The Art of Tacit Learning in Serious Location-Based Games

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Over the past two decades, location-based games have moved from media art fringes to the mass cultural mainstream. Through their locative affordances, these game types enable practices of wayfaring and placemaking, with the capacity to deliver powerful tacit knowledge. These affordances suggest the potential for the development of location-based games in educational contexts. This paper presents three cases studies—*TIMeR* and *Wayfinder Live* and *Pet Playing for Placemaking*—to illustrate how each uses elements of wayfaring and placemaking to bring new opportunities for education through a tacit knowledge approach.

Keywords: location-based games, serious games, games for change, new media art, urban place-making

INTRODUCTION

In recent years, location-based games have tended toward entertainment, yet their precursors within new media art contexts held greater ambitions: shaping perceptions of spaces, society, and culture. As experiences that layer virtual and embodied worlds, location-based games and the digital wayfaring they enable, hold the capacity to deliver tacit knowledge and deep understandings of space and place (ter Vrugte and de Jong, 2017). By digital wayfaring, we refer to how the digital has become imbricated in how we move through our everyday lives across social, material worlds (Hjorth and Pink 2014). Location-based games can be adapted as "serious games"—interactive experiences created for purposes beyond pure entertainment. While Serious Location-based Games (SLGs) (Baalsrud Hauge et al., 2020) have already been developed as learning tools in areas such as digital heritage (Volkmar et al., 2018); environmental engineering (Söbke et al., 2019); interdisciplinary education (Pánek et al., 2017); exercise (Laato et al., 2020); urban policy (Leorke 2019); and the development of contemporary social skills (Fonseca et al., 2020), these experiences tend to rely on didactic learning models.

In a contrasting approach, this paper discusses three serious location-based games that draw on the media arts origins of the location-based game's genre to deliver tacit knowledge about space, placemaking and sociality. The games that we present seek to communicate beyond didactic educational structures but instead aim to deliver "authentic situations" that can lead to "place-based learning" (Xanthopoulos and Xinogalos, 2019). Such learning contexts, formed through tacit processes as intuitions and cultural knowledge, emphasise implicit or informal understandings, enabling flexibility and resilience to dynamic situations.

In making our case, the paper unfolds in the following way. We begin by providing a literature review of location-based games tracing their history and origins to outline their place in media arts practice. This discussion focuses on how location-based games have cultivated tacit and embodied learnings about place through wayfaring. We then explore the contexts of serious games and games for change and how the development of serious location-based games can use social and spatial elements to deliver tacit yet powerful understandings of place.

Having outlined the background of this research, we then introduce a conceptual framework to explore in detail the dimensions of tacit knowledge that these games can deliver. Finally, we apply this methodological lens to three location-based game case studies: *TiMER, WayFinder Live* and *Pets Playing for Placemaking*. Our analysis shows how these experiences use wayfaring and placemaking to deliver tacit knowledge that can be used in education contexts. At stake in this discussion is a new way of understanding the teaching and learning potential of location-based games, which connects to their past as works of media art.

The Development of Location-Based Games as Arts Practice

Location-based games evolved from avant-garde and new media arts experimentation with space, emerging technologies, and the people who interact with them. Because of this arts legacy, location-based games have long been inflected with conceptual, spatial and artistic intentions. The information they communicate is often implied and abstract rather than didactic and prescriptive. There has long been a need to utilise the tacit modes of art practice to reimagine social norms beyond representations towards changing behaviours and motivations (Kester, 2011). The learnings that arise from location-based games in art contexts are experience-based, which is to say they enable us to build intimate understandings of spaces as we find our way through them.

The wayfinding methods found in location-based games can be traced to the activities of the nineteenth-century *flâneur*, an imaginary figure conjured by the poet Charles Baudelaire (1821–1867). Later, the philosopher Walter Benjamin (1892–1940) expanded the *flaneur* into emerging modernist urban environments. For Baudelaire and Benjamin, the *flâneur* denotes a person who is deliberate in their sensory and embodied engagement with the city. This notion was taken up in the 1960s Situationist International (SI) Avant-guard, whose experimental practices methods of *derive* (drifting) reframed cities like Paris as playgrounds for psychogeographic explorations (de Souza e Silva and Hjorth, 2009; Hjorth and Richardson, 2014). In a similar vein, the American New Games Movement of the early 1970s sought to transform entire cities into playscapes by overturning norms of urban space and their social and political undercurrents (Richardson et al., 2021). Across these works is a recognition of the transformative potential of city spaces through simple acts such as walking and play.

In the late 1990s, inquiries into the navigation of space as avant-garde arts practice were reinvigorated by media arts practitioners. British-based Blast Theory (2003), Forced Entertainment and Canadian artist Janet Cardiff experimented with mobile technologies to propose artistic interpretations of how city space could be meaningfully and playfully subverted. Although not explicitly described as such, each of these artists and the experiences they created can be retrospectively understood as placemaking. Placemaking is formed by investing a space with personal meanings and significance, transforming it into a lived place.

Although early location-based games were primarily experimental artworks, Dale Leorke (2019) has observed that their emergence occurred against a 30 years backdrop of urban theorists lamenting the "decline" of public life. Long before being thought of as serious games, the social and playful capabilities of location-based games and the placemaking they enabled were seen as holding the potential to respond to this erosion of public space by commercial forces. These games offered new pathways for asserting what had been long theorised as a "right to the city" (Lefebvre, 1968; Mitchell, 2003; Harvey, 2008). As mobile devices came to permeate society, increasingly commercial and entertainment driven experiences such as *Botfighters* (It's Alive! 2001) and *Mogi, Item Hunt* (Newt Games, 2003) cemented location-based games as a distinct and fully formed game genre. Nonetheless, location-based experiences in this period remained on the periphery. In the words of Cornell and Varnelis, (2011), they were "the stuff of demos and art-technology festivals, at least until 2008 when Apple released the GPS-enabled iPhone 3G" (2011: n.p.).

With the introduction of smartphones in the late 2000s, location-based games became increasingly normalised and commodified, a shift exemplified by the "appification" of mobile geospatial services and experiences such as *Foursquare*, *Strava* and *Uber* (Wilken, 2012). The profound impact of *Pokémon Go* in 2016 was its mass popularisation of previously fringe location-based games into the mainstream. In doing so, the game brought attention to how playful experiences could reframe city space and numerous spatial transgressions such as players swarming in cemeteries, memorial centres, churches, and holocaust museums, or simply otherwise quiet streets (Hjorth and Richardson, 2017; Davies, 2020). Thus, *Pokémon GO* inadvertently highlighted how politicised, codified, and uneven public space had always been.

Encounters of the Digital Wayfarer

In the proliferation of location-based gaming into city spaces, the traditional notion of the *flaneur* struggled to encapsulate the increasingly embodied and political nature of engagement with the city. Arising in the work of Hjorth and Pink (2014) was a metaphor of digital wayfaring, reflecting the ongoing augmentation of place, which has led to contemporary hybrid experiences of it. The notion of digital wayfaring describes a kind of movement through the world that combines our experience of physical place with digital networked information. Wayfaring can be understood as knowledge about the world and our surroundings produced through walking, movement and traversal. This interpretation of the term originates from the work of Tim Ingold, who suggested that wayfaring is a type of embodied mobility that is both routine and habitual (e.g. commuting), in which a kind of familiar knowing is produced in and through repetitive movement.

Hjorth and Pink (2014) subsequently coined the term digital wayfaring, adapting Ingold's notion to our contemporary experience in which data has become woven into our movement through the urban environment—especially through mobile media. Take, for instance, when walking through the city with the assistance of geolocative maps, our

knowledge about, and moving through, place is increasingly augmented by mobile apps. Digital wayfaring acknowledges that our perception, modes of engagement and attention—our sense of where we are and with whom—is informed by data and media interfaces.

This conceptualisation of the digital wayfarer led to a critique of *Pokémon Go* and the politics and practice of playful mobile media (Hjorth and Richardson, 2017) and new conversations about the politics and discrepancies of space that arose. Katie Salen Tekinbaş (2017) outlines issues of accessibility, privilege, and race raised by the "unlevel playing field of *Pokémon GO*", showing how the game emphasises existing but unannounced spatial politics of moving in the physical world more difficult for some than others. Echoing the sentiments of *Pokémon GO* players of colour who risked being targeted by police: "I might die if I keep playing" (Akil, 2016), Salen Tekinbaş asks: "How might we make sense of issues of accessibility, privilege, and race raised by the game?" (2017: 35). Following these player revelations, we suggest that locative play emerges as a helpful aperture for understanding the implicit inequalities of public spaces.

Such tacit understandings, we argue, are a powerful aspect of the embodied interactions of location-based games. As Peter Bayliss asserts, the gameplay is a spatial, sensory, and embodied phenomenon, "one that can only exist as experienced by the player situated in the context of their own experience" (2007: 96). Unlike screen-based games that occur in disembodied virtual space, the player brings their body with them in location-based games. Situated in physical space and engaged through the virtual interface of a mobile device, the location-based game's player is afforded new readings of the urban environment as the digital, spatial, and bodily converge (Hjorth and Richardson, 2014). Location-based games overlay the digital and the material, the mapped and the lived "imbricating place and experience–generating "palimpsestic" or layered experiences of place and presence" (Richardson et al., 2021). Through this "layering" of in-game narrative and real-world location, location-based games erode clear notions of gameplay and "everyday life", adding a complex dimensionality to place and space, one that cannot be easily transmitted through other means (Richardson et al., 2021). In this way, the experiential yet tacit knowledge gained from playing location-based games traverses the entertaining and playful to educational and serious contexts.

Serious Games

Location-based games are now being developed as serious games—experiences that use the mechanics of games and the enjoyment of play to address issues in the real world (Ouariachi et al., 2018). The physical, social, and spatial aspects of location-based games make them well suited to address real-world scenarios and conditions. With location-based games often requiring teamwork and collaboration, serious location-based games can entwine the social and cultural aspects of the areas in which they are played (Westerholt et al., 2020). However, there are key differences between serious games and location-based games and how each can transmit knowledge. Serious games are more directly, prescriptive and didactic, aiming to deliver measurable and explicit learning whereas location-based games—having evolved largely within an arts context—tend to rely on sensory and tacit experiences to bring about new spatial perspectives. Moreover, while location-based games have tended to focus on placemaking within local contexts, serious games have tended to be more expansionist and geographically ambitious.

Many developers and designers have questioned the approaches of serious games in tackling global issues such as poverty and climate change without becoming overgeneralised, overwhelmed, or overrun by political, commercial, or ideological interests (Sanford et al., 2015). This has led to critiques from game developer communities forming movements such as Games for Change, with participants reflecting on how "games can both educate and indoctrinate" and that "education is a political act" (Albor in Davies, 2016). Such questions have brought about a shift in the Games for Change movement away from gamified and informational tactics to more playful and iterative approaches proposed by Colleen Macklin and others (Macklin and Sharp, 2016). More recent serious games have worked to engage locally and socially in areas such as cultural heritage (Mortara et al., 2015), the elderly population (Fua et al., 2013) and sustainable issues (Ouariachi et al., 2018). These approaches have favoured local engagement towards social and community outcomes.

With attention to these recent Games for Change approaches, we propose that serious location-based games can be developed as learning tools by engaging locally and socially—not through direct educational models—but instead through the tacit learning inherent to location-based experiences.

METHODOLOGY

We argue that tacit knowledge can be powerfully and effectively gained through playing location-based games. Tacit knowledge refers to informal and process-based knowledge gained through experience (Asher and Popper, 2019). It is not readily associated with formal learning contexts so much as encountering situations, works of art and—we suggest—location-based games. First coined by Polanyi (1966), tacit knowledge is defined beyond communicable by standard means, or "(w)e know more than we can tell" (4). More recently, Alexander Muir Walker (2017) uses the term "tacit knowledge" to describe knowledge and beliefs that have not been articulated but which are present. Following Duguid's *The Art of Knowing* (2012), we suggest that the tacit dimension can have a "profound affect" because it addresses aspects of learning and identity that the conventional social sciences often overlook.

As Satinder Gill (2015) outlines, deep learning can be gained through tacit engagement, where the body mediates the experience of knowing. We make the case that location-based games are well placed to deliver these tacit learnings as they offer complex dimensionality at the intersection of physical bodies, material space and social practices (Hjorth and Richardson, 2014). According to Gross (2009): 359, social practices are themselves "ways of doing and thinking that are often tacit, acquire meaning from widely shared pre-suppositions and underlying semiotic codes, and are tied to particular locations

in the social structure and to the collective history of groups". Otherwise put, tacit knowledge is already deeply familiar to us through our interactions with each other and the world.

One of the difficulties of using tacit knowledge in education contexts is that it is difficult to map, implement and measure. To address this, Asher and Popper (2019) usefully provide a model through which tacit knowledge can be designed and conceptualised. In their framework, tacit knowledge is accessed in three layers (**Figure 1**). They describe the first layer as "hidden practical knowledge" to describe learning that emerges through practice. The second layer is "reflective tacit knowledge", describing the personalised ways in which knowledge is responded to. The third layer: "demonstrated tacit knowledge" refers to how tacit knowledge becomes internalised and repeated. We apply this "onion model" proposed by Asher and Popper to the design and practice of creating location-based games.

Within this context of serious location-based games, the first layer refers to knowledge gained through engagement with the game. At this level, players bodily encounter the space in which the game is set. The second layer denotes how players participate through wayfaring, whereby players reflexively develop rules of thumb, cultivate practices, heuristics, and personal ways of knowing and being. Finally, the third layer refers to demonstrated tacit knowledge. In this layer, players internalise and practically apply the knowledge gained through placemaking, engaging in the space and the people in it, forming deep associations and relationships.

There are limitations to the application of tacit learning that deserve attention. A fundamental difficulty is in measuring outcomes. Tacit knowledge is–by its definition–insinuated and implicit and is therefore difficult to evidence, express or extract. By its nature, it is internalised and cannot be verbally relayed (Duguid, 2012). Leorke

(2019) notes that this is equally true of measuring the experience of location-based games. Seeking to test or quantify players' involvement outside of the context of the game itself can prove difficult and futile and "risks stripping the games of their more ambiguous, complicated and always contingent specificity" (Leorke, 2019: 6). In the discussion at the end of this paper, we gesture to ways in which tacit learning may be measured, but within the remit of this paper, we explore how it can be instilled within location-based games through wayfinding and placemaking.

Placemaking is a contested process. Recent scholarship on placemaking has given critical attention to the politics of the process, seeking to uncover who is doing the placemaking and to what ends; who is empowered and who is disempowered by the process (Borrup, 2020; Burns and Berbary, 2021). To avoid becoming colonising exercises, placemaking processes must seek to centre and emphasise the stories and experiences of people who already occupy the places "being made" (Borrup, 2020). With awareness of these concerns, each of the games explored here was developed, not simply through a consultative approach but utilising greater-or-lesser-degrees practices of collaboration and co-design with locals and occupants. As mobile media expert Jordan Firth and Jacob Richter informs us, spaces are already "filled with stories, with histories that shape how people understand the nature of a place." (2021; 2) Placemaking, therefore, is an ever-evolving and ongoing process reflecting human geographer Doreen Massey (2005) notion of place as changing and unfinished or as made up of "stories-so-far" (130). Placemaking is at once shared, evolving, personal, and political.

The design of both education and location-based games are also inherently political acts. These experiences leave deep impressions on participants, and their contexts of creation must be considered. As Leorke informs us, the production of location-based games "takes place at the intersection of art, commerce, and play and involves contending with everyday public life and the complex, innumerable forms of soft and hard power that circulate around it" (2019: 6). These influences also create tacit information within a game. With awareness of these political forces, we have attempted to provide transparent context to these games and the forces that shaped them into existence.

Case Studies

In this section, we discuss three location-based games that encourage tacit knowledge and encourage social and community inclusion. The three projects—*TIMeR, Wayfinder Live* and Pet *Playing for Placemaking*—have involved the authors to varying degrees from co-design, development, delivery, or participation. The creation of these serious location-based games is informed by international workshops with experts like Colleen Macklin to indigenous collaborative games with key elders such as N'Arweet Carolyn Briggs and collective decades of locative and pervasive game production experience. In pursuing tacit knowledge, we recognise the limitations to this approach specifically that tacit knowledge is qualitative and, by its nature, difficult to express or evidence via quantitative or even interview based insights. Nonetheless, we attempt in each of the case studies to trace its existence through discussions with players. Through these conversations and analysis, we reflect upon some of the learnings around the future of location-based serious games.
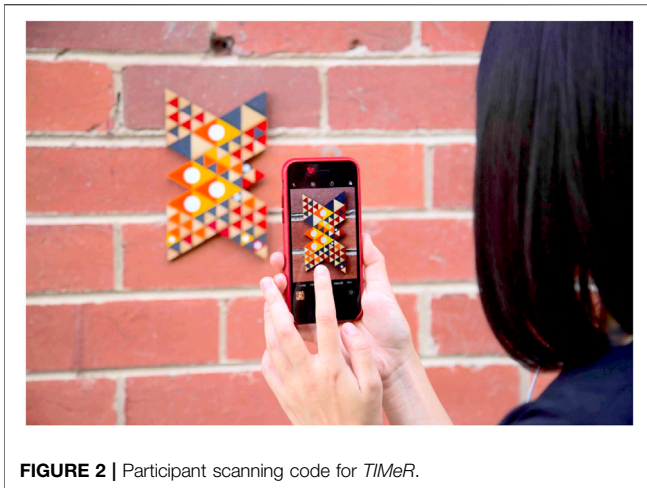

FIGURE 1 | The "Onion Model" of Tacit Knowledge developed from Asher and Popper (2019).
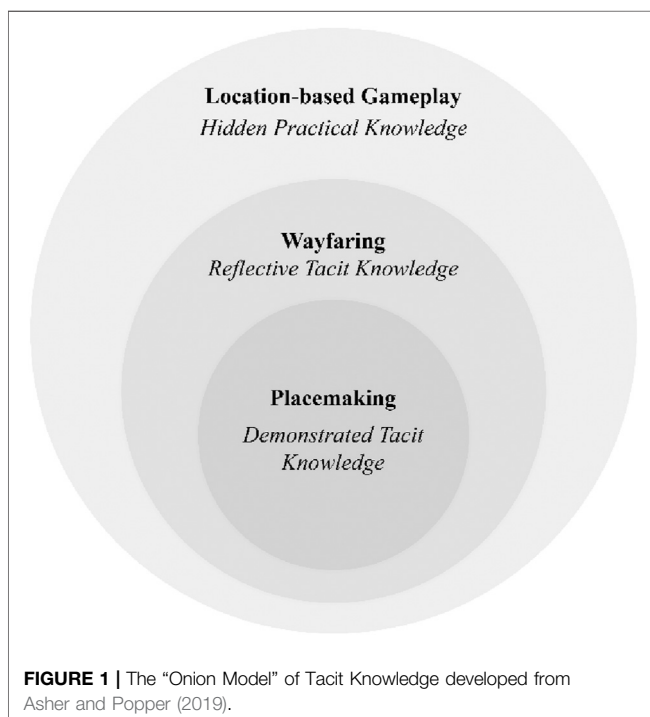
FIGURE 2 | Participant scanning code for *TIMeR*.

TIMeR–An Augmented Reality Pervasive Game

TiMeR was produced by Hugh Davies in collaboration with Troy Innocent and Olivia Guntarik alongside the Elders in Residence in the Ngarara Willim Centre based at RMIT University's Melbourne Campus.[1] The game was first presented on campus in February 2019. The mobile location-based experience explores the multisensorial and contested notions of making place on unceded Indigenous land. Accessible via a freely downloaded app, participants are guided via audio directions to a series of locations around the Melbourne campus. Players scan one of the distinctive codes at each location that activates an augmented reality animation on the player's mobile device (**Figure 2**). Through this animation, players are offered a choice of directions to guide their wayfaring through the audio tour. As well as providing directions, the audio features stories of land, river and sky shared by Boonwurrung elder N'Arweet Carolyn Briggs. As players move across the campus landscape, they listen to uncover alternate cartographies, bringing new insights to familiar routes (**Figure 3**). These unique forms of traditional and alternate knowledges of space are mediated through the *TIMeR* project as an exemplar of location-based games fostering tacit understanding of place.

Play in public space impacts how we come to know, shape, and recall place. Because location-based games can provoke complex questions around location, spatial interaction and narrative, players of these experiences come to consider issues of ownership, use, respect, and belonging, as they contemplate the spaces they move through. Their placemaking emerges in conversation with—and with awareness of—those who come before and after them. As noted by the creators of *TIMeR*, the growing popularity of pervasive and location-based games have brought a new urgency to recognising indigenous understandings of place (Davies et al., 2019).

[1]This project was commissioned by the RMIT Design and Creative Practice Enabling Capability Platform.

There has been a recent groundswell of location-based projects that engage with First Nations knowledges and understandings in response to these spatial concerns. Beyond the growing number of more prescriptive Welcome to Country mobile apps (Bessant, 2014) many location-based initiatives explore much deeper and more nuanced relationships between space, place, and cultural heritage. These include *Digital Songlines* (Wyeld et al., 2007), *What's ya Story* (Edmonds et al., 2014) *Nyungar Place Stories* (Irving and Hoffman, 2014) and *TIMeR* (Davies et al., 2019). The primary aim of *TiMER* is to provoke new understandings of place and invite players to rethink their place within that landscape.

At its heart, *TIMeR* is a placemaking experience. The game attempts to provide its players with a small insight into the vast and enduring connection between the space of *Naarm* (Melbourne) and the Kulin nations tribes who continue to inhabit it. In this context, relative newcomers to the city (those whose families have arrived in the past 200 years) are invited to reflect upon their place of belonging within the location and history. They can weave their own story into the deep time of existing stories present in the location. These profound understandings of place saw many *TIMeR* players seek to discuss their experience with fellow players during or after the event. The sense of place it evoked and invited saw players reach out and come together to discuss and unpack the ideas that the game had provoked.

Through the lens of pervasive game design, *TIMeR* expands the space of play spatially, temporally, and socially. It draws upon a rich culture of connecting story and place, involving the use of music, voice, and visual language in sophisticated mappings of space. A circular shifting between past, present and future in traditional oral storytelling was reflected in the stories of land, river and sky in which it is situated. Players are placed in relation to location, community, story, and other players, which drove social engagement through the cultural logic of the design. The experience that *TIMeR* delivered motivated players sought to collaboratively negotiate their place in the space of *Naarm* with a more profound sensitivity to the Kulin nations past and presence.

Through informal discussion between creators and players immediately following the game, participants spoke of their
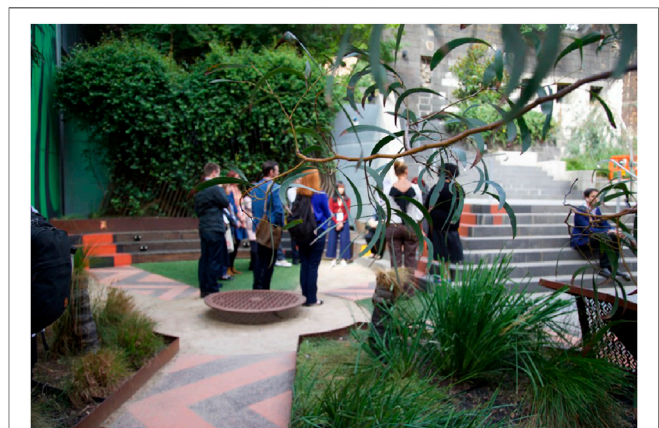

FIGURE 3 | *TIMeR* Players moving across the RMIT Melbourne campus.

FIGURE 4 | Social interactions in *Wayfinder Live* (Innocent., 2016).

FIGURE 5 | Scanning an urban code in Wayfinder Live (Innocent., 2016).

experience of the campus as slowing down during gameplay. They described moving through the familiar spaces of the university campus, but in an unfamiliar manner. Players mentioned following the path that was being described to them in a way that was connected to but separate from their everyday life. In what can be understood as a demonstration and solidification of tacit knowledge attainment, participants reflected deeply and for up to an hour in a discussion about the game experience, debriefing with the game creators and each other. Participants asked to know more of the audio information that the game has transmitted. They sought directions to where more of this information could be obtained. The experience of the game had brought an intangible but evidenced desire for players to learn more about the First Nations upon whose place they stood.

Wayfinder Live–A Location-Based Augmented Reality Game

Wayfinder Live is a free-to-play location-based augmented reality game designed by Troy Innocent and presented in multiple cities, including Bristol in the United Kingdom, Tampere in Finland, and Melbourne, Australia. Innocent was awarded a City of Melbourne Knowledge Fellowship to develop the game, which enabled him to research playable cities in the Europe and United Kingdom, informing his public art practice of "urban codemaking". Innocent's practise explores the relationships between geometric abstraction and code, resulting in works of sculpture, animation, image, sound, and installation. *Wayfinder Live* evolved from a desire to create heightened awareness and intensity in the perception of urban space through Innocent's mode of research practice.

The game integrates the city's physical space as "urban codes" situated in everyday urban environments (**Figure 4**). Once the game app is downloaded, players are requested to put away their phones momentarily and seek out the in-game codes. These multicoloured objects are designed to blend in with nearby urban infrastructure, architecture, street art and signs. Sixteen codes define the space of the game within the city. The codes are typically close to one another—within a couple of 100 m. Once found, players scan these codes with their smartphones unlocking
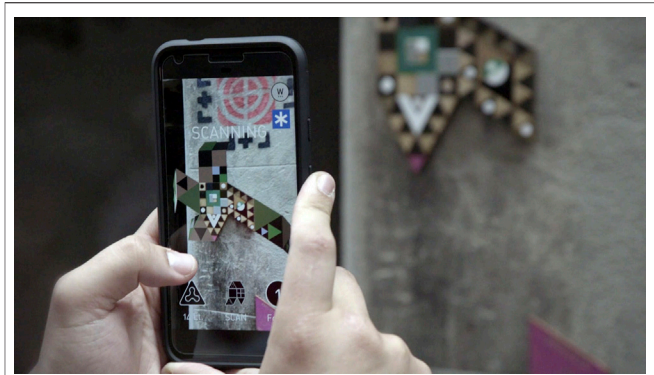
fragments of animation and sound documenting traces of a hidden and alternate city within the city, a playful micronation (**Figure 5**).

As players find their way through the game, conversations, social connections and alliances between players form. These relationships become formalised as players are asked to choose a clan or faction. A colour represents each faction: green, blue, or orange and each represents a different philosophy on urban design. This is a way of decoding the city to perceive it as a process or system, leading players to reimagine or reinvent the city through their play experience (Innocent and Leorke, 2019). Troy Innocent and Dale Leorke (2019) note that unlike other games AR games, *Wayfinder Live* is deeply embedded in the cities material, social, and cultural conditions in which it is played.

Over the course of a week of play, players can apply influence over the locations they unlock by scanning codes and the city map changes to reflect urban design views—shifting in real-time like election results or heatmap of popular opinion. The faction with the most influence over the play locations is declared the winner overall. In the fiction of the story world, the winning faction's philosophy is adopted by the city in planning its future.

Wayfinder Live draws explicit attention to how cities are implicitly encoded. Through engaging with the game and its focus on "hidden codes" at an unspoken level, players come to reflect upon the complex layers of code: material/social/economic/political/semiotic/spatial. Players are invited to become Urban decoders by building a "heightened awareness of place the multiplicity of codes that produce it" (Innocent and Leorke, 2020: 272). This "heightened awareness" is both a mode of tacit learning as well as a placemaking process as players are invited at a deeper level to consider the design and planning of the city, to reflect on how it is shaped and how they can shape it.

While games such as *Pokémon Go* and *Ingress* actively encode the city (Davies and Innocent, 2017) by taking abstractions of the physical landscape (such as google maps) and reskinning them with the aesthetic language of the game brand (such as AR Pokémon), *Wayfinder Live* encourages it players to decode the city. The game achieves this by moving beyond the mobile
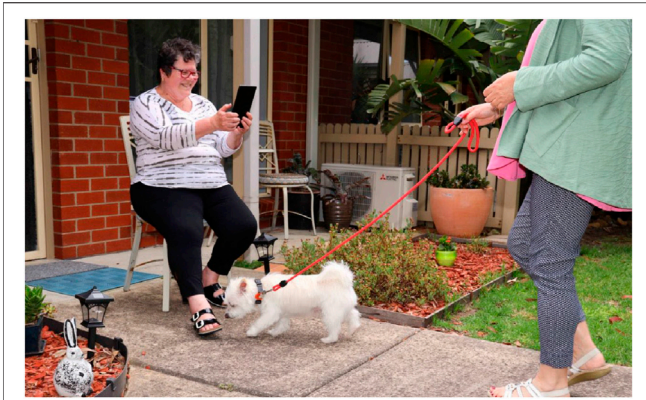
FIGURE 6 | Participants engage with *Pet Playing four Placemaking*.

handset interface to emphasise the lived experience of the city, thereby opening up the potential for that space to be transformed by play (Innocent and Leorke, 2019). The game then serves as a speculative world-building project, communicating urban cultures through play-based learning opportunities.

Through interviews with players, engaging them during and outside of play, the developers constructed observations on the gameplay that can be explored through the lens of tacit knowledge. For example, through semi-structured interviews with six *Wayfinder Live* players, Leorke (2019) identifies heightened awareness as a common element in player descriptions of how the gameplay altered or intensified their perceptions of the city. One player, "Rob" ascribed a "subconscious absorption" of the laneways and spaces of play to his gameplay, indicating how implicit knowledge had emerged through his engagement with the game and space (2021: 225). Another interviewee, Samantha, reflected on how through the searching for codes, she had to "look at everything new, and that's difficult" (2021:227). Samantha and Rob attempt to describe a re-association with the city, demonstrating a tacit knowledge acquired through placemaking and gameplay.

With this intentional outcome of gameplay, players develop a heightened awareness of the urban environment, demonstrating a level of tacit knowledge in placemaking. In doing so, *Wayfinder Live* demonstrates Innocent's artistic intention and offers a powerful example of tacit knowledge in decoding the city as a code and a place towards a reconfigured, heightened relationship with it.

Pet Playing for Placemaking: A Mobile Location-based Game (2020 - Present)

Developed by Jacob Sheahan in partnership with the Cherished Pets Foundation, *Pet Playing for Placemaking* is a location-based game created to support the social engagement of vulnerable older pet owners in a post-pandemic reality. Funded with a Community Connections Grant through the Give Where You Live Foundation to reduce social isolation and support the social participation of vulnerable community members.

Pet Playing for Placemaking is primarily a social and supportive experience. Responding to the isolation and social restrictions on vulnerable and older members of the Ocean Grove pet-owning community due to the COVID19 pandemic, this serious location-based game takes an innovative approach to the support and education of pet ownership in the community. The game invites older pet owners and local community members to partner up and compete in treasure-hunt style gameplay. Older pet owners, limited in mobility and vulnerable to the virus, must complete digital puzzles which reveal locations where their play partner (typically a volunteer or neighbour) can walk their pet and discover more challenges that lead to other places (**Figures 6–8**). Co-operation is critical, with each player supporting the other with their limitations. For example, older pet owners may have low technology literacy and require support to learn these features on their devices. At the same time, their fellow player may need local know-how and guidance to find the hidden locations and look after the pet in their care. The gameplay presents playful scenarios as content through digital-physical mechanics, encouraging players to explore such themes through play and engage with others in their local community.
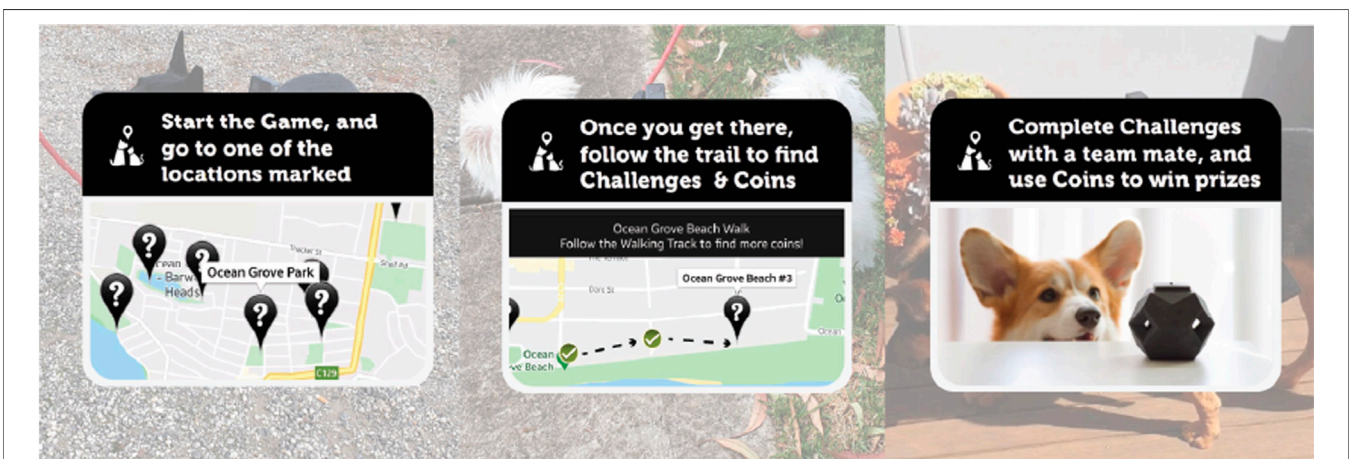

FIGURE 7 | Pet Pals Gameplay Information for Test Players.

FIGURE 8 | A physical location marker that players discover through the mobile application.

In responding to the isolation and social restrictions of the COVID19 pandemic on vulnerable and older members of the Ocean Grove pet-owning community, this serious location-based game takes an innovative approach to support and education of pet ownership in the community. Initial survey research into community conditions and well-being found both vulnerable older pet owners and more mobile volunteers within the Cherished Pets Foundation. Through this discourse, the project aims to make apparent the technical literacy and personal attributes of players (such as the digital limitations of the older players or the inexperience of the volunteers with pets) towards fostering lasting social engagements and inclusive thinking. Furthermore, the game invites an open discourse through cooperative play to respond to the unevenness and inequalities resulting from the pandemic restrictions, such as the reduced engagement and long periods of isolation.

This discourse is aided by the specific modes of communication, with players interviewed outside gameplay on social inclusion, pet companionship and healthy ageing. Nurturing a circle of reliance through which vulnerable and elderly players must complete challenges that enable their volunteer counterparts to advance and discover more locations while pet-walking. Furthermore, rather than rely on explicit and defined pet ownership rules and responsibilities, the challenges push mobile players to realise their interactions with others and develop tacit knowledge of appropriate and fair sharing of places.

Through the early Beta phases of development, testers discovered that the gameplay enables them to communicate their limitations ["I do struggle to walk such distances with my dog, that why my friend (volunteer dog walker) is fantastic" –

Older Pet Owner] as they play. Through this dialogue of reflecting on their hidden and practical knowledges with their partners through gameplay, the researchers captured early co-designing around how to modify the game for individual needs. Each older pet owner and a volunteer have different requirements, live in different places, and have very different pets. Their ways of not only playing but also of moving through places constitute forms of wayfaring that invite reflective and tacit knowledge. The gameplay was initially developed to enable them to take different pathways through the game space, which began the process of placemaking through uniquely cooperative manners that demonstrate their emerging tacit knowledge.

DISCUSSION

As we establish in the discussion of the media arts history of location-based games, modes of tacit knowledge are inherent to this game genre. Location-based games encourage social connection between players and the other occupants of the space in which the games are set, leading to tacit yet deeper understandings of place. These tacit learnings are subtle but powerful, forming a sense of responsibility for spaces and their occupants in the past, present and future. As noted by United Kingdom arts group Blast Theory in a discussion of their 2001 location-based game *Can You See Me Now?* "the gameplay pushes us to understand aspects of ourselves, our communities and social responsibility." (np).

The three cases studies presented above illustrate the varying ways in which tacit knowledge can be cultivated through serious

location-based games. Discussing the experiences of wayfinding and placemaking that each game provokes, we outline how these games deliver tacit understandings of space and encourage players to reconfigure their relationships with the people and environments around them. For example, in *TIMeR*, participants sought further engagement in First Nation places and stories, in WayFinder Live, participants took on new perspectives of familiar city street and in *Pet Playing for Placemaking*, players connected with local communities through intergenerational and interspecies exchanges. These games, we argue, provide handles to explore both how the world is and how the world could be.

A crucial aspect of the tacit knowledge these games deliver is the contexts in which they are created and set. Of equal importance to the game design process is the involvement of local communities and partners in shaping the underlying experience of play. The games presented here were developed through partnerships with social and cultural organisations relevant to their locations and ambitions. Through meaningful collaborations with partners such as the Ngarara Willim Centre, City of Melbourne or Cherished Pets communities, these games afforded deep understandings of the spaces in which they occurred and informed the social interactions that arise between game participants. This principle recalls location-based games as art practice and how the artist/creators are deeply concerned with providing "a right to the city" and raising awareness of the everyday lived reality of the spaces in which games occur. This involvement of the local in location-based games fundamentally influences and informs the tacit knowledge they carry.

We are also aware of the limitations in making a case for tacit knowledge in serious location-based games. Analysing our case studies through the tacit knowledge lens proposed by Asher and Popper (2019), we note that unlike more traditionally didactical education approaches, the tacit knowledge accompanying serious location-based games is difficult to measure. Recognising this, ter Vrugte and de Jong (2017) suggest that students of tacit learning models must be made "aware of what they are doing and how they are doing it" to make tacit knowledge explicit (143). In this way, the social interactions cultivated during and after gameplay do more than connect players to place but also solidify the tacit knowledge and understandings that these games bring. While the games discussed here did not rely on organised debrief sessions, debriefs often occurred organically after play. In these impromptu sessions, participants spoke with each other to resolve their experiences and attempted to make explicit the knowledge they had acquired. We recommend that such debrief sessions be a compulsory element of serious location-based games.

The discussion of tacit knowledge through explicit means is not always easy, especially when the knowledge itself reveals tensions to a player's understanding of space. As outlined by Marianna Cavada and Chris David Foss Rogers (2019), the overlapping of cultural territories and innovative technologies within location-based gaming brings the potential to introduce challenges or conflict at both the digital and physical levels. *TiMER* exemplifies such tensions due to its layering of traditional and alternate knowledges of space, challenging many player's notions of the familiar and known. But by delivering such information within the playful context of the games, players of these experiences can safely engage with contested understandings of place and their presence within it. Herein lays the intrinsic value of serious games–of being able to approach complex real-world problems through practices of play.

In this way, serious location-based games hold the potential to reorganise how values and relationships are developed and transmitted. As such, they follow Flor Avelino and colleague's notion of game-changers, macro-trends that reconfigure the rules of "how society is organised and defined by today's understandings, values, institutions, and social relationships" (2017, 1). Evidence is already emerging of how location based games have influenced people's movements and localised activities during the pandemic (Laato et al., 2020). Likewise, Jacob Sheahan's *Pet Playing for Placemaking* (2020 – Present) and Troy Innocent's recent endeavour 64 Ways of Being (2019 – Present), public art trail *Me* and *UooUoo* (2021 – Present) are examples of community-based and researcher-led effort to explore a return to the urban environment from restrictions and see transformative social innovation in times of COVID crisis. In recognising current issues and responding to them, serious location-based games contribute to the tacit understandings made through these game-changing events. These outcomes might not readily fit into the classroom curricular but instead offer players the opportunity to develop informal knowledge and manage the increasingly embodied and political nature of engagement with their environments.

Futures of Serious Locative-Based Games

This paper has highlighted the tacit knowledge inherent to location-based games and how it can be nurtured in creating serious location-based games. We suggest that given the stabilisation and ubiquity of mobile technologies through which these experiences are delivered, the location-based game genre will continue to grow while further embracing serious applications, perhaps signalling a third era of the location-based form.

In mapping the emergence of digital wayfaring activities, Hjorth, Richardson and Davies (2021) include location-based and pervasive games as occurring in two stages or "generations" of development. The first generation represents an investigational and avant-garde phase of experimentation and development. The second saw a stabilisation of technologies, modes of delivery, and locative games applications as they moved into more formal, institutional, and educational settings. Extending on this generational model, we might speculate that the current era signals a third generation of wayfaring games characterised by increased hybridisation into utilitarian purposed and serious games. Such applications have already seen locative and wayfinding games deployed to a range of spatial concerns, such as encouraging citizen participation in smart city spaces (Cavada and Rogers, 2020) and developing awareness of Indigenous understandings of place (Davies et al., 2019). Meanwhile, as Hjorth and Pink (2014) defined, digital wayfaring acknowledges that the digital, material and social are entangled in complex ways in our movements in everyday life. Thus, we suggest that such modes of learning might contribute a new or "third" era of serious locative-based experiences.

Within these experiences, there is an implicit recognition that cities are not only built spaces but lived places. City spaces arise through socio-cultural relations that are increasingly being informed by digital media. Participants can fundamentally alter the city's shape by changing these social, cultural and technological relations through implicit knowledge, social dialogue, and play.

CONCLUSION

In the context of serious location-based games, this paper has introduced and investigated the use and potential for tacit learning outside of didactic structures. This saw the surveying of approaches previous serious games have sought to offer through new modes of learning about issues from climate change to cultural knowledges. Developing the notion of implicit learning and tacit understandings as ways to engage public spaces through serious location-based games, we demonstrate how experiences of wayfaring and placemaking can deliver tacit knowledge that is useful within educational contexts. Building on the experiential richness of the flâneur's multisensorial and embodied engagement with space, we describe how the digital wayfarer's experiences have given rise to new socio-cultural understandings and perspectives of place. Across the serious location-based games case studies presented, we show how, from practical to tacit knowledge, players gameplay formed as wayfaring to placemaking in urban environments, bringing awareness to the unevenness and inequalities and cultural knowledge of these spaces to the fore.

At the core of this study is the idea that tacit knowledge developed through location-based gameplay formalises as impactful storytelling and understandings of place within social contexts in contrast to prescribed learning models. The examples presented here outline the opportunities for such learnings through new media art and community-based interventions, engaged with how the digital, material, and social intertwine. As game-changing events and movements disrupt and rewrite societal norms and rules, the potential of serious location-based games as mediums of facilitating and reframing these shifts should be explored in such complex and playful scenarios. In arguing that location-based games hold

the capacity to deliver tacit knowledge and understandings of space and place, we propose a new era of serious locative-based experiences. These games that layer the embodied experience of players with social and technological spaces hold the potential to explore both how the world is and how it could be.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by RMIT University. The patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

AUTHOR CONTRIBUTIONS

Each author gave a substantial contribution to the article's conception and development, HD being responsible for forming the background and JS developing the analysis and discussion, with all involved in the editing of the manuscript and approving the submitted version.

ACKNOWLEDGMENTS

We would like to acknowledge the support of the Design and Creative Practice Enabling Capability Platform in the development and submission of this article. We would also like to thank Troy Innocent for allowing us to include Wayfinder Live: location-based augmented reality game (2016) in this article. Pet Playing for Placemaking has been kindly supported by funding from the Give Where You Live Foundation.

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