what those online interactions are like?
- What kind of information do you share in your game profile?
  - What can others see about you? Are there things you choose to hide or lock?
  - What do you typically look for in others' information before deciding to cooperate or meet?

Trust & First Cooperation.

- What helps you decide whether to trust someone enough to play or meet?
  - Can you describe the process?
- When meeting someone for the first time, how do you recognize each other?

- During your first in-person interaction, how did you feel regarding safety and trust? Can you share an example?

(2) Sustaining Trust Over Time

Focus: Ongoing relationships, managing friction, maintaining cooperation, and evolving perceptions.

Continuity & Relationship Building.

- Have you developed ongoing relationships or regular play groups through LBGs?
  - If yes, how did those relationships develop over time?
- How did you continue communicating outside the game (e.g., chat apps, social media)?

Challenges & Frictions.

- Have you ever experienced distrust or conflict with other players?
  - What happened?
  - How did you handle or resolve it?
- Have you ever regretted meeting someone or trusting them? Why?
- What strategies do you use to maintain trust when misunderstandings or conflicts occur?
- How do you decide whom to keep playing with versus whom to avoid?

Trust Maintenance Practices.

- What actions or habits help sustain trust in your play community?
- How do you ensure safety or comfort during ongoing in-person play?

(3) Memorable Trust-Shaping Moments

Focus: Specific events—positive or negative—that shaped participants' sense of trust.

Positive Experiences.

- Can you share a favorite or memorable experience playing with others that strengthened your trust?
- What made it special or trustworthy?
- Did any app design or community feature contribute to that trust?

Negative Experiences.

- Can you share an experience where trust was broken or tested?
- What caused that distrust?
- How did you manage or recover from it?

Reflection.

- Looking back, what moments most shaped your overall sense of trust in location-based games?
  - Please share any relevant examples.
- How do those experiences influence how you approach other players or events now? Please share an example.

Thank you, we have finished all the questions. Do you have more things to add? Anything else you want to share about trust in location-based games? If not, we will close this session. Appreciate your time and valuable answers.