Persuasive Games for Intergenerational Social Interaction in Urban Environments

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Abstract. Social isolation in urban areas is a societal challenge. It affects people of all ages but particularly elderly who struggle to maintain social ties into later-life. Interventions in social isolation primarily focus on elderly in clinical care, overlooking the existence of older adults who live independently. Despite facing dwindling social contact, groups of healthy older adults reside alongside large groups of younger citizens that might offer much needed social interaction. This type of intergenerational social interaction seems promising but motivations of elderly to engage with younger groups who are not necessarily related to them are not well-understood and vice-versa. Persuasive games have the potential to encouraging social interaction. This paper presents a preliminary work on investigating motivations for intergenerational interaction rooted in persuasion theory. It proposes the use of the Integrated Behavior Model as a theoretical framework for understanding behavioral determinants and explores the use of games as a way of fostering changes in attitudes that could enhance intergenerational interactions.

Keywords: Older adults · Intergenerational games · Persuasive games
Active ageing

1 Introduction

Urban areas- towns, cities and their suburbs are home to nearly three quarters of the European Union's population [1]. This supports the notion that citizens, national and foreign urban migrants will work and age in cities. Although the problem of ageing is often included in city plans such as smart city concepts, these visions usually only take infrastructural and mobility needs of older people into account. The infrastructural needs are provided for by augmenting spaces to make them "age-friendly", in other words fulfilling the assistive needs of older adults related to decline in physical and cognitive abilities [2]. Although urban areas should always cater to the mobility needs of older adults, it is also important to meet their social needs [2]. Recent studies show sustained social interaction to be a stronger predictor of successful ageing than mental and physical conditions [3]. While the link between social interaction and a higher quality of life is not always clear, the benefits of social interactions are generally presented as counters to the negative effects of social isolation. It has been reported that social isolation leads to higher cases of dementia, depression and other health

conditions that expedite the need for institutional care [4]. The increasing need to care for older adults is often implicated as one of the stressors of economic resources in urban growth plans [12].

Information Technology (IT)-based interventions have emerged as promising tools for supporting the lives of older adults in cities. These interventions focus on how IT can enhance the social lives of older adults in a way that enables them to live independently for as long as possible [5]. For instance, monitoring applications use wearable sensors to track the physical state of a user and notify caregivers in case of abnormalities without requiring the user to leave their home [5]. In spite of the benefits it may provide, it is clear that exploiting IT for monitoring can contribute to further social isolation. This undesired effect might be associated to mainstream views of technology which consider older adults as a passive, frail, isolated group that is separated from the larger part of society [3, 6].

We find the view of older adults as an isolated group surprising since the reality is that there are populations of healthy older adults who live independently in city neighborhoods alongside younger groups of citizens. We view this current limited perspective of older adults as a missed opportunity to foster interactions between these different groups. Intergenerational social interaction can address the issue of social isolation, but current challenges to realizing this vision may be attitudinal [2, 7, 8], reflecting a diffuse in *ageism*. Ageism is often presented as negative attitudes younger and older people may hold towards each other [9]. Younger people may view older people as frail and unproductive while older people may regard younger people as troublesome and unruly [3]. There is growing interest in the use of games to promote prosocial behavior between younger and older people. Similar to other research [7, 10], we posit that the success of efforts in intergenerational play requires a keen investigation into motivations and other determinants to engage in this kind of interaction. We propose the use of the Integrated Behavior Model as a theoretical framework for understanding behavioral intentions around intergenerational interaction. We further maintain that grounding intergenerational play in persuasive theory can potentially enhance its goals, particularly for interactions between non-familial players. In the following sections, we introduce a series of concepts related to the problem of social isolation in elderly and propose a research approach towards addressing it.

2   Related Work

2.1   Intergenerational Approach to Social Isolation

As the world's ageing population continues to grow the need for medical care is likely to increase. Furthermore, the rise in the ageing population has been accompanied by a rise in social isolation, a condition of minimal involvement in social life that can lead to feelings of loneliness, depression and dementia [11]. A large part of research has addressed social isolation attempting to increasing communications between older adults and their families or within same age peers [3, 5]. Intergenerational interactions within families have been shown to have positive effects on the psychological well-being of both younger and older people [3]. While these benefits are widely elaborated

on, there is very little research that elaborates on how intergenerational interaction can be improved in the broader society. Studies suggest that there seems to be a diffuse problem of social disengagement between older and younger people of no relation [3] where the motivations to create or maintain social attachments are less apparent. This breakdown is likely to be more relevant in urban areas that include larger populations of unrelated individuals [12]. While some people may regard the separation between younger and older people as natural, we see it as a problem that worsens social isolation and wastes the opportunity to foster new relationships between people who live side by side. Previous research in intergenerational interaction [13] show that elderly people reported a more positive attitude towards younger people and vice-versa [14] after intergenerational engagements. It is hardly surprising that there has been a movement to extend these benefit using games. While this game-based intergenerational approach has clear benefits, there is need for a more coherent effort in improving attitudes between players of a different generation and relation.

2.2   Persuasive Games

Persuasive technology (PT) is a term used to describe systems that are designed to influence a user's behavior or attitude without coercion [15]. By extension, persuasive games try to accomplish the same goals by gameplay. Games have crossed over from being used purely for entertainment and have also become a medium for tackling complex societal issues [16]. The use of games as behavior and attitude change agents is significantly elaborated on by Bogost [17]. The recent success of games like *This War of Mine* and *Spec Ops: The Line* has further renewed interest in the use of games as tools of persuasion [16] and it is not surprising that digital games have also been identified as a viable means to promote social interaction and learning between different age groups [3, 10]. The use of games is further bolstered by the increase in the number of gamers over the age of 50 [18].

   While games, and more broadly gameful experiences, follow a characteristic of being rule-based and structured [19], persuasion can also be implemented in playful experiences. According to Deterding et al. [19], playful experiences fall in the region of care-free play where activities support a more exploratory, free-from, expressive, improvisational amalgamation of meanings and behaviors. Kors et al. [16] elaborate on the potential of playful experiences to influence attitude formation and in the long run, behavior change. Although distinctions have been drawn between game and play [19], we do not see the need to introduce a new definition for a combination of the two. Instead we use the term "gameful experiences" to mean a combination of both rule-based goal oriented structure of traditional games and the open exploratory modes of play. This mix of game and play is especially important as it allows for prototyping play modes and investigating motivations, it does so by presenting open modes of play that encourage discovery and iterative design while maintaining a light-weight structure of game rules. Gameful experiences can be facilitated without the more committed investment required to play long complex narrative-driven digital games and therefore, may even be more successful at recruiting reluctant players.

There are several mechanisms used to implement persuasion in game and play, these include but are not limited to enjoyment, immersion (engagement), flow, procedural rhetoric and persuasive strategies. The mechanisms are interdependent and contribute to promoting positive reflection and engagement in the case of attitudes. Of the five that we have listed, we find enjoyment, procedural rhetoric and persuasive strategies to be the most relevant. Enjoyment can be loosely described as the qualities of a product that make it fun or pleasurable to use [20]. Fun is distinct from pleasure in that it is associated with distraction and leisure, while pleasure is associated with absorption brought about by skill, challenge and clear goals [20]. Both fun and pleasure are important to enjoyment and may be cultivated to bring about different levels of enjoyment in a game [20]. Although it hasn't always been at the center of games with a purpose, researchers have prioritized enjoyment to be instrumental to all other goals games might hope to achieve [18, 21]. Procedural rhetoric refers to the way games use processes persuasively by guiding players through different stages of reflection [17]. Guiding players through processes in a game has been shown to produce strong feelings of empathy and attitude change towards groups or individuals [16, 17]. Persuasive strategies can be thought of as principles adapted from social psychology that explain why people comply, perform or reject certain behaviors [22]. The *authority* persuasive strategy, for instance, refers to the tendency for people to easily comply to requests made by people we regard as having advanced knowledge on a specific topic [23]. All the mechanisms discussed are used to strengthen the persuasive quality of a game.

2.3   Integrated Behavior Model

In trying to understand the factors that affect persuasive interventions, researchers often rely on psychological frameworks [22, 24]. The frameworks are useful for examining behavioural determinants, which are the casual factors that explain why a behaviour is likely to be adopted or rejected. While some designers may consider behavioural determinants before a design, it is common for designers to engage in design without the guide of a theoretical framework [24]. Nevertheless, it has been suggested that following a theory-based design of persuasive systems leads to higher success [24]. Several models such as the Fogg Behavior Model [15] and the Attitudinal Gameplay Model [16] have been proposed to design persuasive systems building on psychological frameworks. These abstractions have the advantage of being simple but they may lack the complexity required to understand the relationship between behavioural determinants and persuasive goals. The Integrated Behavior Model is a framework that describes a given behaviour as a function of attitudes, perceived norms and personal agency [25]. The *attitude* reflects a person's predisposition to a certain behavior. The *perceived norm* describes the influence of others to perform (or not to perform) a behavior. The *personal agency* influences the extent to which a person's ability or environmental factors enable them to perform the behavior. We believe the IBM has the potential to overcome the challenges of conventional persuasive design, especially where persuasive design oversimplifies behavioural determinants in favour of being efficient [26].

3   Proposed Approach to Persuasive Games for Intergenerational Interaction

The possible state of opposing attitudes between older adults and younger citizens leads us to consider persuasive games and persuasive gameful experiences as a potential way of facilitating intergenerational social interaction. This section describes the research we intend to carry out to accomplish the research goal of developing a persuasive game for intergenerational interaction. Furthermore, we also aim to develop a framework that shows how persuasive strategies, procedural rhetoric and enjoyment can be used to enhance attitudes in the frame of a game. We use the research through design process [27] to probe the concepts of game and play, and plan to evaluate technical artifacts that encompass our learning. Figure 1 illustrates our research process, starting with an examination of behavioral determinants, the design of persuasive gameful experiences and finally, an evaluation of player experience. The process unfolds incrementally and iteratively, building towards a final technical artifact.
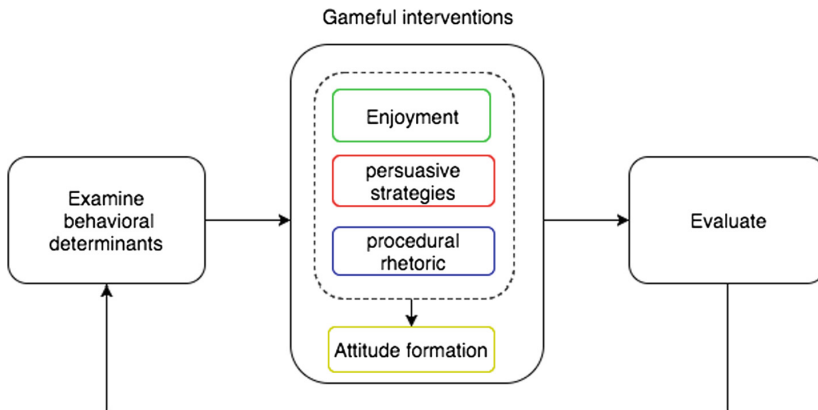

Fig. 1. Research design

3.1   Behavioral Determinants

While there have been a considerable number of efforts in the direction of intergenerational interventions, most interventions using games have received minimal attention outside the family sphere [3, 7]. We aim to investigate the motivations for non-familial intergenerational interaction, why and if older and younger players would choose to engage with the other in play. This is a distinctive aspect of our research. Furthermore, intergenerational games have partly been unsuccessful due to the little attention given to behavioral determinants. Looking at the broader context of persuasive games, Kors et al. [16] state that current persuasive design practices rarely consider how attitudes are formed. This point is particularly significant since change in attitude is considered as a reliable predictor of intent for behavior change [16]. Kors et al. [16] further point out that although there is enough evidence to demonstrate the persuasive

power of games, there is little in the way of research that practically shows how persuasion and therefore behavioral determinants can be accounted for in the implementation of persuasive games. It is from these shortcomings that we have chosen a behavior-theory driven approach that identifies behavioral determinants and reconciles them with persuasive strategies in the frame of games and play.

As shown in Fig. 1 the first part of our research is concerned with investigating the behavioral determinants for non-familial interaction. This will involve a closer look at motivations, perceived norms, self-efficacy and attitudes. We plan to carry out semi-structured interviews for this part of the research. The target of the initial studies will be older adults that live independently (60 < older) and youth (18–30) residing in Trento, Italy. Through means of a conceptual design, prior work by [26] used the IBM to study the motivations of older adults to use a social network that connects older adults with similar interests. Within the IBM framework that considers three major components (attitudes, perceived norms and self-efficacy), a series of semi-structured interviews were carried out. The results showed a diversity in the motivations of older adults which are only partly met by the medical model that dominates the design of older adult technologies [26]. Although the objective of the early research had no specific focus on games, the results provide valuable insights on behavioral determinants that might be useful in the design of a persuasive game intervention. We intend to expand on the use of the IBM for technology design by using it to study the determinants of older adults and younger participants towards intergenerational interaction. Finally, we also intend to probe the meaning of game and play, which can illuminate how these concepts differ across generations.

3.2   Gameful Interventions

As is typical of any research through design project, we do not immediately envision developing a final commercially-ready artefact. Instead we rely on capturing multiple perspectives of the problem, generating ideas and prototyping a series of game and play experiences. That said, we do however expect that we will have an artefact of relatively high fidelity that will encompass most of the learnings from earlier iterations. It may be called a final artefact in that sense. The technical artefacts will be developed through participatory practice with older and younger players. We choose this form of co-creative design to record player sensibilities and to develop play mechanics, dynamics and aesthetics of the gameful experiences. Similar studies [28] affirm that a participatory approach can be effective for finding a good balance of game features for both player types. Involving both younger and older players will also provide a platform to playtest the gameful experiences. Once again we harken back to the idea of using gameful experiences as instantiations of game and play that build knowledge around the quality of the interactions, behavioral intentions and the effectiveness of persuasive strategies. We feel that this approach is useful to balance aspects of purpose and play that would otherwise be lost in creating a fully-fledged game for entertainment or a purpose game that misses out on the crucial aspects of enjoyment that make games fun to play. We expect to investigate the interplays between enjoyment, persuasive strategies, procedural rhetoric, and how they affect attitude formation.

3.3   Evaluation

We constrain our evaluation to co-located play, for the simple reason that remote play is disembodied while co-located play utilizes presence and direct interpersonal engagement. Here we make an assumption that co-located play might be better at promoting social interaction than remote play where players can easily disengage [29]. We evaluate the quality of interactions using observation, post-game questionnaires, and pre and post interviews. This approach has been used by other researchers [10, 16] in assessing attitude change. Due to the fact that the persuasive goal is a change or reinforcement of attitudes, we are reluctant to operationalize measures such as a "performance of target behavior". We feel instead that focusing on the self-reported gameful experiences would offer greater depth in understanding the efficacy of the interventions. In our evaluation we look at the quality of the interactions but we also examine how the gameful interventions enhance determinants. An incremental and iterative approach to the research ensures that the learning outcomes of each iteration inform the properties of the next, all the while improving our knowledge of both determinants and persuasive mechanisms (see Fig. 1).

4   Discussion and Future Work

Our research aims to investigate the determinants for intergenerational interaction among urban citizens (of no relation) for the purpose of designing persuasive gameful experiences that addresses social isolation concerns. We are currently applying research through design inquiry methods to understand the state of attitudes between potential young and older adult players. The results of these preliminary studies, review of existing literature and a participatory workshop will inform the design of persuasive games that will be evaluated with the target users. An additional point of interest in our research is to investigate the role of fun in the effectiveness of persuasive games. On the one hand, persuasive design seems to offer a way to improve the persuasive quality of games, on the other hand it seems like too much of an emphasis on persuasion can distract from the more engaging qualities of games. We also hope to show the distinct advantages that non-familial interactions provide over the more established familial convention.

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