Arts, Maps and People: Exploring engaging objects

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I hereby declare that this dissertation is all my own work, except as indicated in the text:

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Date 13/09/2016
Abstract

Through the artistic practice, this research explores the rhythm of an audience’s journey around a mixed reality object. Similarly, theoretical, observational and self-reported methods have supported the study unfolding the audience’s engagement with artistic maps.

Snail’s Place is the designed artwork that uses both, physical and virtual, environments to represent a city far away from Nottingham. Archeological evidence regarding the artist’s hometown was the resource to bring back the complex dynamic of the city; ambiguous criteria was used to inspire new narratives in the spectators. The physical world is a designed aquarium inhabited by coloured snails, they are tracked and projected in a digital map. Regarding the technical solutions, a Computer Vision and Computer Graphics systems were coded to connect the movement of the snails with the virtual world. The digital map’s surface displays a novel design to hide and reveal the map from different viewpoints, enhancing concepts of exploration and discovery, and supporting the journey of the audience. HCI researchers, artists and general public explored the object revealing key details of their experience. Information about their actions, movements and strategies are profiled in fourteen sheets, as well as commented in a critical evaluation; likewise, the spectator’s interpretation is studied as an active interaction, thus, audience become creatively co-creator of the meanings in the artwork.

The participants showed several different strategies to approach artistic maps based on their journey and their actions. Thus, the participant trajectory was defined by a set of focused and unfocused movements, preferred and abandoned viewpoints, and expected and unexpected actions. In addition, the spectators’ interpretative engage displayed different levels of comprehension regarding their vision of the environment, the living entities and, consequently, the quality of the spaces. Finally, based on the profiles and critical evaluation the artist reflects on the artistic and HCI rationale to inform the artwork.

Keywords: Audience, Engagement, HCI, Mixed Reality, Interactive Art, Trajectories, Maps
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1 Introduction

Since the oldest map, found thousands of years ago sculpted on ancient stones; paths, edges, districts, nodes and landmarks have been essential in the representation of every geographic environment (Lynch, 1960). However, according to de Certeau (1984) vision, some artists have worked with geographic information moving from the immutable urbanistic space to reimagine new representations of urban environments with the inhabitant as the main actor. Emotions (Nold, 2004), sensations (Quercia, 2014), or movement patterns (Belasco Rogers, 2011) have been some of the characteristics explored for reimagining this urban geography based on the behaviours and relations of its inhabitants. Looking at this artworks another valuable element may be highlighted, these usually exist inside the Mixed Realities (Milgram, 1999); and although most of them use Location Based Systems to describe Maps, the hue of possibilities is enormous. Likewise, the audience’s journey through a designed experience does not have to be restricted to a singular category of the Mixed Reality, as suggest to Koleva and colleagues (2009) the experience can create the illusion that different realities are joined together. Thus, taking into account artistic combinations to represent cities, and the participants journeys (Benford et al., 2009) around an artwork we might identify that the role of audiences is a complex process.

1.1 Purpose of the study

The audience’s interaction might not be usually related to the manipulation of the artwork as Reeves (2011) and Sheridan, Bryan-Kinns and Bayliss (2007) suggest, and consequently, Edmonds’ (2007) assumptions mention the audience’s interactions are based on the viewing as an action to engage the artwork, by observing and interpreting its meaning. The purpose of this research is to explore the artistic practice the engagement of the audience with artistic maps. This project will present a prototype of an interactive art object based on slow interactions; this system will work tracking the position of animals in an aquarium and displaying them in a digital world.

1.2 Aims & Objectives

Complementing the previous description, this dissertation will be oriented to:

- Outline the journey of the spectators around an artistic object whilst exploring artistic maps.
- Examine how people engage with the multiple meanings of an interactive artwork.
• Investigate the audience’s engagement by a combination of theoretic, artistic and analytical, methods.

1.3 Structure of the dissertation

In the second chapter, the key concepts for studying and developing interactive arts will be analysed by analysing previous examples approaching artistic maps. Likewise, some useful frameworks of HCI (Human-Computer Interaction) in arts will be critically reviewed. The third chapter will describe through three components the design of the artwork. The artistic rationale traces how the artists have defined the artwork and its reflexive practice. The HCI rationale explains the designed interfaces to support the artistic content, and more importantly, it describes the designed interactional trajectories. Additionally, the technologies implemented are described as well. The fourth chapter will trace the settings of the formal study, the methods to gather the data, and the way to analyse them. The fifth chapter will display fourteen profiles illustrating the background of the participants, a visual description of their behaviour whilst exploring the artwork (e.g. actions, positions, movements), and the information provided in the interview. We will present a critical evaluation of the overall approaches in the sixth chapter. The observational analysis will draw on the rhythm of the participant’s journey. We will also categorise and comment on the dialogues provided in the interviews. In the seventh chapter, the study iteratively informs the artwork in the artistic and HCI fields will be presented and discussed. Finally, in the eighth chapter a conclusion of the research process and our approach to the research question will be summarized.
2 Related Work

Interactive art has been approached several times by artists and researchers, in this chapter we will provide examples of various projects that have explored artistic maps by the interaction between humans and technology. The focus of this analysis will be centred on the relationship that emerges in this experiences from a human-centred perspective, therefore, the studies of HCI in arts will take an important role in the discourse of this dissertation, as well as the analysis of the audience’s performance who are the main issue in the question that this project tries to answer. Regarding artistic maps, we have identified a gap in the study of the relationship of the exposure to both, physical and virtual representations. Hence, a methodology that addresses multiple connections around theory, practice and study will be outlined to determine the suitable position to approach this research question.

2.1 Previous work - Cities in Interactive Arts

It is notable how previous examples have captured maps and cities with novel artistic resources. Different teams have highlighted specific elements regarding HCI such as the collection of Geographical information (Belasco Rogers, 2011), ludic interactions for everyday objects (Gaver et al., 2004) or public interfaces for spectators (Flintham et al., 2007).

Some Geographic projects have allowed to analyse different cities through the movements of their population by GPS technologies (Van der Spek, 2009). Similarly, Belasco Rogers (2011) has exploited the same principle in his artworks. He has been capturing Berlin through his movement around the city (technically, the movement of his GPS device) since 2003. He also has examined different ways to engage with his audience; Belasco has materialized his artwork in plotter prints, as well as in interactive installation, describing his memories whilst journeys are being drawn on a display.

![Figure 2.1 Draw of my life (Belasco Rogers, 2011)](image)
An interdisciplinary team had used technological solutions to link digital and physical realities in everyday life (Gaver et al., 2004). One of their products was the Drift Table, a toy object to be used at home. This coffee table allowed users to navigate in satellite maps by a system of sensors, creating an environment of uncertainty. Benford and colleagues (2005) explain how Drift Table is a good example of a study that combines the analytic and inspirational process in the development of artistic interfaces, by the analysis of sensed, expected and desired characteristics.

![Drift Table](image)

**Figure 2.2 Drift Table (Gaver et al., 2004)**

Other artists have worked with physical mock-ups to reproduce spatial environments, with interfaces centred on spectators. DoF (Day of the Figurines) was a pervasive game played by text messages. A physical map was presented to show the movement of the players in the virtual city, and especially, to engage new participants (Flintham et al., 2007). The elements of the interface have been designed to lead the audience by way of a set of activities through a whole designed experience. In a similar way, Real Snail Mail was conceived as a net.art project; where snails, inside a tank, were tracked by radio-frequency identification. Their opportune movement across the tank allowed the system to send emails stored in the server (Lieser, 2008). It became an installation allowing the audience to observe the movement of the animals in real time, whilst a blog was describing the adventures of the snails (Isley, 2008).
Nevertheless, to examine thicker the relationship between the artwork and the audience is necessary to look the HCI concepts in spectator interfaces and in spectator experiences. Similarly, identify the role of this group in interactive arts will provide suitable criteria to the literature to set the study.

2.2 The complex city

We have identified several examples around the representation of physical places through diverse techniques (i.e. drawing by GPS tracking, exploring in ambiguity, controlling actions by SMS, and much more artworks). However, current conceptions of cities encourage researchers to consider a complex vision of places where the perceived space (e.g. the concrete area that is usually represented such as streets, squares, parks, buildings, among others) and the conceived space (e.g. mental constructions, emotions, and emerging ideas, in other words the relation that emerges when living entities inhabit a physical space) coexist (Lefebvre, 1991; Purcell, 2002). Therefore, we are motivated to explore the narratives of maps in artworks when the perceived and the conceived space are representing a lived space.

2.3 HCI in arts

Due to the crescent interest of artists in interactive artworks, several researchers have presented taxonomies, key concepts, and practical frameworks to support artists and designers in different stages of the design process. This chapter will show extracts of different postures around those resources; this review will provide the knowledge to understand how other authors have engaged with their publics in a variety of interactive artistic products, likewise, it has been the theoretical basis for the development of the study and consequently of the artwork. Some contributions have emerged by the examination of interactive objects, others by reviewing inspirational methods and others from the study of key concepts.

Traditionally, HCI has been oriented into the breakdown of qualities of the products in terms of its usability, especially in the workspace (International Organisation for Standardization, 2000). However, artists require a different optic to evaluate the relation between artworks and their publics (Paulos, 2007). Thus, some researchers have included concepts like fun, leisure, surprise, among others (Cockton 2006; Law et al., 2008) to talk about the experience in the interaction. Even, Jordan (2000) introduced four types of pleasure to explain satisfaction in the HCI interest; focused in the experience of play, Costello and Edmonds (2009) provide a set of interesting concepts by the synthesis of different approaches in thirteen categories around
pleasurable experiences (Figure 2.4) where exploration, discovery and captivation have had a protagonist role in artistic interactive maps.

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<td>Exploration</td>
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<td>Application of Skill</td>
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Figure 2.4 Pleasure Framework (Costello and Edmonds, 2009)

Drift Table was also conceived as a variant of utilitarian HCI (Gaver et al., 2004). Focused on ludic engagement, this artwork traced the importance of play as cultural attitude (Huizinga, 1944; Gaver et al., 2004) by promoting the exploration in an ambiguous interaction. Gaver and colleagues explain that ambiguity is a powerful resource in playful experiences, that might be used to generate a different type of narratives, co-created by the audience. However, a different type of strategies might be approached to produce meaningful experiences through ambiguity; some researchers explain how imprecise information, incompatible contexts or unfamiliar relationships may encourage the spectators to reflect on the issues, as well as, to produce their own interpretations (Gaver, Beaver, and Benford, 2004). Similarly, Jochum and Goldberg (2016) have studied the uncanny in Telegarden, a Net Art project. This artwork showed a deep contrast between the fast feedback of the new technologies and the slow and delicate growth of plants in a garden operated by a robotic arm (Gatti, 2010). Users modified the physical space (e.g. planting, watering) surfing in the website of Telegarden; nevertheless, they never meet the physical garden and are constrained to trust in the existence of the garden by their ambiguous relation with the website (Jochum and Goldberg, 2016).
Particularly, in interactive maps, we have identified two issues that are addressed by the authors. On one hand, the representation of the space, that sometimes is very close to the figurative reality (e.g. the satellite maps in Drift Table); however, cities have also been illustrated by the abstraction of any of their elements (e.g. GPS following Belasco Roger’s movements in The Drawing of my Life). On the other hand, maps have been related to the temporality of their narrative; the map that was built as the spectator interface in DoF, shows a temporal expansion where twenty-four days of interaction represent twenty-four hours in the rendered city (Flintham et al., 2007), in contrast, Real Snail Mail’s tank is an environment designed to observe the movement of the agents in real time. We have also found a coherence in the speed of the meaningful relations (e.g. slow-paced feedback in Drift Table and Real Snail Mail, temporal expansion in DoF, slowness in the designing process in Drawing my Life). Grosse-Hering and colleagues (2013) debunk the relation between fast and fun, and slow with sloth. The authors consider that the characteristics of the slow design are able to generate a suitable environment for contemplation and subsequently reflection (Figure 2.5) (Grosse-Hering, 2013; Marsh, 2016).

Figure 2.5 Slow Design Principles (Grosse-Hering et al., 2013).

To sum up, based on a slightly shifted definition of experience, some researchers and artists have explored HCI concepts in artworks to engage their spectators; however, HCI has also inspired artists to develop creative interactive works. Thus, interesting and useful concepts have emerged from the analysis of HCI in interactive arts such as exploration and discovery. Finally, we have identified the representation of space and time as common issues to address in interactive art maps, and slow interaction and ambiguity as key techniques to engage in this context.
2.4 A framework for interactive arts

Beyond inspirational concepts, in the review of the literature around HCI in interactive art, we have identified frameworks able to support the artistic process through the design of the interactions, and consequently the spectator experience. Frameworks might become more than just creative insights, an important link between the arts and the HCI in the development process, and in the study of the experience (Benford et al., 2013).

Benford and colleagues (2005) consider how the participation of a research team in Drift Table project have contributed with analytic resources to enhance the interaction after the inspirational phase. They explain how the evaluation of the ‘expected, sensed and desired’ movements have improved the performance of that artwork, by analysing weakness and strengths through a series of brainstorming sessions and a subsequent comparison. However, the researchers explain that this framework could have better results when physical interaction is involved. Conversely, Interactional Trajectories are not focused on the manipulation of the artifact, but, it searches a way to combine interfaces, physical object, audience, and others, in a holistic experience (Benford, et.al, 2009). Costello and Edmonds (2005) define trajectory as the control of the flow experience, through significant moments that outline the experience; therefore, interactive artworks, especially those related to mixed realities (e.g. DoF, Desert Rain, Uncle Roy All Around You) might be designed and analysed from the perspective of the user experience, by managing the route of the audience through the experience (Benford et al., 2009). The researchers define a framework to design the key moments in the journey of the spectator in three types of trajectory, matching the designed journey with the desired experience. Beginnings and endings that frame the experience, the first one introduces the premise to the audience attracting their attention; the second might be conceived as a space for reflecting (individually or in groups) about the experience. In between of the journey, the researchers suggest analysing the flow of the journey by the Traversals, a concept introduced by Koleva and colleagues (2000), that makes reference to the movement between the physical to the virtual environment and vice versa. Likewise, Benford and colleagues (2009) mention the implications of the transition between interfaces, episodes, resources and infrastructure; particularly to manage the moments of disengagement and reengagement aligned with the flow of the experience.

Designing narratives is a complex negotiation between the predefined key moments and the individual behaviours. On one hand, the artist defines the previous criteria to create a Canonical Trajectory (i.e. the guideline of the experience). On the other hand, spectators perceive a personal journey based on the intimate relation with the key components of the artwork, this is
the Participant Trajectory (Benford and Giannachi, 2008). Hence, the researchers recommend strategies of pacing during the orchestration to mind the gap between both journeys. In DoF is observable the relation between the analysis of the designed interfaces and the behaviour of the spectators in order to assemble a logical journey through the map (Benford and colleagues, 2011). Their study shows the spectators moving from the first contact with the map, through a set of milestones around the experience in different roles and interfaces.

### 2.5 Designing for the Audience

Additionally, to indicate the nature of the spectator in interactive art is particularly important a holistic understanding, when applying the framework for the design and study of the interactions. We will look at how authors have investigated the role of people in interactive experiences, distinguishing the presence of the audience in the environment (Edmonds 2007; Sheridan, Bryan-Kinns and Bayliss, 2007; Reeves, 2011). Nevertheless, slightly differences have been distinguished between diverse postures.

![Performance frame](image)

**Figure 2.6 Performance-Led Research Methodology (Reeves, 2011)**

There is an artistic conception of the audience where they are considered observers that might perform an active engagement. by viewing as a creative act (Duchamp, 1957; Edmonds 2007). Others commune these ideas reinforcing the active presence of the audience, not based in performing any action, but involved in an active interpretation of the meanings (Heitlinger and Bryan-Kinns, 2013). Reeves (2011), introduces a more extensive taxonomy to name the components of a public performance based on the types of interactions that could happen in a Performance Frame experience (Benford et al., 2006; Sheridan, Bryan-Kinns and Bayliss, 2007). The audience is a third party who is in the boundaries of the stage affected indirectly by the manipulations and the effects of the participant’s performance; likewise, he includes the bystander, the participant, the actor, and the orchestrator in the Performance Frame (Figure 2.6). As, Reeve’s spectator's concepts, Sheridan, Bryan-Kinns and Bayliss (2007) describe the frame
regarding the intention and the meaning. They use Beeman assumptions (2007; Sheridan, Bryan-Kinns and Bayliss, 2007) to distinguish types of spectators whilst define wittingness, technical skills and interpretative skills. Sheridan and colleagues characterize performers as the motor of the system, they are aware that they are part of the performance, and they are allowed to manipulate the interactive system. Participants are part of the scene and know that are been observed, however, participants do not manipulate the performance. Audience frame a group of people that are conscious of the performance frame as well; they do not perform any technical skill and, consequently, they do not aggregate any valuable meaning to be interpreted by other members of the audience. This project finds suitable the performance frame to allocate roles to the parties in the artwork; however, based on the Fischer-Lichte (2008) assumptions, who characterize animal bodies as performers in arts, we want to consider the presence of unwitting performers in the frame.

Based on observation and reflection, Heitlinger and Bryan-Kinns infer three levels of engagement that vary depending on the comprehension of the spectators. Surface engagement refers audience appreciating the materiality of the artwork, although, they do not show interest in the content; associative engagement means that the audience creates their own stories by connections with elements of the artwork; deep engagement, when the audience record the story as the author defines (Heitlinger and Bryan-Kinns, 2013). Specific strategies to engage the audience have been explored by Reeves (2007) analysing diverse ways to combine manipulations of the interactive object and the effects produced as a resultant. Thus, through the exercise of hiding or revealing these characteristics in spectator interfaces, Reeves defined Magical, Expressive, Secretive and Suspenseful possibilities to approach the audience (Figure 2.7).
To sum up, designing for engaging an audience means to understand the characteristics of this public that is involved in an active participation by the contemplation and interpretation of the spectator interface. Audience's frameworks provide the resources to approach the spectator, as well as, the elements to evaluate the type of engagement produced.

2.6 Methodology

In order to trace the engagement of the audience with artistic maps, we have identified a suitable methodology for approaching the research question from the artistic and scientific perspectives. Benford and colleagues (2013) suggest a methodology to unfold the relation of three areas (practice, studies, and theory) and their multiple combinations (Figure 2.8). According to this proposal the methodology of our dissertation will be addressed by (i) the review of the information of previous artistic interactive maps, as well as, the critical analysis of the concepts and frameworks that have been investigated previously; (ii) the creation of an artwork that has been guided by HCI and arts, and the personal reflexion of the artist whilst designing the experience and prototyping the object; finally, (iii) the formal study of this prototype when writing the artistic and HCI rationals and in the evaluation of the human behaviour around the experience.
Main challenges around each component and between them have been mentioned by the authors. We want to highlight some of the ones that have implied to create strategies to deal with them. Benford and colleagues indicate that in artistic studies are suitable to understand both, the experience of the spectators and the artist's intention. In Practice challenges, the authors talk about the potential difficulties for contrasting patterns of work activities between researchers and artists. They also explain the usual concerns in the documentation of the artwork, they encourage artists and researchers to record visual information of the artwork that maintains appropriate language and structure for each community (i.e. HCI and arts). Likewise, archiving systemically important information have to be issued carefully, these are the essential link between the knowledge and its materialization in the artwork.

Advantageously, in this project the research and the arts are developed by the same person, therefore most of the dichotomy might be managed. Beside the HCI descriptions regarding theory, practice, and studies, we have decided to include Artistic Rationale and Artistic Evaluation as additional inputs to the discussion of the research question. The artist/researcher started a log to archive all the interesting information about the project.

2.7 Conclusion

The exploration of artistic maps is not a new question, it has been addressed by different artists and researchers for decades. Artists have shown novelty ways to engage users by representing the perceived space (Gaver, 2004; Flintham et al., 2007; Belasco Rogers, 2011) and HCI
researchers have unfolded interesting theories around the experience in interactive arts (Gaver, Beaver and Benford, 2004; Benford et al, 2013).

In order to approach the research question holistically, we have analysed the performance-led research. Hence, we will design and built an artwork applying the knowledge found in the combination of HCI and arts disciplines. Through interactional trajectories, a set of interfaces will represent a mixture of physical and digital space; exploration and discovery are concepts that might be integrated into the experience, as well as, the resources of slow interaction and ambiguity. Additionally, a formal study will be developed to analyse the participant’s experience.
3 Rationale

3.1 An overview of Snail’s Place

Snail’s Place is an interactive artwork that merges object design and computer graphics in a mixed reality environment to show a dialogue between physical and virtual maps. Representing a city, placed in the highlands (3000 meters above the sea), a group of snails live in a designed aquarium where the aesthetic is related to a specific zone of this city. The movement of the snails triggers a digital map that adds different information to the representation of this environment on a different surface. Both, the conceived space (i.e. the physical world), as well as, the perceived space (i.e. defined by the personal approximation of the artist to the city) allow the spectator to engage the lived space, in other words, the complex picture of a place that exists thousands of kilometers far away from Nottingham.

The audience’s interaction is based on an active interpretation, although there are no direct manipulations to modify the performance of the artwork, the object invites the spectators to engage by exploring and discovering the simulated realities. However, the apparently autonomous behaviour of the artwork does not have to be understood as an algorithmic expression, the performers who operate the dynamics of the object are living creatures (snails), emulating the uncertain behaviour of humans in cities, which includes a bizarre, but enjoyable, relation of ambiguity in the narrative.

3.2 Artistic Rationale

Snail’s Place has two main artistic goals to talk about the relation of the citizens in cities. One is autobiographical, therefore, I analysed and represented my hometown by different elements. However, the other is interrogative; I am interested in encouraging the audience to think about the importance of the inhabitants in the representation of places.

3.21 Autobiography and memories

To me, this project started as a self-portrait to bring to the spectators in UK an important part of my life in Ecuador. I was born in Quito, and I spent about 25 years living in the same neighborhood “La Jipijapa”. Hence, I wanted to bring back a story about my past by representing the place, but more importantly, displaying the emotional relations that I got in that zone with my family and friends. Thus, Snail’s Place becomes a deep map to recall memories during the exhibition of the artwork, where performance and the city were combined in a whole
experience (Pearson, 2006). Nevertheless, the design process has been an opportune approximation to unpack symbolic moments and places during the investigation and the doing.

In order to set this artwork I recalled my past and sketched a preliminary map with the strongest places around my neighborhood. I tried to transport myself to those spaces to feel the same that I feel when I am over there. Thus, I found several special places such as a little park behind my grandmother’s home that I did not use to go very often but that is etched in my memory. I also recalled other confusing places, full of chaos, garbage and also fear. “La Y” it is one of the biggest green areas, however, nobody frequents this place for enjoyment. It is framed by the junction of big avenues, but also it has several informal traders in a chaotic organization under the huge and dirty concrete walls of their bridges. In the following list, I will briefly describe, based on my experience living in this neighborhood, what have been the most important physical elements of the landscape of “La Jipijapa” (Figure 3.1).

Figure 3.1 “La Jipijapa” (Sketch and Satellite)
1. “La Y” (The Y). The big roundabout and junction of three important avenues of the capital. It is a tribute to the things that I do not like in a city (traffic, thieves, and concrete). Obviously, is one of the most frequented places by cars; as well as, an important informal station to take the public transport.

2. Bus Station. This bus station works for the electric transport, an electric bus service, it represented the future of the mobilization in the city in 1995. Nowadays, it is overcrowded. However, it may be the fastest way to travel across the whole city. Its exclusive lane is also a paradise for bikers invading the street for avoiding contact with other cars.

3. Bullring. This particular place, have two components. One one hand, it represents the animal cruelty on bullfighting events and its extension on massive street parties full of drunkards and troublemakers; but also, it means dozens of massive protests to stop this barbaric act. On the other hand, the bullring has been a cozy scenario for plenty of rock bands that I have enjoyed with friends.

4. “El Globo” (The balloon) - Mall. El Globo was a very old fashion mall, it does not exist anymore; however, I used to go there with my grandmother to pay the water and the power. We also frequented that mall to develop film photos, therefore, I remember that we have some pictures taken in that place, mainly the first or the last picture of the film.

5. Parent’s home. My parents live in a group of three houses. The front house is inhabited by the sisters of my grandmother they are the landlords of the entire property. My grandmother lives in the top house nowadays; however, my cousin and his mother used to live there before; and before them my mother’s cousin with her parents. My parents live in the third house and I used to live with them and my brothers until I turned 23.

6. “Isla Tortuga” (Tortoise Island) - Park. It is a group of eight little parks, each one has their own meaning and represent a particular group of memories. Probably, the most important is the nearest to my parent’s home because it was the meeting point of friends, cousins, and family; I have had lots of adventures in there. It suffered a positive transformation in terms of its infrastructure; nowadays, it is the start of the bike line of the city.

7. Technical Institute. It was my father’s workplace for a while, and although, I have never studied in there, I have a bad feeling about that place. Most of its external walls are gray and full of graffiti tags. Before that, the walls were old metallic fences, some of them were bent and were the escape route of some students.

8. The Hornero Pizza. One of the most delicious pizzas of the city, we celebrated some birthdays over there. It includes a playground with plenty of plastic balls and tons of
static; we enjoyed the area mainly when we were children. Nowadays, my daughter and her cousins love to eat there.

9. Spanne’s - Building. I recently, came back to the neighborhood, almost three years ago. I spent about two years living with my family in a flat of Spanne’s building, next to my grandmother’s house. I also used that place as a studio, for a couple of months, we had about five colleagues working in there during the day.

10. Grandma’s house. Although it was a big house, home of my grandmother and her daughters (my mom and aunts), they divided the three floors house into three flats. Each floor is the home of each of my aunts. My brothers, cousins and I used to go every day in the afternoon after school. It always has been one of the most important places for the entire family.

11. “Tony el Gordo” (Fat Tony) - Arcade. It was not the real name of the arcade, however, the owner reminded us the famous character of the TV show The Simpsons. This store moved from different places around La Jipijapa, nevertheless, my cousins, brother and I followed it every time. I am placing it in the location that was more frequented for us.

12. The little park. Every time that adults went to the church (e.g. baptisms, weddings or commemorations), we kept out of the church playing around. It was a place to chill out, climb trees and fight in the horizontal ladder.

13. Uncanny Factory. No one knows how this old factory operates in the residential neighborhood, however, it is older than my memories. The big walls, the smoke and the little dark streets outside are part of the environment. It is part of a big block with old abandoned cellars and inaccessible places.

Additionally, I defined a genealogy of the people that I reminded the most whilst I was sketching the milestones of the site. The entities that occupied the place (i.e. the snails) had linked the attributes of important persons that shared special moments in the neighborhood with me. This performance was telling the story, in a nonconventional way, of a group of people inhabiting a particular place (Pearson, 1994).
During my doing, I also drew some routes that I used to walk in specific journeys.

“Walking across the Tortoise Island at nights was very common for us. When my mother finished her workday, she came at the Abue’s home to pick us up (my little brother and me) and go home. The three of us used to move in the same route every night for years until the park became dangerous at nights. I also remember that I thought that the moon followed me from home to home”.

Figure 3.2. The genealogy of my family

1. Abue. My grandmother, on my mother’s side
2. Paty. My mother
3. Suco. My father
4. Mona. My wife, we are best friends since 2005, then we married in 2010.
5. Xavier. Me
6. Sambo. My brother, he is two years younger than me.
7. Lucas. The youngest brother, we have a difference of ten years, I took care of him when he was a toddler.
8. Davo. My cousin, he is two years older than me. He is like my old brother.
9. Juanse. My little cousin, he did not live in the neighborhood, but we met very often.
10. Lucia. My daughter
11. Amaru. My nephew, is the son of my brother Sambo.
Nevertheless, I decided for this experience not to constrain paths or routes. I was expecting to trigger memories randomly. I would probably bring back this moment again when surprisingly Mother snail meets Sambo snail and Xavier snail at the representation of the park. I hoped that defining an ambiguous and polysemic relationship with the past could help me to unpack memories that maybe I have forgotten (Figure 3.3).

![Figure 3.3 An alternative archeology (Pearson, 1994)](image)

### 3.22 A reflexive practice

Among the variety of functions that an artwork may have, we are also interested in the reflexive function of art. Martin (2010) analyses Hegelian theory of art, and he explains that in addition to the pleasurable values that an artwork might contribute; the internal function of art is to be a reflexive practice, free in its significance. In this artwork, we have explored different types of ambiguity as a resource to encourage the audience to question for themselves about their relation of the inhabitants with their environment (Gaver, Beaver and Benford, 2004).

#### Ambiguity of Information

Are both realities connected? - The relation between the physical and the virtual world is unclear, at least at the beginning. The spectator should identify the imprecise synchrony of movement of the agent snail and virtual character, the similarities in the ground, or the clues in the displays to confirm that relation. But more importantly, we are interested in making them reflex about the importance of living entities (e.g. snails or human beings) in the representation of living places. What makes a place or a city unique, their structure or the relation between their inhabitants?

#### Ambiguity of Context

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Are this maps referencing a real place? - The context of the design was not explicitly informed to the audience. Additionally, we have defined pixelated aesthetic to blurred the identity of the characters and hide partially the digital representation of the city. We probably are contradicting one of the goals of this artwork (bring Quito to Nottingham); nevertheless, we want to use the self-reflexion to inspire the spectators to create their own ideas, instead of informing the personal motivation of the artist. We are interested in encourage the spectators to bring new and interesting places by their exposition to a nonliteral context made by their own associations.

Ambiguity of Relationship

What is the role of the inhabitants in the artwork? The presence of snails in the aquarium may not reveal new narratives to the artwork, however, their reflection in the virtual map in their humanized characters might generate an ambiguous relationship between the positions that the characters are occupying in the pixelated map and the position of the animals in the aquarium.

There are not correct answers to those questions, and definitely deeper questions could emerge from the performance of the artwork. Snail’s Place is focused in allowing the audience perform an active engagement with issues suggested by the performance. Altogether, the artwork presents a set of testimonials (different in each performance) about a particular place (my hometown), that it is determined by the uncertain movement of the snails in the aquarium. To me, this is a theatre/archeology and a potential trigger of memories; to the audience, the artwork should be a discursive and poetic representation of the complexity of the living places that have to be discovered by the observation, the exploration, and reflection.

3.3 HCI Rationale

Snail’s Place characterized a complex model of a city that merges conceived space and perceived space in a whole experience. Nevertheless, the object was developed in several structural components, each one with a specific structure and function. The integral experience through a designed journey allow the audience engage the lived space. In this chapter will be described the characteristics of the object, as well as, the trajectories through the spectators interface.

3.31 Design of the spectator interface

The interface has been designed to support spectators to engage with an experience based on an active interpretation. Hence, the communicative characteristics of its elements have been selected carefully. Three elements shape the artwork: (i) the aquarium where the snails live, (ii)
the surface that displays the virtual map, and (iii) the terminal that develops the uncanny of the interaction. Nonetheless, the elements hold unity in its aesthetic by the congruence of the material a mixture of white and clear boards of acrylic, and, the irregular and asymmetric shapes that built the polyhedrons.

A tank in the ground refuge the snails and show them to the spectators. This is the motor of the artwork, its translucent walls allow the audience to observe the behaviour of the animals inside the tank from everywhere. However, the base is a white board to separate the aquarium from the floor (Figure 3.4). Inside the aquarium are placed 3D structures that characterise the anthropological elements of the neighborhood, those 3D elements are also covering the biological needs to provide a well-being to the snails (e.g. water, food, calcium, soil, fun, among others) (Pet Snails, 2005). We decided to use snails in the artwork trying to control a slow interactive resource able to provide a proportional movement of the performers around the living space. The movement of the snails should encourage the spectators to understand gradually that the snails are living animals and then to think about the potential relation that the living snails could have with the characters on the virtual map. Managing the slow interaction is a powerful virtue to engage the audience by attention, concentration, and reflexion (Gross-Hearing, 2013; Marsh, 2016). The aquarium tends to a pyramidal shape, whilst the snail's performance was observed in their previous tank we identify that during the day the look for the highest places and corners. Therefore, we wanted to maintain the snails in a good range of vision for the camera, that leads the computer vision system, but more importantly, for letting the audience observe the snails from a comfortable position.
The digital map is projected onto a surface that combines opaque and clear boards in an irregular tridimensional structure (Figure 3.5). This structure has been designed to capture the audience attention in different stages by the transformation of their characteristics, thus, from a specific viewpoint, the surface looks completely translucent, allowing the spectators to observe through the object to the aquarium. From the other perspective, the object is completely opaque and the map projected on it fits perfectly in a fully understandable graphic. The map is a pixel art projection over the opaque acrylics that displays “La Jipijapa” in a nonfigurative representation. A camera placed below the surface, over the aquarium, track the snail's movement and use this position to place the characters defined previously with the same graphic treatment that the map has. Although, the information that is presented on this surface is the same that the information in the aquarium, both representations are slightly different. Snail’s Place has remarked the importance of the reflexion to share the substance of the project, therefore, if the main relationship that the snails have with their environment it is biological, we might say that this digital world is based on the representation of emotional relations. The digital map represents the perspective of the neighborhood from a satellite map, however, the shapes of the milestones and the colours of specific zones has been designed to depict different emotional states. In like manner, the presence of predefined anthropomorphous characters
change the perception of the performers (snails) inhabiting the aquarium to the symbolic world of humanoids. Definitely, the opportune location and movement of the snails in the tank, will influence the conditions of the potential narratives of the stories that the characters may tell.

To support the interpretation of the slow interaction, a trail was attached to each character. Although we were expecting to observe the snail’s trail in the aquarium, a few tests confirmed that it was not possible. Therefore, to deal with the slow speed of the snails, and consequently, the potential lack of feedback with their equivalents (i.e. digital characters in the virtual world); we attached a coloured shadow trail to make their previous movements observable. Thus, even when the snails sleep, it is possible to recognize the routes that they have walked before.

The last display is the terminal that is used to operate the interactivity of the object. Therefore, a system that allows the audience to connect all the gaps regarding the technology used, as well as, a screen showing some clues about the potential answers to the ambiguities and questions defined, was partially hidden in the structure. Inside the box was placed the computer, this box has just two faces translucent, the others are built by opaque material. Thus, just since a strategy position, it is possible to realize the presence of the terminal. In the screen are placed four windows (Figure 3.6) that should guide the audience to analyse the map in a different level. (i) One module reproduce, in real time, the camera visualizing the movement of the snails in the aquarium; (ii) totally aligned to the tank, the digital map is shown without the affection of the irregular surface, in other words, flat; (iii) connected with this, the satellite image of the neighborhood is projected, hence, it may be recognizable the relationship with the real city by the coherence of the both images; (iv) finally, a camera placed at the top of the object reproduce the movement of the audience around the object, in contrast with the other modules this wants to introduce questions more than provide answers. When we mean “look inside the box” we do
not talk just about the literal act of observing what has been placed in, we also mean the climax of the reflexion stage. Thus, by the journey around the four elements we want to share the questions defined in the artistic practice.

Figure 3.6. Inside the box

3.32 The journey of the audience

The three objects fit all together in a comprehensible experience allowing the audience to get a holistic understanding around the maps and consequently about the complexity of cities. Every object has been designed keeping concordance with the aesthetic values of asymmetric in irregular polyhedrons, which referent are the variety of highlands around Quito (Ecuador). Inspired in DoF decisions we have formally chosen asymmetry in the physical communicative resources to encourage the audience to move around the object and to engage the interfaces from diverse positions (Benford, 2011). More importantly, the surface invites and also supports the trajectory of the audience who engage with different set of hidden / revealed elements depending on the viewpoint. By analysing Reeves’ (2007) approaches on effects and manipulations, different moments may be highlighted in the canonical journey.
Every element in the artwork has been placed with a specific intention across the spiral shaped axis to encourage the audience approach the object from diverse perspectives to interpret progressively travel from the physical to the virtual world. Regarding Milgram’s classification, this experience might represent a journey from the totally physical environment to the augmented reality. Some researchers explain how traversable interfaces may support the illusion of transportation from the pure reality to the artificiality by using mixed reality boundaries to allow the progressive communication between both environments. (Benford, 1998; Koleva, 2000). Thus, we have also considered the importance of the transparencies in the surface as much as the visualizations projected on it, those the positions of the screens in the surface has been placed carefully to support this journey across the mixed realities. Four moments may be highlighted in the canonical journey.
Figure 3.8. The journey of the audience

Figure 3.9. Viewpoints from the spiral to the artwork
[1] First approach. The first contact with the object will constrain the view of a reduced number of elements. The digital map is completely hidden, the angles of the polyhedrons in the surface are aligned to the main entrance, therefore, whoever enters the room just will look at the translucent faces of the object. Consequently, the aquarium, that has been located under the surface, is revealed; and although, this is not the suitable distance to observe properly this element, it might be enough to engage the spectator with a set of coloured elements inside the aquarium (i.e. the snails). By the way of contrast, the terminal is totally hidden by the opaque panels. The audience could appreciate the shapes of the structure; suggested by the asymmetry of the surface, the spiral and other motivations they might recognize the movement around the object as a medium for the exploration. In the first position, we approach the audience with a secretive strategy. Effects and manipulations are hidden; thus, the spectator will be able to observe the snails without the knowledge that they are the performers who manipulate the interactive system.

[2] Second approach. The next stage is not a specific viewpoint, but it is the process where gradually the audience may identify fragments of the digital visualizations on the surface. The graphics are based on geometric structures and with a low frame rate to unify the penetrating presence of the object’s shapes and angles. They should also identify that they are following the spiral on the floor and should decide if they will continue walking from inside the spiral, over the line or from out of the spiral. The movement of the characters will become visible whilst the spectator will be ending this stage, as well as, the chromatic relation between both worlds, nevertheless, we do not expect that in this stage the audience will be able to realize the link between the snail’s movement with the effects. At this instance, the spectators’ approach could be placed in the middle of Reeves possibilities (i.e. manipulations and effects partially revealed) with a trend to magical or intriguing approach, depending on what will engage them the most the physical or the digital element.

[3] Third approach. It might be considered as the climax of the journey. Both realities start fitting together unfolding the symbolic relation that exists between the physical and the digital environments. The gaps generated by the translucent boards in the surface disappear and a map is revealed in the projection; which, streets, buildings, characters, and others look connected within the different sheets. At the same time, the shapes of both objects start looking more similar, therefore, it is possible to correlate the 3D objects of the aquarium with the graphic milestones in the digital projection, and the position of the snails in the tank with the movement of the characters on the surface. From this viewpoint, it is observable all the main content of the artwork, mainly, the content regarding both, conceived and perceived space. The effects are
totally amplified and the manipulations might be revealed, nevertheless, in order to encourage
the spectator to jump to the next stage one of the translucent faces of the terminal box appears,
thus, this effect may suggest to continue traveling around the artwork to observe inside this
element completing the canonical trajectory.

[4] Fourth approach. We have placed clues that might disclose most of the “magical tricks”
from a perspective that emulates to be inside the machine. Approaching this position standing
will block the projection over the surface, realizing the technology behind of the displays.
Similarly, below the surface, it is identifiable the camera that points the aquarium. More
importantly, the size of the terminal’s box and the spiral entering into the object suggest the
spectator to assume a crouched position to look inside the box, by analyzing the relation
between the screens in the terminal could be understood the technology that lets the object
works: amplifying the audience's aware above the manipulations.

However, It is not expected, that the audience realizes every aspect of the artwork in one lap
around the object. Each participant might have his / her own journey to explore the object, as
well as, a unique interpretation of the content as a resultant. Considering that this is an artwork,
we are aware of the multiplicity of significances that might be co-created by the engaging of the
audience.

3.3 Technology

The system that brings the experience to life is created by three components: location tracking,
computer graphics, and physical objects. Every element in the in the project has been carefully
designed, developed and tested by the artist.

In order to identify the position of the snails in the aquarium, a computer vision system has been
done to process the information provided by the camera that has been located on the snail's tank.
The code is written in Java1 and executed in Processing2, a software created from and to
computational artists (Appendix A).

Based on Shiffman (2008) codes the camera have been used to gather all the pixels of each
frame in a one-dimensional array by the function loadPixels(). Then the information of each
pixel was compared with a tracked color that was previously assigned (Table 3.1). In
processing, color variables can be divided into their (red, green, blue) components, thus,
managing both variables (i.e. the analysed pixel and the defined color) as vectors (x,y,z) it is

1 https://www.java.com
2 https://processing.org
possible to interpret the distance between both variables. Consequently, locate the most similar variable in terms of its color. Additionally, we have used a formula to identify the position of each pixel on a two-dimensional screen (Figure 3.10).

Figure 3.10 Fragment of the code

The counterpart of the computer vision system are the snails that had to be painted every day as part of the preparation to the performance. We have selected a non-toxic paint to avoid damaging the animals. And based on some tests, a suitable number or performers in the aquarium, as well as the better combination of colors, have been determined to improve the performance of the system in the physical context of the MRL.

Table 3.1
List of performers

<table>
<thead>
<tr>
<th>#</th>
<th>Color name</th>
<th>Hexadecimal code</th>
<th>Processing code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yellow</td>
<td>847c38</td>
<td>-8094664</td>
</tr>
<tr>
<td>2</td>
<td>Blue</td>
<td>7b99af</td>
<td>-8676945</td>
</tr>
<tr>
<td>3</td>
<td>Pink</td>
<td>a06b8b</td>
<td>-6263925</td>
</tr>
</tbody>
</table>
Based on a predefined set of characters, their characterization in the digital environment was defined randomly to experience different combinations of characters each performance. In order to generate the graphics for the digital environment the computer graphics structure was implemented in Processing to recognize and pixelated the characters (Figure 3.11) every time the defined color is recognized. The basis of processing structure is defined in (i) the settings where the canvas is created; (ii) the setup function that initializes variables and load images; and (iii) the draw that is redrawn every frame and in this case where the tracking system analyse the data before creating the map, the trail of the characters and the avatars.

![Figure 3.11 Pixelated characters](image)

The virtual map is the section of a bigger representation of Quito (Figure 3.12), however, we decided to use just a specific path of the canvas related with the neighborhood (Chapter 3.21). In order to map the whole virtual world on the irregular surface of the object, it was used Resolume Arena³, a program for managing and mapping visual projections. Processing and Resolume had a virtual communication through Syphon⁴, an application that allows different systems to share frames.

³ [https://resolume.com](https://resolume.com)
⁴ [http://syphon.v002.info/?.html](http://syphon.v002.info/?.html)
Inside the aquarium were placed little objects carefully designed in *Maya*[^5], a 3D computer graphics software. Each architectural and anthropological milestone defined in the artistic rationale was materialized by printing the objects in Nylon material in the *Markforged*[^6] 3D printing of the Mixed Reality Lab. The elements achieve more than a associative or decorative function, but also they are real motivations and tools for providing a suitable care to the snails.

[^5]: http://www.autodesk.com/products/maya/overview
[^6]: https://markforged.com
The structure of the object was designed and built in the prototyping area of the Mixed Reality Lab. By the combination of white opaque and translucent acrylic sheets were assembled the three objects, nevertheless, some scaled models were prototyped in low fidelity to evaluate the stability of the structure, as well as, the designed optical effects designed for the journey around the object. The objects were assembled all together to enhance the journey of the audience and allowing the use of the technological equipment on and in the structure (Figure 3.14).
To sum up, each component has represented an important technological challenge in the development of the artwork, and analysing the independently might reveal the specificity of the knowledge that was applied in different stages. However, looking at them as an integral object, it shows the application of Location Based System (i.e. snails tracking system) and Augmented Reality (i.e. projection on the surface) combined through the journey to engage the audience in their experience.
4 Study Method

Performance-Led Research highlights an approach in the wild as pillars to examine the behaviour spectators and the performance of interactive arts (Benford et al., 2013). Therefore, after designing, prototyping and exhibiting the artwork; relevant qualitative data were collected for analyzing the audience engagement with artistic maps.

We have designed two ways to unfold the degrees of audience engagement. According to some researchers (Crabtree and Rouncefield, 2012; Benford et al., 2013), observational methods have been applied to describe the journey of the spectators around the artwork; additionally, semistructured interviews have allowed the researcher to speculate about the audience's experiences. Thus, the artwork was implemented in the Mixed Reality Lab (MRL) to trace the significant moments of fourteen participants and to investigate their interpretations.

Identify a location to conduct the research is paramount to conduct a research in the wild. Although apparently the suitable place for exhibiting artistic or cultural experiences might be a gallery, artworks can also be placed in laboratories. However, Benford and colleagues (2013) explain the weaknesses and threats when artworks are evaluated in laboratory settings, but also the conditions to enhance a “the wild” approach in unusual settings. Even extraordinary places could acquire the quality of everydayness, an important factor in the research in the wild. Nevertheless, based on the cost-benefit we have used the installations of the Mixed Reality Lab to place the object, taking into account the need for stimulating the audience to appropriate the technology by their own experience. Thus, a group of adults was recruited to provide data whilst exploring the artwork exhibited in the MRL. We maintained personal dialogues with the candidates that were selected by practical convenience (i.e. proximity and disponibility), nonetheless, this study was interested in collect information of three types of audiences: the general public experience, a critical look of HCI researchers and the feedback of artists and curators. We also looked for a gender balance in the sample. The approval of the participants was obtained voluntarily before their contact with the artwork, in the consent form was explained the nature of the artwork and a simple task that encouraged the participants to spend as long as they want exploring the object. Additionally, the usage of biological materials (i.e. snails living in an aquarium) was detailed, as well as the details of the collection and storage of the data, according to the Data Protection Act.
4.1 Procedure

The study was designed to last approximately 20 minutes including the exploration of the artwork and the interview, in other words, 10 minutes each. With a little introduction about the procedure, we allow the participants to explore the artwork by themselves. During this time we recorded their movements with a videocamera located on the roof of the lab. As soon as each participant intentionally decided to finish the observation a conversation about their interpretations and journey in an interview format started.

![Participant exploring the artwork.](image)

**Figure 4.1** Participant exploring the artwork.

4.2 Observation

Capturing the Audience journey was defined by a set of components collected by observation. We identified the movements of the participants around the object since they entered the room until they let it and told the researcher they finished their observation. This process was focused in identifying the way their explore the object through recognizing the points they spent the most time, however, the behaviour of the audience were also described. We have seen some previous examples to analyse the process of movement in living spaces (Van der Spek, 2009); as well as, others using spatial information to describe the way that participants approach specific areas, such as Can You See Me Now (Crabtree et al., 2004). Hence, we used colored maps to show the behaviour of the participants when exploring the artwork, as a mechanism to describe the participant's trajectory in Snail’s Space.
4.3 Interviews

In order to inform the spectator’s interpretations, we designed a semi-structured interview to be done after the observation. The purpose of this method is to get a depth feedback about engagement (Preece, Rogers and Sharp, 2002). Hence, a set of questions has been defined to dialogue with the audience about their interpretations of their experience and their approach to explore the artwork.

The list of questions was defined around the topics that we were interested in learning. (Table 4.1). However, due to the freedom that a conversation in an interview shows, the discourse with each participant was shaped by both interviewer and interviewee. Benyon (2010) tell us that interviews might examine new ideas if those appear. Thus, the interviewer adapted the questions and the words to the flow of the conversation with each participant to maintain mainly the spontaneity (Oppenheim, 1992).

Table 4.1
List of topics and questions

<table>
<thead>
<tr>
<th>Topic</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning</td>
<td>What do you think it is about?</td>
</tr>
<tr>
<td></td>
<td>What does it mean to you?</td>
</tr>
<tr>
<td></td>
<td>How would you describe it to someone else?</td>
</tr>
<tr>
<td>Maps / Cities</td>
<td>Did you see the map?</td>
</tr>
<tr>
<td></td>
<td>Where do you think it might be of?</td>
</tr>
<tr>
<td>Inhabitants</td>
<td>Who are the inhabitants of this place?</td>
</tr>
<tr>
<td></td>
<td>Did you see the snails?</td>
</tr>
<tr>
<td></td>
<td>What do you think is their role in the exhibition?</td>
</tr>
<tr>
<td>Spatial trajectories</td>
<td>What did you first notice when you first saw the work?</td>
</tr>
<tr>
<td></td>
<td>How did you approach and explore the work?</td>
</tr>
<tr>
<td></td>
<td>Would you recommend any interesting viewpoints from which to view the work.</td>
</tr>
</tbody>
</table>

4.4 Questionnaire

A shortly survey questionnaire was provided to collect the interest of the participants regarding the areas of specificity of the artwork. The topics that have been selected are disciplines related with the artwork such as Computer Science, Human Computer Interaction, Interactive Art and
General Art. Participants have rated their interests in a scale from 1 to 5 where 1 represented ‘not interested’ and 5 ‘very interested’ (Figure 4.2). This data does not provide a statistical significance to describe the group or to categorise them, however, the background of the spectator might add interesting information whilst the data is analysed qualitatively.

**Could you please rate your interests in the following areas?**

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<thead>
<tr>
<th></th>
<th>NOT INTERESTED</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>VERY INTERESTED</th>
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<tbody>
<tr>
<td>a) Computer Science</td>
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<td>b) Human Computer Interaction</td>
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<td>c) Interactive Art</td>
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<td>d) Art</td>
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Figure 4.2 Questionnaire about participant interests.

**4.5 Pilot**

Before running the definitive group of evaluations a set of aspects were piloted in the study. Oppenheim suggests piloting the work to analyze the performance of the research instruments, the techniques to gather the information, and the attitudes of the participants (ibid). We have applied an iterative correction with the advice of a couple of native English speakers to control the wording in the questionnaires. After that, we piloted the study especially for evaluate the performance of the research instruments (e.g. video camera, audio recorder) in the collection, as well as, to identify how to manage real data in the analysis of the tasks. However, it also worked to improve the control of the time setting the artwork before the study starts (e.g. initializing the program, calibrating the video mapping projection, repainting the snails, among others). More importantly, after the pilot we identify that the best stage to conduct the interview is in front of the object. Describe Snail’s Place’s elements, viewpoints, among others, is a hard task for the interviewee, thus, using the same place make the process easier during the interview and easier during the analysis.

**4.6 Analysis**

In order to analyse the data collected this study presents one profile for each participant, as well as a general summary of the interpretation of the interviews and observational data. The profiles (Figure 4.3) shows at the top [1] a bar chart displaying the reported interests of the participants. Below, is presented a visual description of the movement and actions [2] of the audience during
their observation time. Finally, a table outlines their oral report [3], telling the researcher’s interpretation of the main topics of each interview.

4.61 Observational analysis

Using Adobe Photoshop\textsuperscript{7} and Adobe Illustrator\textsuperscript{8} we reproduced the video recordings on a virtual canvas. In a preloaded similar map, we painted each second the participant stayed in each place. A low opacity (3%) brush, which size emulate the spectator's size, was used to paint with orange color over blue representing a heat map (Figure 4.4).

\textsuperscript{7} https://www.adobe.com/products/photoshop.html
\textsuperscript{8} http://www.adobe.com/products/illustrator.html
The recognizable activity that the spectator was doing in each place, at a specific time, was also informed. Thus, it has been traced the different postures around the exploration of Snail’s Place (e.g. scanning the object, looking at something specific, touching any surface, among others). We used a time line to attach each spot to a labeled activity during the time that each participant spent.

The fabrication of fourteen profiles that include the entire description of the audience participation allowed the researcher to summarize the highlights and specific points of the spectator's performance. Thus, the construction of the profiles represent individual performances but also became the matrixes to analyse the group's performance. In addition, an overview of the spectator’s performance have been described.

4.62 Interviews Analysis

A table containing the interpretation of the participant answers have been placed next to each observational profile. The answers have been organised by the main topics and, usually, it includes one quote per participant. We have took notes in a big table about some key concepts, extracts of quotes and interpretations of the participants interview (Appendix B). We identified similarities and differences regarding the following bullet points.

- Qualities of the different spaces
- Spectator’s relation with artistic maps
- Dealing with living identities
- Exploring an artistic maps

This last analysis was done for the whole group of fourteen participants and it is displayed as a general contribution for describing the interpretation of the audience experience.
5 Profiles

The participation of the whole sample have been characterised in profiles that contain information about their interests, movements and activities performed in the journey, as well as the interpretation of their answers to the interview. Big scale and coloured profiles are also provided (Appendix C).

The artwork

The journey is a gentle experience that flows in the same rhythm that the snails behave and is guided by the delicate movement of the spiral in the ground. However, is contrasted with non-elegant angular shapes and an old fashioned blocky world is revealed through different perspectives.

The maps

A chaotic city in the mountains is revealed by snails showing the difficulties of living in a nonnatural environment. Similarly, the preselected map is embedded in an irregular surface with strong angles evokes the same characteristics.

The inhabitants

When the snails were painted they were taken away from their natural environment. They are transferred to an inorganic preselected world. The movement of their digital copies seems to have quantum qualities, while the snails are motionless the digital characters are flicking around the position.

The journey

"When you come around you can't actually follow all the way through. It makes you feel like you're lost in the sort of the smart box set that I can be in there."

Walking carefully over the spiral on the floor with the eyes looking at the object, until clashing with the object. This process was repeated a couple of times trying to get the author's perspective. Likewise, analyzing the object from different interesting spots.

The artwork

The shape of the object destroys the geometric patterns to build a complex structure. However, the core of the artwork is the representation of the snail's trajectory, and the spiral journey.

"In my culture snails are symbol of the infinity."

The maps

An urban city emerges by the architectural shapes of the 3D objects inside the aquarium as well as the general object. In the preselected map it is difficult to recognize what is presented, nevertheless, it might be houses and streets with tons of people living inside.

The inhabitants

The digital characters might be considered as the inhabitants who are occupying the urban environment. However, the snails are the ones who live in the physical environment.

The journey

One of the most interesting places to observe the object is from behind the structure where the surface looks irregular and fragmented. It becomes an enjoyable and uncanny experience when looking the visual effects generated by the projections over the surface.
The artwork

The artwork shows a group of snails in a non-real environment that might be understood as a city, and about how the snail interacts with a simulated and projected world. The relationship between both worlds is based on the snail’s movement.

The maps

Although there are different elements to relate both maps such as the shapes of the interfaces, or the colors in the trails of the digital characters, the representation of the urban city emerges just by observing the virtual scene. It is difficult to imagine something based on the physical scene.

The inhabitants

"Defining the inhabitants would vary depending on the stage, but if I were to talk about the whole experience, I would say that the inhabitants are the colors"

However, the presence of animals in the object is remarkable for a computer science related project, where the artifacts are usually inert objects.

The journey

The elements are revealed step by step. First, the tape that changes from a single line to divide the space into a sail shape, then the geometric structure appears and then the virtual scene. The most interesting position is placed in front of the whole virtual scene and the aquarium.

Figure 5.3 Participant 3

The artwork

There is a relation between the aquarium and the virtual world over the surface that might be observed from a certain angle.

"When I looked at the snails it did not mean anything to me, but if I look at them in human form I see them walking around the city making a story. It’s telling me more. I had this idea that it felt like a story."

The maps

The virtual map presents an urban reality that seems fictional or might be somewhere in Nottingham. When the relatives are observed on the transparent boards it is possible to identify a twisted reality, like in Inception Movie.

The inhabitants

Snails are the inhabitants but in a human form. After, looking at them for a week or similar it would be possible to describe their performance in the aquarium, and the digital characters would create a story based on their movement.

The journey

Although the journey is defined by the spiral in the floor it is also possible to explore the object through walking in an opposite direction. This experience is made to be discovered, although at the very beginning it is hard to identify what to expect, the elements of the object were appearing one by one.

Figure 5.4 Participant 4
The artwork

The artwork encourages the audience to find a way to solve the puzzle for setting free the digital people in the maze. The avatars are related with snails in an aquarium. Therefore, the game could finish by removing the snails from the aquarium.

The maps

The digital image projected over the tridimensional surface generates a sort of map, which elements are in some way related to the elements of the aquarium. The main clue to relate both worlds are the similarities between the milestones (i.e. 3D objects and parts). Moving the objects in the aquarium might modify the digital map.

The inhabitants

Snails are the unaware inhabitants of the artwork, they are just trying to survive in their own reality. However, for a while the idea that the spectator is the inhabitant of the space emerged, inviting the audience to interact with the object.

The journey

"I even tried to open it (the aquarium), I didn't know if I am allowed to do that. But I did!"

The experience is generated around the exploration: touching, discovering and playing have been essential activities to engage the projection over a set of tridimensional objects. However, observing is also interesting especially from a specific viewpoint that allows combining all the scenarios in one.

---

Figure 5.5 Participant 5

The artwork

The object enhances the skills to observe the map. This third person view reminds a God's power, allowing to look the behaviour of the snails in the aquarium and in the augmented reality.

The maps

A city with parks on it was recognizable: the parks existed as well in the designed aquarium in the 3D printed objects. However, neither the identity of the city nor its location is easy to interpret.

The inhabitants

Snails are controlling the behaviour of the artwork while they move around the physical city, they are the real explorers.

"When the purple snail walked from there to there (pointing both extremities of the surface) I realized that it had elapsed a long time"

The journey

At the beginning, the aquarium with snails is the first thing that strikes, everything else is unobservable. The spiral guide to suggest to turn around the object, at the end of the spiral it is easier to look at both maps and relate the behaviour of both worlds.

---

Figure 5.6 Participant 6
The artwork

The experience works well to relieve stress whilst someone is observing the snails in the aquarium. It is easy and funny to identify the specific behaviour of each snail.

"Three of them were curious, the others were motionless."

The maps

The map may be a representation of the real snail's home. However, there is no evidence to assume a posture.

The inhabitants

It seems that the snails are the inhabitants, however, the virtual map contains little people. It could be a reflection of people being somewhere. If anybody would look the human beings from a third person view, it could look like this.

The journey

The first place to stop is just in front the snail, crouched or sat to look at them very close. Then, walking around the object allow having a general overview of the artwork. However, you will want to come back and, if you are not afraid of touching the snails, open the aquarium.

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Figure 5.7 Participant 7

The artwork

The experience arouses the curiosity of the spectator, the object shows the performance of real subjects in a physical environment, those are translated to a virtual world connected by the movement.

"It's not like watch a distant place in your computer, in google maps, you can observe all together in the same interface"

The maps

It is hard to understand the image presented in pixels, some elements seem to be related to the aquarium; however, the relationship cannot be tested. The digital scene might be a map, or a maze or some other; the possibilities are endless.

The inhabitants

The snails and the audience are the inhabitants of the space. Although the digital people seem to represent the movement of the snails in the physical environment, it might be influenced in some way by the actions of the spectator.

The journey

The strategy to approach the object is: firstly, walking straight to observe the snails in the aquarium, secondly, looking for the position of each actor on the stage, then, comparing the actors and also the elements in both worlds, lastly, looking for similarities from the different viewpoints.

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Figure 5.8 Participant 8
Figure 5.9 Participant 9

The artwork

"None of us is caught in another space. The city is the new, the virtual city alone. The city is a vertex that is also represented over the planetary circle, and this planetary space that is not a city but in the place where the artwork is located."

The maps

The map is compound by articulating different qualities of fragmented cities overlapping in a hierarchical relationship. The virtual city enhances the qualities of the physical space with different values from each viewpoint.

The inhabitants

Digital avatars and snails are showing a dialectic between the slowness of the reality and the speed of the hyper-reality without physical boundaries. Nevertheless, snails are creatures that can transmit emotions to the observer like affection.

The journey

Is a process of discovering, through the snail-shaped object. From the transparent, to the screens, the snails and then the box. The object can be restricted to one position, the observer has to turn around the object, that is an important part of the interpretative process.

Figure 5.10 Participant 10

The artwork

This may be an interactive sculpture or a big technological toy. Where the people have to walk around, they perceive the transformation of the object from different perspectives. Explore is the keyword especially if the observer does not have previous expectations.

The maps

"If is not a map, are pictorial that recall the shape of buildings. It is more like a remembrance of a city, where the protagonistic is the movement."

The map makes reference to an allegorical construction, this might be linked to video games such as "Age of Empires", "Termin", "Minecraft", etc. The third person view allows observing the living avatars.

The inhabitants

They are presented in a sort of contrast between the singularities and the collectivities. Each snail might be differentiated from one to another. It may be said "what happen with the yellow?", or "the purple is climbing the wall?" Instead, the colors of the snails became the microorganisms without a notorious identity in the city map.

The journey

Firstly, looking if there is any way to manipulate the performances of the object by touching any element, the surface might look like a touch screen. More importantly, observing carefully the sculpture and enjoying the main viewpoints like the front of the object. Likewise, finding new interesting viewpoints hidden in the geometry, like the parallel dimensions that appear in the reflex of the translucent sheets.
The artwork

The experience is a bit confusing, there is some relationship about what is going on in the small box and what is happening in the projection at the top of the object.

"I am not sure, I am maybe missing something but I am a Computer Scientist, not an artist."

The maps

A city emerges in the aquarium as well as in the digital map, but the movement of the elements in the digital city is very fast, so it is hard to focus on its characteristics.

The inhabitants

It seems like snails are representing different types of people in the city. Although their relationship is not clear, it is observable their movement in both maps (e.g. the blue snail crosses a section of the aquarium and the blue character did the same), it looked like the blue guy was in the park.

The journey

Exploration is a transitional journey from the beginning where only the physical city and the snails are shown, through the fragmented odds and ends of the screen. Later as the digital city is revealed, this is the most interesting viewpoint where snails and the projection can be perceived, and the potential relationship appears.

Figure 5.11 Participant 11

The artwork

The artwork shows a virtual representation of a place and the physical representation of a place. There is also a connection between both environments that may be related to the positions of avatars and avatars.

The maps

Recognize the cities in the environments takes a time, it is necessary to compare the position of the elements to identify this relation (e.g. the 3D objects with the parks, or the snails with the avatars). When both interfaces are overlapped the city is revealed, however, the city is not a particular place rather than a city with lot of things going on.

The inhabitants

"I found the snails quite pervasive I was unsure about their veracity."

Depending on the unknown conditions, they may be considered captives or performers. They are clearly represented on people, doing something in the city, hence, there is a narrative created by the movement of the snails. However, there are some characters moving very fast around the city, it is not clear if there is meant to be like this or if it is a problem of the visual tracking system.

The journey

To make sense of the fragmented reality it is necessary to spend some time walking around the object. Although the line suggests a guide to finding the key spots inside the spatial area, it is difficult to get the position to make a geometric sense of the alignment of both interfaces. To sum up, the spiral guide may not be accurate depending on the observer’s height.

Figure 5.12 Participant 12
The artwork

The experience is about an overlay, from some perspectives, of physical and digital maps. These are places with living actors, one on top of each other. There is no literal way to overlay both realities, they have to be connected symbolically by comparing the elements one by one.

As it is placed in a lab context, a remarkable context, it was difficult and perhaps difficult to engage emotionally. I found myself feeling the exercises rather than...

The maps

There are two maps in the object and both maintain the same slow and smooth characteristics. The upper map is a bit messy when the sheets are fragmented, however, when the gaps are hidden, in this front face, it looks like a city environment with people on it.

The inhabitants

In the physical world are inhabiting it, snails, in the digital world is hard to identify. However, they seem to be related to their position and by the trails of their previous movements.

The journey

The object might be explored by walking around. When following the spiral, the observer could look from the first position that the digital map does not exist. In the following viewpoint, the city is nearly completed. However, the spiral route finishes in a problematic spot. There the spectator blocks the projection, feeling perhaps that is in a wrong place.

Figure 5.13 Participant 13

The artwork

It’s a mixture of physical and digital worlds in which the physical world consist of a small box with snails inhabitants. That in some way maps to a digital world. The snails are represented in a sort of people living in a digital city.

The maps

The projection looks like a city map, but it is so pixelated so it is difficult to determine, whether there is an actual city or a random arrangement of pads. For example, physical objects in the aquarium might be represented by the green rectangles; these might be parks or not. The characteristics of the city and the location of the place is not easy to recognize.

The inhabitants

"Be one of the snails seem to be hanging out in the park."

The snails are the main actors. It seems that they create what happens in the digital world. However, although their activities are easy to recognize, it is not like people moving in a real city trying to get the bus or whatever. This does not communicate all the vibrancy of a real city.

The journey

When exploring the object the things are revealed slowly. It is pleasurable to travel around the matric form to understand what is happening. First, the projection is hidden, however, while the observer moves they become more visible, and at 360° of the spiral both snails and projection might be observed together.

Figure 5.14 Participant 14
6 Critical Evaluation

In this evaluation, we have combined the individual profiles to comment the similarities in the participant's behaviours and conversations, as well as highlighting the main differences in their profiles. The strategies to approach the artwork are interpreted by their trajectories, similarly, the answers provided in the interviews has been categorised and retold to summarise their experiences.

6.1 Audience trajectories

Different ways to approach the object have been identified by observing the behaviour of the participants around the object. In this summary, we will draw on our interpretation of the participant’s performance. Particularly, the ways to explore the artwork; recurrent and abandoned viewpoints; and highlighted activities will be described as the resultant of the overall comparison of the participants experiencing the artwork. This analysis was done contrasting the individual trajectory profiles showed in the previous chapter.

6.11 Ways to explore

Studying the journeys of the participants around the artwork two main strategies for observing the object have been revealed. Spectators focus in specific viewpoints or moments when they stay in the same place looking at any feature of the artwork, and participants that move continuously around the object or around a particular area of the object.

In the coloured maps of the cases of P3, P8, and P14 (Figure 6.1) may be revealed, the way that those participants observed the artwork. Although they have spent some time looking at the object, they have chosen a semi-stationary strategy to approach the artwork. As every participant, they started their journey from the same position, however, during their journey they
found one or two ideal spots to focus their attention. In P8 profile we can identify how this participant completed a lap around the object in the firsts two minutes before she decided to observe the artwork from the first stop she did. However, P14 found his ideal viewpoint in the firsts fifteen seconds, he spent almost all his journey time from this position where he occasionally moved just a few steps to left and right. P3 showed a similar performance, he was popping between two nearby spots for almost 6 minutes, after that he moved for a next viewpoint and came back to his ideal viewpoint. In the cases of P3 and P8, we can identify that they change their activities in during the time they spent in the same spot. P8 in his ideal spot touched the surface, explored the changes in the digital map when covering the camera, bent down to look at the snails, whilst in P14’s case just the movement of his head to compare both worlds it was observable.

Figure 6.2 Unfocused strategy

By the way of contrast, other spectators have spent their journey time moving around the object with multiple stops in different places (Figure 6.2). P13 spent a considerable time pivoting nearby the east and the west face of the artwork, and more importantly he did in three times an apparently conscious lap around the object by following the spiral on the ground. Those laps were not consecutive, he did different activities in between. On the other hand, P1 started moving from spot to spot scanning the object until she completed her first lap, then she pivoted from the east face area, walked around the object, as well as, returned to previous spots doing different activities in each spot. The most common behaviour where participants turned around the object was walking around in circles focused on any of the object’s interfaces. However, rarely, participants like P10 walked around crouched moving her head to observe both interfaces.

Additionally, we can identify a huge range of approaches in between both extremes, some participants presented an unfocused strategy in a specific area or areas. Sometimes, with a
stationary strategy for a while and then moving to a completely different spot without making sense of the object during their movement to the next spot.

6.12 Viewpoints

During the audience’s journeys some spots were more used occupied than others, therefore, it might be appropriate to describe the most recurrent spectator’s viewpoints and, conversely, identifying the abandoned spots.

A general overlay of the fourteen coloured maps has provided an overview of the way that the participants spent their journey time around the artwork. Thus, by studying this general map (Figure 5.3), as well as the individual profiles we have observed that [4] spot was the place where participants spent more time. The most occupied surface is placed inside the spiral area between the line and closes to the aquarium, however, there is also a mild shadow coloured behind the spiral line. From this viewpoint twelve participants have bent down or even lie down (e.g. P9) to look carefully the snail’s aquarium, and also nine participants have observed both interfaces at the same time. Usually, others such as P3 and P10 have used this space to explore the sensors of the artifact or to touch the screen, respectively. Another viewpoint that has had a huge demand has been the [2] spot, it has been occupied for approximately half of the participants, although it was one of the first stops in the first lap it was common for these spectators to return to this viewpoint in any time of their experience. Generally, it was unidentifiable the specific action that the spectators did in this place, therefore it was described as scanning the object, notwithstanding, P8 occupied this spot for about three-quarters of their journey against the few seconds that she spent in the [4] spot. She compared both interfaces and even reached the aquarium crouched down from this viewpoint.
We have identified an area with less attention than the average, it seems to be that the southwest face did not have received the same interest as other spots. Although [1] spot was the only compulsory place (i.e. the beginning of the journey) and about half of the participants came back to the area, they did not spend as long as in other spots, but about ten seconds. Nevertheless, a few participants like P13 tried to reproduce the first impression by leaving the room and entering again. Other spots such as [9] and [7] became a sort of transit areas, just two participants stopped in the viewpoints, they spent no more than fifteen seconds in each spot, respectively. However, it should be mentioned that when the participants were stood in the positions [6] and [7] they blocked partially the projection over the surface as a resultant of the disposition of the elements (i.e. projector and object) in the exhibition. Thus, to mention a case, when P3 approach the [6] position he backed to see the projector placed on the roof, and then came back to the [4] spot. Somehow, [8] received considerably more attention than the other spots on the southwest face, eleven participants stopped at this point to scan the object at any point of their journeys, nonetheless, the time they spent it was not very significative.

6.13 Participant’s behaviours

We have categorised the interesting participant’s activities relating this behaviour with the designed experience. Hence, a set of expected and unexpected behaviours have been outlined.

- During the observational analysis, we have identified twelve participants looking at the aquarium and the digital map at the same time. Mostly, this activity was done on the
east face of the artwork where both interfaces are totally visible and the digital map seems to be one screen. Nevertheless, a few participants like P10, who was walking around the object comparing both interfaces, or P6, who spent almost all her journey time in the north area, showed a different strategy. The data also showed two participants counting the snails and the characters with their fingers whilst they looked at both interfaces.

- Thirteen participants crouched down at least once to observe the aquarium and sometimes the activity was repeated multiple times in the same journey. P1 did it three times, all of them for looking at the snails; P9 was crouched looking at the snails in the aquarium, later she crawled across the floor through the box until she got lying on the floor for about one minute.
- We identify four participants who seem to walk around the spiral consciously, although a huge number of the participants walked around the object, this four were located at the beginning of the spiral and moved forward following the pattern on the floor. However, most of them stopped in the east face.

These group of behaviours (i.e. looking at both interfaces, crouching down to look something closer, and walking around the spiral) was expected activities, therefore, the artwork was designed to support these behaviour. Notwithstanding, participants did activities that were surprising.

- Usually, participants started their journey walking in clockwise, following the guide placed in the nautilus-shaped spiral in the ground. However, three spectators walked against the clockwise.
- Six participants explored the object by touching the projected surface. This did not happen in a specific zone but in different spots. Most part of the time the act of touching the surface was linked with the movement of the participants around the object, for example, P2 pivoted in the west region whilst she was touching the surface, however, it seems to be linked to the exploration of the shapes of the structure, as well as the texture of the projected and translucent sheets. Others tried to catch the digital characters, like P5; or used their arms to modify the projections on the white sheets and the reflexes on the translucent sheets, like P10.
- Two Participants examined the functionality of the sensors, P1 observed the effects on the digital map by blocking the vision of the camera with her hands.
- We identified one participant trying to open the aquarium to get access to the snails; P5 approach the snail’s box from different positions to remove the top of the aquarium.
6.2 Audience experience

Although artworks tend to become unique products there is a huge range of meaning that each spectator could assign by observing or studying artworks. This contribution is conceptualized by Duchamp as a spectator’s creative act (Duchamp, 1957; Edmonds, 2007). Thus, Snail’s Place become a mechanism to allow the audience to experience their own subjective thoughts of complex cities whilst are introduced new representations and questions about cities and inhabitants. Thus, the audience become part of the creative process whilst helping the author to make sense the meaning of the artwork. Hence, the aim of this analysis is not to identify the communicative accuracy of the object, but to outline the different perspectives where spectators linked the experience that was created by their personal trajectory with their own knowledge. We use “quoted italics” to show the fragments of the interviews.

6.21 Different qualities of spaces

Most of the spectators have found in the artwork the representation of one or more spaces, they have used different words like stages, spaces, maps, cities, worlds, environments, places, among others. Although the definition of each word may be substantially different from one to another, the interviews show more power in the content that describes the interpreted relationship between this multiple worlds. Participant’s comments might reveal several options to determine possible relationships between the multiple dimensions of maps that were presented in the artwork. From practical ways to identify and proof that the interfaces were technically connected such as “there is some relationship between both entities (snails and characters), I tested it out (pointing the camera connected to the computer vision system)”, said by P1, to abstract interpretations based on the understandings of the audience.

“Everything turns around the snails in a non natural environment that might be understood as a city, and about how this stage interacts with a emulated and projected world” (P3).

Similarly, a six participants described the relation of both spaces as the digitalisation of the aquarium. This group commonly believed they understood the functional mechanism of the object or at least they may have an idea, especially by identifying that the movement of the snails was tracked and emulated in the digital projection. Nonetheless, others did not know or did not care the about the functional technologies to project the aquarium on the surface, and they identified the relationship in other elements (e.g. 3D printed objects, colors, shapes). In
some cases, this apparent physical connection encourages them to find a potential correlation as informed P12 “I spent a lot trying to see the connection until I look at the green shape here and I recognize as the shape there (pointing the 3D printed object). Then I recognize the pink snail that there is probably this avatar here”.

“Three type of spaces that are combined in another type of space. The city of the snails, the virtual city above, the city in your mind that is also represented over there (pointing the white box); and this psychical space that is not a city but is the place where the artwork is framed” (P12).

A slightly different concept to understand the relationship of both interfaces it was the notion of overlapping worlds. Although participants identify the projection of digital projection of the aquarium on the surface, half of the group had different approaches to looking at this relationship. (i) Some participants commented that both worlds might be combined in a third space that could exist in between and that could be accessed just through specific spots around the object. P13 explained that “there is no literally way to overlay the things, they have to overlay next to each other” (ii) Others mentioned that both spaces, physical and digital, are the representation of a third place that in some cases could be allegorical (P10) or fictional (P4), however, a couple of participants related this third place with a real environment. P4 said at the beginning of the interview “First, I think that it was Nottingham”. (iii) Nonetheless, a fourth space was mentioned by P8, this participant included “this physical space” to the the frame, a place where “all cities are interacting through the structures” where the object and the observer are present.

“Coloured snails in an aquarium, half of them are curious the rest of them don't care about anything. However, I couldn't interpret what it's placed above. why maps?” (P7).

Additionally, a P7 reported an experience based on the behaviour of the snails and a complete disconnection with the potential relation between both interfaces. Although, this participant associated the projection on the surface with a map, the spectator was focused in observe and interact with the snails in the aquarium. Thus, the participant’s possible explanation to the presence of a map in the surface was “probably are related to the place where you caught them” referring to the snails.

6.22 Engaging with maps

Excepting one, all the participants realized the existence of urban environments represented by maps. Although the representation was ambiguous, they engaged specific elements that allow
them to create this connection. This does not mean that just one aspect inspire them, but more probably, it was the resultant of several elements displayed in the artwork. However, we will categorize the different type of aesthetics reported around the reported process.

The spectators have identified some aesthetic values around the concept of cities. In most of the cases, the relationship has been developed by the following order: the physical space connects with the digital space, and the digital space connects with the third space (i.e. symbolic city).

“It feels like a city with lots of things going on, oh... it has a park on it” (P12).

A group of seven participants commented that the 3D objects in the aquarium were the elements that allow them to link the physical with the digital space through the milestones represented on the digital map, especially the Tortoise Island; “it looks like those little things are represented in parks”, said P6. Although, there was no way to overlap them perfectly some participants recognized the correlation of elements in both spaces and they identified which object corresponded to the assigned digital milestone. It was not a simple task and it did not work for every element, the ambiguity in the content displayed on the digital map worked with ambivalent meanings. While the old fashioned blocky map sometimes brought notions of parks, streets, buildings; it also confused some spectators as well, P14 commented his doubts, he said “I don’t know still if there is a city or not” then P14 added that if there was a city in the map “it is definitely a city that I don't recognize”. Nonetheless, others engaged with the pixelated map referring that “It is not a map, are pixels that remind me the shape of buildings. It is more like a remembrance of a city, where the protagonist is the movement”. The notion of a video game was present too, three participants commented the link; P10 mentioned titles like Age of Empires, Minecraft, Terraria. Sometimes the relationship was linked the usage of pixel art and the third person view of living environments as said P6 “you feel like a God, looking how everything moves, like in a video game”.

“Virtual avatars and snails represent a division between the slowness of the reality and the hyper-reality without a physical limit over the time” (P9).

Additionally, participants defined the movement as an important factor in maps. Firstly, the slow or null movement of the snails linked with the constraints of a physical environment, this has even been translated to the posture that they assume to look at the object; P14 said: “It was quite nice to get that sort of slow exploration of what is actually happening”. Secondly, the fast speed of the things happening in the digital map brought the idea of an urban city with lots of things going on. Four participants included in their descriptions words like fast, quickly regarding the movement of the characters to explain the dynamic of the digital space. Two of
them were doubtful in assigning a meaning to the random of the characters, when a snail was hidden behind the tape, or reporting the issue as an accuracy problem. Thus, P3 said: “I don't know if there is the lack of accuracy regarding the fast movement of some of the characters, however, it is funnier to think that there is a kind of randomization to dynamise the movement”.

6.23 Dealing with living entities

The comments regarding the inhabitants of the place were divided among participants that understood the snails as performers (P12) and others that founded in the characters digital microorganisms (P10).

During the interviews was very common to receive question about the welfare of the snails, sometimes as a general doubt, and some others in the manner of comments about for specific snails calling them by their colors; “just half of the snails are exploring, in fact, I took the green because I wanted to know if there was an animal inside the shell”, said P7. Even more, this participant reported that opened the aquarium to check the motionless green snail, to identify if the snail was still alive.

“If I look at the snails it does not mean anything to me, but if I look at them in human form it is kind of they are walking around the city. Kind of making a story, it is telling me more. I feel like they have life” (P4).

Conversely, P4, P12, and P14 identified narratives on the digital map by the behaviour of the snails in the aquarium, likewise, they described specific moments of the performance by the context of the characters in the digital city (e.g. P4 said “they are walking around the city kind of making a story. It’s telling me more, I feel like they are alive” and P14 commented “so one of the snails seem to be hanging out in the park”). Notwithstanding, P14 explained that it was not possible to find the “vibrancy of a city”. Although, P12 reported a type of narrative by the relationship of both living entities, he said that “is not like people moving in a city trying to get the bus”. Others felt that they were co-participants in the artwork and tried to complete the narrative by performing a set of actions, P5 said that he was trying to find the way to “find the way to break free these guys (characters) from the maze” by touching, moving, or opening the object.

6.24 Viewpoints

Participants explained their relationship with the different areas of the object: their first impression in the entrance, as well as what they considered the most interesting viewpoint. We also identified areas that generally did not have importance in the participant’s descriptions.
However, a few group of participants recommended the exploration as a strategy instead a restrictive viewpoint.

Participants commented on the first thing they saw when they approached the artwork, the answers included the structural elements of the object such as angles, crystals, black tape. Similarly, the spiral in the ground was mentioned a couple of times; P9 said: “This shape of snail (pointing the tape on the ground), because the panels cannot be observed”. However, a bit bigger number, five participants, reported they got to look through the transparent structure to the snails. Whilst the first group engaged first with the shape of the object (e.g. P1 said "it's stark, it's extreme") the second deleted these distractors focused on the coloured snails.

Most of the participants suggested the east face was the most interesting viewpoint to approach the artwork; nine of the spectators engaged specifically with the spot where all the screens joined together. P11 said “I can see the snails and I can see the projection. And here I can also identify the relationship between the shape of the box of the snails and the perspective of the box of the projection. It's kind of similar”. However, P14 explained a different perspective to approach the artwork from the same spot “and there is also another viewpoint, going down to the floor trying to see the snails. Ignore the digital map completely and you just look at the aquarium”.

Just one identify the north area as her favourite viewpoint, P8 said that looking through the fragmented surface allow her to “compare what is in the top and what in the bottom”. In addition, none mentioned any south face’s spot to talk about the interesting viewpoints. Some participants commented that defining a favourite viewpoint does not make necessarily sense in this object, thus, P9 explained that it would be “constrain the artwork”.

6.25 Exploring the artwork

In conversations, the audience commented two main effects as a resultant of the exploration. Although they commonly entered with high expectations and no previous knowledge about any element of the artwork, P11, P12, P13 and P14 saw previously the nonfunctioning prototype and P1 and P9 received an oral brief about the artistic rational. However curiosity and uncertainty were highly reported during the experience, the effects that will be described make reference of two reported ways to assimilate the exploration, one is a fragmented object and other is a unity.

“This journey feels like a gentle experience, contrasted with the angles and blocks in the objects. Things also look like nonintegrated and that transmit frustration” (P1).
Some users have reported frustration by looking at the fragmented perspective of the artwork. What may be described in a physically fragmented stage has been linked to the conflicts between angular and irregular shapes of the geometric structures; as well as, the contrast of the smooth movement of the snails with the low frame rate and pixelated animation. Even, P7 expressed disappointment whilst commented “I don’t have any idea” talking about the meaning of the experience.

“I wanted to walk around to make sure that I got, not the right way but, the ‘good’ way to view in the projection. That is here where the fragmented screens look like one, then I also realize, ‘oh there are actually snails in there!’” (P13).

Seven participants commented that they found a position to articulate the artwork as a whole, they give some details about this position related to the similarities of shapes or elements of both interfaces as the best spot to relate both worlds and even more important, to make sense of the meanings of the artwork. They explained how the fragmented boards where the map was projected joined as a one, where the transparent gaps disappear.

“It is interesting to have things that seem hide, but that are not really hidden” (P9).

Although most of them engaged with a particular viewpoint of the object, especially with one that allows them to observe the aquarium and the surface as a unity; some participants mentioned that what they engaged the most was the exploratory process whilst discovering new things every time they observe each face. Thus, a group of spectators explained that the artwork is enjoyable whilst it is approached “from different angles” (P10). Most of them commented that they were guided by the spiral shape on the floor to move around of the object, especially in the first lap.
7 Informing the artwork

So far, we have analysed individually each participant’s performance and interpretation in the profiles; in addition, an overview of their approach have shown different strategies to move around the artwork based on the rhythm of the audience, as well as an interpretation of the spectators’ answers. Therefore, a personal reflexion of this material might inform the relationship between the artistic and HCI design with the results.

7.1 Aquarium

In the physical world, the snails were recognized immediately and the milestones become utilitarian objects especially to connect both realities. On one hand, the snails were recognized as the inhabitants of the object, they were sometimes identified as a collective, and more importantly, they were treated as individuals. Therefore, some spectators commented about their behaviour naming them by their colors. Surprisingly, some of the participants were very concerned about their welfare. On the other hand, a huge group of participants mentioned that they related both environments by comparing the position of the milestones in both worlds. Thus, although the 3D printed object was included for decorative purposes, they became absolutely important to the audience.

Spectators assumed a very curious posture to look at the snails, some of them were very focused on the movement of the animals moving in the aquarium. However, the colours in the snail’s shells also struck their attention, this modification was considered as a first step to transferred them to the inorganic digital world. They usually spent a big amount of time looking just the snails, deleting almost every other aspect of the artwork. In order to approach them as much as possible, they crouched down or seated down on the floor to look at them. Additionally, some of the participants tried to break into the aquarium or even to manipulate the snails. Although it is not a rule, we tend to believe that the background of the audience may influence their exploration activities, uniquely at the surface level, people with lesser interest in Computer Science were most tempted to open the aquarium; whilst, for example, seemed that others more interested in the subject explored the sensors covering the camera with their hands.

The influence of the physical word in the symbolic city it seems to be very limited or almost null. None of the users reported qualities to the map based just on the elements of the aquarium. Although the connection between both worlds was very evident for the participants, most of the qualities of the symbolic city were based on the digital map, or in the connection between
digital and physical worlds. Even, some of the behaviour of the snails were identified by the performance of the digital map.

7.2 Digital projection

Although they used different words, usually spectators referred this world as an urban geography. As it was designed, spectators mentioned that the aesthetics of the digital map such as the chromatic, the pixelated style or just the composition, allowed them to observe parks, buildings, streets, among others. Nevertheless, we were surprised to listen to all their reflections about the definition of the city by the movement of the pixels in the digital map. The audience observed carefully the dynamic of the digital world through the movement of its elements; it was reported as a chaotic environment and others as a slow place, although, a few participants describe it as a delicate slow movement. That was determined by the behaviour of the snails in the aquarium but visualized in the digital map. The accuracy of the sensors had as well an influence on the movement of the characters, similarly, the low frame rate defined in the code.

The digital characters were very easy to identify for some of them whilst others found very challenging define what those group of pixels represented. Participant did not report any emotional link with those avatars, they did not engage with the same intensity with this type of living entities. By the way of contrast, the digital map evoked ideas of third worlds or real worlds somewhere, but the characters did not. Thus some participants related the map with a place in Nottingham, due to the context of the exhibition; and others were convinced that it was related to a fictional video game place modifying their attitude from discovering by observing to playing with the object.

In the viewpoint that the participants enjoyed the most the digital map was totally revealed. However, it was the combination of the map as a unity totally aligned to the aquarium and the possibility to look at both interfaces simultaneously what engaged the spectators in this spot. We observed spectators doing a particularly interesting movement with their heads from up to down several times comparing both interfaces.

We have observed that comparing both interfaces has been a key activity to make sense of this relationship, however, the summary of the process seemed to help to identify the particular elements. Nevertheless, our project was limited to the lack of feedback from the digital worlds to the physical world. Thus, although the understanding of the relation of both interfaces was influenced by the correlation of the elements of both worlds, the digital city had more influence in defining the characteristics of the lived space.
7.3 Surface

The designed of the surface where the digital map was projected might be considered as our novelty input from the artistic practice. In some way, we identify that it accomplished the purpose guiding the audience from the pure physical spot to the mixed reality viewpoint. In the coloured map (Figure 6.3) was possible identify how the spectators spent most part of the time moving around this area of interested, limited as well by the spiral.

Similarly, some participants reported their journey around the artwork mentioning how the object transformed its appearance. Thus, most of the participants identified in the northwest face the lack of digitality and focus their attention in the snails or in the structure. Likewise, some of them reported that they found the relationship of both worlds from the southeast face where the two maps were totally aligned, notwithstanding, some of them were stood in the viewpoint but they could not match perfectly the map, this problem might be related to the difference of the heights of different participants. Nevertheless, this position became the most interesting viewpoint reported by the spectators in the interviews and the most occupied by our observational analysis.

However, a few tried to get more possibilities from the designed surface. Hence, some of them talked about including an extra position where the virtual map will be highlighted and the physical map totally was hidden. Others identified unexplored angles to approach the combination of both maps, and they found in the reflection of the digital map in the transparent acrylics several interesting views (e.g. “It looks like in inception (Christopher Nolan Movie)”).

A couple of them spent so many time, trying to overlay both worlds by using this technique, and also playing and looking how the digital image was distorted.

Although the journey to connect both worlds (physical and virtual) it was not evident for all the participants, the ones with more experience in HCI researchers commented about the slow process to reveal the fragmented reality until combine the screens in a single map. This journey was interpreted by two opposite experiences: firstly, as a totally fragmented experience and secondly as a process of unification; as we interpret may be influenced by their interpretative engagement regarding the different quality of the cities (chapter 6.21) assigned.
7.4 Structure

The structure is a complex object to analyse, it was present all the time, however, for most of the spectators seemed to assign just a mediator quality over it. Although it was not fully described, a few participants were aligned to the ideas of the original design. A few group of the spectators build on the idea that the shapes of the object represented an exploration of the geometric basic shapes raising architectural and topographic ideas; these concepts were assigned on the macro scale, regarding the whole artifact, and also to the micro scale with little elements such as the 3D printed milestones in the aquarium. Notwithstanding, even though it is difficult to highlight the pure presence of the object, the answers of preferred viewpoints were more related to other elements, and just in one case, the structure was mentioned.

The observational analysis showed that the physical structure receive an unexpected type of exploration, and that may be the reason for the lack of observative appreciation. We identified that almost half of the participants explored the structure by their kinetic skills, they discovered the shapes of the surface, the angles, and the texture whilst they touched walking around the object. Some of them with clearly interactive motivations, but others without apparent reason.

7.5 Engagement

The posture that we assume around interactive arts has always been to encourage the audience to become co-creators of the meanings of the artwork by viewing, exploring and discovering. Thus, the motivation of the experience was almost impossible to understand, especially because the artist used a huge amount of personal information defined in archeological evidence. However, as defined Gaver, Beaver and Benford (2004) the participants had to assume a creative posture whilst they observed the artwork making sense of ambiguous references.

Although there were limited possibilities to consciously concatenate the symbolic world with the artist hometown, some of the characteristics of the cities that were described were very accurate to the vision that the artist has about his hometown. Similarly, some other recurrent values assigned by the participants (e.g. chaotic and conflictive) may reflect feelings that the artist includes in the artwork unconsciously and those might be properly interpreted by the audience.

Notwithstanding, some interesting meanings about the artwork were reported, highly related with the intention of the artist for re-creating a lived space by combining the perceived and the conceived space. Spectators have engaged with the presence of living creatures in combined maps, and more importantly, the have assigned a narrative to the activities that the snails
perform by their digital pairs. A few participants assigned activities to the complex living entities (i.e. the combination of snails and characters) such as P14 (e.g. “So one of the snails seem to be hanging out in the park”) or P4 (e.g. “if I look at them in human form I see them walking around the city making a story, it's telling me more. I feel like they have real life”).

We find interesting not just the potential alignment between the artist discourse when design Snail’s Place, but also clues to believe that people actually had the experience to re-think about different types of cities, as well as the importance of their inhabitants in those spaces. We might interpret that they asked themselves some of the questions that defined our artwork a reflexive practice.
8 Conclusion

This research has attempted to examine the engagement of the audiences exploring artistic maps. The Performance-Led Research methodology has guided the process through the analysis of the theory supporting the artist practice, and consequently, the artwork has provided information to the formal study of the audience. Hence, after studying several cases of maps in artistic representations (Belasco Rogers, 2011; Gaver et al., 2004; Flintham et al., 2007) and reviewing literature regarding the topic, useful concepts, such as Exploration and Discovery (Costello and Edmonds, 2009), Ambiguity (Gaver, Beaver and Benford, 2004), Interactional Trajectories (Benford et al., 2009) have emerged.

Thus, in the practice, we have also explored the engagement whilst the experience was designed. Snail’s Place was developed to encourage the spectators to become co-creators of a narrative revealed by the combination of physical and digital maps. Both worlds have included the presence of living entities with living snails in a designed aquarium and their digital pairs in the virtual environment. Different viewpoints in the artwork revealed and partially and totally hidden the elements of Snail’s Place, the journey around this object was supported by the design of the surface where the digital map was projected.

The study wrote on qualitative information collected from fourteen participants exploring the artwork. The sample was assembled for general public, HCI researchers and artists/curators; and the data was gathered by observational and self-reported methods. After profiling each case independently and evaluating critically the overall results, it was identified that:

- The audience approaches interactive maps by different strategies based on their journey and their actions. The richness of their movements is found in the variation of their rhythm of journey analysed by the identification of focused or unfocused approaches, as well as observing the most preferred or abandoned spots during the trajectory. In addition, the expected or unexpected activities, done by the spectators during the exploration, have also been added useful information to schematize not just where and when, but how the audience engages with artistic maps.

- The interpretative engage of the audience has different levels of understandings. These results are in substantial agreement with Heitlinger and Bryan-Kinns (2013). Similarly, as defined Gaver, Beaver and Benford (2004) ambiguity created a suitable environment to inspire the spectators to creatively participate, complementing the narrative of the artwork; and more importantly for this artistic practice, is possible that ambiguity encourages the spectators to think over about the relationships and of cities and people.
Although this study has shown the hue of participant’s strategies to engage artistic maps, the approach to analyse these process has not been very specific whilst describing each participant activity. It is possible to think that this study was limited including sensitizing criteria for observing the journey, specifically, the participant's behaviours exploring the artistic map.

We definitely agree on the way that concepts, frameworks, and similar artistic practices have guided the development of Snail’s Place. Notwithstanding, according to with Benford and colleagues (2013), we have also found challenging to share artistic and academic interests. Especially taken into account that both fields were worked by the same person, who shifted between one and another position depending on the situation.

8.1 Future work

Regarding the artistic praxis, this approach works as part of an iterative process to refine the artwork. The study traced the rhythm of the participants exploring the object, therefore, the artist might occupy this information to modify the experience, the design or even to inspire new artworks.

About the research, we recommend that other studies in this field include a first exploratory observation of the specific activities of the audiences when they explore a particular element (e.g. the unexpected kinetic exploration), as well as the apparent movements that they perform when spectators assign meanings to the artwork (e.g. looking at both interfaces moving their heads). Thus, the self-reported methods, such as the semi-structured interviews used in this study, might include the discussion about the particular movements that any participant does to engage the artwork.

In addition, we suggest an analysis of the relevance of extending the categories of performers in the performance frame. Some authors (Reeves, 2011; Sheridan, Bryan-Kinns and Bayliss, 2007) agree that this type of users is aware of the frame and tend to understand the manipulations of the artifact. Nevertheless, according to Fischer-Lichte (2008) assumptions, Snail’s Place has include animal bodies as unwitting performers. Thus, the presence of animal bodies controlling the behaviour of a mixed reality artifact could include a slightly different input to this knowledge.
9 References


Martin D, Art as Reflexive Practice, Proceedings of the European Society for Aesthetics 2, 125-142.


Appendix A

Source Code
import codeanticode.syphon.*;
import processing.video.*;

Capture video;
SyphonServer server;

//SNAILS COLORS
color YELLOW = -8228058;
color CYAN = -9533285;
color MAGENTA = -6396291;
color ORANGE = -6001871;
color GREEN = -11175067;
color PURPLE = -11448469;

// INITIALIZE VARIABLES
PImage people[] = new PImage[11];
PImage map;
int[] snailColors = {CYAN, YELLOW, MAGENTA, ORANGE, GREEN, PURPLE};
int step = 6;
int backStep = 12;
int tolerance = 250;
int shadow = 2400;
int accuracy = 20;
int [][] trails = new int[people.length][shadow];

void settings(){
    size(1920, 1080, P3D);

    PJOGL.profile=1;
}

void setup() {
    //VIDEO SETTINGS
//video = new Capture(this, Capture.list()[0]);
video = new Capture(this, Capture.list()[15]);

video.start();

//STYLE
frameRate(2);
noStroke();

// LOADING IMAGES
people[0] = loadImage("0_xavo.png");
people[9] = loadImage("1_paty.png");
people[7] = loadImage("2_suco.png");
people[5] = loadImage("3_abue.png");
people[6] = loadImage("4_davo.png");
people[4] = loadImage("5_sambo.png");
people[8] = loadImage("6_juanse.png");
people[10] = loadImage("7_luk.png");
people[3] = loadImage("8_mona.png");
people[2] = loadImage("9_lu.png");
people[1] = loadImage("10_amaru.png");

//map = loadImage("jipijapa_2304x1536.png");
map = loadImage("jipijapa_1920x1080.png");

for (int i = 0; i < people.length; i++){
    for (int j = 0; j < shadow; j ++){
        trails[i][j] = -20;
    }
}

//SYPHON SETTINGS
server = new SyphonServer(this, "Processing Syphon");
}

void captureEvent(Capture video) {
    video.read();
}

void draw() {
    background(255);

    //LOAD VIDEO
    video.loadPixels();
    //map.loadPixels();
//image(video, 0, 0);
ground();
filters();
trail();
people();

//proof();

server.sendScreen();
}

void proof(){
  int closestX = (mouseX/backStep)*backStep;
  int closestY = (mouseY/backStep)*backStep;
  //trail(closestX,closestY,0);
  drawElement(closestX,closestY,people[0]);
}

void ground(){
  for (int x = 0; x < map.width; x += backStep ) {
    for (int y = 0; y < map.height; y += backStep ) {
      int loc = x + y*map.width;
      float r = red(map.pixels[loc]);
      float g = green(map.pixels[loc]);
      float b = blue(map.pixels[loc]);
      fill(r,g,b);
      //DRAW PIXELS
      rect(x,y,backStep, backStep);
    }
  }
}

void drawBox(int x, int y,float r, float g, float b, int step){
  float midStep = step/2;
  if (x%2 == 0){
    y+= midStep;
  }
  beginShape(TRIANGLES);
  fill(r,g,b);
  vertex(x+step,y);
  vertex(x,y+step);
  vertex(x,y-step);
  endShape();
  beginShape(TRIANGLES);
  fill(r+50,g+50,b+50);
void people() {
    for (int i = 0; i < snailColors.length; i++) {
        trackColor(snailColors[i]);
    }
}

void filters() {
    fill(255,225,200,100);
    rect(0,0,width,height);
}

void drawElement (int closestX, int closestY, PImage element) {
    for (int x = 0; x < element.width; x += step) {
        for (int y = 0; y < element.height; y += step) {
            int loc = x + y*element.width;
            float r = red(element.pixels[loc]);
            float g = green(element.pixels[loc]);
            float b = blue(element.pixels[loc]);
            if (r < tolerance && g < tolerance && b < tolerance) {
                pushStyle();
                strokeWeight(0.5);
                stroke(0);
                fill(r,g,b);
                rect(closestX - (element.width/2) + x, closestY - (element.height/2) + y, step, step);
                popStyle();
            }
        }
    }
}

void trail(){
for (int code = 0; code < snailColors.length; code++) {
    pushStyle();
    fill(snailColors[code], 50);
    for (int i = 1; i < shadow; i += 2) {
        rect(trails[code][trails[code].length-i], trails[code][trails[code].length-1-i], backStep, backStep);
    }
    popStyle();
}

void saveTrail(int newX, int newY, int code) {
    trails[code] = addOneIntToArray(trails[code], newX, newY);

    //pushStyle();
    //fill(snailColors[code]);
    //for (int i = 1; i < shadow; i += 2) {
    //    rect(trails[code][trails[code].length-i], trails[code][trails[code].length-1-i], backStep, backStep);
    //}
    //popStyle();
}

public static int[] addOneIntToArray(int[] initialArray, int newX, int newY) {
    int[] newArray = new int[initialArray.length + 2];
    for (int index = 0; index < initialArray.length; index++) {
        newArray[index] = initialArray[index];
    }
    newArray[newArray.length - 1] = newX;
    newArray[newArray.length - 2] = newY;

    return newArray;
}

//TRACK COLORS
void trackColor(color trackedColor) {
    float worldRecord = 500;

    int closestX = 0;
    int closestY = 0;
for (int x = 0; x < video.width; x ++ ) {
    for (int y = 0; y < video.height; y ++ ) {
        int loc = x + y*video.width;

        color currentColor = video.pixels[loc];
        float r1 = red(currentColor);
        float g1 = green(currentColor);
        float b1 = blue(currentColor);
        float r2 = red(trackedColor);
        float g2 = green(trackedColor);
        float b2 = blue(trackedColor);

        float d = dist(r1, g1, b1, r2, g2, b2);

        if (d < worldRecord) {
            worldRecord = d;
            closestX = (x/backStep)*backStep;
            closestY = (y/backStep)*backStep;
        }
    }
}

if (worldRecord < accuracy) {
    strokeWeight(1);
    for (int i =0; i < snailColors.length; i++){
        if (trackedColor == snailColors[i]){
            saveTrail(closestX,closestY,i);
            drawElement(closestX,closestY,people[i]);
        }
    }
}

//READING COLORS
void mousePressed() {
    // Save color where the mouse is clicked in trackColor variable
    int loc = mouseX + mouseY*video.width;
    color whatIs = video.pixels[loc];
    print ("color = " + whatIs + " / ");
}
Appendix B

Preliminary Raw Interviews Table
| About | They are related (Snails and projections)  
|       | Conflict of shape and impetus |
| Meaning | Frustration. Travelling in a non elegant and non delicate (angular, blocky) space. |
| Describe | Really interesting conflicts of shape and impetus. |
| Map | Old fashionate blocky and angular set of perspectives. |
| City | Mountains, strong angles  
|       | Snails trying to get something in a difficult environment.  
|       | If you look at the roads 'It does not look like where I am come from' |
| Inhabitants | There is some relationship between both entities (snails and characters) 'I tested it out'.  
|       | They are so very slow (snails), but the characters are flicking so fast. It feels inorganic, because people do not banish. It is a digital thing or a quantic thing. Something very inorganic.  
|       | using animals (organics) to play around and taking away from their situation 'you painted them' to translate them to an inorganic pixelated world. |
| Snails | Slow movement in a difficult environment |
| First thing | Look black lines, and the snails that can be observed are motionless. |
| Explore | Felt the spiral like a 'kept away form it'. Then realize she could walk by the line.  
|       | This journey feels like a gentle experience, contrastly with the angles and blocks in the objects. Things also look non integrated and that transmit frustration.  
|       | Follow the floor with my feet and I walk until I could anymore. I spent quite a long time because I wanted to get the perspective. It made to have different faces. |
| Viewpoint | [1] "it's so stark, it's so extreme". Behind the curtains is the original start point that shows some of the projections from the side and some from behind. And this make me thing, If this ambiguous thing it is the starting point.  
|       | [4] following the spiral make you get inside the snails box and feel you want to be in there. I would like to be in there. |

*Positions [1,2,3,4] as are defined in chapter 3.32 "The journey of the audience"
**About**

It is related with the architecture by the shapes and because it has two. The first impression it is a snail but also has those structures related with the architecture.

But they also can observe those plastic forms although I don't know what are those.

The object destroy the geometric basic shapes to make them more complex and interesting. And that could also have relationship in someway with the building of a house.

**Meaning**

It was nostalgic because a person that I loved was an architect.

The design is related with the metaphor of a snail.

**Describe**

This artwork represents the metaphor of the snail in an object that combines structures to destroy basic geometry in the making of complex shapes.

I was wondering, how are the projections mapped in the surface.

**Map**

But I had problems to recognize the place probably because I don't have my glasses or because it is pixelated.

**City**

It might be a city, a urban city I could see lots of houses and streets.

It is not a town it is a place where tons of people live.

**Inhabitants**

Firstly, the little persons that are moving here (surface) but it could be also the snails.

**Snails**

They are a metaphor related with the design to fortify the concept of the snails. In our culture we see the snails as a symbol of the infinity, then I could imagine that it is complementing the idea.

**First thing**

The structure struck me.

**Explore**

I walked by the line, to came finally here [4]

**Viewpoint**

This one [4]. Because the color and how it is moving. I was trying to get how it was projected, why is it projected here (white sheet) and not here (transparent sheet).
| About | Interactive scene, that shows a physical and a projected stage that are interacting in between. This interaction in an scene based on the snail's movement.  
I did find an interactive feedback, unless I deliberately cover the camera. What confuses me is the movement of the snails.  
I was absorbed trying to decipher how much influence the physical stage has over the virtual stage. |
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Meaning</td>
<td>We are accustomed to interact with inert objects, but the snails reminded me to little photons. There are more living entities to interact who.</td>
</tr>
<tr>
<td>Describe</td>
<td>Everything turns around the snails in a non natural environment that might be understood as a city, and about how this stage interacts with a emulated and projected world.</td>
</tr>
</tbody>
</table>
| Map | There are several elements that makes me think about the relationship of the objects and the projection.  
The colors in the trails, because I observed a movement of a people  
There was interesting observed the irregular surface because you are always questioning yourself if there is a relationship between both stages. |
| City | Maybe it is difficult imagine something based on the physical scene, but in the virtual one it is observed a representation of the complexity of a urban environment. |
| Inhabitants | It vary depending on the environment, but if we talk about the whole experience, the inhabitants are the colors.  
I don't know if there is lack of accuracy regarding the fast movement of some of the characters, however, it is more funny to think that there is a kind of randomization to dynamise the movement. |
| Snails | Snails are living in a city that it is the system itself. |
| First thing | The first thing I saw it was the crystal structure... |
| Explore | ... then I looked at the type in the floor and when I followed it I realize that it has the shape of a snail. |
| Viewpoint | What is more interesting is the projection of the virtual stage  
This looks weird but at the same time interesting. These movements on the projection contrast the lack of movement in the physic stage. |
<p>| | |</p>
<table>
<thead>
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</thead>
</table>
| **About** | it shows the snails like people  
If you look at a specific angle the surface it is a reflection of the snails cage. |
| **Meaning** | What are those guy, oh they are the snails.  
If I look the snails it does not mean anything to me, but if I look at them in human form its kind of they are walking around the city. Kind a makeing a story, its telling me more. I feel like they have life  
Discover. You dont know what to expect, but then when it is revealed it becomes fun to watch. |
| **Describe** | There is the cage with the snails and there is another platform on top of it with a projection on it. If you look at a certain angle you could see that the projection is a reflection of the snails cage. |
| **Map** | The green 'how could I say' the green parts.  
There is a relation between the objects in the aquarium and the elements of the surface. Does not match perfectly. It is kind of similar but it is not the same. looks fictional because it is pixelated |
| **City** | First, I think that it was Nottingham. But it kind of looks like fictional too. It looks like in inception (movie), because the map goes like this (reflects) its makes the reality different |
| **Inhabitants** | Snails are the inhabitants but in human form.  
They were moving around, and the snails were moving around as well |
| **Snails** | If you look at them all day, or for a week or something. After observing that much you can really know what are they doing in their lives.  
If you watched that long you could create an story |
| **First thing** | I just moved, I felt like I should follow thise (spiral) |
| **Explore** | (spiral) it is like a guide, it makes you come here and then turned on here. [3]  
The angles have mean to be, maybe the angles you look at it |
<p>| <strong>Viewpoint</strong> | Looking the reflection of the projection in the transparent sheets (nearly [4]) |</p>
<table>
<thead>
<tr>
<th><strong>About</strong></th>
<th>Try to frame the image in one board to simulate a map</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>But I have been trying to understand how that is related with that other thing (aquarium). I tried to opened it, I didn't know if I was allowed to do that, but I tried.</td>
</tr>
<tr>
<td></td>
<td>Projections in a tridimensional space through different objects to create any type of map</td>
</tr>
<tr>
<td><strong>Meaning</strong></td>
<td>It was interesting, i was trying to find anything, but i didn't know what i was looking for</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Describe</strong></td>
<td>A 3D projection of several objects that allow the observer to think in a kind of map.</td>
</tr>
<tr>
<td><strong>Map</strong></td>
<td>I was trying to identify the relation between the map and the model. And those objects (3D printed objects) seems similar to what is here (virtual map). That's why I was trying to open it to move the objects and see what happens. But just when you are stood in a particular place.</td>
</tr>
<tr>
<td></td>
<td>I was trying to find the way to break free this guys (characters) from the maze</td>
</tr>
<tr>
<td><strong>City</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Inhabitants</strong></td>
<td>There are people, for a while I thought that was me. That is why I tried to move to break free him from that place. But it didn't work.</td>
</tr>
<tr>
<td></td>
<td>Then I think that I have to break free the people removing the snails from the aquarium.</td>
</tr>
<tr>
<td><strong>Snails</strong></td>
<td>They are inhabitants of its places, living their life.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>First thing</strong></td>
<td>The screen, then I tried to touch it to interact.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Explore</strong></td>
<td>then I looked at the bottom and seems similar, and while I was turning I realize the thing in the floor.</td>
</tr>
<tr>
<td></td>
<td>then I got how to combine the screens</td>
</tr>
<tr>
<td><strong>Viewpoint</strong></td>
<td>here [3], because you can see all the screens and you can understand the perspective</td>
</tr>
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<td>P6</td>
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<td>---</td>
<td></td>
</tr>
<tr>
<td><strong>About</strong></td>
<td>It is a way to analyse the behaviour of the snails about how people like us, could observe the behaviour of those animals</td>
</tr>
<tr>
<td><strong>Meaning</strong></td>
<td>you feel like a god view, looking how everything moves an experience with tracking and mapping technologies</td>
</tr>
<tr>
<td><strong>Describe</strong></td>
<td>An experience about tracking and mapping the snails</td>
</tr>
<tr>
<td><strong>Map</strong></td>
<td>I know that I don't know this place it looks like those little things (3d printed objects) are represented in parks</td>
</tr>
<tr>
<td><strong>City</strong></td>
<td>a place with parks or similar</td>
</tr>
<tr>
<td><strong>Inhabitants</strong></td>
<td>snails the purple snail walk from there to there, and I realize that it had elapsed long time</td>
</tr>
<tr>
<td><strong>Snails</strong></td>
<td>They are who explore the city or the map they are the real explorers</td>
</tr>
<tr>
<td><strong>First thing</strong></td>
<td>I entered looking at the snails, you can not see anything else from there [1] The map, then I observed that here (spiral) shows where you might walk</td>
</tr>
<tr>
<td><strong>Explore</strong></td>
<td>i turned around the object</td>
</tr>
<tr>
<td><strong>Viewpoint</strong></td>
<td>you have everything, the view of the snails in the physical map as well as the virtual map overthere. And you can look how the things are related.</td>
</tr>
</tbody>
</table>
the color strucks me, why those colors just half of the snails are exploring. In fact, I took the green because I wanted to know if there was an animal inside the shell. coloured snails in a tank. half of them are curious the others are not. But I can not interpret what is upside. I dont know what are those maps.

It helps you to relieve stress. I was stressed but here I got so focused on observing that I forgot the stress.

but I also love animals and I enjoyed look at them interacting, for example, there are people that does not like snails. It they dont disgust me.

Coloured snails in an aquarium, half of them are curious the rest of them dont care about anything. However I couldn't interpret what its placed above. why maps?

I do not have any idea what is the relation with the maps.

probably are related with the place where you caught them (snails)

It seems that the snails but in the image are little people, so maybe it is a reflect of how we look like but in a little scale, if anybody looks us from above, we could look like these.

just, the bigger are exploring. the little ones are just there.

The lights, at the very beginning I didn't understand what I was looking at, or why there are just some parts with projections.

First of all, I thought that I can not cross this line (spiral). then I realize that it is snail shaped and I did not care.

I sat to observe the snails, then I turned around. Then I tried to observe it in general.

This (sat down in [3]), here I am still sat. I think that for the closeness to the snails. here I can observe all the snails I have a look of the structure.
| **About** | the snails are the little persons, then i tried to identify who is who.  
this are in constant movement and not connect none.  
a mixture between real subjects... but this real environment translated and represented in a  
virtual world but in the same object. it is not like see a distant place in your computer, you  
look all together. |
| --- | --- |
| **Meaning** | curiosity, i want to know what is happening there but i don't understand. i want to know what  
are those white things (3d printed objects) but I cant.  
i want to be more time to decipher what is happening. |
| **Describe** | A mixture about real subjects... this real environment translated and represented in a virtual  
world but in the same place. it is not like see a distant place in your computer, you can look  
everything together. |
| **Map** | i don't know if the shape matters. or relate this shape with the thing that it is overthere.  
i didnt understand what is the image. but i thought that this things (3d printed objects) are  
there (virtual park)  
But i think that is a map, or a maze or stairs, They can be lots of things |
| **City** | Identify if the snails that have movement are reflected there (surface)  
it is not that overthere (aquarium)? |
| **Inhabitants** | the snails, but also the users.  
i am thinking that i am reflected, am i? |
| **Snails** | they represent each one to each person  
the purple one, climb the wall. i don't know if this trail represent his route. it is purple as well.  
But the green also climb, but i dont see anything. |
| **First thing** | I entered directly to here [2] looking for the snails. i mean the real  
then i looked the surface and tried to identify each snails |
| **Explore** | comparing what is above with what is in the bottom  
looking for similarities  
but as the structure has different sides, not what i expected, i wanted to identify if this shape  
it is related with something in the bottom. |
| **Viewpoint** | from this side [2] because you can look above and belowe.  
but also here [3]. probably here it is better |
| **About** | three type of spaces that are combined in another type of space. The city of the snails, the virtual city above, the city that you bring, that is overthere (pointing the withe box); and is the physic space that is not a real city but this place. All fourth spaces interacting through the structures. Cities overlapping in different dimensions. |
| **Meaning** | Kind of curiosity and questions. Affection to the snails. |
| **Describe** | Cities overlapping, different spaces: physical, virtual and of memories. Different qualities of cities overlapping. |
| **Map** | You have different shapes that intersect between themselves. |
| **City** | A fragmented place. |
| **Inhabitants** | Avatars are inhabiting but without knowing who is who. Virtual avatars and snails that represent a division between the slowness of the reality and the hyper reality without a physical limit over the time. |
| **Snails** | They are part of a hierarchichal system. I felt affection while observing the snails. |
| **First thing** | This shape of snail, because the panels cannot be observed. The white panels |
| **Explore** | Everything is dark, so you move overhere [2] and you coudl identify the white panels. Then you crouch to look at the snails and when I was below I draged to the computer to look what was inside. It is interesting to have things that seem hide, but that are not really hide. |
| **Viewpoint** | None, that would be constrain the object. It is ok to suggest to the participants to turn around. Becuase here you have an interesting perspective [1] that it looks like you have nothing, but overthere [3] you look the ensemble with the panels. I imagine that there is one position where the snails totally disappear. |
### About

Multiple projections. I was playing all around and in everywhere you have different...

- an interactive sculpture, in the range of an interactive toy
- It remind me videogames (age of empires, minecraft). Like this games that simulate cities with a arereal view. Looking to the little avatars live together

### Meaning

I was intrigued at the very begining because you arrived without a previous knowledge. But I enjoyed because I like exploring the things.

- It gave me the opportunity to look from different angles, crouch and see

### Describe

I would call an interactive sculpture like a big technologic toy. Where someone can look around and understanding changes while moves.

### Map

- even the reflects of the projections on the mirrors are able to create a distortion of the realities, like a paralel world.

### City

- I was several time looking at the snails analysing the snails

### Inhabitants

- It remind me videogames (age of empires, terraria, minecraft). Like this games that simulate cities with a arereal view. Looking to the little avatars live together

### Snails

- the colors of the snails allow you to identify who are the inhabitants in the physical environment, but in the digital terrarium is built as a city map where the inhabitants are those digital microorganisms.

- There are people but it is not just one protagonist that could be differentiate their behaviour from the others.

- I see the live in the set, I can not look at the differences, like a sociopath who came to burn something. That might be a protagonist in this kind of realities.

### First thing

- The map
  - Try to move the avatar in the biggest panel.

### Explore

- I was looking for the type of interaction. therefore i went directly to the more visible panel to try to affect the artifact

- I tried to control them, to know if they response to any of my actions. But I have the impression to look at the little persons live in a terrarium without modified their behaviour. At least I want to hit the glass, but I dont gonna do that.

- When I identify the reflects it encourage me to start looking around again to look how the things are modified. I find a place to project the map over the snails.

### Viewpoint

- from [3] you can delete the transparent gaps. All the complex polygonal shaped structure make sense from this position. Additionally you can also observe this underworld in a paralel dimension.

- I was trying to find a trick to overlap the digital world on the physical world, but I couldn't.

- Don't let the first impression affect you, try to explore and look how the perspectives are changing
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<tr>
<td><strong>About</strong></td>
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<tr>
<td><strong>Meaning</strong></td>
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<td><strong>Describe</strong></td>
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<td><strong>Map</strong></td>
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<td><strong>City</strong></td>
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<td><strong>Inhabitants</strong></td>
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<tr>
<td><strong>Snails</strong></td>
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<tr>
<td><strong>First thing</strong></td>
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<td><strong>Explore</strong></td>
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<td><strong>Viewpoint</strong></td>
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<tr>
<td><strong>About</strong></td>
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<td><strong>Meaning</strong></td>
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<td><strong>Describe</strong></td>
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<td><strong>Inhabitants</strong></td>
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<tr>
<td><strong>Snails</strong></td>
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<tr>
<td><strong>First thing</strong></td>
</tr>
<tr>
<td><strong>Explore</strong></td>
</tr>
<tr>
<td><strong>Viewpoint</strong></td>
</tr>
</tbody>
</table>
**About**

It overlays the virtual world with the physical world. I can see the virtual one projected at the top, and I see things moving although I can't identify what these are.

But there is an environment there and something moves, at a certain place there is somebody jumping.

There are two environments involved and there are actors that are moving. In some how they are related to each other.

**Meaning**

As it is placed in a lab context, no in an art context it was different and difficult to feel something. I found myself testing the manuals rather to...

**Describe**

An overlay, from some perspectives, of physical and digital maps with live actors on top of each other. But there is no literally way to overlay the things, they have to overlay next to each other.

**Map**

There are two maps in the object...

I tried to see the similarities between both maps but I couldn't identify the connection. They don't layout.

Overlay of physical and digital maps, and live actors on top of each others, and overlay from some perspectives. But there is no way literally overlay the things, they have to overlay next to each other.

**City**

Both moves slow, that is the link.

And it some point it looks like they (characters) have similar colors to the snails but this is no yellow it is orange, or is it that? Oh, they leave trails.

**Inhabitants**

In the physical these 6 snails, up here (surface) I don't know, it could be people. I think that it have to be with the resolution of the projector.

I think the map is a bit messy from that side [2]. So if you see it from that side [3] it is more like a city environment. And I presume that it is people.

**Snails**

And there is the physical environment at the bottom with 6 snails. And they move very slowly or not at all. For example, the yellow one haven't moved.

**First thing**

From this part you see very little of the virtual map. They way you shape the enclosure. And there is a parte here [1] when I can't see the map at all.

**Explore**

First I looked all around (sorround), then I tried to follow this trail, and that it is slightly..I did a multiple time.

The first time was kind of disappointing. When I followed it at the end I blocked my own view. So it looks you limiting this viewpoint. I can see the map from this point, that confused me a little bit (i feel that i was not in the right point).

It is interesting how the trailway seems to lead you somewhere but i can't quite delivered tell people what have to do.

**Viewpoint**

So i Founded this other position were the virtual it is more pronounced but for me it worked well. However, it wasn't on the line, it depends on your height.

It is basically playing with these two where you can see the digital nearly map completed, and there is the on the otherside where you can not see the digital map.

and there is also another viewpoint, going down to the floor trying to see the snails. ignore the digital map completely and you just look at the aquarium.
<table>
<thead>
<tr>
<th>About</th>
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<tbody>
<tr>
<td>some snails are related with the figures in the projection, but some of the figures are jumping around</td>
<td></td>
</tr>
<tr>
<td>I think the physical objects in the aquarium might be represented with the things in the projection. Potentially the green things.</td>
<td></td>
</tr>
<tr>
<td>It is interesting to represent snails in digital people or in a way inhabitants over a digital world.</td>
<td></td>
</tr>
<tr>
<td>Somehow there is a connection between the physical world and the projected world. But it was tricky to relate those two...</td>
<td></td>
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<tr>
<td>So one of the snails seem to be hanging out in the park.</td>
<td></td>
</tr>
<tr>
<td>It seems unrelated what it is actually happening. The digital players don't seem to interact with each other and the snails are interacting with each other. But both worlds overlap in some way. But I don't think that the digital have some impact on the snails.</td>
<td></td>
</tr>
<tr>
<td>It's a mixture of physical and digital worlds in which the physical world consist of snail aquarium with snail inhabitants. That in some way maps to a digital world. The snails are represented in a sort of people living in a digital city.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Map</th>
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<tbody>
<tr>
<td>The projection looks like a city map, but it is so pixelated so it is difficult to determine, whether there is an actual city or a random arrangement of pixels.</td>
<td></td>
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<tr>
<td>Green things may be parks or something,</td>
<td></td>
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<tr>
<td>I do not know still if there is a city or no, but it is definitely a city that I don't recognize</td>
<td></td>
</tr>
<tr>
<td>There are other people in the projector map that are moving around. (jumping across)</td>
<td></td>
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<tr>
<td>So one of the snails seem to be hang in the park.</td>
<td></td>
</tr>
<tr>
<td>So is no like people moving in a city trying to get the bus or the vibrancy of a city.</td>
<td></td>
</tr>
<tr>
<td>What it was difficult it is that snails are so slow, so nothing seems to be changing on the map. There are slight shifts in what the people are doing but they are still stationary.</td>
<td></td>
</tr>
<tr>
<td>The snails are the main actors because I assume that what they do relate to what happens in the digital world.</td>
<td></td>
</tr>
<tr>
<td>First I couldn't see the projection</td>
<td></td>
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<tr>
<td>Slow reveal that there was a projection happening.</td>
<td></td>
</tr>
<tr>
<td>I was walking along the nautilus snails shape, and I couldn't see the projection. But then the projection get more and more visible. And at the time that I was 200° of the circle I could see the whole projection.</td>
<td></td>
</tr>
<tr>
<td>Perceptually I like the shape of the object. It was quite nice to get that sort of slow exploration of what is actually happening. Because first you see just the snails and the you see the projection.</td>
<td></td>
</tr>
<tr>
<td>At the end I was stood at that point, where I could see the whole projection, and I tried to make sense of what I was seeing.</td>
<td></td>
</tr>
<tr>
<td>Somewhere around here [3] that it is orthogonal to the largest projections. Because you see most of the projection, although there is also somewhere a white spot. But you can get almost only projection.</td>
<td></td>
</tr>
<tr>
<td>[3] Kind of relating the most to the aquarium itself. The orientation of the physical objects it can be easily map to what you see in the projection I thought.</td>
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</tbody>
</table>
Appendix C

Profiles
The artwork

The journey is a gentle experience that flows in the same rhythm that the snails behave and is guided by the delicate movement of the spiral in the ground. However, is contrasted with non-elegant angular shapes and an old fashioned blocky world is revealed through different perspectives.

The maps

A chaotic city in the mountains is revealed by snails showing the difficulties of living in a nonnatural environment, similarly, the pixelated map is embedded in an irregular surface with strong angles evokes the same characteristics.

The inhabitants

When the snails were painted they were taking away from their naturality. They are transferred to an inorganic pixelated world. The movement of their digital couples seems to have quantum qualities, while the snails are motionless the digital characters are flicking around the position.

The journey

“When you come around you can’t actually follow all the way through. It makes me feel I wanted to cross into the snail’s box so that I can be in there”

Walking carefully over the spiral on the floor with the eyes looking at the object, until clashing with the object. This process was repeated a couple of times trying to get the author’s perspective. Likewise, analysing the object from different interesting spots.
The artwork

The shape of the object destroys the geometric patterns to build a complex structure. However, the core of the artwork is the representation of the snail's metaphor, and the spiral journey.

"In my culture snails are symbol of the infinity"

The maps

An urban city emerges by the architectural shapes of the 3D objects inside the aquarium as well as the general object. In the pixelated map it is difficult to recognize what is presented, nevertheless, it might be houses and streets with tons of people living inside.

The inhabitants

The digital characters might be considered as the inhabitants who are occupying the urban environment, however, the snails are the ones who live in the physical environment.

The journey

One of the most interesting places to observe the object is from behind the structure where the surface looks irregular and fragmented. It becomes an enjoyable and uncanny experience when looking the visual effects generated by the projections over the surface.
The artwork

The artwork shows a group of snails in a nonnatural environment that might be understood as a city, and about how this stage interacts with an emulated and projected world. The relationship of both worlds is based on the snail's movement.

The maps

Although there are different elements to relate both maps such as the shapes of the interfaces, or the colors in the trails of the digital characters, the representation of the urban city emerges just by observing the virtual scene. It is difficult to imagine something based on the physical scene.

The inhabitants

"Defining the inhabitants would vary depending on the stage, but if I have talked about the whole experience, I would say that the inhabitants are the colors"

However, the presence of animals in the object is remarkable for a computer science related product, where the artifacts are usually inert objects.

The journey

The elements are revealed step by step. First, the tape that changes from a single line to divide the space into a snail shape, then the geometric structure appears and then the virtual scene. The most interesting position is placed in front of the whole virtual scene and the aquarium.
The artwork

There is a relation between the aquarium and the virtual world over the surface that might be observed from a certain angle.

"when I looked at the snails it did not mean anything to me, but if I look at them in human form I see them walking around the city making a story, it's telling me more. I feel like they have real life"

The maps

The virtual map presents an urban reality that seems fictional or might be somewhere in Nottingham. When the reflexes are observed on the transparent boards it is possible to identify a twisted reality, like in Inception Movie.

The inhabitants

Snails are the inhabitants but in a human form. After, looking at them for a week or similar it would be possible to describe their performance in the aquarium, and the digital characters would create a story based on their movement.

The journey

Although the journey is defined by the spiral in the floor it is also possible to explore the object through walking in an opposite direction. This experience is made to be discovered, although at the very beginning it is hard to identify what to expect, the elements of the object were appearing one by one.
The artwork

The artwork encourages the audience to find a way to solve the puzzle for setting free the digital people in the maze. The avatars are related with snails in an aquarium. Therefore, the game could finish by removing the snails from the aquarium.

The maps

The digital image projected over the tridimensional surface generates a sort of map, which elements are in some way related to the elements of the aquarium. The main clue to relate both worlds are the similarities between the milestones (i.e. 3D objects and parks). Moving the objects in the aquarium might modify the digital map.

The inhabitants

Snails are the unaware inhabitants of the artwork, they are just trying to survive in their own reality. However, for a while the idea that the spectator is the inhabitant of the space emerged, inviting the audience to interact with the object.

The journey

“I even tried to opened it (the aquarium), I didn’t know if I am allowed to do that, but I tried”

The experience is generated around the exploration: touching, discovering and playing have been essential activities to engage the projection over a set of tridimensional objects. However, observing is also interesting especially from a specific viewpoint that allows combining all the screens in one.
The artwork

The object enhances the skills to observe the map. This third person view reminds a God’s power, allowing to look the behaviour of the snails in the aquarium and in the augmented reality.

The maps

A city with parks on it was recognizable; the parks existed as well in the designed aquarium in the 3D printed objects. However, neither the identity of the city nor its location is not easy to interpret.

The inhabitants

Snails are controlling the behaviour of the artwork while they move around the physical city, they are the real explorers.

“When the purple snail walked from there to there (pointing both extremes of the surface) I realized that it had elapsed a long time”

The journey

At the beginning, the aquarium with snails is the first thing that strikes, everything else it is unobservable. The spiral guides to suggests to turn around the object, at the end of the spiral it is easier to look at both maps and relate the behaviour of both worlds.
The artwork

The experience works well to relieve stress whilst someone is observing the snails in the aquarium. It is easy and funny identify the specific behaviour of each snail.

“three of them were curious, the others were motionless”

The maps

The map may be a representation of the real snail’s home. However, there is no evidence to assume a posture.

The inhabitants

It seems the snails are the inhabitants, however, the virtual map contains little people. It could be a reflection of people living somewhere. If anybody would look the human beings from a third person view, it could look like this.

The journey

The first place to stop is just in front the snail, crouched or sat to look at them very close. Then, walking around the object allow having a general overview of the artwork. However, you will want to come back and, if you are not afraid of touching the snails, open the aquarium.
The artwork

The experience arouses the curiosity of the spectator, the object shows the performance of real subjects in a physical environment, those are translated to a virtual world connected by the movement.

"it's not like watch a distant place in your computer in google maps, you can observe all together in the same artifact"

The maps

It is hard to understand the image presented in pixels, some elements seems to be related to the aquarium, however, the relationship can not be tested. The digital scene might be a map, or a maze or some stars; the possibilities are infinite.

The inhabitants

The snails and the audience are the inhabitants of the space. Although the digital people seem to represent the movement of the snails in the physical environment, it might be influenced in some way by the actions of the spectator.

The journey

The strategy to approach the object is: firstly, walking straight to observe the snails in the aquarium; secondly, looking for the position of each actor on the stage; then, comparing the actors and also the elements in both worlds; lastly, looking for similarities from the different viewpoints.
The artwork

“Three type of spaces that are combined in another type of space. The city of the snails, the virtual city above, the city in your mind that is also represented over there (pointing the white box); and this psychical space that is not a city but is the place where the artwork is framed”.

The maps

The map is compound by articulating different qualities of fragmented cities overlapping in a hierarchical relationship. The virtual city enhances the qualities of the physical space with different values from each viewpoint.

The inhabitants

Digital avatars and snails are showing a dialogue between the slowness of the reality and the speed of the hyper-reality without physical boundaries. Nevertheless, snails are creatures that can transmit emotions to the observer like affection.

The journey

Is a process of discovering, through the snail-shaped object. From the transparent, to the screens, the snails and then the box. The object can be restricted to one position, the observer has to turn around the object, that is an important part of the interpretative process.
The artwork

This may be an interactive sculpture or a big technologic toy. Where the people have to walk around, they perceive the transformation of the object from different perspectives. Explore is the keyword especially if the observer does not have previous expectations.

The maps

“It is not a map, are pixels that remind me the shape of buildings. It is more like a remembrance of a city, where the protagonist is the movement”

The map makes reference to an allegorical construction, this might be linked to video games such as ‘Age of Empires’, ‘Terraria’, ‘Minecraft’, etc. The third person view allows observing the living avatars.

The inhabitants

They are presented in a sort of contrast between the singularities and the collectivities. Each snail might be differentiated from one to another, it may be said ‘what happen with the yellow?’, or ‘the purple is climbing the wall’. Instead, the colors of the snails become the microorganisms without a notorious identity in the city map.

The journey

Firstly, looking if there is any way to manipulate the performance of the object by touching any element, the surface might look like a touch screen. More importantly, observing carefully the sculpture and enjoying the main viewpoints like the front of the object. Likewise, finding new interesting viewpoints hidden in the geometry, like the parallel dimensions that appear in the reflects of the translucent sheets.
The artwork

The experience is a bit confusing, there is some relationship about what is going on in the snail box and what is happening in the projection at the top of the object.

“I am not sure, I am maybe missing something but I am a Computer Scientist, not an artist.”

The maps

A city emerges in the aquarium as well as in the digital map, but the movement of the elements in the digital city is very fast, so it is hard to focus on its characteristics.

The inhabitants

It seems like snails are representing different types of people in the city. Although their relationship is not clear, it is observable their movement in both maps (e.g. the blue snail crossed a section of the aquarium and the blue character did the same), it looked like the blue guy was in the park.

The journey

Exploration is a transitional journey from the beginning where only the physical city and the snails are shown, through the fragmented odds and ends of the screens. Later is the digital city is revealed, this is the most interesting viewpoint where snails and the projection can be perceived, and the potential relationship appears.
The artwork

The artwork shows a virtual representation of a place and the physical representation of a place. There is also a connection between both environments that may be related to the positions of snails and avatars.

The maps

Recognize the cities in the environments takes a time, it is necessary to compare the position of the elements to identify the relation (e.g. the 3D objects with the parks, or the snails with the avatars). When both interfaces are overlapped the city is revealed, however, this city is not a particular place rather than a city with lots of things going on.

The inhabitants

“I found the snails quite provocative I was concern about their welfare”

Depending on the unknown conditions, they may be considered captives or performers. They are clearly represented on people, doing something in the city, hence, there is a narrative created by the movement of the snails. However, there are some characters moving very fast around the city, it is not clear if there is meant to be like this or if it is a problem of the visual tracking system.

The journey

To make sense of the fragmented reality it is necessary to spend some time walking around the object. Although the line suggests a guide to finding the key spots inside the spiral area, it is difficult to get the position to make a geometric sense of the alignment of both interfaces. To sum up, the spiral guide may not be accurate depending on the observer’s height.
The artwork

The experience is about an overlay, from some perspectives, of physical and digital maps. These are places with living actors, one on top of each other. There is no literally way to overlay both realities, they have to be connected symbolically by comparing the elements one by one.

“As it is placed in a lab context, a nonartistic context, it was different and perhaps difficult try to engage emotionally. I found myself testing the manuals rather to…”

The maps

There are two maps in the object and both maintain the same slow and smooth characteristics. The upper map is a bit messy when the sheets are fragmented, however, when the gaps are hidden, in the front face, it looks like a city environment with people on it.

The inhabitants

In the physical world are inhabiting 6 snails, in the digital world is hard to identify. However, they seem to be related to their position and by the trails of their previous movements.

The journey

The object might be explored by walking around. When following the spiral, the observer could look from the first position that the digital map does not exist. In the following viewpoint, the city is nearly completed. However, the spiral route finishes in a problematic spot. There the spectator blocks the projection, feeling perhaps that is in a wrong place.
The artwork

It’s a mixture of physical and digital worlds in which the physical world consist of a snail’s box with snails inhabitants. That in some way maps to a digital world. The snails are represented in a sort of people living in a digital city.

The maps

The projection looks like a city map, but it is so pixelated so it is difficult to determine, whether there is an actual city or a random arrangement of pixels. For example, physical objects in the aquarium might be represented by the green rectangles, these might be parks or not. The characteristics of the city and the location of this place is not easy to recognize.

The inhabitants

“So one of the snails seem to be hanging out in the park”

The snails are the main actors, it seems that they create what happens in the digital world. However, although their activities are easy to recognize, it is not like people moving in a real city trying to get the bus or whatever. This does not communicate all the vibrancy of a real city.

The journey

When exploring the object the things are revealed slowly. It is pleasurable to travel around the nautilus shape to understand what is happening. First, the projection is hidden, however, while the observer moves they become more visible, and at 200º of the spiral both snails and projection might be observed together.
Appendix D

Consent Forms
Research Consent Form

The Snail’s Place is an interactive object reproducing a physical and a digital scenario. You will be asked to spend some time observing the artwork by yourself. The physical map is an aquarium with living snails and the digital map is a projection over the object. After you finish, there will be a short interview about your experience, lasting no more than 10 minutes.

I have read and understood the attached information sheet, which includes information about the data to be recorded and how it will be stored.

I understand that I can withdraw at any time by contacting the researcher at the address provided in the information sheet, or in person during the study, and my unpublished and/or non-anonymous personal data will be erased from the records.

During this study, I will use a smartphone and headset loaned to me by the researchers. I will undertake to keep this equipment safe and secure and to return it in good condition at the end of each session.

I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: July 28th
Print name: Rosa Cristina López
Telephone: 63532302
Email: rosa-cristina@hotmail.com

Signed: [Signature]

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published. [ ]

Signed: [Signature]

I give permission for the data collected to be used in subsequent research. [ ]

Signed: [Signature]

Researcher details:

Xavier Barriga Abril
School of Computer Science, University of Nottingham, Jubilee Campus
Telephone: 07759790357
Email: psxexb@nottingham.ac.uk
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I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: 28/07/2016
Print name: Spyros Matsoukis
Telephone: 07544932791
Email: itxsw7@nottingham.ac.uk

Signed:

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published. [ ]

Signed:

I give permission for the data collected to be used in subsequent research. [ ]

Signed:

Researcher details:

Xavier Barriga Abril
School of Computer Science,
University of Nottingham,
Jubilee Campus

Telephone: 07759790357
Email: pscxsb@nottingham.ac.uk
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I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: 2 August 2016
Print name: JOCeLYN SPENCE
Telephone: 07707 606321
Email: jocelyn.spence@nottingham.ac.uk

Signed: [Signature]

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published.

Signed: [Signature]

I give permission for the data collected to be used in subsequent research.

Signed: [Signature]

Researcher details:

Xavier Barriga Abril
School of Computer Science,
University of Nottingham,
Jubilee Campus

Telephone: 07759790357
Email: psxcox@nottingham.ac.uk
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I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date:
Print name: Esmeralda Espinosa
Telephone:
Email: bxeez@nottingham.ac.uk

Signed:

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Signed:

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Signed:

Researcher details:

Xavier Barriga Abril
School of Computer Science,
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Telephone: 07759790357
Email: pxcxb@nottingham.ac.uk
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I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: 3 Aug 2016
Print name: Francisco Javier Navarro Barron
Telephone: 07770022712
Email: psxfjn@nottingham.ac.uk

Signed:

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published. [ ]

Signed:

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Signed:

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School of Computer Science,
University of Nottingham,
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Telephone: 07759790357
Email: psxexb@nottingham.ac.uk
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I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: 03/08/2016
Print name: Beste EREN
Telephone: 
Email: psxbe1@nottingham.ac.uk

Signed: 

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published. [ ]

Signed: 

I give permission for the data collected to be used in subsequent research. [ ]

Signed: 

Researcher details:

Xavier Barriga Abril

School of Computer Science, 
University of Nottingham, 
Jubilee Campus

Telephone: 07759790357 
Email: psxceb@nottingham.ac.uk
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I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: 3/08/2016
Print name: RICARDO ERAZO
Telephone: 0779 86 83 785
Email: levrre@nottingham.ac.uk

Signed: 

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published. [X]

Signed: 

I give permission for the data collected to be used in subsequent research. [X]

Signed: 

Researcher details:

Xavier Barriga Abril

School of Computer Science,
University of Nottingham,
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Telephone: 07759790357
Email: psxcxb@nottingham.ac.uk
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I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: 3 October 2016
Print name: Sebastian Guerreo
Telephone: 075 1948 74 87
Email: itxMale @nottingham.ac.uk

Signed: [Signature]

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published. [ ]

Signed: [Signature]

I give permission for the data collected to be used in subsequent research. [ ]

Signed: [Signature]

Researcher details:

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School of Computer Science,
University of Nottingham,
Jubilee Campus

Telephone: 07759790357
Email: psxcxb@nottingham.ac.uk
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I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail's Place research trial on:

Date: 31 August 2016
Print name: Nuria Palau Martinez
Telephone: 07342 286070
Email: nuriap14@hotmail.com

Signed: [Signature]

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published. [ ]

Signed: [Signature]

I give permission for the data collected to be used in subsequent research. [ ]

Signed: [Signature]

Researcher details:

Xavier Barriga Abril

School of Computer Science,
University of Nottingham,
Jubilee Campus

Telephone: 07759790357
Email: psxxb@nottingham.ac.uk
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I confirm that I am over the age of 18.
I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: 04th August 2016
Print name: Gesa Rojas
Telephone: 07516784478
Email: psxogr@nottingham.ac.uk

Signed: [Signature]

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published. [ ]

Signed: [Signature]

I give permission for the data collected to be used in subsequent research. [ ]

Signed: [Signature]

Researcher details:

Xavier Barriga Abril

School of Computer Science,
University of Nottingham,
Jubilee Campus

Telephone: 07759790357
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I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail's Place research trial on:

Date: 04/08/2016
Print name: Estefania Pineiros
Telephone: 07939 331 346
Email: c.pineirosa@gmail.com

Signed: [Signature]

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published. [ ]

Signed: [Signature]

I give permission for the data collected to be used in subsequent research. [ ]

Signed: [Signature]

Researcher details:

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Telephone: 07759790357
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I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: 4th August 2016
Print name: Elsa Garzon Ruiz
Telephone: +44 0777 821 3883
Email: adxeg1@nottingham.ac.uk

Signed:

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published. [ ]

Signed:

I give permission for the data collected to be used in subsequent research. [ ]

Signed:

Researcher details:

Xavier Barriga Abril
School of Computer Science,
University of Nottingham,
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Telephone: 07759790357
Email: psxceb@nottingham.ac.uk
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I have read and understood the attached information sheet, which includes information about the data to be recorded and how it will be stored.

I understand that I can withdraw at any time by contacting the researcher at the address provided in the information sheet, or in person during the study, and my unpublished and/or non-anonymous personal data will be erased from the records.

I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: 4th August 2016
Print name: Andros Basante
Telephone:
Email: androsbasante@gmail.com

Signed:

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published. [ ]

Signed:

I give permission for the data collected to be used in subsequent research. [ ]

Signed:

Researcher details:

Xavier Barriga Abril
School of Computer Science,
University of Nottingham,
Jubilee Campus

Telephone: 07759790357
Email: psxcb@nottingham.ac.uk
Research Consent Form

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I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: 4 August 2016
Print name: Holger Schädel Bach
Email: holger.schaebelbach@nottingham.ac.uk
Signed: Holger Schädel Bach

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published.

Signed: 

I give permission for the data collected to be used in subsequent research.

Signed: Holger Schädel Bach

Researcher details:

Xavier Barriga Abril

School of Computer Science,
University of Nottingham,
Jubilee Campus

Telephone: 07759790357
Email: psxcbx@nottingham.ac.uk
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I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: 08/08/2016
Print name: MARTIN FLINTHAM
Email: martin.flintham@nottingham.ac.uk
Signed: 

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published.

Signed:

I give permission for the data collected to be used in subsequent research.

Signed:

Researcher details:

Xavier Barriga Abril

School of Computer Science,
University of Nottingham,
Jubilee Campus

Telephone: 07759790357
Email: psxxxb@nottingham.ac.uk
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I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: 8/8/16
Print name: A BROWN
Email: Anthony.Brown@nottingham.ac.uk

Signed:

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published.

Signed:

I give permission for the data collected to be used in subsequent research.

Signed:

Researcher details:

Xavier Barriga Abril

School of Computer Science, University of Nottingham, Jubilee Campus

Telephone: 07759790357
Email: psxceb@nottingham.ac.uk
Research Consent Form

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I understand that I can withdraw at any time by contacting the researcher at the address provided in the information sheet, or in person during the study, and my unpublished and/or non-anonymous personal data will be erased from the records.

I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: 2/7/16
Print name: S Reeves
Email: S.reeves@nottingham.ac.uk
Signed: [Signature]

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published.

Signed: [Signature]

I give permission for the data collected to be used in subsequent research.

Signed: [Signature]

Researcher details:

Xavier Barriga Abril

School of Computer Science,
University of Nottingham,
Jubilee Campus

Telephone: 07759790357
Email: psxexb@nottingham.ac.uk
Research Consent Form

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I confirm that I am over the age of 18.

I confirm that I have agreed to take part in the Snail’s Place research trial on:

Date: 8 AUGUST 2016
Print name: Nils Jaeger
Email: Nils.Jaeger@nottingham.ac.uk

Signed: [Signature]

In addition to the data analysis, I give permission for data that could identify me (e.g. photos, audio, video) to be published. ANONYMOUSLY

Signed: [Signature]

I give permission for the data collected to be used in subsequent research.

Signed: [Signature]

Researcher details:

Xavier Barriga Abril
School of Computer Science,
University of Nottingham,
Jubilee Campus

Telephone: 07759790357
Email: psxcxb@nottingham.ac.uk
Appendix E

Snail’s Place - Teaser
Teaser

Duration (2:13)

Credits

Xavier Barriga Abril
Mixed Reality Lab
University of Nottingham
UK 2016

Music, Vortex (Macho Muchacho + El Ermitaño)

Link bit.ly/snailsPlace