Generational Controls: Designing and implementing a serious intergenerational escape game that analogizes data personalization, filter bubbles and echo chambers

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Abstract:

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Scott DeJong

Digital literacy initiatives disproportionately favour school children, leaving older adults and individuals in spaces of economic precarity without access. Current initiatives to provide digital literacy skills, struggle to provide analog methods of learning creating an access gap. Escape games, collaborative puzzle solving games, offer a promising educational alternative by naturally promoting a critical evaluation of game material. The project demonstrates a method that can provide information about digital processes without the barriers of online learning through an analog escape room titled, *Reactile.* The analog game uses analogy and facilitator performed characters to represent content and guide players into discussion about the collection of data for platform personalization, filter bubbles, and echo chambers. Connecting activist facilitation practices with subversive teaching approaches, this Masters outlines the process of making and implementing a serious escape game that represents digital infrastructure. Placing players at the forefront of the learning practice, the game embeds reflection during and after play, prompting players to connect their experience and knowledge to the issues discussed. The project acts a template for intergenerational knowledge exchange through games.

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1. Introduction

As a kid, I remember designing countless different games with my neighbours. We would design elaborate rule sheets, continually alter how one was expected to play, and would incorporate influences from our favourite television shows or movie characters. Like many children, we would imagine our game world, immersing ourselves into a co-created narrative that would keep us running around the neighbourhood for hours. Our adventurers changed all the time, introducing new ideas, changing objectives and ranging from competitive to collaborative experiences. As a child, many of these games were reflections of influences on my life, and while I can barely remember the rules of the numerous game's we played, the prominent stories and worlds stick with me today.

My personal experience is not uncommon, but it emphasizes how game's and meaning interact. The framework of a game, with rules, procedures, and stories allow for designers or players incorporate ideas through play. Games can embed elaborate systems which reflect experiences and idea from our lives. Mary Flanagan (2009) connects games to cultural infrastructure, emphasizing that games represent cultural activities or structures within a game's characteristics. As an example, Flanagan highlights how one of the oldest board games, *Senet,* reflects farming culture, specifically the sowing of seeds (ibid.). Video games have a similar history. Early computer 'games' existed as simulations for militaries to test potential outcomes on a global scale (Smith, 2014). Eventually, video games provided designers with a new medium using interfaces and computational processes to simulate real-world scenarios in virtual spaces. Video games combine software, hardware and designer intentions in order to abstract ideas to players, a process Ian Bogost connects to procedural rhetoric which he defines as, "the art of persuasion through rule-based representations and interactions rather than the spoken word,

writing, images, or moving pictures" (2007, ix). Bogost's work suggests that digital games can effectively abstract non-digital ideas through technology. However, this begs the question, can the opposite be done? Can non-digital games be used to effectively abstract digital concepts or issues?

Like games, digital infrastructures rely on a series of rule-based systems and interactions to curate user experience. While analog games might not rely on code and algorithms, both computers and games uphold similarities in how they create sites of exchange and interaction. Both systems incorporate structures that allocates user/player agency and invoke a form of collaboration (either between user and device, or between players) to successfully complete a task.

For the sake of this project, analog games are understood as games played without the direct mediation of a console or computer. While technology might exist within the game, the primary play space for the game relies on non-digital tools. Player communication, game environment, narrative, and play mechanics all establish the rules which govern an analog game space. Live Action Role Playing (LARP) provides an effective example. Dedicated communities of players, alongside designers, collaboratively construct a game experience where performance, improvisation and player decision determines the overall outcome of the game (Bowman, 2015). Through role-play LARPs can construct spaces that allow players to grapple with challenging issues and ideas (Clay, 2015).

While LARP's provide a good example of performative analog games, level of performance and player interaction required can be challenging for some players to engage with (Back & Föreningen Knutpunkt, 2014). Providing a less intimidating space than LARPs, analog escape rooms have risen in popularity because the co-operative and collaborative game space

critically engages players through the use of specific materials. Understood as team-based, problem solving games, commercial escape rooms typically invite participants into a 'themed' room where they complete a series of puzzles in order to 'escape' (Nicholson, 2016). Escape rooms do not require players to 'perform a role' and necessitate little upfront knowledge. Rather, they prioritize problem solving the game's content making them potentially effective sites for knowledge transmission. While commercial escape games typically present theatrical narratives such as stopping a biological war, the genre's ability to weave narrative and play mechanics through collaborative discovery offers potential to create an inviting medium in educational settings. Escape Games prompt players to evaluate an environment and set of materials, matching with the critical thinking skills heralded by educators.

By containing elements of roleplay and immersion, escape rooms may function as effective spaces to abstract digital issues and remove challenging barriers of access to discuss issues related to digital literacy. According to a 2017 report by the Brookfield Institute many Canadians struggle to effectively navigate digital technology and require better digital literacy programs, (Hadziristic, 2017). Digital literacy is a broad concept that encompasses issues related to disinformation, fake news, and technological navigability (Chung et al., 2013; Schermer, 2011). Echo chambers, filter bubbles and data personalization all fall under this umbrella. The Canadian government has started some initiatives to improve Canadian digital literacy curriculum programs and digital games created to teach children digital literacy skills and knowledge. However, while these initiatives offer benefits, they create two barriers for engagement. First by creating digital literacy games that are hosted through technology, individuals who do not have easy access to technology, may struggle to locate the resources that could help them. Second, by focusing on younger children, these initiatives may not provide

digital literacy skills to all Canadians, like older adults and those who live in a situation of economic precarity. Counteracting these barriers, escape rooms offer the potential to create approachable analog spaces to convey digital issues.

Recognizing the need for analog interventions to address these barriers, this research-creation project develops an analog escape room that focuses on three issues related to digital platforms; the algorithmic micro-targeting of users based on their personal data (Negroponte 1995), filter bubbles which sift the information that users readily witness in their feeds based on their activity online (Pariser 2011), and echo chambers that consistently present the same ideological narrative to users thus re-affirming belief systems (Sunstein 2001). This intervention is guided by three research questions. First, addressing concerns of demographics, it studies how games could be designed to invite older and younger audiences into a serious game space. Recognizing games as collaborative tools, I theorize how intergenerationality can be conceptualized by serious game designers. Second, focusing on the issue of digital literacy, the project asks how digital issues could be presented in an analog game. Third, positioning escape games as an effective and understudied educational medium, I analyze how escape games provide players with learning opportunities and space for players to connect their own experiences to the overall design. To address these questions, this project constructed and implemented an analog escape game titled *Reactile*.

Moving forward, I will outline the current literature and initiatives related to this project's focus. I then revisit Mary Flanagan and Helen Nissenbaum's work on values in game design connecting it with Bogost's discussion of procedural rhetoric in games and a conceptual understanding of intergenerationality in order to provide a theoretical framework for my intervention. Following this, I outline the project's methodology and provide details on the

designed game. Moving into the results and discussion of the project, I revisit the methodology and connect it to my theoretical and methodological choices to address my research questions. Finally, after providing speculation for further projects and the limitations of this current piece, I conclude by summarizing my findings.

2. Literature Review:

2.1 Digital and Media Literacy:

While core to this project's educational goals, the term digital media literacy is used to incorporate a range of knowledge and proficiency about different online practices (Chung et al., 2013). In a whitepaper by Mozilla, digital literacy incorporates written, read and participatory actions, which are further broken down into subcategories that include (but are not limited to) content creation, analysis, privacy protection, and knowledge gathering (Chung et al., 2013). As a 'catch-all' term, it was impossible to discuss every aspect of digital literacy in one game. For this reason, I focus on the algorithmic personalized micro-targeting of users (which I will refer to as digital personalization), filter bubbles, and echo chambers. These topics were chosen based on their use in misinformation and privacy discourse, which have received consistent media attention (Bruns, 2019). Tied to a larger discussion around digital surveillance, scholars like Marc Andrejevic connect how, by tracking, recording and analyzing users, algorithms can be considered an 'all-seeing digital eye' (Andrejevic, 2002, 2007). Andrejevic (2012) breaks down this process into the commodification of users, audiences, and content, where users are continually surveilled and categorized (Lyon, 2009), which, according to Srnicek (2016), are ubiquitous and central to our current digital economic framework. These categories allow advertisers and platforms to recommend and suggest certain content and groups curating, alongside user choices, filter bubbles (Pariser, 2011) and echo chambers (Sunstein, 2001).

Scholars argue that targeted content could influence user ideas and behavior (Dijck, 2013). Extending these arguments, recent discussion around misinformation and disinformation, names digital surveillance practices as a central propellant for the increase in claims of 'fake' or misleading news, subsequently raising questions of trust (Allcott & Gentzkow, 2017; Pierri & Ceri, 2019).

The notion of a highly personalized feed builds on the work of Nicholas Negroponte (1995) who theorized the *Daily Me,* a personalized, user-specific, daily newspaper. While Negroponte's idea was hypothetical in 1995, modern mounting surveillance practices have made digital personalization commonplace (Srnicek, 2016) Digital personalization refers to the platforms and devices that aggregate user information to profile and suggest content (Nagulendra & Vassileva, 2016; Schermer, 2011; Srnicek, 2016). These platforms embed algorithms to collect user data, highlighting preferences, interests and interactions in order to present users with content that matches their interactions (Srnicek, 2016). Acting as mediators, these platforms communicate user information across devices and technology subjecting users to extensive, ubiquitous, data collection (Maras & Wandt, 2019).

Alongside digital personalization, Cass Sunstein's discussion of echo chambers and Eli Pariser's notion of filter bubbles visualizes the impact of these data practices (Cohen, 2018; Pariser, 2011; Sunstein, 2001). Sunstein and Pariser's ideas have since been taken up by other scholars and somewhat embellished by the media, creating challenges in defining the terms (Bruns, 2019). In his text *Are Filter Bubbles Real?*, Axel Bruns (2019) differentiates the two, noting a key difference in the role that users play. Bruns (2019) defines each, stating that filter bubbles, "emerge[] when a group of participants, independent of the underlying network structures of their connections with others, choose to preferentially communicate with each

other, to the exclusion of outsiders" (22) while echo chambers, "result from a deliberate connection with like-minded others - a tendency known as homophily, which seeks similarity and avoid[s] difference" (18-19). While both are established through users and technology, filter bubbles suggest preferential content to users (and hiding content they might disagree with) while echo chambers are formed by individuals actively excluding other opinion or ideas. To further accentuate the difference, Fletcher points out that filter bubbles rely on algorithmic filtering of content, where personal preference can dictate what individuals see, while echo chambers involve an overexposure to content of one opinion, "distorting our perception of reality because we see too much of one side, not enough of the other, and we start to think perhaps that reality is like this" (Fletcher, 2020).

As scholars revisit these terms, they have begun to question their pervasiveness and the concerns associated with them (Bruns, 2019; Dubois & Blank, 2018; Robson, 2018). As visual concepts, Sunstein and Pariser's work was picked up by the media where filter bubbles and echo chambers are exaggerated as all powerful algorithmic processes that trap users' views, potentially radicalizing them or altering their thought patterns (Bruns, 2019). Dubois and Blank (2018) suggest that both are not nearly as pervasive as suggested, and argue that blaming them for issues of misinformation, radicalization and fragmentations obscures larger underlying factors such as opinion leaders influencing user viewpoints, and corporate influence over media structures. Bruns (2019) makes a similar critique, highlighting that misinformation campaigns by the far right have focused on delegitimizing the news industry, which becomes ignored when blame is placed on echo chambers and filter bubbles. In any case, scholars point to digital literacy skills as one solution to addressing these concerns.

According to the Brookfield Institute, Canada is "lagging behind" in digital literacy skills (Hadziristic, 2017). Over the course of 2018, the Standing Committee on Access to Information, Privacy and Ethics (ETHI), reported to the Canadian Government on the need for better digital literacy initiatives, specifically around misinformation and data monopolization (Zimmer, 2018). Currently, there are some initiatives that address the dissemination of digital literacy knowledge, with groups such as *Media Smarts*[1] developing curriculum and games for educators. Beyond the Canadian context, there are a variety of games that focus on digital privacy and fake news (Barnard-Wills & Ashenden, 2015; Cetto et al., 2014; Hofer et al., 2017; Kumar et al., 2018). For example, *Factitious* used a simple online quiz format to challenge players on their ability to spot fake news (Grace & Hone, 2019). While beneficial, many of these games are primarily located online and targeted towards younger audiences, making them less beneficial for older audiences, and ironically found on digital platforms that players require digital literacy skills to access (Yang & Chen, 2015). In a recent endeavor, Annette Markham (2019) created the *Museum of Random Memory*, which attempts to address this gap by engaging the public in digital literacy issues through a performative arts-based installation. While not a game, Markham's work created an intergenerational space that prompts public curiosity towards digital literacy skills. However, a gap remains around games that address this issue, where individuals who need this knowledge struggle to access and use the resources that are available.

The narrative of an accessibility gap for digital technology and skills is longstanding in reference to the digital divide. While some scholars have pointed to age as a factor (Prensky, 2001), critiques around homogeneity re-directs the digital divide to questions around social

[1] A Canadian Non-profit website found here http://mediasmarts.ca/. They are the leading group in digital literacy materials in Canada. Additionally, they were interviewed for this project to provide insight about their work, product design, and definition of digital and media literacy.

inequality (Bayne & Ross, 2011; Brown & Czerniewicz, 2010; DiMaggio & Hargittai, 2001; Schmidt-Hertha & Strobel-Dümer, 2014). While age is not necessarily a factor for access, digital practices vary among age cohorts, highlighting the range in knowledge and ability of all ages (Comunello et al., 2015; Halperin & Dror, 2015; Loos et al., 2018). Halperin and Dror (2015) have outlined a series of media practices among different age cohorts, noting differences between digital privacy and generational knowledge and practices. Their research suggests that all generations have concerns about digital surveillance and data mining practices. While older cohorts (55+) have less security in their use of privacy software, and knowledge, awareness of these practices is relatively similar across the ages studied (Halperin & Dror, 2015). In terms of Canadian youth, concerns about privacy fall into a "nothing to hide" paradox, where loss of privacy is seen as unavoidable and outweighed by the social value of being digitally connected (Adorjan & Ricciardelli, 2019, p. 8). While not new, the pervasiveness of this narrative alludes to a shifting lack of concern in personal online privacy (Adorjan & Ricciardelli, 2019), raising questions towards interventions that can impact these attitudes.

As scholars explore the digital knowledge divide and perceptions of privacy (DiMaggio & Hargittai, 2001; Halperin & Dror, 2015; Schmidt-Hertha & Strobel-Dümer, 2014), older cohorts typically remain understudied in relation to their privacy attitudes (Elueze & Quan-Haase, 2018). Privacy knowledge and concerns are associated with technology use and media influence, with many seniors becoming wary of fully participating online for fear of scams and a personal lack of knowledge (Elueze & Quan-Haase, 2018). Seniors feel like they lack the knowledge and tools needed to address these issues, whereas youth, while aware, appear to be unconcerned with online privacy (Adorjan & Ricciardelli, 2019). This difference suggests that greater awareness and contextualization of digital platform practices could be beneficial to

multiple age cohorts. However, it is important to note that older adults are typically grouped into larger age categories, like 55+, which homogenizes data and fails to consider the diverse abilities associated with older individuals (Elueze & Quan-Haase, 2018).

2.2 Intergenerational Play:

Similar to the youth oriented focus of digital literacy interventions, within games literature older adults are relatively understudied compared to younger audiences, however this is starting to change (De Schutter, 2011; Loos, 2014; Marston, 2013). Intergenerationality is argued as a valuable collaborative experience for all parties involved (Loos et al., 2018; Vanden Abeele & De Schutter, 2010). However, research on intergenerational play is primarily situated around the home, where the majority of existing research explores play between members of a family (Agate et al., 2018; Holt et al., 2016; Voida & Greenberg, 2012). In this context, family play allows for positive cultural and information exchanges which can lower generational tensions and stereotypes (Cortellesi & Kernan, 2016; Zhang and Kaufman, 2016).

Game design workshops are also studied as effective places for positive collaboration (Ouellet et al., 2017; Rice et al., 2012). Scholars argue that the creative, participatory culture of the workshops help "reduce generational segregation" (Ouellet et al., 2017, p. 79) and establish positive relationships between participants of different ages (Kayali et al., 2015; Khaled et al., 2014; as cited in Ouellet et al., 2017). As Ouellet et al. point out, intergenerational game workshops may lower stereotypical assumptions around digital literacy and create space for varying ideas (Ouellet et al., 2017). Using game creation to invoke player collaboration, allows for positive interactions between participants. Building from this, games that encourage

collaboration, such as escape rooms, could be effective in creating sites of positive knowledge exchange and experience.

2.3 Escape Games:

Despite a relatively long history, escape games remain relatively understudied, with only a few scholars exploring them alongside their recent mainstream popularity (Lama, 2018). With the first digital escape game[2] emerging in 2006 (Penttilä, 2018), analog or offline escape games became more prominent near the end of the decade. To briefly clarify terminology, "escape games" is an overarching heading that includes the popular escape room, as well as new trajectories such as escape boxes[3] (Nicholson, 2018). This project focuses on escape rooms which Scott Nicholson (2016) defines as, "live-action team-based games where players discover clues, solve puzzles, and accomplish tasks in one or more rooms in order to accomplish a specific goal (usually escaping from the room) in a limited amount of time" (p. 1). Escape rooms focus on collaborative play, immersing players into a game world through a series of puzzles connected to an overarching narrative. As highly localized games that invite players to become participants in an imaginary world, escape games have roots in live action role-playing (LARP) and alternate reality games (ARGs) (Wiemker et al., 2015).

Like LARP, escape rooms create a theatrical narrative such as zombie games (60Out Escape Rooms, 2019), murder mysteries (Basa, 2018), or re-created movie moments (Gouldie, 2019). LARP's typically contain a more extensive backstory, and enforce roleplaying through character development and interaction with others (Wiemker et al., 2015). However, the shorter

[2] The first digital game of the genre is attributed to Takao Kato who designed *The Real Escape Game*, however due to escape rooms having influences from others, one could argue that escape games have a longer history with digital and non-digital older adventure and role playing games (Penttilä, 2018)

[3] Escape boxes are highly transportable escape games that use containers or boxes with a series of locks or puzzles for players to solve. While having similar problem-solving mechanics, escape boxes do not rely on any physical space other than the container itself. (Nicholson, 2018).

game time and focus on puzzle solving, results in escape rooms placing less emphasis on narrative and performance (Nicholson, 2018). LARP encourages players to perform as a character, inviting them to take on a role within a larger narrative that is played out over an extended period of time. Players develop strong relationships with their characters, with some struggling to transition from LARP back into reality (Bowman, 2015; Stark, 2013). However, escape games do not rely as heavily on player engagement and performance, which leaves role-play a choice for participants.

Crucial to the success of escape games is the balance between puzzle design and the game environment. Historically, escape games, "share game design issues present in other forms of play as well; from logic puzzles to physical elements found in board games, geocaching, interactive theater and even game shows" (Wiemker et al., 2015). In this manner, escape rooms construct an interactive 'set', where props, when used by players, uncover an overarching adventure. The physicality of the game situates players inside a pre-designed world where reality is shaped by the intricate connections between in-game material. Upon first entrance, the space looks 'normal' in relation to the environment it represents, however, an opening narrative alters the theatrical set into a site of discovery, where objects provide symbolic meaning, clues, or coded information, encouraging players to critically assess all material in the space.

While the genre is most commonly used in the entertainment industry, recent literature has started to explore its value for education, where it has been adopted into classrooms and academia (Eukel et al., 2017; Ho, 2018; Monaghan & Nicholson, 2017; Vörös & Sárközi, 2017). The inherent problem solving and critical thinking aspects of the game, in tandem with immersive environments provides engaging educational spaces for players to collaboratively work through material (Nicholson, 2018). However, research is currently limited, with a handful

of studies being done that mainly focus on using such games to review curriculum. For example, a project by Nicholson and Monaghan (2017) and another by Eukel et al. (2017) utilized escape rooms in health science classrooms to test student knowledge of the course material. While the game can be valuable for assessment, in a recent project I did with Constance Lafontaine and Kim Sawchuk[4], we used an escape room to raise awareness about social issues, presenting knowledge and creating conversation around elder abuse. Critical to this project, was the encouragement of player reflection through a debrief, where issues and ideas were further contextualized and discussed (Lafontaine, Sawchuk, & DeJong, 2020). The game's debrief invited players to recount their play experience, walking facilitators back through the game and connecting their own knowledge to the serious material (ibid.)

Alongside the limited literature on serious escape rooms, LARPS have also received some attention as serious games. Their focus on performance in play allows players to engage with, "deep emotional exploration and cultural experimentation" (Clay, 2015). Clay (ibid) argues that, "[LARPs] are carefully designed to create safe and therapeutic environments" suggesting that they can allow "players [to] experience particular emotions, [] step into each other's perspective[s], [and] possibly even explore artistic and political visions for new forms of society". While this creates concerns of identity tourism, effective design that considers the educational concepts and viewpoints allows immersive performance to help players connect with material. Despite this LARPS are still seeing little classroom use (Schwarts, 2017), with the challenges of constructing and managing a LARP in a classroom being a major drawback. As less intense play experiences, escape rooms can build from notions of player performance and immersion to offer valuable instances of experiential learning and present engaging learning

[4] Funded by SSHRC and created through the ACT project. See *Sandra's Keys* https://actproject.ca/act/sandras-keys-an-escape-room-on-elder-abuse/

environments for students. The curated, temporal space of escape games differs from the open-ended environment of a LARP, making it potentially more effective for the classroom environment.

2.4 Serious Games:

Perceiving games as learning environments is a longstanding perspective within serious games literature. Early theorists highlighted the relationship between play and learning, situating games as an effective site for learning (Sutton-Smith, 2009). While the field has since fragmented into a variety of subgenres, such as edutainment, e-learning, and social impact games; serious games remain as an overarching genre. Simply understood as, 'games for purposes other than entertainment' (Susi et al., 2007, p.2), serious games build from Ian Bogost's argument on persuasive games, which views a game space as an expressive medium that presents arguments, structures or ideas through play (Bogost, 2007).

While serious games focus on the conceptual framing of theories, models and frameworks (Wilkinson, 2016), educational value extends beyond play. For instance, literature has explored the value of using games to facilitate interaction and knowledge exchange between players (Ferreira et al., 2017; Hausknecht et al., 2017; Sauvé, 2017; Voida & Greenberg, 2012). As literature continues to explore serious games, new genres develop, such as social impact games (Grace, 2019; LaPensée, 2014) and even social justice games (Lafontaine, Sawchuk, and DeJong, 2020).

Expanding on the educational focus of some serious games, social impact games present social issues, systems and concepts. As Ruggerio (2015) argues, social impact games excel at, "helping or guiding other players, thinking about moral or ethical issues, learning about a

problem in a society, and learning about social issues" (p. 597). Building from Bogost's work on rhetoric in games, social justice games explore political, cultural and social implications that are core to a game's design (Grace, 2019). Grace (2019) argues that social impact games infer meaning, "not only from the representation on screen or on a board, but in the dynamics between play [pieces], the rules, the ways in which inventory is acquired, and in the explicit competition" (p. 22). Social impact games separate themselves from the challenges of edutainment and e-learning, recognizing that the entire game system and overall play experience as effective spaces for learning. Social impact games break down these larger systems so that the, "extraludic knowledge, knowledge endemic to the world outside the game" (Wilcox, 2019, p 167), can be embedded into the game.

3. Theoretical Perspective

3.1 Game Design Considerations

Ian Bogost's theory of procedural rhetoric and discussion of persuasive games, breaks down how ideas and concepts can be represented in games. Defining procedural rhetoric as the art of persuasion through "rule-based representations and interactions" (Bogost, 2007, ix), Bogost's work explores digital games, arguing that digital interfaces and programming can effectively be used to present a serious or designer intended argument. While his work focused on exploring the rules and systems that constructed meaning within digital games, this project abstracts computational problems to model within an analog space. Connecting procedural rhetoric to persuasive games, Bogost highlights how abstracted processes can be revisited through representation in the games, articulating how procedural rhetoric can be used to represent cultural, historical and political systems, where procedural representation, the use of

symbolism in design and player interaction, helps embody and highlight ideologies and concepts to players (2007).

Actualizing Bogost's theory further, Mary Flanagan's (2009) work, *Critical Play* explores interventionist, social impact and activist game approaches to design. Flanagan revisits the position of the designer, highlighting their role in constructing effective templates to understand larger cultural or social issues (2009). She argues for the importance of the designer's positionality, where a designer will focus on creating a space that embodies the critical ideas they want to portray. This might include, artist statements or commentary as a way to help their audience understand the final product. Flanagan develops the notion of critical play to discuss how designed interactions can create inquiry from players through participation.

While helpful, Flanagan and Bogost's ideas have been critiqued for their predominant focus on the game and its structure (Sicart, 2011). Miguel Sicart challenges their focus on the game by exploring the player's perspective, arguing for player agency, creativity and ability to construct meaning in the game. Sicart argues that ideas embedded in design are only as effective as the player's ability to construct meaning. His work calls for greater player subjectivity, where designers cannot expect players to decipher the ideas that they have put into the game. Sicart critiques the notion that play is simply scripted or performative, stating:

> Play is not only a performance. Play does not only include the logics of the game - it also includes the values of the player. Her politics. Her body. Her social being. Play is a part of her expression, guided through rules, but still free, productive, creative. Without the openness of play, the player cannot express or explore their ethics, their politics. The player may be guided by reason, by the instrument of play, but that does not guarantee, as the fall of modernity and the critique of Enlightenment have shown, that rationality is enough to express politics or ethics. (n.p.)

Sicart highlights the need to consider player agency, to provide space in the game for players to construct their own meaning which interacts with the games system. Simply put, he suggests that games should function as a frame for play, allowing players to make connections and understandings through their own experiences (Sicart 2011).

Consolidating Sicart's player focused argument with Bogost and Flanagan's game-focused perspective poses a challenge for designers. Escape games follow a relatively procedural format, where locks and puzzles flow into one another as players progress through the game. While players might retain agency in their pace of collaboration, the game still has a predetermined solution. This creates a challenge when the focus of the game is to have players discuss and interact with a social issue. As a designer I need to balance the game's inherent structure that has embedded issues and ideas, alongside the player's experience in the game. To do this, I need to design spaces for players to execute agency in their construction of meaning within the game. This brings my research towards Michael Skolnik's (2013) concept of "weak" procedurality (p. 148), where the rhetoric of a game system attempts to leave space for player agency. According to Skolnik, weak procedurality offers a semi-structured play experience that encourages player interaction and interpretation (ibid). Utilizing the concept of weak procedurality, *Reactile* used two designed techniques to afford players agency in the game; performative and improvisational play, and reflection presented during and after play.

Core to escape rooms are their use of environment and minimal story to pique player curiosity and immerse them into a game world. Players have the option to embed themselves into the game world, where performance remains a choice. While commercial rooms typically do not encourage players to "take on a role", inviting players to improvise and perform can create a positive relationship between player and game (Costello, 2019). Costello (2019) outlines that

improvisation in games encourage deeper learning, personal discovery, and player collaboration. Critically, they emphasize the balance between a structured space and player agency stating that, “a game designed for improvisational play needs to include some structural elements that are predefined and some that can be improvised with and within" (Costello, 2019. p. 6). When designing *Reactile,* design needed to embed concepts or challenges that can become further explored through performance and improvisation.

As a valuable learning technique, reflection can be vital to have individuals to connect knowledge to an experience. Rilla Khaled (2018) discusses how games may construct spaces for reflection which prompt players to contemplate problems, ideas or challenges, allowing them to be introspective and connected to the learning material. When looking at serious games, Khaled highlights how reflective design is a challenge. If a game presents material too directly to players, they can struggle to critically reflect on it (Khaled, 2018). Taking this into consideration, the game further abstracts educational concepts in the game, by inviting players to deconstruct ideas while connecting it to their own experience. While Khaled’s call for reflection provides little discussion on how or where it should be incorporated, Augusto Boal’s (1993) *Theatre of the Oppressed* highlights facilitated performance and debrief as effective spaces for individuals to connect material to their own lives. For example, in their escape game, Lafontaine et al. (2020) used Boal’s framework to effectively create dialogue and learning moments on older adult mistreatment. Their debrief positions players at the forefront of discussion, where they proposed questions, interpretations and suggestions on material based on their thoughts and play experience.

While not as activist or performance-focused as Boal or Lafontaine et al, Postman and Weingartner (1971) discuss the notion of subversive teaching, where teachers act as facilitators

to guide student interaction with material. The idea of the subversive teacher, who prompts discussion, using questions and statements to have students reflect is commensurate with Boal's notion of the joker, a facilitator who guides conversation and activity but never tells participants what to think or do (Boal, 1993). Taking this into design, having the game facilitator act as a subversive guide during play, could allow for players to further reflect and revisit material for additional meaning

Since escape rooms focus on puzzle and problem-solving through narrative and environmental clues, they naturally invite players to critically evaluate game material. While Khaled suggested that serious games struggle with reflection, the inherent inquiry of escape games can encourage participants to reflect on ideas in the game. Designing *Reactile* to include of a story and environment, but lack of scripted performance, such as lines or movement cues, gives players choice in their level of performativity. This, in addition with the collaborative problem-solving that the game provides creates moments of reflection during and upon completion of the game where the excitement of being successful or unsuccessful prompts participants to revisit their experience. Supporting this through subversive facilitation, player performance, and designed spaces for reflection in and after the game makes the space theoretically effective for knowledge dissemination around social issues.

3.2 Theorizing Intergenerational Design

A second challenge for designing the escape room, was theorizing an intergenerational play space. As a concept, intergenerationality remains relatively unexplored, and is quickly brought into obscurity when defining the concept of a generation. As Karl Mannaheim discussed in 1927, the idea of a generation crumbles as one investigates it, where personal subjectivity can

counteract the homogeneity associated with a generation (Mannaheim 1952). While I could spend a whole thesis attempting to break down and construct an idea of generations and subsequently intergenerationality, this project is mainly interested in using those perspectives for design. In this manner, players were asked to make intergenerational teams for participation, allowing them to define the concept.

Current work that explores intergenerational spaces focuses on the family. Sociologists Luescher and Pillemer (1998) propose the notion of intergenerational ambivalence as a frame to explore relationships and interaction within the family. Despite this focus, their perspective of interaction is helpful in exploring non-familial relationships in collaborative scenarios. By pointing out challenges of dependency, conflict and solidarity that impact relationships they emphasize the need to explore intergenerationality as constructed relationships, where each person influences the interaction.

In the context of games, collaboration between players is a key focus (Derboven et al., 2012; George et al., 2011; Hausknecht et al., 2017). Rather than focus on factors of age, the game should consider how puzzles and design create spaces for collaboration, either where players are dependent on one another to complete a task or collaborative knowledge allows for ideas to be addressed. In writing about their intergenerational school, Whitehouse discusses the idea of intergenerativity, where participants co-create and collaborate on a learning project (Whitehouse, 2017). He specifically references the value of the arts for sharing, matching with research on game design workshops that highlight collaborative interaction to provide meaningful exchange (Ouellet et al., 2017; Rice et al., 2012). While the products of the game might not necessarily be tangible, intergenerativity helps conceptualize the collaborative and interactive goals that the game design considers. The largest challenge for design was making the

puzzles and challenges approachable to as many players as possible, removing physical constraints (i.e. making puzzle pieces reachable without extensive bending, legible texts and objects,) and not requiring existing knowledge could create an intergenerational space (i.e. explaining how the variety of locks functioned and describing the game format to every team of players). In this manner, rather than create an 'intergenerational game' the project created a collaborative game that focused on mutual exchange and opportunities for individuals to learn and share ideas around the educational material together.

4. Project Method:

Educational game design is a robust field that contains a range of potential frameworks to use as a method for this project. Since my research goals were focused on design and theorizing space, I primarily employed a creation as research approach (Chapman & Sawchuk, 2012). Building from Chapman and Sawchuk's work on research creation, I used the process of design and implementation to explore three research questions: how analog games can be used to inform about digital issues, how escape rooms can be used as serious games, and what is understood as intergenerational design.

Complementing a creation as research approach, the notion of critical making explores the disconnect "between deterministic, conceptual understandings of the role of technology in social life, and the more material and nuanced understanding of how one relates to them" (Ratto, 2011, p. 253). Recognizing the materiality of escape rooms; objects, alongside narrative and environment, helped metaphorize a digital space. This gave individuals time to reflect and relate their own experience to the game's social and conceptual critique (Ratto, 2011).

In *Values at Play in Digital Games* Mary Flanagan and Helen Nissenbaum (2014) provide a model for exploring and embedding values into games. This project incorporates their understanding of values which they define as, "properties of things and states of affairs that we care about and strive to attain" (Flanagan & Nissenbaum, 2014, p. 5). They connect value to expression, emphasizing how games embed values into their framework to infer meaning to their players. Like others, they turn to the notion of iterative design, where values are embedded and discovered in the game's framework (Flanagan and Nissenbaum, 2014). This is similar to Salen and Zimmerman's (2003) concept of evaluative meaningful play, which, "helps us critically evaluate the relationships between actions and outcomes, and decide whether they are meaningful enough within the designed system of the game" (p. 34). Core to their analysis is designed interaction, where meaning is gathered and assigned through interaction of game pieces and players (Salen & Zimmerman, 2003). Connecting back to the concept of values, meaningful interactions within a game can be used to embed, inform, and discuss values across and alongside players. Using the collaborative nature of an escape room, the game space allows players to meaningfully interact with digital systems, where playtests and speculative design can iteratively extract the 'values at play' in these systems.

The research project was constructed over the course of five months, going through three main phases of development. First, I conducted nine interviews with experts (industry and academic) on topics including: intergenerationality, digital platforms, game design, and digital literacy. These interviews were exploratory, asking questions about the content and theoretical goals of the project, while also providing ideas for feedback on later design iterations. Each interview took between forty-five minutes to an hour, and primarily focused on gathering information that would contribute to the design.

The second phase of the project focused on conceptual paper prototypes, creating frameworks of the project without designing any tangible pieces. Since an escape room project takes up an excessive amount of space, creating a prototype of the game would have been an immense challenge. Rather, building from the previous interviews, I brainstormed ideas around

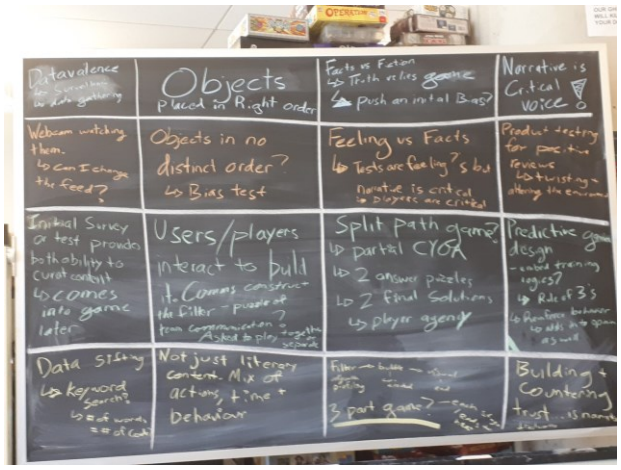

Figure 1. Blackboard filled with some of initial brainstormed speculative ideas.

Datavaillence: - Surveillance through Data Gathering	Placing Objects in the correct order. - Shows preference? Meanial Task to gather information?	Filter Bubbles and Facts vs Fiction - should the game push an initial bias? - where should truth be found in the game? Where are lies found?	The game could have two narratives: - An opening narrative around the players role - A hidden second narrative that is critical or questioning of the players given story
Webcam having a feed of the participants. Can we alter the feed?	Cabin in the woods esc meanial task. - bias test?	Feelings of individuals vs the facts? - Tests in the room ask for feeling and idea - hidden game narrative is critical, players are critical	Players are product testers? Meant to provide reviews? - this could help in twisting and altering the environment
Having earlier tasks, become analyzed for use in later tasks.	Through user interaction the space, the space changes/ adapts to be constructed. - Puzzle of team communication - Their conversation builds the space..	Game should have multiple paths: - Almost like a Choose Your Own Adventure - puzzles that offer 2 distinct answers - different conclusions? -> How can we tie in player agency?	Predictive Game Design - embed training logics -> Use the rule of 3s to enforce an idea - Referencing behaviour?
Data Sifting as a task? - Keyword Search? -> # of Words or a # of code	Content should be beyond the literary. It should have a mix of their actions, their behaviour and the time they spend in the room to shape the space i.e. lighting changes when certain decisions are made.	Its a 3 part game: - Creation of the filter (through profiling and algorithmic gathering) - The perpetuation of the bubble itself - The visualization? -> The are stages that lead to the next?	Building + Countering trust through the story. - trust is questioned

Figure 2. The blackboard image typed up and turned into a spreadsheet.

puzzle design, environmental design, and game narrative. Overall, I accumulated over forty initial ideas (see figures 1 and 2), which were then re-evaluated based on practicality (i.e. timeline) and effective portrayal of the project's goals.

Initially, I adopted James Augers' (2013) understanding of speculative design, where creation proposals might not ever be possible to design, but invoke questions, and prompt considerations in design. I read texts about social media platform processes and critiques, speculating designs that could present these frameworks. For example, one early concept imagined a space with malleable walls that morphed to visually reflect user preferences. However, unlike Auger, my final project was not speculative, and forty ideas quickly became

five core ideas, which I further developed and brought back to some initial interviewees for opinion. For example, the malleable room was re-imagined as a room of mirrors, which also became too speculative for my context. Eventually, I realized that like platforms, the entire space is not what is personalized, rather smaller environmental changes could be used to infer a notion of personalization.

Utilizing Flanagan and Nissenbaum's framework, iterative feedback around speculative design helps improve the overall project's design. While I was unable to create a dedicated design team to physically meet and work through ideas with, I kept in communication with interviewees and other researchers about the design process, providing examples, ideas and iterations for review. Receiving comments and opinions other than my own, strengthened the project, where new ideas connected with my initial aspirations, and unforeseen problems were able to be resolved.

Near the end of the phase as the prototype was concretized, I facilitated walk-throughs of the game with invited colleagues and friends. Using a series of hand drawn images, I presented players with game pieces, puzzles, and challenges through a mix of material and immaterial play. Working with two testers, I invoked their imagination of the space, guiding them through the play experience, and asking them to attempt to solve puzzles along the way. While this method was highly procedural, struggling to highlight the game's environment and player improvisation, it did provide knowledge around the difficulty level of the game, as well as initial player feedback on the educational material in the experience.

The third stage focused on implementation. The project was advertised across university email networks as well as a few public libraries and a small talk about the project I provided to a

seniors group in Montreal. Participants were invited to either make their own 'intergenerational' teams (however they might define that) or contact me to set up and create a team for them. The game was presented for two weeks from December 1 to December 15, 2019, with a total of eight playtests and twenty-one players whose ages ranged from twenty to seventy-six. Playtests took approximately an hour and a half, with gameplay and debrief splitting the time almost equally. Handwritten and recorded notes were taken during each playtest and debrief. Additionally, after each playtest I wrote a reflection of approximately 250-500 words on the playtest, which included lingering questions, future design ideas, and personal observations from the session.

5. Results:

Prior to the game's start, players are briefed with an overview of the project, its goals, and an outline of game pieces that players might struggle to recognize, such as locks. Once this is done, I slap on a nametag, introduce myself, in character, as Craig and greet the players as an overly-excited, enthusiastic corporate employee who is working for *Reactile Inc*. Players are invited into an imaginary play space, where they are thanked for coming to test out *Reactile'*s newest games. They are led into a room and seated at a table where three simple mini-games are set up. Craig proceeds with a walk-through of two of the games, emphatically praising each game and player as they participate in overly simplistic games. Throughout this introductory play experience, Craig informs players that *Reactile Inc* is looking for reviews of their games and encourages players to provide their reviews on provided forms as they play. Before players try

the third game, Craig excuses himself from the room asking players to continue informing them that he will return shortly.

Figure 3. The room during a set up for a game

After Craig leaves the nature and tone of the game typically changes rapidly. The final 'mini-game' contains a message from an ex-employee, mysteriously named CM, who begs players to help them expose *Reactile Inc.* for fabricating fake reviews of their games. The note informs players that three USB sticks are hidden in the room, asking them to find all three and get out before being caught by Craig. As players begin to hunt for the USBs, finding clues and puzzles along the way, Craig periodically comes back to the play space, checking in on players,

bringing distractions or potentially helpful tools, and forcing players to obfuscate their hunt for the USB's from him.

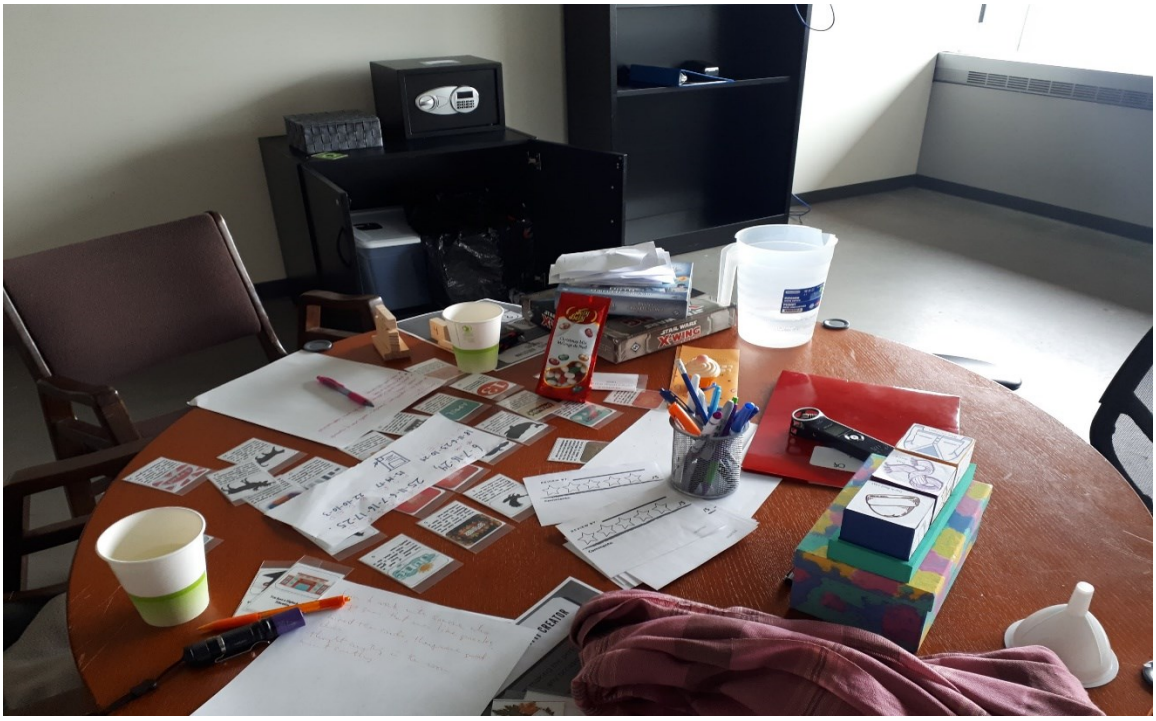

Figure 4. Image of the room after a playtest

Early in the game, players find a cellphone which provides them with a communication channel to ex-employee CM. Players receive messages from CM but are also invited to ask for help or hints through the phone. Additionally, players receive a text message thirty seconds before Craig comes back into space, giving players time to conceal their actions from, surveillance figure, Craig.

The game concludes when players find all three USBs after which they are congratulated and brought into a debrief. The post-game debriefs lasted approximately thirty minutes, functioning as a space for players to provide feedback, discuss the game's material, and share their knowledge in relation to the project.

The debrief, alongside personal reflections, and interviews provided feedback around the effectiveness of using escape rooms as an educational intervention. In the next section, I will discuss the project's findings around design and creation arguing for the value of escape games to be used as effective learning intervention around discussing digital literacy issues.

6. Discussion

6.1 Gameworld

In the introduction to *Programmed Visions,* Wendy Chun (2011) states, "computers embody a certain logic of governing or steering through the increasingly complex world around us" (p. 9), a practice that can also be seen in general game design. Games and computers share a unique history, where digital systems have consistently been used for simulations and games since their early advent (Frasca, 2013). Returning to Bogost's argument that interface, software and mechanics establish a game's rhetoric, it was critical that the game's environment, mechanics and materials all model or represent aspects of the digital structure it portrays. Each piece and action established inside the gameworld was intentionally designed to reflect user interaction with social media algorithmic processes that can lead to data personalization, filter bubbles, and echo chambers. Viewing the game world as an interface, and players as digital users, design became focused on implementing environmental elements and play experiences that reflected both the visible and invisible actions that occur on social media platforms.

Similar to how computer representations of real-world scenarios invoke analogy or metaphor to present an idea, the escape room invoked all actions of the game to reflect onboarding and engagement with a social media platform. The online act of posting was represented through players filling out comment cards or giving feedback to the corporate

employee (Craig). The game's introduction, where Craig guides players through the basic rules and features of the games in the space, was analogous to platform tutorials that use encouragement and step by step procedures to teach basic skills. The mini-games presented to the players helped collect basic information on individuals, while also having more complex clues and infrastructures hidden in their apparent simple features (Figure 5). Recognizing escape rooms as spaces that invoke participant inquiry, the puzzles, flow and space encouraged critical evaluation.

The environmental clues highlight this subtle-obvious dichotomy. Objects such as a document titled Terms of Service were meant to make a direct connection to the policies that guide digital participation. However, less apparently, the game's environmental pieces were painted the colours of major social media brands (See figure 6). Across the room players might notice blue for Facebook, purple for Instagram, and yellow for snapchat, highlighting the materiality of the game environment to hint at the out of game infrastructures to which the game discusses. Other examples, such as the use of previous reviews hanging on a wall to mimic "promoted content" on a social feed, not only enforces the initial task given to players but also materializes digital interactions into analog mechanics. These subthemes invite players into the game experience, while encouraging critical interactions that could prompt reflection that was built upon in the debrief. The game world, whether subtle or obvious, was meant to immerse players into an experience that could be further re-assessed during reflection.

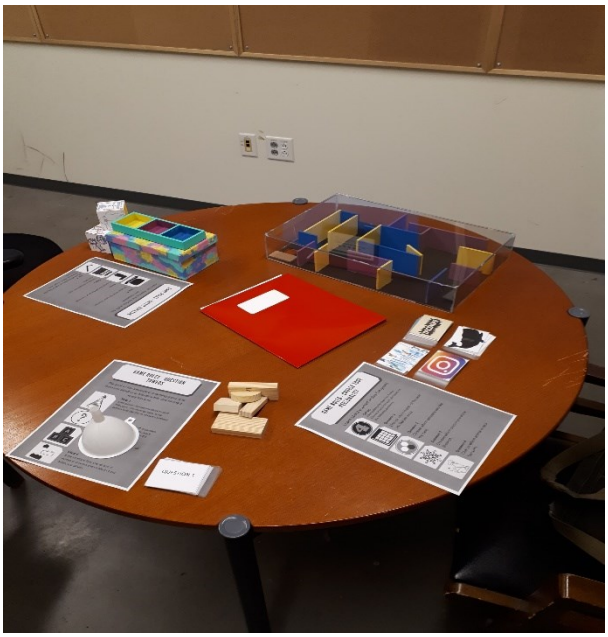

Figure 5. Image of the three onboarding mini games and terms of service

Figure 6. Colours used to create a maze puzzle. Colours were chosen based on social media brands (Yellow for Snapchat, Purple for Instagram, Blue for Facebook).

6.2 Abstracting the Concepts

Through readings, interviews, brainstorming sessions, and design meetings it became clear that echo chambers and filter bubbles were less of a concern than underlying issues that benefited from their existence. When considering the project's goals, alongside recent critiques that Bruns (2019) and Dubois and Blank (2018) have made, it became critical that design focused on representing these underlying issues. As Brun's noted, filter bubbles and echo chambers are created through relationships between users and platforms (Bruns, 2019). Issues with filtered feeds and echo chambers arise when users place large amounts of trust in the relationship and fail to explore alternative information for themselves (Dubois and Blank, 2018). Taking this into design, the game included narratives and interactions that invoked questions of trust and relationship building alongside play. However, content filtering is also closely tied to digital surveillance practices, and based on conversation with professors, in addition to the literature around core themes, surveillance was a major issue related to filter bubbles and echo chambers. While digital surveillance extends beyond the web, it is connected to data mining and content filtering and leads to larger issues around personalization.

6.3 Data Personalization

To effectively represent digital data personalization, which relies on algorithms to micro-target users based on their choices and actions online, the game needed to highlight how these typically obfuscated algorithms behave. While digital games can embed choose-your-own-adventure or matrix decision trees that allow players to feel their play experience as personal, escape rooms cannot hide these choices behind code and interface. Analog games struggle to make content invisible to players, where an overabundance of choice can leave players surrounded by distractions and red herrings. Rather, building from LARPs, I roleplayed

characters whose interactions with players collected personal data, such as music and style preferences, that was presented back to the players as the game progressed.

Platform personalization is not an immediate process. I have argued how the amount of time individuals spend on a platform developing their profiles impacts the level of targeted personalized advertising of Facebook algorithms (Sawchuk et al., 2020). Representing this in the game, early on players make decisions which construct a personalized profile based on their choices that becomes increasingly apparent as the game continues. Starting with the game's three initial mini games, each puzzle prompted players to share information and personal preferences. For instance, taking *Buzzfeed* quizzes[5] as inspiration, an onboarding activity asked players to select a card that matches their answer to various questions in order to find out something about their personality. Some of their responses were reflected later in the game, such as their artist or music genre of choice becoming overbearing by the game's conclusion.

By including myself as an actor and facilitator in the game I was able to build on the information participants shared, bring attention to certain game pieces, ask probing questions, and personalize the experience. One example focused on Craig's outfit in the game, where player decisions during a mini-game altered Craig's appearance when they entered the room (See Figure 7). Beyond Craig, some of the information shared, was used by Craig to alter the game environment, such as playing music based on player preference. In this manner, Craig was the algorithm. Using entrances and exits from the space to obfuscate how collection was recorded

[5] Buzzfeed quizzes are typically nonsensical quizzes that ask participants a range of questions to 'tell them about themselves'. For example, by selecting a multiple-choice answer to 15 questions like, "how do you feel about parties?" participants are informed of which root vegetable matches their personality". https://www.buzzfeed.com/weluvjackpowers/what-kind-of-root-vegetable-are-you-3pjq8

and stored, Craig's slow transition of them self and the space to match players preferences, analogized the algorithmic personalization process to players.

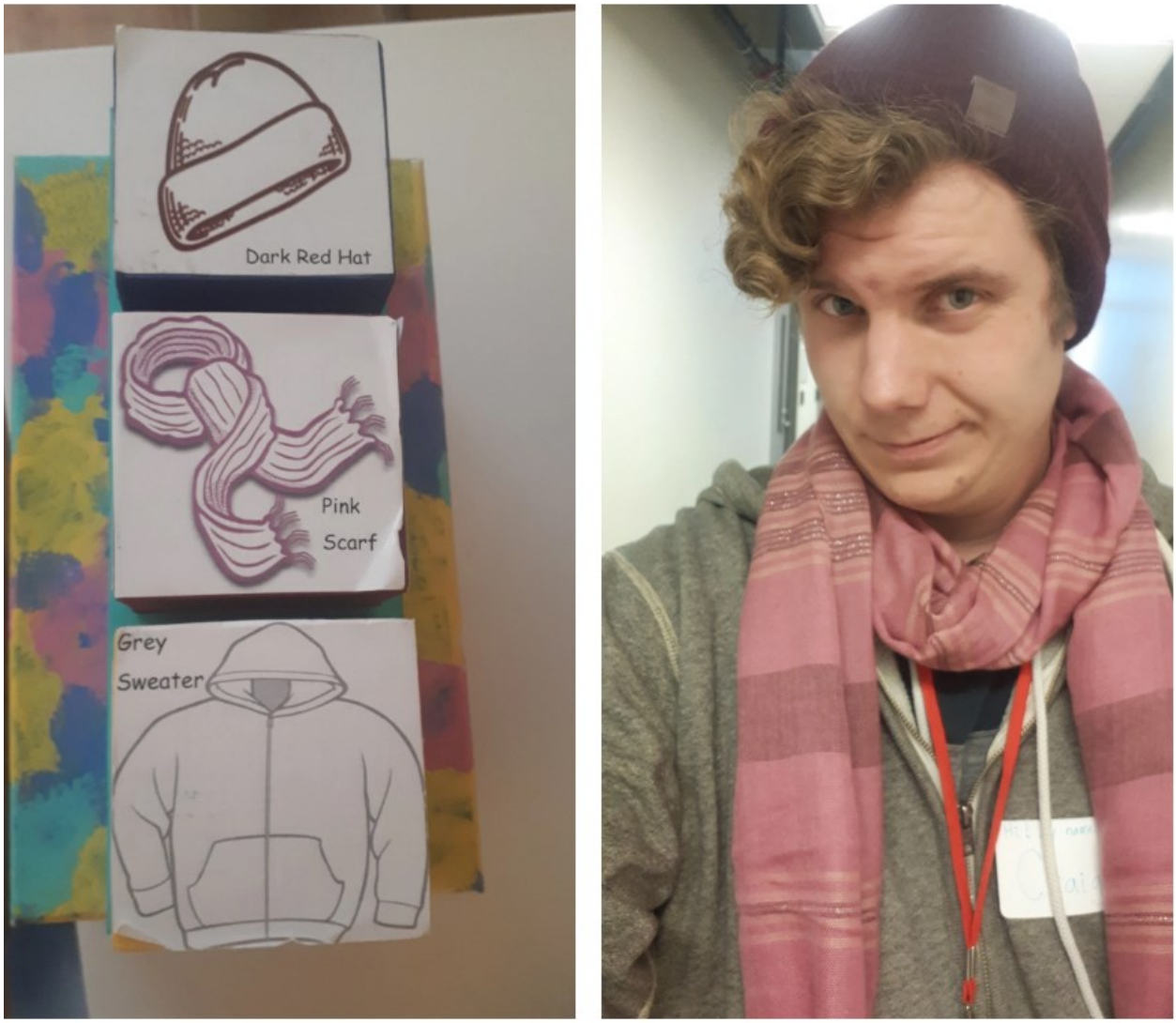

Figure 7. Example of a mini game and its subsequent impact on the game. The chosen outfit is worn by Craig when they enter the room shortly after.

6.4 Content Filtering and Trust

To present content filtering in the game, it became important to outline two relationships that exist online, user to user and user to platform (DeJong & Werbin, 2021). Guiding these relationships is an element of trust or familiarity, which act as a motivation for use (Kang et al.,

2016; Sukhu et al., 2015). When defining trust in the context of the digital economic infrastructure, Botsman (2019) describes it as, “a confident relationship to the unknown”. Building from this, the game presented relationships through performance, and interactions through the environment to create a facade, and prompt players to, “look behind the curtain”.

The games two NPC’s, Craig (the overly enthusiastic employee) and CM (the ex-employee trying to usurp the company), presented relationships with players which alluded to trust and critical evaluation of the space. Craig works hard to be friendly with players, and present the facade that ‘everything is great’, while CM only interacts with players through the cell phone and, in two cases a ‘hacked’ surveillance stream, providing players with hints and information to help them complete their overarching task. Craig’s role builds trust through brand recognition and uses personal information about the players (i.e. their favourite colour, music, etc.) to obscure the game’s surveillance structure and the company’s motivations. CM, while never met by the players, presents themselves as an ally prompting players to critically evaluate the information that Craig is providing.

Craig’s overbearing optimism and encouragement to players reflects a platform’s attempt to obscure surveillance structures, and points to the benefits provided by that system. As an antagonist, Craig consistently slows player progression in the game by nagging them to continually engage in the ‘mini-games’, replacing puzzle pieces, relocking containers, or moving clues that players found back to other locations. The character, mirrors social media recommendations of content and push notifications, encouraging specific behaviour and trying to obfuscate underlying structures.

The tension of the two characters, is meant to promote media literacy skills of critical thinking that scholars emphasize as a critical first step in addressing the larger issues (Bruns, 2019; McDougall et al., 2019; Shepherd & Henderson, 2019). Their interactions cause players to re-evaluate the material in the space and question the room's initial dominant narrative. Recounting their interactions, players discusses their skepticism toward Craig and almost immediate trust of CM. When asked "why", players stated that CM's critical view made them seem more authentic. This matches with literature around users and trust, where authenticity is important for digital relationships (Marwick & boyd, 2011). In some games, players distrusted both characters, sending messages to CM to either 'vet' them as trustworthy or distract CM entirely. In review, players pointed to a lack of familiarity with CM and Craig, which made them feel like they could trust nothing, and opened up discussion around trust and relationships online.

6.5 Surveillance

As a familiar issue to many players, surveillance structures were directly embedded in the environment, where player interactions were recorded through Craig and an obvious camera in the room. An entire puzzle path of the game was dedicated to players finding a surveillance camera and livestream of their actions in the space. This was complemented with the interactions between players and Craig, where a conversation which appears to be colloquial, is actually a subversive surveillance structure that collects player data to tailor the space based upon the player's preferences. As an actor in the space, Craig surveils and collects data during the game, making it increasingly apparent as the game goes on.

Contradictory to how digital media surveillance is relatively ubiquitous, players quickly recognized the surveillance infrastructure in the room. When asked what issues they might pull

from the game, every playtest group pointed to surveillance as prevalent in the space and a major concern. Andrejevic highlights that surveillance practices cause individuals to alter their behaviours (Andrejevic, 2007). This was presented in the game, with players either obfuscating the camera upon discovery, or moving it to show a different part of the room. Craig, as a corporate employee, also became recognized as a surveillance body. When entering the space, players would attempt to hide their actions from Craig, with some groups even rearranging the room and completely altering their behaviour. Players discussed how this interaction was an enjoyable game aspect, asking for further iterations to include greater benefits and penalties for players who Craig caught.

6.6 Reflection:

While some issues, like surveillance, were apparent to players, creating discussion around the analogies, issues, and examples provided in the game required "structured" reflection. Considering the work of Khaled (2018) and Mekler et al. (2018) the game includes reflective moments during the play experience and which were coupled with the post-game debrief based on the work of Lafontaine et al. (2020).

In-game reflection was presented in two ways, influence from the performed characters, and prompts from the game genre. As characters whose actions were relatively improvised, Craig and CM prompted players to question information, re-evaluate game pieces, and revisit their actions. CM attempted to be an ally, providing hints, or refocusing players to certain game pieces, prompting them to reflect on material. While in most cases, player in-game reflection focused on finding a clue, CM's prompts caused players to revisit material with more scrutiny which impacted their thoughts post-game.

Representative of corporate surveillance, data collection, personalization and the game's antagonist, Craig's entrance into the space prompts players to alter their behaviour, improvising their interaction with him. By forcing players to perform a deceptive role, Craig uses improvised conversation to have them discuss and consider game material. For example, Craig provides the players with a terms of service document which he refers to as 'legal jibber-jabber'. He notes that players need to sign it before they leave today. His nonchalant approach to the document prompts player skepticism. In some games, players would read parts of the document and ask Craig questions about their information. While players did this to convince Craig, they were not attempting anything malicious, their performance also caused them to evaluate game material. When revisiting those moments in a post-game reflection which revealed that the document was based entirely from Instagram's privacy policy, players discussed questions of user awareness of data collection when these documents were so off-putting to read. By nature of antagonist, Craig prompted players to reflect on his actions and material each time he left the space.

My role as Craig enmeshed with that as facilitator for in-game reflection. As Postman & Weingartner (1971) discuss around subversive teaching, Craig never directly imparts knowledge. Rather, incorporating performance from LARP, his character immerses players in the game while simultaneously facilitating while performing. As a character, Craig functions like a data collection algorithm, mimicking player's desires and feeding information back to them on the spot, acting in real time. Because of this he asks them to consider their own knowledge in relation to game material in order to construct knowledge on concepts. Craig's performed personification of player's personal requests invites participants to reflect on issues connected to their own actions within the game. Craig provides no answers, rather his role of antagonist prompts questions and functions as a feedback loop, providing considerations that players might

not have otherwise had. In their exploration of performance in games, Pérez and Coterón (2013) make reference to the *Wizard of Oz* model in improvisation where, "the sense that the activity is moving along steadily and continuously—can be used to adapt gameplay to the needs of the players" (p. 160). Craig uses the game interface he is embedded in, to reimbue player feedback as they are participating. By physically entering the space, Craig disrupts game flow. Forcing participants to hide their actions, players put their search for clues on pause and take time to revisit the material they might have previously glossed over. Similar to Bogost's considerations of interface alongside the game, Craig's emulation of algorithmic processes through the game's framework established a larger rhetoric and personalization and surveillance structures. While not always apparent during play, these moments can be revisited after the game, where player ideas can be further evaluated and critically assessed alongside the game.

Escape rooms inherently provide moments for reflection, through the game's puzzles and challenges. Designing escape rooms for reflection focuses on providing spaces for player agency in discovery. Embedding a multi-linear puzzle allows players to choose the flow and direction of their interactions (Wiemker et al., 2015). Connecting this with Costello (2019), who points to the value of structure in allowing for player creative exploration, the game provides initial direction and a predesigned set of puzzles (i.e. one key for one lock), but allows players to interact with NPC's (Non-player Characters) and the environment at their own pace. Unlike commercial escape games, which enforce a time-limit, a serious escape room's goal was not to be competitive but to provide players with a learning experience. Game pace was enforced by the players, where they could ask for hints if they felt stuck for too long. Additionally, before entering the space, players were made aware of the project and reminded to take their time.

However, in discussion, players argued that they still felt pressured to go fast, building from pre-conceptions of the genre and other escape games they had participated in.

Most critical to the reflection process was the post-game debrief. As Khaled (2018) suggests, players should act as, "critical commentators on their own experiences, and to take ownership over them" (p. 21), which is demonstrated in the work by Lafontaine et al. Their construction of a debrief used forum theatre to engage participants in their reflection, making them lead the debrief process. Building from Boal, Lafontaine et al.'s debrief incorporated the role of the joker to guide discussion. Embedding these ideas for this game's debrief, I also included the inquiry focused approach of Postman and Weingartner (1971) to have participants lead discussion through their questions related to the game. Since the issues embedded in the game are multifaceted, I focused on having players share their observations of issues and let them relate their own experiences to the game. Players shared personal opinions, ideas, and questions on the material, which in collaborative discussion became a larger conversation about digital infrastructures that govern their daily lives. For instance, in one game, participants reflected on personal privacy, starting by initially discussing their own habits to keep information safe. However, the conversation transitioned into the larger economic practices online, and how their minor control of Facebook settings was meaningless in the larger economic framework. Eventually, this created a debate about legislative and political approaches that could be done. In this manner, player tacit knowledge, ideas and information that individuals are developing and struggle to express verbally, is extracted and put into discourse through reflection (Middleweek, & Tulloch,. 2018; Polyani, 1958). As Khaled (2018) states, "games that promote reflection will be, therefore, less about providing players with clear-cut, singular solutions, and more about creating opportunities for players to explore multiple possibilities and re-imagining

problem framings. Asking meaningful questions is more important than providing clear answers" (p. 21). Building from Lafontaine et al, the debrief guided players in conversation about the subject matter extracting meaningful ideas and opinions.

Facilitating discussion in this manner, creates challenges on players recognizing the 'serious' material. For instance, while some players would make immediate connections to the game's metaphors, leading to a discussion about larger infrastructural challenges and methods of combatting these spaces, others entered the debrief stating, "I learned nothing" but later pointed to issues that they thought the game did a good job presenting. This response suggests that they had pre-existing knowledge on the subject matter, where the game helped reinforce knowledge and potentially prompt questions.

Fleck and Fitzpatrick (2010) argues for the importance of time in a debrief as it provides encouragement and greater engagement with material. Building from previous games (Lafontaine et al., 2020), the debrief, while budgeted at thirty minutes, typically went longer. In many cases, players continued to reflect on the material after the game's completion. For instance, a participant approached me a month later, mentioning (unprompted) how they enjoyed the game's presentation of misinformation practices online. What made this distinct was that this had not been a discussion point in their debrief, nor the main objective of the game. In another case, I received an email from an older (76) player discussing how the game provided them with confidence writing, "playing your game helped me solve some problems here which required some logic. I was not afraid of working on a car GPS". Both examples emphasize how player agency can infer additional meaning beyond the time spent on reflection during and after play. Players clearly reflected on the experience beyond their time playing, suggesting that holding follow up debriefs a week or two later could provide meaningful feedback on a game, its

educational impact, and how it relates to their own experiences. While this suggestion is not always realistic for designers, these games could be used in educational settings, like classrooms, where additional debriefs are more plausible.

6.7 Intergenerational Design:

Despite reaching out to different age groups, and asking players to bring intergenerational teams with them, only two groups out of the eight playtests considered themselves intergenerational. Similar to discussions on age and intergenerationality which highlight the challenges in using age as a factor in determining generations, and subsequently intergenerational experiences, players in all games shared similar sentiments around team cohesion, collaboration and experience. During the debrief of a game with a two-player team consisting of a seventy-six-year-old and a twenty-four-year-old, participants highlighted the different knowledge and abilities that each brought to the table; a narrative also expressed by other teams with members who were roughly similar age. Players highlighted the value of in-game problem solving for provoking collaborative discussion where player's strengths were able to help the team. Rather than age being a factor for inclusion and participation, players referred to previous escape room experience to feel helpful to their teammates. The game's older participants had experienced escape rooms before, which gave them confidence and awareness in puzzle solving. However, players with no previous knowledge of the genre highlighted a need to rely on teammates to solve puzzles, despite team members emphasizing how everyone contributed.

Beyond player ability and expectation, players who participated in 'intergenerational' playtests highlighted their enjoyment of playing with individuals of different ages. While one

group of participants had a previous relationship with each other, in an intergenerational playtest where players had not previously met, players recounted how enjoyable it was to get to know each other through the game. Players discussed how pleasant the game experience was, and how sharing knowledge and collaboratively discussing the puzzles provided positive sentiment towards each other.

While the small sample size suggests that further research should be done, player feedback to games that focused on collaborative play experience and puzzles that attempted to avoid a need for pre-existing knowledge was effective in creating an inviting intergenerational space. Despite Hausknecht et al.'s (2017) suggestion that puzzles should be designed towards specific cohorts of knowledge, designing the experience to be approachable and not favourable towards any player's knowledge can be effective in engaging both parties. Genre knowledge did make a difference in how comfortable players felt in the space. However percieving the game-space as intergenerative, where learning is co-constructed through diversity between two parties (Whitehouse, 2017), is effective for intergenerational game design. Intergenerative spaces focus on providing room for all parties to share knowledge, rather than relying on existing knowledge and experience. Examples in this project include; puzzles only relying on knowledge found in game pieces, players receiving distinct tasks and moments to gain knowledge which they needed to share with the team, invoking team improvisation through performance, and designing puzzles to encourage multiple participants to solve. Intergenerational game spaces require further exploration; however, this project suggests that collaborative play spaces, and pre-existing knowledge are important factors for successful intergenerational play.

7. Conclusion:

7.1 Escape Rooms as Learning Spaces

Contributing to the limited work on educational escape rooms, *Reactile* demonstrates the genre's ability to invoke critical thinking skills and discussion. Escape games promote player-led exploration, where puzzles stagger the flow of the game, and ask players to re-evaluate mechanisms in the game world. While previous educational escape rooms typically focused on reviewing course material or embedding students into simulated environments, such as a medical lab (Eukel et al., 2017; Monaghan & Nicholson, 2017), escape rooms offer a more robust interaction with material. By combining reflection, narrative, and player improvisation, escape games encourage players to collaboratively gather information, construct ideas, and relate their own knowledge and experience to the game. As Lafontaine at al. discuss, it is important to bring in experts on the issues that the game is discussing, and take care to present the issue in a correct and meaningful way (Lafontaine et al., 2020). If successfully done, the genre allows players to problem solve and explore facets of complex issues.

While promising, further work is required to implement social impact escape games into classrooms, evaluating how educators can incorporate the game alongside curriculum and student reflection. Revisiting the design process of *Reactile* suggests that designing a game alongside learners could promote them to share personal insights and questions around content. Recognizing game design and gameplay as a collaborative process, escape rooms can allow its players and designers to further connect and discuss critical issues. Khaled (2018) suggests that the most effective games are those that raise more questions than answers. Considering this in design and implementation, escape games can function as primers for discussion, encouraging participants to interact with material and raise questions. In one playtest, when asked if they felt like they could trust the NPC's the participants began to relate them to larger businesses and

algorithm infrastructures. They debated needs for transparency alongside needs for better regulated corporate practice. This conversation hunted for solutions, and while no answer was uncovered in the end, game material encouraged players to discuss the larger infrastructures and their impact. This project is one example, further work should be done on using games to create discussion. It should explore how serious game design can move away from providing answers and focus on constructing spaces for interaction and discussion.

7.2 Escape Games as Research Spaces:

Just as games can prime players about a concept, or issue, this same process can be used to gather qualitative data. While games like *Factitious* (Grace & Hone, 2019) highlight the value of digital games for gathering quantitative data, the use of post-game reflections and debriefs can also encourage participants to share personal thoughts, and experiences related to the content. In the case of this project, post-game debriefs facilitated player discussions of their own media practice in relation to the digital issues, suggesting that analog games could be used as a method for qualitative data collection. For example, when players discussed the idea of trust, they highlighted how they alter their own practice depending on the site. Through gameplay and debrief, players highlighted Amazon as untrustworthy especially when compared to Uber, referencing media stories and personal experience to back up their claims. Additionally, this led some players to highlight that trust did not necessarily make a difference, where Amazon's monopoly and prominence as an online retailer made the participant feel like it was the only option. Building from this project, future work could explore the use of game's as a qualitative research method, where post-game debriefs act as unique conversational spaces. Additionally, recognizing a standing gap in qualitative research on Canadian media habits, future iterations of this project could provide a unique template to conduct research through games.

7.3 Limitations:

As a master's project, *Reactile* was limited by its options for space and audience. While outreach occurred beyond the university, about 90% of participants were students, professors or colleagues. This sample group could skew my observations around discussion, where some players might have some background knowledge in the material allowing them to engage in deeper discussion around the material.

Like any project, there were significant challenges and subsequent limitations to the overall design of the game. Escape games require a delicate design balance between meaningful game pieces and red herrings where every object in the space needs to have its environmental value weighed against its distraction to players. Too many red herrings can obscure meaningful game pieces, while not enough makes the game feel too simplistic and not very immersive. To counteract this, some game pieces were brought into the space later, lowering the amount of content players needed to explore. Upon review, players highlighted how previous escape game experiences helped them determine what information was valid. While not every player had experienced escape games before, every set of playtests did have at least one person on their team who had. In discussion these players highlighted how their teammates' previous experience helped them understand how clues and puzzles exist in the game. Future escape games should be aware of this initial learning curve for the genre and attempt to design accordingly, perhaps including very simple introductory clues and puzzles to encourage the problem-solving format of the game.

Logistically, the creation and implementation of the game faced some challenges. Bogost's discussion on procedural rhetoric emphasizes the value in recognizing factors beyond

the game that develop the game space, in his case software and hardware. For an analog game, the locality and temporality of the game represent similar considerations. Escape rooms still require specific spaces, which required specific negotiations with my university to find a space that I could use. This space came with its own set of policies around how I could augment the room. For instance, I was not allowed to hang or place anything on the walls or ceiling, which forced me to be creative in how I built the space. Additionally, some material could not be removed or cleaned from the room which created their own challenge in the game experience. As a humorous example, in one game session, participants observed glow in the dark paint that had previously existed on the room's ceiling. In the context of an escape room, this discovery was viewed as a puzzle that needed to be solved, leading to players drawing out the paint pattern and attempting to connect it to their knowledge of star formations. While this situation was resolved with a visit from Craig to the space, it highlights the logistical challenges that can influence immersion and experience for players as well as the impact of the escape room genre on player action.

The rising popularity of commercial escape games also creates pre-existing expectations of how a game might function. Commercial escape games typically have physical countdown clocks, struggle to let participants take on a character, and want to have a low success rate to keep the game competitive and potentially bring customers back. The educational variant challenges these narratives. With a focus on knowledge transmission, time is less critical, players are invited to immerse themselves into a narrative or environment, and educators want a higher success rate so that participants can engage with content. Since most players had only experienced commercial escape rooms, they came in with expectations for the game, such as the strict time limit. The challenge of circumventing player expectations in educational variants, is

perhaps a task that time will mend, however until then, designers should consider the influence of the mainstream iterations of the genre.

7.4 Final Remarks:

Returning to the barriers that this project wanted to address, *Reactile* provided an initial attempt. Through theorizing, designing, and implementing the game, each of the research questions that guided this project was explored.

First, the concept of intergenerationality remains too ambiguous for designers to effectively consider in game creation. Intergenerationality relies on stereotypes and assumptions of age that on an individual level fall apart. Rather, when designing game experiences for collaborative individual focused experiences, like escape rooms, designers should focus on making the game as approachable as possible. Design should attempt to place participants on 'even footing' where players are learning a system together. Intergenerational games should try to create challenges and puzzles that invoke collaboration, pushing players to interact and exchange ideas. From this perspective, the game invited participants to make their own 'intergenerational teams' and used the escape genre as an immediate space of collaborative play.

Second, the use of metaphor and analogy within the escape game helped to create an analog space which reflected issues and structures of the digital. By abstracting the concepts for inclusion in the game, two of the initial focuses, filter bubbles and echo chambers, transitioned into a focus on surveillance and trust. Trust specifically stood out to the players as a relatable concept and connected them to the rest of the issues. Building on the relationship between games and computer systems, the game's environment, narrative, and mechanics can all be used to portray these issues. Similar to how digital platforms are black-boxed, with the interface guiding

interaction, the game analogized this interface but also provided spaces for players to ‘peek inside the box’.

Third, the escape genre naturally invited participants to critically evaluate material, making it an effective serious game space. It encourages players to critically assess the environment and messages, allowing players to connect their own knowledge to the game. By viewing the game as a mediator for knowledge construction where players are guided and supported in their learning, the space invites collaborative learning around an issue. Reflection was critical, where improvisation, game structure, and time allowed players to evaluate material during and after the game. Incorporating ideas on subversive teaching and theatre, the game prompted discussion which encouraged players to relate their own behaviour and knowledge to the game material.

In addition to addressing these questions, the project also developed three innovations towards serious escape rooms. First, by connecting performance practices from LARP with facilitation practice, the escape game was able to include facilitation directly in the game space, helping to further immerse players into the game. Second, the incorporation of a reflective moments during gameplay as well as in a post-game debrief, helped to extract tacit knowledge and develop meaningful conversation. Third, rather than maintain the same game experience for all players, the game reflected algorithmic practices through the environment and characters to respond to player decisions in real time.

Reactile provided an exploration of escape rooms that do not rely on edutainment or review focused narratives. As an initial attempt, the project leaves room for greater explorations of the genre and further discussion on intergenerational design. The use of reflection encouraged

deeper interaction with material, where subthemes, like trust, could be challenged and discussed for their impact on players daily behaviour. As the project showed, analog games can be effective sites to discuss digital issues. Using analogy in the game, alongside considerations for the game's structure and player experience, allows player collaboration in game to translate into effective critical reflection and learning. *Reactile* demonstrates a method that can provide information about digital processes without the barriers of online learning. Game's invite interaction, and it is through these interactions that learning can take place.

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