Design Framework for Alternate Reality Games

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Abstract

English

Alternate Reality Games (ARGs) are immersive, interactive experiences that blend narrative elements across multiple media, engaging players in a fictional world through real-time activities and fragmented storytelling. This research introduces a structured framework tailored for designers, especially those new to ARG creation, to streamline the design process while preserving the narrative depth and engagement essential to ARGs. Drawing on principles from Interactive Digital Narratives (IDN) and User-Centered Design (UCD), the framework provides a flexible, phased approach developed through extensive literature review to guide designers from concept to execution. The framework was evaluated in workshops with creative designers that had basic knowledge about the topic, where participants applied its step-by-step methodology to conceptualize and outline an ARG narrative. Results from these sessions indicate that the framework effectively lowers the barrier to ARG design by offering clear, actionable guidance on narrative structure and interactive mechanics. Workshop feedback emphasized the framework's utility in enhancing narrative coherence and, at the same time, recommending refinements in the framework's tools to make it a valuable starting point for emerging ARG developers and a solid base for future research on the complex topic of ARG design.

Key words: *Alternate Reality Game*, *Design Framework*, *Interactive Storytelling*, *User-Centered Design*.

Italiano

Gli Alternate Reality Games (ARG) sono esperienze immersive e interattive che combinano elementi narrativi transmediali, coinvolgendo i giocatori in un mondo fittizio attraverso attività in tempo reale e narrazioni frammentate. Questa ricerca introduce un framework strutturato pensato per i designer di ARG, in particolare quelli alle prime armi, per semplificare il processo di design mantenendo la profondità narrativa e il coinvolgimento dei giocatori, elementi essenziali per un ARG. Basato sui principi delle Interactive Digital Narratives (IDN) e dello User-Centered Design (UCD), il framework propone un approccio flessibile e articolato in fasi, sviluppato attraverso una revisione approfondita della letteratura, per guidare i designer dal concetto all'esecuzione. Il framework è stato valutato in diversi workshop con designer creativi dotati di conoscenze di base sul tema, durante i quali i partecipanti hanno applicato la metodologia proposta per concettualizzare e delineare una narrazione ARG. I risultati di queste sessioni indicano che il framework riduce efficacemente le difficoltà di accesso alla progettazione di ARG, offrendo una guida chiara e pratica sulla struttura narrativa e sulle meccaniche interattive. I feedback dei workshop hanno sottolineato l'utilità del framework nel migliorare la coerenza narrativa, suggerendo al contempo miglioramenti nei suoi strumenti per renderlo un punto di partenza prezioso per i designer novizi su questo argomento e una solida base per future ricerche sul complesso tema della progettazione di ARG.

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Alternate Reality Games

Games predate not just human civilization but are present throughout the animal kingdom as well. For animals, play is a means to practice survival skills, build social bonds, and establish hierarchies without the threat of real-world consequences. For instance, young animals wrestle, chase, and pounce, mimicking hunting and defensive behaviors, all within the safe context of play. This simulation of reality equips animals with skills they may need later in life, but in a controlled, consequence-free setting (Huizinga, 1949). As humans, we expanded upon this inherent inclination, creating games as spaces set apart from the demands of daily life. In this "magic circle" of play we enter an alternate reality governed by its own rules, where outcomes are both predictable and unpredictable within the structure of the game. By imposing limitations, such as defined actions and expected outcomes, we build a framework within which we can experience a heightened sense of freedom and immersion. Games allow us to grapple with challenges, test boundaries, and experience intense emotions in a contained, symbolic realm. This experience of a "safe danger" offers a unique way to explore emotions like joy, fear, tension, and triumph without the real-world repercussions. Games, therefore, are more than diversions; they are vital expressions of culture and human psychology. They provide a way to play with reality, to rehearse life, and to step into roles and situations that we may never encounter outside of the game, expanding our understanding of ourselves and the world around us (Huizinga, 1949).

Alternate Reality Games (ARG) are a modern rendition of this type of experience, born in the last decade of the 20th century and exploded from 2001 onwards thanks to the first recognized ARG called The Beast (2001), they take to an extreme level the suspension of disbelief of the players, that are both fully conscious of the fictitious nature of what they are living but are also immersed in an interactive story that feels real and that they want to keep believing to be real; a state that researcher Jane McGonigal refers as *Gaming reality* (McGonigal, 2003).

As Ruiz-García (2020) explains, ARGs thrive on interactivity, collaboration, and transmedia storytelling, making them versatile tools for fostering engagement across various domains, including marketing, entertainment and education. These games are characterized by their ability to dissolve the boundaries between fiction and reality, inviting players to actively participate in problem-solving, narrative discovery, and community-building. This transformative potential is evident in their application to both creative and pragmatic contexts.

In the realm of marketing, ARGs have proven to be powerful tools for creating innovative campaigns that enhance brand loyalty and foster deeper consumer engagement. Unlike traditional advertisements, which rely on passive consumption, ARGs invite audiences to actively participate in the narrative, creating a sense of investment and connection to the brand. By

blurring the boundaries between marketing and entertainment, ARGs offer a unique avenue for brands to engage their audience on a personal and interactive level. One of the most iconic examples of marketing through ARGs is the campaign for *The Dark Knight* (2007), titled *Why So Serious?* (2007). This groundbreaking campaign engaged millions of players across the globe, transforming promotional material into an elaborate interactive experience. Players were drawn into Gotham City's fictional universe, participating in activities ranging from deciphering cryptic messages to solving puzzles and completing real-world tasks, such as scavenger hunts in major cities (*Why So Serious?*, 2007). These activities not only created buzz around the film but also fostered a sense of community among participants, who collaborated online and offline to progress through the game. What made *Why So Serious?* particularly effective was its ability to create a deeply immersive experience that felt both personal and expansive. The campaign cleverly utilized transmedia storytelling, weaving its narrative through a variety of platforms, including websites, phone calls, emails, and physical props. This multi-channel approach ensured that participants were consistently engaged, while the real-world elements, such as bakery cakes delivered with evidence of Joker crimes, heightened the sense of realism and excitement.

Entertainment has always been a fertile ground for ARGs, where the immersive qualities of this medium allow for rich and interactive storytelling. Within this domain, grassroots ARGs, developed by independent creators or small teams, stand out for their ingenuity, community-driven focus, and deeply personal narratives. Unlike large-scale corporate ARGs, grassroots ARGs often prioritize creativity, audience collaboration, and storytelling over polished production or high budgets. These games frequently blur the line between creator and participant, inviting the audience to actively shape the narrative. Examples such as *Chasing the Wish* (2003) and *Urban Hunt* (2005), both designed by Dave Szulborski, highlight the unique qualities of grassroots ARGs. *Chasing the Wish* captivated players with its deeply emotional and character-driven story, offering an intimate exploration of themes like personal loss and redemption. The game's design encouraged players to not only solve puzzles but to engage with the narrative on an emotional level, fostering a sense of connection with its characters and storyline (Szulborski, 2005). Similarly, *Urban Hunt* embraced a scavenger hunt format, leveraging real-world spaces to create a participatory, location-based experience. Players became active participants in a game that merged urban exploration with problem-solving, blurring the boundaries between digital storytelling and physical engagement. A defining characteristic of grassroots ARGs is their reliance on collaborative problem-solving and community engagement. Players often form tightly-knit online communities, working together to decode cryptic clues, analyze narrative threads, and uncover hidden layers of the story. This communal aspect fosters a sense of belonging and shared purpose, as seen in the forums and chat groups that sprung up around *Chasing the Wish*. Szulborski himself frequently interacted with players, blending the roles of creator and participant, which added a unique dynamic to the experience. Moreover, grassroots ARGs often excel in creating an atmosphere of mystery and discovery, relying on clever storytelling techniques and immersive design rather than high-end graphics or special effects. For example, *Urban Hunt* used a combination of cryptic websites, real-world locations, and multimedia elements to weave a compelling narrative, demonstrating that compelling ARGs can thrive even with modest resources.

In education, ARGs offer a powerful framework for experiential learning, enabling participants to develop critical thinking, teamwork, and problem-solving skills in a dynamic and engaging manner. By embedding educational content within a narrative framework, ARGs create a learning environment that feels meaningful and participatory. One notable example of an educational ARG is *A Labyrinth* (2020), designed at the University of Chicago during the COVID-19 pandemic. This game served as a creative response to the challenges of remote learning and social isolation, building a sense of community among students and participants who were otherwise physically distanced. Through a blend of storytelling, puzzles, and collaborative tasks, *A Labyrinth* encouraged intellectual engagement and social interaction, demonstrating how ARGs can bridge gaps in connectivity while delivering educational value (*Alternate Reality Game A Labyrinth Offers a Model for New Media in a Distanced Age*, 2020). Similarly, *Urgent: Evoke* (2010), an ARG developed by the World Bank Institute, exemplifies how this medium can tackle global challenges and inspire actionable change. Aimed at young adults worldwide, the game tasked players with addressing pressing issues such as sustainability, food security, and disaster resilience. Players collaborated online to propose innovative solutions, blending theoretical knowledge with practical application. By rewarding creativity and innovation, *Urgent: Evoke* empowered participants to see themselves as agents of change, fostering a sense of agency and responsibility in addressing global problems (Waddington, 2013). The versatility of ARGs lies in their capacity to bridge the gap between entertainment and real-world impact. Whether used to educate, market, or entertain, ARGs effectively foster engagement by creating participatory experiences that resonate with a wide range of audiences, showcasing the potential of interactive storytelling in both creative and practical domains.

In the next sections, through literature review, we will define more in detail what an Alternate Reality Game is, what its components are, what different types there are and how this phenomenon came to be. We will look through some renowned case studies and what the main pain points of ARG development are to introduce all the important notions that are going to be referenced and used as foundation for the Alternate Reality Game Design Framework.

1.1 A Definition

Alternate Reality Games have been defined multiple times by scholars and researchers (such as Elizabeth Bonsignore, David Ruiz-Garcìa, Jane McGonigal, Dave Szulborksi, Koos de Beer and Theo Botma) focusing on the experience's characteristics, mechanics and objectives. ARGs are interactive experiences that don't follow strict rules, they evolve with technology, media, and online communities. We can try, nonetheless, to pinpoint a brief definition that tries to touch every specific part that builds the label ARG

An Alternate Reality Game is an interactive, narrative, transmedia game experience that utilizes fragmented storytelling, game actions and real time and space to immerse a community of players into a fictional world with realistic features, allowing them to influence the development of the story through their interaction with its components (Ruiz-García, 2020).

One important hallmark of any ARG experience is the *This is Not a Game* (TINAG) principle (Szulborski, 2005; McGonigal, 2006). It is more of a philosophy than a strict rule but consists of the idea that the entirety of the narration feels real, even if the story appears creepy or out of this world in the player's point of view, as if it is actually happening in front of their eyes and they could jump in and change it, by saving someone in danger or interfering with some evil corporation. Most ARGs abide by this rule because it sets the basis for the entire experience, it gives the player an exciting thrill that starts when they discover a fracture of their daily life, a gamified conspiracy theory that they can collectively participate in.

1.2 Components

According to ARG developer and author Dave Szulborski (2005) the main components that outline how an Alternate Reality Game is usually structured are: *Rabbit Holes*, *Puppet Masters*, *Interactions*, *Real World Events*.

Rabbit Holes are the actual entry points to the alternate reality, they change the trajectory of a player from the role of bystander, an unwitting observer of the experience, to the role of participant (Benford, 2009). Named after the rabbit hole in Lewis Carroll's *Alice in Wonderland*, they represent a fracture from our world into another. Usually, rabbit holes are literal calls to action from a character in the ARG story, pleading for help on an online message board, through strange YouTube videos or weird features of what seem normal advertisements. The key to achieve a well executed rabbit hole is to design an intriguing hook, containing some sort of narrative piece of information (de Beer & Bothma, 2016) or a clear trail that if followed involves a new player without them even knowing that the game has begun. Usually, rabbit holes lead players to online content that resembles realistic websites or legit video blogs, where the entirety of the narration will be given out, interaction after interaction.

Puppet Masters (PM) are the designers of Alternate Reality Games. They pull the strings of the game characters as if they were on a stage, controlling what happens and how it happens in relation to the players' actions. To do that, PMs use *interactive authoring* (Szulborski, 2005) to watch players in real time and, if necessary, react to what they do and feel. This approach allows PMs to change their story in minor ways that reflect and enhance the players' experience by making a fictional story believable and psychologically immersive with specific details and small, but important, pieces of information. Interactive authoring also lets PMs assess what game or story elements are detracting from the players' experience and sense of immersion. This form of storytelling is very powerful when experienced PMs use it because, while players may respond in unpredictable ways to the story served to them, the ability to reframe their agency while nudging the idea that they are in control of what might come next makes the experience memorable. PMs usually work in a team where every PM has a different expertise in a particular skill such as writing, coding, graphic design or whatever may turn out to be useful for the realization of an ARG. This happens because the sheer quantity of elements to prepare, organize and then run real time is too high for a single person, even though successful one-man-show ARGs exist, but they are a rare exception.

In the world of Alternate Reality Games interactions can take many forms, more than we could list, and that is because they are designed to resemble everyday life interactions with objects, technology and people. Game characters will use real communication methods such as messaging,

phone calls or social media posts, to either talk directly to the player or to leave a trace of their existence and subsequently be discovered by them. Real-time interaction between characters and players help tremendously to establish believability to the story. Real World Events are not mandatory for an ARG to be defined as such, but many successful case studies have used this component to enhance the immersion for their player base. *I Love Bees* (2004), *MetaCortechs* (2003), *Chasing The Wish* (2003), *Year Zero* (2007) are just some examples of an effective use of this element. During these games players had to go outside, reach a specific location or find real items that were essential to continue the experience.

Another way to visualize the main components of Alternate Reality Games is through the conceptual framework produced by researchers Koos de Beer and Theo Bothma (2016). They divide the basic elements of Alternate Reality Games into the following main categories: *Narrative*, *Community*, *Game Actions*, *Miscellaneous*. Each category branches into sub-categories that are used to describe ARG elements through a visual representation. The Narrative category contains every story-related object such as *narrative hook*, *narrative reward* and *narrative piece* (see table 1.1). The Community category describes the interactions between the community of players themselves, the game and the outside world and contains the following sub-categories, *System with player interaction*, *Player with system interaction*, *Player with player interaction* and *External interaction* (see table 1.2). The Game Action component is crucial to define what interfaces the players are going to encounter, they are divided in *Lead-in mechanism*, *Puzzle* and *Links* (see table 1.3). Finally, the Miscellaneous category describes two phenomena that, according to the researchers, do not fit in the previous groups: *Hooks* and *Complete elements* (see table 1.4).

Thus, a complete ARG is the sum of all the elements we have mentioned so far, the various combinations of these elements can make or break the success of an Alternate Reality Game and it is really important to implement them in the most coherent way possible.

Category	Symbol	Criteria
Narrative	 Narrative	The narrative category encapsulates everything narrative from the game. The subcategories compiled during the analysis identified unique functionality of the individual narrative pieces.
Subcategory	**Symbol**	**Criteria**
Narrative hook	 Narrative hook	The narrative hook provided a piece of narrative that then linked to another component. This can be a narrative piece, a lead-in mechanism or a puzzle.
Narrative reward	 Narrative reward	The narrative reward is a piece of narrative given to the players as a reward for game participation. The narrative reward can contain narrative hooks.
Narrative piece	 Narrative piece	The narrative pieces are provided to the players throughout the game. This can be in the form of game updates on a regular schedule or narrative provided to the players to further the game context. Narrative pieces can contain narrative hooks.

Table 1.1 - *ARG conceptual framework* – Narrative Category and subcategories (de Beer and Bothma, 2016).

Category	Symbol	Criteria
Community	 Community	The community category encapsulates everything community related in the game. The subcategories describe unique community interactions and are all phenomena that added to the collaborative nature of the community. The community category also displays the manifestation of the collective intelligence.
Subcategory	**Symbol**	**Criteria**
System with player interaction	 System with player	The system with player interaction describes the system providing the players with specific information. This communication can spark other interactions within the community or can appear as rewards for the players.
Player with system interaction	 Player with system	The player with system interaction describes the players communicating with the system. The system can take the shape of game characters. Primarily it is the players providing the game with input.
Player with player interaction	 Player with player	The player with player interaction describes the players' communication with one another on either player only channels or game created channels. This category is the manifestation of the dissemination of information required for the community in an ARG to function.
External interactions	 External interaction	The external interaction category describes phenomena that were not produced for game purposes. These phenomena are the external viewer commenting on the internal events of the game, for example media reaction to the game, players talking to non-players about the game etc.

Table 1.2 - *ARG conceptual framework* – Community Category and subcategories (de Beer and Bothma, 2016).

Category	Symbol	Criteria
Game action	 Game action	The game action category encapsulates everything mechanic and puzzle related in the game. The game actions are the traditional "game play" components that can be found in all games, both digital and non-digital.
Subcategory	**Symbol**	**Criteria**
Lead-in mechanism	 Lead in mechanism	The lead-in mechanism category describes phenomena that are not narrative related. These phenomena usually leads directly to game puzzles. The lead-in mechanism describes all things within the game that lead to puzzles that are not narrative or community related.
Puzzle	 Puzzle	The puzzle category describes all the phenomena that contain game actions. From treasure hunting to solving cryptography puzzles, these phenomena are called puzzles.
Link	 Link	The function of the link element was implicitly present in the other two games due to formulations in the narrative context. Year Zero was the only game that provided an explicit phenomenon for it. The link element can either be explicit or implicit. In the case of "Year Zero" a link element occurred in the shape of a number linking the various phenomena and serving as an in game referencing system. In other games the linking between phenomena occurs implicitly in the form of context and thematic linking.

Table 1.3 - *ARG conceptual framework* – Game Action Category and subcategories (de Beer and Bothma, 2016).

Miscellaneous	Symbol	Criteria
Hook	 Hook	The hook category describes a phenomenon that provides non-players with clues that draw them into the game and turns them into players. Any phenomenon can be categorised as a hook as long as its function adheres to the criteria.
Complete element	 Complete element	The complete element describes a combination of the narrative hook, lead-in mechanism, puzzle and narrative reward. The existence of this element was due to the structure of the game summaries. A single sentence recounted by the guide author can contain all the above-mentioned phenomena. Instead of breaking up the sentence into multiple sentences so the categorisation can be applied, the complete element was used to describe the combined phenomena.

Table 1.4 - *ARG conceptual framework* – Miscellaneous Category (de Beer and Bothma, 2016).

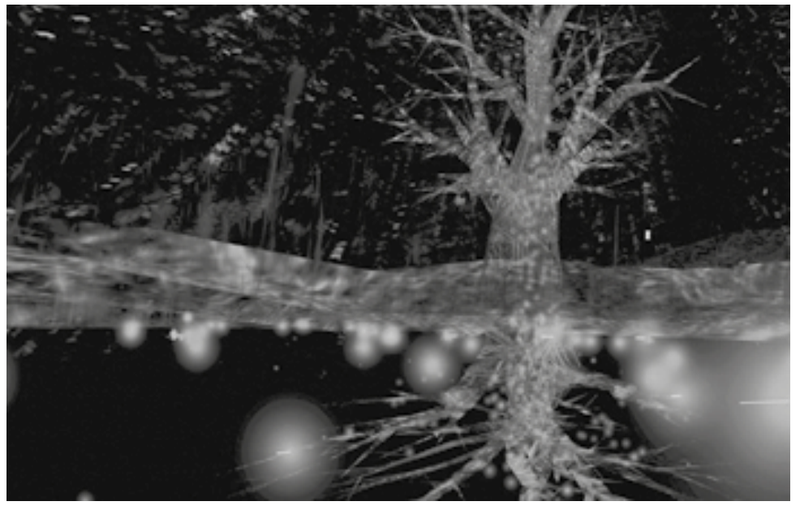
1.3 Origins and proto-ARGs

ARGs did not emerge in isolation but rather evolved from a variety of pre-existing media forms that explored immersion, interactivity, and narrative experimentation.

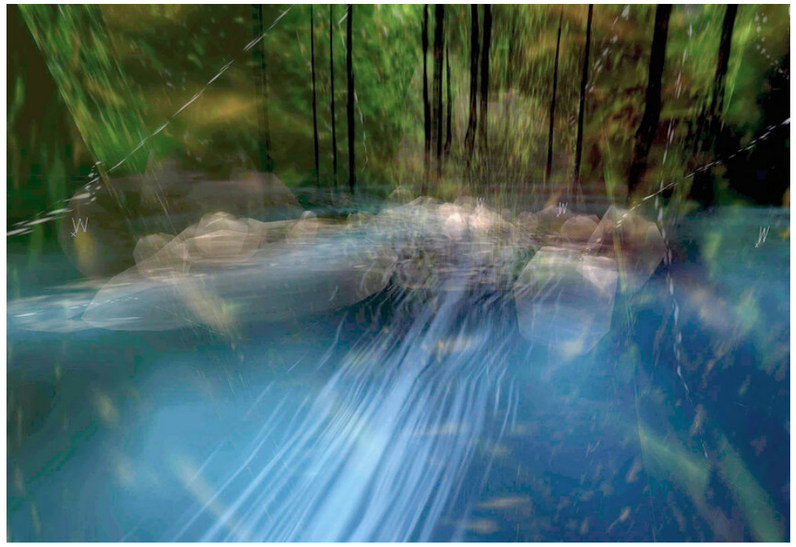
Immersive art pieces from the end of the 20th century, interactive literature in the form of *choose your adventure books* or early hypertext fiction in the form of *text adventures* video games, they all tried, more or less, to put the spectator in a position of power, the power to influence the story they were used to only witness. All of these narrative experiments contributed to the eventual creation of ARGs as we understand them today.

1.3.1 Immersive Art as a Precursor to ARGs

One of the earliest and most significant influences on ARGs can be found in the realm of immersive art, where artists experimented with drawing audiences fully into fictional environments. Szulborski (2005) highlights that even 19th-century panoramic paintings served as early forms of immersive art, creating vast, enveloping scenes that placed viewers directly within historical or fantastical settings. While these works lacked interaction, they established a precedent for removing the boundaries between observer and artwork, setting the stage for more interactive forms of engagement. Moving forward to the late 20th century, technological advancements allowed for the creation of virtual environments that went beyond static visuals, bringing about experiences like Char Davies' virtual reality projects *Osmose* (1995) and *Ephemère* (1998) (see pictures 1.1–1.2). These pioneering projects allowed participants to move within a simulated environment, interacting with a virtual world in a way that mimicked physical space. These works were more than mere passive experiences; they invited users to explore and interact with environments that responded to their actions, foreshadowing the digital worlds that ARGs would later use. In Davies' work, the boundary between artwork and observer began to dissolve, and while narrative depth was limited, the experience hinted at what ARGs would later accomplish: blending reality with digital realms in an interactive narrative landscape.



Picture 1.1 - *Osmose* (Davies, 1995)



Picture 1.2 - *Forest Stream, Ephémère* (Davies, 1998). Screenshot captured in real-time through Head-Mounted Display (HMD) during live performance of interactive immersive virtual environment.

1.3.2 Immersion in Literature and the Concept of Alternate Realities

Literature also played a foundational role in the development of ARGs, particularly through works that explored immersive environments and alternate realities. Science fiction, in particular, introduced concepts that resonated deeply with the interactive and immersive qualities of ARGs. Szulborski (2005) notes several influential literary examples that foreshadowed the core principles of ARGs, each contributing a unique dimension to the concept of narrative interactivity.

One early example is Ray Bradbury's short story *The Veldt* (1951), which explores the consequences of an advanced, interactive environment designed to respond to its occupants' thoughts and emotions. In *The Veldt*, a family installs a high-tech nursery that allows the children to manifest their imagination as physical environments. The room becomes a window into the children's inner world, evolving into a dangerous space that blurs the line between reality and fantasy. The story highlights the emotional and psychological impact of immersing oneself in a simulated reality, a theme that resonates strongly with the nature of ARGs. Bradbury's story also serves as an early cautionary tale about the power of immersive environments to influence behavior, an idea that later ARGs would explore by embedding narratives within real-world interactions and encouraging players to question the nature of reality.

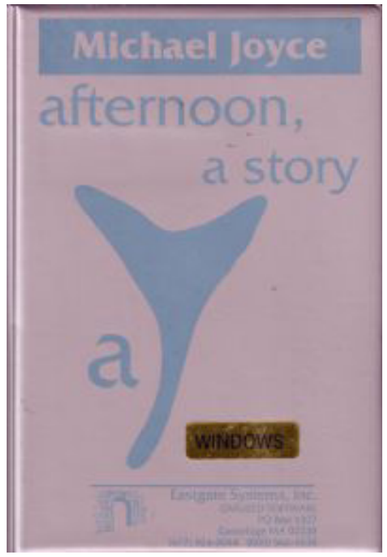
William Gibson's *Neuromancer* (1984) further advanced the idea of immersive, digital worlds with the introduction of "cyberspace," a virtual reality network that characters can navigate as if it were a physical environment. Gibson's novel describes cyberspace as a "consensual hallucination," a digital landscape where individuals can escape the limitations of their physical surroundings. This concept of a secondary, immersive space where participants can explore, interact, and engage with others echoes the online dimensions of ARGs, where players immerse themselves in a fictional narrative that transcends their physical world. *Neuromancer* popularized the notion of virtual realities that are as influential as physical spaces, suggesting that people could have agency and influence within these alternate realms; an idea foundational to ARGs, which often rely on digital elements to create a seamless interaction between reality and fiction.

Neal Stephenson's *The Diamond Age* (1995) provides another compelling exploration of interactive environments, particularly through its portrayal of the "Primer," an interactive book designed to adapt and respond to its reader. The Primer serves as an educational tool for a young girl, introducing her to a virtual world populated with characters and narratives that evolve based on her responses. Unlike a traditional book, the Primer is programmed to teach and engage its reader by adapting the story to her individual growth and development, effectively placing her at the center of an unfolding narrative. This concept foreshadows the personalized and adaptive storytelling in ARGs, where the narrative responds to participants' choices and actions. *The Diamond Age* demonstrates how immersive narratives can serve as tools for learning, self-discovery, and even socialization, which are goals that ARGs sometimes pursue, as they often incorporate elements of real-world problem-solving and collaborative storytelling.

Through these diverse examples, literature provided an essential foundation for ARGs by introducing the idea of immersive, interactive worlds.

1.3.3 Hypertext Fiction and Non-linear Narratives

Another critical precursor to ARGs is hypertext fiction, a genre that emerged in the 1980s and emphasized non-linear narratives where readers actively shaped the story's progression. Hypertext fiction, such as Michael Joyce's pioneering work *Afternoon* (1987), allowed readers to navigate through a web of interconnected textual segments by selecting hyperlinks, each choice leading to a different part of the story (see picture 1.3). This structure mirrored the process of uncovering a fragmented ARG narrative, where players would follow clues scattered across websites, emails, and real-world locations. By making readers responsible for piecing together the narrative, hypertext fiction fostered an active engagement similar to what ARGs would require. In both cases, the narrative becomes an unfolding mystery that participants must solve. This approach to storytelling empowered readers to determine the direction of the story, inviting them to explore multiple possible outcomes and creating a precedent for interactive, discovery-based narratives. Szulborski (2005) notes that, like ARGs, hypertext fiction dismantled traditional storytelling structures, showing how stories could adapt to user choices and making audiences a central part of the narrative experience.



Picture 1.3 – *Afternoon, a story* (Joyce, 1987). Cover art for floppy disk case for afternoon.

1.3.4 Early Proto-ARGs: Ong's Hat and Publius Enigma

Szulborski (2005) also identifies two early case studies; *Ong's Hat* (1993) and *Publius Enigma* (1994) as proto-ARGs, illustrating how the blending of online and offline storytelling laid the foundation for future ARG development.

Ong's Hat centered around a complex narrative involving a secretive cult and parallel dimensions. It combined real-world locations with online storytelling, requiring participants to follow clues and uncover hidden layers of the story. Though lacking the technological sophistication of later ARGs, *Ong's Hat* introduced many of the elements that would come to define the genre, including the use of real-world clues and community-based puzzle-solving. Similarly, *Publius Enigma*, associated with the release of Pink Floyd's The Division Bell album in 1994, featured cryptic messages posted on Usenet. These messages led fans on a journey to solve puzzles that combined online and offline elements. Although the nature of *Publius Enigma*, whether it was a marketing ploy, a fan-driven conspiracy, or something else remains ambiguous, it demonstrated the potential for interactive, multi-platform storytelling that blurred the lines between entertainment and reality .

Both of these examples reveal how early experimental projects pushed the boundaries of storytelling by integrating digital and physical spaces, a characteristic that would become central to ARGs. Participants in these projects were encouraged to engage deeply with the narrative, not just as passive consumers but as active detectives piecing together clues from a variety of sources.

1.4 Types of ARGs

Another effective way to define ARGs between them and explore how they evolved is through a classification based on their objectives and presence of native concepts. Using researcher's Ruiz-García's (2020) taxonomy we can divide Alternate Reality Games in *Grassroots or canonical ARG*, *Promotional or Branded ARGs*, *Commercial or Payment ARG* and *Serious ARG*.

1.4.1 Grassroots or canonical ARG

They represent the essence of the genre, embodying the *This is Not a Game* (TINAG) philosophy, where the boundary between reality and fiction is deliberately blurred. These ARGs immerse players in narrative-driven experiences without initially requiring suspension of disbelief. Participants are made to feel as though they are living a real adventure, only discovering the fictional nature as the story unfolds. This distinguishes canonical ARGs from other playful activities like treasure hunts or Geocaching, which focus more on competition and rewards rather than storytelling. ARGs, by contrast, prioritize narrative immersion and the use of the real world as a diegetic setting, enhancing the ambiguity between fiction and reality. Grassroots ARGs, typically created by fans, emerged post-2001 following *The Beast* and have sustained their popularity due to their complex puzzles and immersive narratives. Over time, modern ARGs have evolved, with some prioritizing narrative over community involvement or puzzle-solving. These contemporary games, like *Ben's Playhouse* (2018), often use transmedia channels (e.g., YouTube, Instagram) and found footage techniques to heighten the illusion of reality. Despite changing trends, the collaborative and narrative-driven core of ARGs remains intact, appealing to a dedicated, niche fanbase. Examples include *Lockjaw* (2002), *Catching the Wish* (2006), and *This House Has People in It* (2016).

1.4.2 Promotional or Branded ARGs

Promotional ARGs are created as part of marketing campaigns to promote brands or products. These campaigns, often tied to cultural products like films, video games, or series, but also extending to industries like automobiles, aim to engage consumers in creative, immersive experiences that enhance brand loyalty. In promotional ARGs, the narrative and gameplay elements are often simplified to make the experience accessible, with a focus on achieving marketing goals rather than deep storytelling or complex puzzles. Two main types of promotional ARGs exist: *teaser ARGs*, launched before a product's release to generate excitement, and *narrative extension ARGs*, designed to extend a product's story after its launch. Examples of teaser ARGs include *The Beast* (2001), which promoted the film *A.I. Artificial Intelligence* (2001) by Steven Spielberg, and *I Love Bees* (2004), created for the video game *Halo 2* (2004). These ARGs maintained a high level of complexity and followed the TINAG philosophy. In contrast, narrative extension ARGs, like *Dónde está Yago* (2009) for *El Internado* (2007-2010) and *La Garduña Exists* (2019) for *La Peste* (2018-2019), directly promote a product after release, with a more straightforward approach to gameplay and immersion. A sort of hybrid between Promotional ARGs and Grassroot ARGs can happen when the grassroot narrative is located in a fictional universe belonging to an existing intellectual property. Fans of a franchise become PMs who take advantage of an already famous narrative world to tell their story. It is the case of *Metacortechs* (2003) an ARG set in the *Matrix* (1999) universe designed by Steve Peters, Krystyn Wells, Brooke Thompson, and Sean Stacey, and *Exocog* (2002) by Jim Miller, a grassroots ARG set in the *Minority Report* (2002) universe.

1.4.3 Commercial or Payment ARG

The goal of Commercial ARGs is generating revenue, offering a complete experience only after payment by the players. This can involve upfront payments for the full game or subscription models that unlock exclusive content. This category includes various ARG types, such as *productive ARGs*, *single-player ARGs*, *monetized ARGs*, and *live event ARGs*, highlighting the diversity within the commercial ARG space.

One example of a self-financing ARG is *Perplex City* (2005), which used the sale of collectible cards to enhance the player experience without undermining the narrative. In contrast, *Majestic* (2001), a subscription-based game, is considered one of the earliest commercial ARGs, though it failed to succeed due to low player engagement. Commercial ARGs vary in their adherence to each of the classic components. Some resemble grassroots ARGs, requiring a purchase agreement before participation, as seen in *Majestic*. Others, like Permanent Alternate Reality Games (PARGs), offer on-demand experiences, allowing individual players to engage without community interaction. Real Games, a hybrid of ARGs and Live Action Role-Playing Games (LARP), further diversify this category, sometimes blending escape room elements.

1.4.4 Serious ARGs

Designed with educational, organizational, or reflective purposes in mind, Serious ARGs aim to foster critical thinking or drive change in the player's real life. This subgroup includes *educational training ARGs, life management ARGs*, and those with civic or formative objectives. Unlike entertainment-focused ARGs, serious ARGs share goals with broader gameplay forms like Persuasive Games or Epistemic Games, fitting within the wider category of Serious Games (Susi et al. 2007; Dörner et al, 2016), which are designed to impact real-world behavior or understanding. Serious ARGs can be used in a variety of settings. In education, they encourage learning and skill development, as in *ARGuing* (2008), an EU-funded project promoting multilingualism among secondary school students. In corporate environments, they are used to train workers and test responses to challenges, like *I Love Trees* (2011), which introduced educational technology at a Pennsylvania conference.

Serious ARGs can also stimulate critical reflection, exemplified by *World Without Oil* (2007), which engaged players in imagining solutions for a global oil crisis. Additionally, some ARGs like *Superbetter* (2009) promote healthy living and assist in trauma recovery. These games often deviate from traditional ARG rules, where the narrative may serve as a simple backdrop, and gameplay focuses on integrating real-world issues into the player's life. Although they emerged later than entertainment ARGs, serious ARGs have gained prominence due to their multidisciplinary nature and wide-ranging practical applications. Examples of serious ARGs include *Robots Are Eating the Building* (2010), *Chore Wars* (2007), *Evoke* (2010), *Conspiracy for Good* (2010), and *The Comfort of the Strangers* (2008). These games continue to evolve, offering unique opportunities to engage players beyond mere entertainment.

1.5 Types of ARG Players

ARGs have become increasingly popular due to their unique blend of digital and real-world engagement. Players immerse themselves in fictional narratives that unfold across multiple platforms, including emails, websites, and social media, while interacting with live events or real-world tasks. This diversity of engagement and media brings a wide range of player types to ARGs, each with unique motivations, skill sets, and engagement preferences. According to Dena's (2008) analysis, the type of player a game attracts significantly impacts the design and progression of the ARG, as designers cater to different levels of player dedication and expertise by "tiering" their content.

1.5.1 Player Tiers

The concept of participatory culture, where fans or players actively create and circulate content, has been crucial to the development of ARGs. Jenkins (2006) defines this as a culture where consumers are encouraged to contribute, modify, and expand on existing content rather than passively consuming it. Dena builds on this by explaining that ARG players often create tiers of participation that allow others to engage with their content without directly interacting with the game. This form of tiering addresses the needs of different audiences, from casual observers to devoted, puzzle-solving experts. In the context of ARGs, tiering becomes essential as it structures the experience for players with varying levels of interest, skill, and time availability. The game content is distributed in ways that allow for casual, active, and hardcore engagement. This method ensures that a wide range of players can participate in the game at different levels without the need for complete immersion. Tiering appeals to ARG designers because it broadens the audience, allowing for layers of participation that build on each other, often culminating in a collaborative effort where casual players support more intense gameplay.

1.5.2 Types of ARG Players

ARG players are diverse, with three primary categories identified by Dena (2008): casual players, story players, and hardcore players. Each group brings a unique approach to the game, influenced by their personal motivations, preferred media, and desired interaction level.

Casual players represent the largest group in ARGs, often referred to as readers because their engagement is typically passive. They may follow the game's storyline by reading updates on forums, tracking discussions, or watching recap videos created by more engaged players. Casual players do not usually solve puzzles or participate in real-time events; instead, they consume the narrative and puzzle solutions created by more active participants. Dena (2008) notes that this group values ease of access and minimal time commitment, which aligns with the broader trend of casual play in digital games. The infrastructure within ARG communities, such as forums, wikis, and blogs, enables casual players to stay informed without direct participation. These resources allow them to enjoy a lite version of the game experience, where they gain entertainment value without having to invest significant effort. ARGs like *I Love Bees* (2004) and *The Beast* (2001) have demonstrated that the presence of casual players contributes to the game's popularity and reach. By actively thinking about this type of player while designing PMs can appeal to massive audiences (Dena, 2008).
Story players are those who immerse themselves in the ARG's narrative, character interactions, and plot developments. Unlike casual players, story players are motivated by the allure of influencing the storyline and connecting with fictional characters. Dena (2008) describes these players as story hackers, individuals who derive pleasure from navigating the narrative intricacies of the game and sometimes even shaping its outcome through their choices. Story players often take on a quasi-authorial role, adding depth to the ARG experience by producing content such as fan fiction, theories, and analyses of characters and plot twists. An example from Perplex City illustrates this dynamic: players collaborated to write a fictional book for an in-game character, which ultimately became part of the ARG's narrative. Story players contribute by actively engaging with the content, thereby enriching the game world for themselves and others, including casual players who benefit from the resulting shared content (Dena, 2008).
Hardcore players represent the most dedicated group in the ARG community. These individuals are often labeled as devotees because of their intense commitment to puzzle-solving, real-world challenges, and the collaborative aspects of gameplay. Hardcore players enjoy the complex puzzles, cryptographic challenges, and immersive experiences that ARGs offer, and they thrive on the intellectual and social demands of such games. Hardcore players tend to form the backbone of the ARG experience by coordinating large-scale efforts, often orchestrating solutions across various platforms. Within the hardcore category, there are distinct subgroups, including puzzle players, story players, and real-world players. Puzzle players, for example, engage with cryptographic challenges and codes, using a variety of skills to decipher complex messages. Real-world players, in contrast, participate in physical, on-location challenges, adding an extra layer of realism to the game. These hardcore players frequently document their journeys, creating walkthroughs and guides that become essential resources for both active players and the more passive audience (Dena, 2008).

1.5.3 Collective Intelligence

One of the defining features of ARG player communities is their reliance on social collaboration and collective intelligence. ARGs are often designed in a way that necessitates teamwork, as puzzles and challenges require pooling knowledge and skills from diverse backgrounds. This social aspect is especially pronounced among hardcore players, who form groups or networks to coordinate their efforts. Through forums, chat rooms, and social media, players discuss clues, share findings, and develop strategies to progress in the game. Authors like Lévy (2002) and Jenkins (2006) describes this phenomenon as *collective intelligence*, where knowledge communities emerge to solve complex problems that would be insurmountable individually.

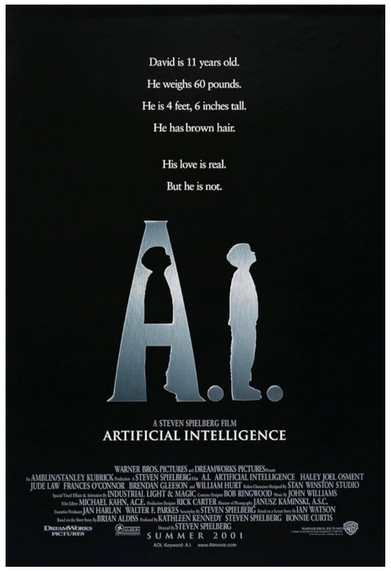
This collective approach not only enhances gameplay but also contributes to a vibrant community culture within ARGs. Players often create and share extensive resources, such as *The Trail* and *The Guide*, which serve as encyclopedias of information on specific ARGs. These resources are instrumental for both new players who want to catch up and casual players who prefer a more observational role. By fostering a culture of sharing and support, ARGs create an inclusive environment where players can choose their level of engagement while benefiting from the collective output of the community.

1.6 Notable Case Studies

1.6.1 The Beast

The Beast (2001), which is widely recognized as a pivotal moment in the development and popularization of ARGs. Developed as part of the promotional campaign for Steven Spielberg's film *Artificial Intelligence (A.I.)* (2001), The Beast is seen as a landmark for ARGs, combining interactive storytelling with collaborative puzzle-solving.

According to Szulborski (2005), *The Beast* (2001) was created by a team known as the Puppetmasters, including Sean Stewart, Elan Lee, and Jordan Weisman, under the guidance of Microsoft and DreamWorks. Initially, the game was developed as a unique promotional effort for *A.I.*, but it quickly grew into something much larger: a fully immersive experience that pushed the boundaries of online interaction. The project began in 2000 when Jordan Weisman first approached Sean Stewart about creating a new type of game for the upcoming movie. Although the first version of their concept fell through, the team reunited in early 2001 to create what they described as a "world-changing new art form". The *TINAG* principle was a key feature of *The Beast* and helped to maintain the illusion of an alternate reality. As Stewart (2001) explained, the goal was for players to engage with the characters and the story on a deeper emotional level, experiencing laughter, tears, and frustration as if the events were real. The narrative of *The Beast* was fragmented across multiple platforms, including websites, phone calls, emails, and physical clues embedded in posters and trailers for *A.I* (see picture 1.4). The story itself was an exploration of the futuristic world of 2142, focusing not on the plot of the movie but on its thematic undercurrents, such as artificial intelligence and human-robot relations. Players were required to piece together the story through collective puzzle-solving, working together in what became an inherently cooperative and community-driven experience. This model of narrative fragmentation and cooperation became a defining characteristic of ARGs moving forward. The game officially began in March 2001 with the release of the first in-game websites and continued to evolve until the release of the movie in June of that year. The initial clues were hidden in the credits of the *A.I.* trailer, where a mysterious credit for "Jeanine Salla, Sentient Machine Therapist" led players down the rabbit hole of a fictional world. As they investigated further, players discovered a series of websites tied to this futuristic universe, and their interactions with these sites advanced the plot. The scale of the project was unprecedented, with over 30 websites and hundreds of in-game assets such as videos, emails, and phone numbers, which added to the immersive quality of the experience. The collaborative nature of *The Beast* gave rise to a large online community known as the *Cloudmakers*, named after one of the early websites uncovered in the game. The community played a crucial role in solving the puzzles and advancing the narrative, posting over 43,000 messages on their forums during the four-month run of the game. The sheer volume of activity reflected the game's ability to foster a strong sense of social agency and collective play, a concept later explored in academic studies by McGonigal (2008). The need for teamwork and shared knowledge among players helped solidify the cooperative aspects of ARGs, distinguishing them from traditional single-player video games or even early multiplayer online experiences. *The Beast* set the standard for future ARGs, both in terms of its technological complexity and its narrative depth. It also demonstrated the potential of ARGs as a powerful marketing tool, though its financial impact was difficult to measure. While the movie *A.I.* did not perform particularly well at the box office, the game itself attracted significant media attention and is considered by some critics to be a more compelling piece of art than the film it was designed to promote. The success of *The Beast* led Microsoft to invest heavily in future ARG projects, such as *I Love Bees* (2004),further legitimizing the genre as a serious marketing and entertainment platform. Additionally, *The Beast* helped to elevate the study of ARGs within academic circles, particularly in the fields of narratology and ludology. Its innovative approach to storytelling, which blurred the lines between reality and fiction, has been analyzed in numerous scholarly papers, further establishing ARGs as a valid subject of study. The game's legacy also extends to the many amateur and independent ARGs that followed, as *The Beast* inspired a new generation of creators to experiment with interactive, community-driven storytelling.

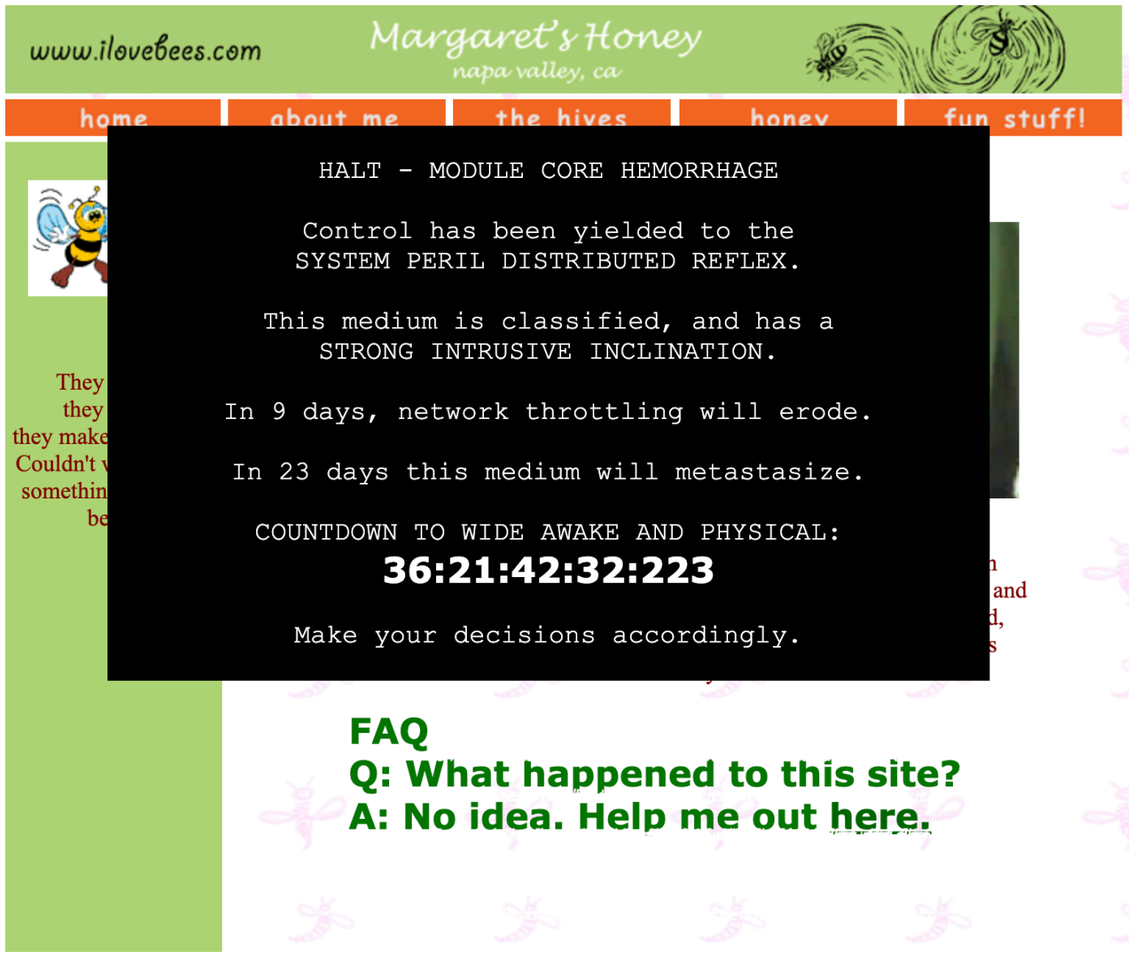


Picture 1.4 – *A.I. Artificial Intelligence* (Spielberg, 2001), Original movie poster.

1.6.2 I Love Bees

Created as a promotional campaign for the release of *Halo 2* (2004), *I Love Bees* (2004) not only set a new standard for immersive gaming but also showcased the marketing potential of ARGs. It showed groundbreaking game design for the time and its impact on the ARG community advanced the genre into mainstream consciousness.

The origins of *I Love Bees* can be traced to the summer of 2004, when ARG enthusiasts were eagerly awaiting the next big game. The ARG community had been relatively quiet since earlier games had either concluded or failed to launch as anticipated. The breakthrough came in July when several ARG-related websites received strange packages containing honey jars and letters that spelled out "i l-o-v-e b-e-e-s." These packages directed players to the website *ilovebees.com* (see picture 1.5), which appeared at first to be an innocuous beekeeping site but quickly revealed hidden messages, setting the stage for a three-month long game that would blend digital storytelling with real-world actions. From the outset, *I Love Bees* embraced the core ARG principle of blurring the line between fiction and reality. The game's narrative revolved around an artificial intelligence that had crash-landed on Earth and was attempting to reassemble itself. Players were tasked with uncovering pieces of this AI's story by interacting with the website, solving puzzles, and responding to in-game communication. This design reflected one of the key features of ARGs: a non-linear narrative that required collaboration and active problem-solving from the player community. The game utilized multiple mediums to engage its players. Participants communicated through blogs, email, and phone calls, with the website itself offering cryptic clues embedded within its images and text. The interactivity was not limited to online spaces; a key component of the game involved players physically visiting payphones across the United States to receive in-game audio messages, an activity that became central to the progression of the narrative. These payphones, referred to as "axons" in the game, were part of a larger network that players had to collectively activate, fostering a sense of cooperation and community among participants. Similar to previous ARGs like *The Beast* (2001), *I Love Bees* required players to work together to decode messages, solve puzzles, and share information. The game attracted not only ARG veterans but also a large number of new players, many of whom were fans of the *Halo* franchise and had been drawn to the game through its connection to *Halo 2*. This influx of new players created a diverse and dynamic community, united by a common goal of uncovering the story behind *I Love Bees*. The collaborative nature of *I Love Bees* also reinforced one of the genre's key strengths: its ability to create a sense of shared experience. Players were not simply following a pre-scripted narrative; they were actively shaping the story through their actions, both online and in the real world. This interactivity led to strong emotional connections between players and the game's characters, even though these characters were only presented through fragmented audio clips. One of the most notable aspects of *I Love Bees* was its success as a marketing tool. The game was designed to promote the upcoming release of *Halo 2*, and according to Szulborski (2005), it succeeded in generating significant buzz and media coverage. The innovative use of an ARG to promote a video game was a first, and it demonstrated the potential of ARGs to serve as powerful marketing platforms. By the end of the game, an estimated one million people had been exposed to *I Love Bee*s, either through direct participation or through media coverage, making it one of the most successful promotional campaigns of the year. Beyond its marketing success, *I Love Bees* also had a lasting impact on the ARG genre itself. The game set new benchmarks for scale, complexity, and interactivity, and its success helped to push ARGs further into the mainstream.



Picture 1.5 – *I Love Bees* (42 Entertainment, 2004). The homepage in March 2004, the starting point of the titular ARG.

1.6.3 Year Zero

The *Year Zero* (2007) ARG, created by 42 Entertainment for Nine Inch Nails, stands as a seminal example of the genre, blending online and real-world elements to create an experience that engaged players in exploring a dystopian vision of 2022. Running from February to May 2007, this ARG supported the release of the Nine Inch Nails album of the same name, presenting a world governed by authoritarian theocratic regimes under the guise of security and order. Players encountered the game through clues embedded in album paraphernalia, such as highlighted letters on concert T-shirts, which led them to cryptic websites. The rabbit hole into this narrative became increasingly intricate as players unearthed a network of interconnected puzzles, hidden messages, and multimedia elements that contributed to an overarching narrative of societal decay and governmental control (de Beer, 2015). Through meticulously designed real-life artifacts like USB drives, distributed at concerts, and digital assets that included websites and videos, participants pieced together an unfolding story where each discovery enriched the dystopian atmosphere. This included encountering websites such as *Another Version of the Truth*, which depicted government suppression and censorship, reflecting the game's themes of surveillance and control. According to de Beer, these narrative elements served as hooks to engage players and drive them to further exploration, where each piece connected to larger thematic and story elements, encouraging players to delve deeper into the unsettling universe of *Year Zero*.

The collaborative element of the game proved crucial to the ARG's engagement. As de Beer notes, the game's design encouraged intense community participation, requiring players to work collectively to decode encrypted messages, unearth narrative fragments, and build a cohesive picture of the fictional world's future. This collaboration wasn't simply a gameplay necessity; it actively shaped the ARG's narrative by making the player community a part of the story itself. Each week introduced new narrative elements, puzzles, and player interactions that required community-wide problem-solving. In particular, de Beer emphasizes how the ARG used power plays to drive player engagement. Power plays in this context refer to scripted events or actions within the ARG that leveraged community skills, such as decryption or collaborative analysis, reinforcing the game's immersive qualities and ensuring player investment. This design not only unified players but also fostered a shared experience of opposition against the game's authoritarian fictional regime, a reflection of real-world fears about the encroachment of surveillance and loss of privacy.

A key aspect of *Year Zero* was its ability to create an emotionally resonant experience for players through its narrative rewards. These rewards came in the form of content that expanded upon the bleak world of 2022, offering players glimpses into the lives of fictional characters impacted by the regime's oppressive policies. One example includes the discovery of a banned book excerpt embedded within a site, further illustrating the government's censorship and propaganda efforts. By engaging with these elements, players became emotionally invested in the narrative which was critical to the ARG's impact. The ARG didn't simply rely on puzzle-solving as an end goal but integrated these activities as gateways to deeper, more nuanced storytelling (de Beer, 2015). *Year Zero* also leveraged its media content to create a sense of ongoing discovery and urgency. Each website and artifact introduced carried numbers and references that acted as link elements between the various parts of the story. De Beer explains that these link elements were crucial to establishing a coherent timeline and structure for the narrative, as they enabled players to track the sequence of events across different media and locations. This approach made the ARG's progression feel organic, as if the story were actively evolving in real-time, a design choice that heightened immersion and reinforced the game's unsettling depiction of a controlled, censored society.

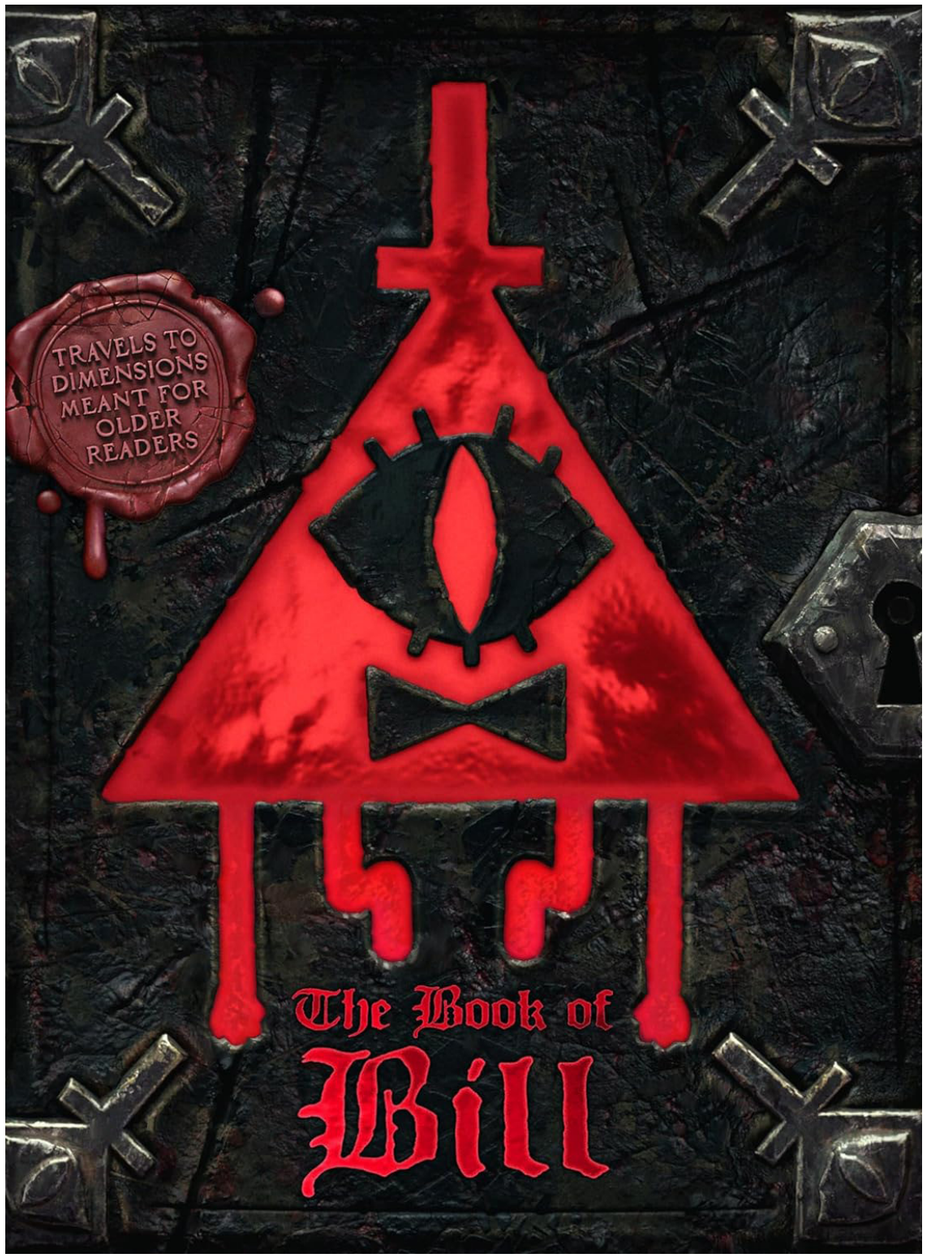
The overall success of the game lies in its sophisticated integration of narrative depth with interactive engagement. Through its complex design, *Year Zero* set a precedent for future ARGs, demonstrating how interactive storytelling could be used to immerse players not only in a fictional narrative but also in a community-driven process of discovery and interpretation.

Picture 1.6 – *Year Zero* (Nine Inch Nails, 2007), titular album cover.

1.6.4 The Book of Bill

The Book of Bill (2024) ARG, linked to the animated tv show *Gravity Falls* (2012-2016), offers an exceptional case study for understanding the mechanics of ARGs that blend storytelling with fan engagement. The ARG was launched to coincide with the release of the physical *Book of Bill* (see picture 1.7), which contains hidden codes and ciphers embedded within its pages. These puzzles were carefully designed to echo the enigmatic personality of Bill Cipher, the iconic antagonist from *Gravity Falls*. The creators ensured that both newcomers and experienced players could participate by offering puzzles of varying complexity. One of the key aspects of the game was its use of a cipher wheel, a physical decoding tool that was made available alongside the book. This blending of physical and digital elements reflects one of the hallmarks of ARG design, where players are encouraged to interact with real-world objects as part of the game's narrative. The ARG also made use of cryptic messages that required players to collaborate online to solve the more challenging puzzles. By distributing clues across multiple platforms, including social media and forums, the *Book of Bill* ARG exemplified the decentralized and non-linear storytelling often seen in the genre. This method encouraged a strong community-driven approach, where participants from different backgrounds and skill levels could contribute their knowledge to advance the narrative. The puzzles in *Book of Bill* demanded a mix of problem-solving skills, from basic code breaking to advanced cryptography. Players encountered ciphers and hidden symbols in the book, which they had to decode using both traditional methods and game-specific tools, such as the aforementioned cipher wheel. The collaborative aspect was key to solving the ARG; dedicated online forums allowed players to share insights and theories, reflecting how ARGs often foster communal problem-solving. One of the critical features of this ARG was its gradual release of clues. Players did not receive all the information at once; instead, the game unfolded over time, mirroring the episodic nature of *Gravity Falls* itself. This not only sustained interest but also deepened player engagement, as participants returned regularly to check for new clues or updates. *The Book of Bill* ARG offers several insights into the evolving design of ARGs. First, it illustrates how multimedia integration can deepen immersion. By incorporating physical items such as books and cipher wheels, the ARG encouraged players to bridge the gap between the digital world and reality. This use of physical artifacts is a growing trend in ARGs, as it reinforces the idea of blurring the line between game and life, a concept fundamental to the genre. Additionally, *Book of Bill* highlights the importance of community collaboration and narrative in ARG design. The connection to *Gravity Falls* allowed for an emotionally resonant experience for fans of the series, who were already invested in the characters and lore. This deep narrative integration, coupled with challenging puzzles, helped to ensure that the ARG remained engaging over time.

In conclusion, *Book of Bill* also served as an ideal entry point for a new generation of ARG players. As Michael Andersen (2024), owner of ARGNet.com, says: "it attracted younger audiences who were passionate about Gravity Falls and introduced them to the immersive potential of ARGs". By blending a familiar narrative with intricate puzzles and an interactive format, the ARG successfully engaged these new players, fostering their enthusiasm for the genre and contributing to its growing popularity among diverse demographics. This shows the adaptability of ARGs in reaching different age groups and interests.



Picture 1.7 – *The Book of Bill* (Hirsch, 2024). Cover of the physical book, part of the ARG.

1.7 Complexity of ARG Development

The development of ARGs presents a variety of intricate challenges, requiring both technical acumen and a nuanced approach to narrative structure (Szulborski, 2005). Bonsignore et al. (2014) provide valuable insights into the experiences and strategies of ARG designers, shedding light on the specific demands and tactics they employ to craft immersive, participatory narratives.

One primary challenge involves managing the technical demands of creating an ARG. For independent developers and small teams, the need to coordinate across multiple platforms such as websites, phone lines, and social media can be overwhelming. This complex infrastructure not only requires technical knowledge but also demands significant time and financial resources to maintain, making it a logistical hurdle for developers aiming to create seamless, immersive experiences (Szulbroski, 2005; Bonsignore et al., 2014). Beyond the technical challenges, player engagement and content delivery are key concerns for ARG designers. ARGs, by nature, require sustained player interest over time, and maintaining this engagement often involves a balance between spontaneity and structured content. Designers approach this by varying the narrative structure along a spectrum from thickly plotted and close-ended storylines to thinly plotted and open-ended formats. As one designer noted: "ARGs differ from deeply-architecturally-sophisticated content like books or films, instead needing to leave space for the player to feel that their choices make a difference" (Designer #7 in Bonsignore et al., 2014). This player-driven aspect of ARG narratives fosters a participatory culture, where players not only consume the story but actively contribute to its evolution through their own interpretations and choices. To support player agency and engagement, experienced designers employ specific tactics that create *points of convergence* (Bonsignore et al., 2014). These are moments where narrative and gameplay intersect, giving players actionable tasks that reinforce their roles in the story. For instance, designers often use tropes like *secret societies* or in-game characters asking for help, which compel players to participate by solving puzzles or decrypting codes. This technique helps players feel like integral parts of the story, as described by one designer: "An in-game character asking for help makes it feel real for the players and keeps them engaged" (Designer #2 in Bonsignore et al., 2014). The use of intentional gaps in the narrative, moments of ambiguity that encourage players to imagine and contribute their own interpretations, is crucial for ARG designers.. This concept, referred to as *counterfactual design*, allows designers to create a space where players can insert their own ideas and stories. As one designer explained, "What is the vacuum I create that allows the story to be told?" (Designer #13 in Bonsignore et al., 2014). By embedding these gaps, designers not only invite players to co-create the narrative but also encourage them to document and interpret the story for other players. This strategy enhances the collective storytelling experience, transforming the ARG into a dynamic, evolving narrative shaped by the player community. Puzzle design and difficulty balancing also emerge as significant challenges in ARG development. If puzzles are too simple, players may lose interest; if they're too difficult, players may become discouraged. This balancing act is further complicated by time and budget constraints, as many ARGs lack the resources for extensive testing (Szulborski, 2005). To aid players in navigating complex narratives, designers incorporate *essential nodes*, which act as stable narrative anchors amid the non-linear format of ARGs. These nodes provide islands of coherence, helping players maintain an understanding of the storyline even as they encounter fragmented elements across different media (Designer #18 in Bonsignore et al. 2014). Ethical considerations also play a crucial role in ARG design. The immersive, reality-blurring nature of ARGs requires designers to carefully consider the impact on players' real lives. Experienced designers are particularly mindful of ensuring that in-game actions like live interactions or phone calls do not inadvertently disrupt or harm players' everyday experiences. This ethical focus demands thorough foresight and sensitivity in ARG design, especially when dealing with real-world interactions that could unintentionally interfere with players' lives (Bonsignore et al., 2014).

In sum, the literature reviewed reveals the depth of strategic thinking required in ARG development. From embedding participatory elements and leveraging player-generated micro-stories to carefully balancing difficulty and addressing ethical concerns, experienced designers view ARGs as a unique medium that blends authorial control with player agency. Furthermore, one of the hardest challenges is building a cohesive narrative that resonates with players. ARGs often unfold non-linearly, with story elements revealed piece by piece across multiple media. Crafting a coherent narrative that players can understand and engage with, despite these fragmented elements, is both a creative and logistical challenge.

2

Research Question

Stating the complexity and different difficulties novice and expert PMs encounter during the creation of Alternate Reality Games, we can identify the main goal of this research, that emerges from a distinct gap in the ARG literature; there is no comprehensive guide on how developers can ideate, structure, and refine ARGs in a systematic way. Szulborski (2005), in Chapter 3 of *This Is Not a Game*, attempts to address this by offering advice based on his personal experiences. His approach, while valuable, is limited by its focus on specific, technical challenges relevant to early ARGs, such as securing domains and maintaining phone numbers, thus lacking broader, adaptable insights for today's ARG landscape, which has evolved dramatically in terms of both design and audience engagement. The importance of *TINAG* principles is also emphasized, where ARGs blur the boundaries between game and reality. However, Szulborski's guidance remains abstract and lacks structured methodology for ARG creators to systematically craft this immersive experience. His advice, while insightful, is often anecdotal and does not provide a step-by-step framework for collaborative creation by PMs. Today's ARGs incorporate more sophisticated, transmedia storytelling techniques that weren't as prevalent or accessible in 2005, making the need for updated best practices even more apparent. Thus, we can formulate the research question and then address the two main sub-goals of the research itself:

How can a structured design framework help ARG designers efficiently develop, iterate and prototype ideas while ensuring cohesive, interactive narratives?

The first objective is to design a sequential list of phases that enables ARG designers to develop and refine ideas quickly and systematically, providing a streamlined process from concept to completion.

The second focus is on the creation of targeted design tools for each phase, helping designers apply structured methodologies that support narrative cohesion and interactivity.

Together, these tools and phases aim to achieve a faster, more organized ARG creation process, offering novice developers essential resources for generating, planning, and executing ARGs from the ground up. The proposed framework will help simplify complex ARG mechanics, making it easier for new creators to approach ARG design with confidence and creativity, even without prior experience. In essence, the research aims to bridge the gap between experienced ARG developers and newcomers by building accessible and effective design structures, allowing ARGs to be created with greater efficiency and through accurate planning thanks to a revised methodology and new, adapted tools.

3

Existing Frameworks for Interactive Experiences

Before delving into the methodologies, goals and phases of the ARG design framework, it is important to showcase what led to some specific design decision for the framework itself. In particular, existing frameworks in other types of interactive experiences and user-centered design framework and tools.

During literature research, Interactive Storytelling and Interactive Digital Narratives were identified as adjacent topics to Alternate Reality Games due to their similar goals: tell a complex story that is able to change after player interaction. Even though the realization of these types of experiences is quite different from ARGs, their goals and existing framework gave interesting insights for the definition of rules and tools to follow for Alternate Reality Game development.

3.1 Interactive Digital Narratives

Interactive Digital Narratives (IDNs) represent a revolutionary approach to storytelling that capitalizes on the unique possibilities of digital media. Unlike traditional narratives, which typically follow a linear, author-driven structure, IDNs integrate user agency as a central component, allowing participants to influence the story's trajectory and outcome directly. This integration of interactivity significantly impacts both narrative flow and the user's experience, creating a dynamic, personalized form of storytelling that extends across a range of media. From hypertext fiction and video games to interactive cinema and digital art installations, IDNs encompass a rich landscape that continuously expands the boundaries of narrative creativity.

3.1.1 Historical Foundations of Interactive Digital Narratives

The roots of IDNs can be traced back to the mid-20th century, with experimental technologies and early interactive projects that explored the potential of audience participation in storytelling. Some of the earliest contributions to the field emerged from pioneering work in the realms of computer science, hypertext fiction, and interactive cinema. These early explorations laid the groundwork for IDNs, influencing how narrative and user interaction could coexist within a digital medium. In the 1960s, early projects such as Joseph Weizenbaum's *Eliza* (1966) demonstrated the potential for computers to engage users in simulated dialogue. *Eliza*, a computer program designed to emulate a Rogerian psychotherapist, interacted with users through text-based responses. By mimicking human dialogue patterns, *Eliza* highlighted the capacity of digital systems to provide responsive and engaging experiences, sparking interest in computer-mediated interactions as a potential narrative form. The 1980s and 1990s marked a significant period in the development of IDNs, particularly in hypertext fiction. Hypertext fiction, an early form of digital narrative, enabled users to navigate non-linear story paths through hyperlinks, creating a new kind of storytelling experience where the reader's choices shaped the unfolding narrative. Hypertext fiction initially flourished as a literary movement, with authors like Michael Joyce and Stuart Moulthrop at the forefront of the genre. Joyce's *Afternoon, A Story* (1987; published in 1991) is often regarded as one of the earliest and most influential works of hypertext fiction. In this piece, users navigate a labyrinthine story about a man grappling with the aftermath of a car accident, and each decision determines which fragments of the story will appear next. With over 500 lexias (textual nodes) and more than 900 hyperlinks, *Afternoon* demonstrates how hypertext fiction relies on segmentation and linking, allowing readers to interpret and reinterpret the story in multiple ways through repeated visits to different lexias. Another notable work, Shelley Jackson's *Patchwork Girl* (1995), pushes the boundaries of hypertext fiction by presenting a fragmented narrative that mirrors the protagonist's physical construction. The story, written from the perspective of a creature pieced together from various body parts, offers a deeply layered narrative experience that requires the reader to explore links between different segments to uncover the complete story. Jackson's work exemplifies the complexity of hypertext fiction, which often requires readers to assume an active role in constructing meaning and understanding narrative connections. These works were part of a larger trend in the 1980s and 1990s that saw authors and artists exploring digital media as a means of creating *serious fiction*, according to Michael Joyce and Jay Bolter. They argued that digital platforms could elevate literary experimentation, enabling new narrative forms distinct from traditional printed texts. By allowing readers to navigate multiple narrative pathways, hypertext fiction transformed the reader from a passive consumer into an *interactor*, a term coined by Janet Murray to emphasize the active role of users in shaping digital narratives (Koenitz et al., 2015).

While hypertext fiction explored narrative in a literary context, interactive cinema emerged as an experimental form that combined cinematic storytelling with audience interaction. The origins of interactive cinema date back to 1967 with Radúz Çinçera's *Kinoautomat*, presented at the Montreal World Fair. *Kinoautomat*, widely recognized as the world's first interactive film, invited the audience to make decisions that would alter the film's progression. At several decision points during the screening, the film would pause, and viewers would vote on what the protagonist should do next. While the audience's choices only temporarily altered the film's direction (returning to the main plot shortly after each choice), *Kinoautomat* showcased the potential for user-driven cinema and paved the way for future developments in interactive media. Advancements in video technology in the late 1970s and early 1980s further enabled interactive cinema. The introduction of the laser disc allowed for rapid access to specific points within a video, enabling the Architecture Machine Group at MIT to create the *Aspen Movie Map* (1978). This innovative project allowed users to navigate a digital map of Aspen, Colorado, by clicking on video segments to explore different areas of the town. The *Aspen Movie Map* is considered one of the earliest examples of interactive media that provided a spatially navigable virtual environment. It marked a departure from linear storytelling by giving users the freedom to explore a digital representation of a real-world space. Another fundamental piece is *Lorna* (1979) by Lynn Hershman, the first interactive installation that uses laserdisk technology to tell the story of an agoraphobic woman called Lorna and put the viewer in her world, leading them to choose how the experience would end (Schwarz, 1997).

Interactive cinema continued to evolve in the 1990s, with notable experiments like *Mörderische Entscheidung* (1991), a German crime thriller directed by Oliver Hirschbiegel. The film was broadcast simultaneously on two television channels, with each channel representing a different character's perspective. Viewers could switch between channels at any time, effectively creating a dual-narrative experience where users controlled their perspective on the story. Hirschbiegel's experiment highlighted how interactive cinema could create multi-dimensional narratives that empowered audiences to navigate different viewpoints, adding a layer of agency to the cinematic experience. This concept was further developed in the 2000 Danish project *D-Dag*, which presented viewers with seven different channels to navigate a bank heist narrative on New Year's Eve, offering a range of perspectives and contextual information for a more immersive experience. Interactive cinema installations also gained traction as a form of digital art, with creators like Toni Dove incorporating interactive technology to merge video with user-driven experiences. Dove's *Archaeology of a Mother Tongue* (1993) allowed interactors to control the environment of a virtual reality murder mystery by using a data glove and a small camera, immersing users in a

narrative space they could manipulate directly. In *Lucid Possessions* (2013), Dove further explored the intersection of identity and technology, using motion-tracking and custom hardware to blend live performance with interactive video, thereby allowing the interactor to influence the narrative's unfolding through gestures. These interactive cinema installations demonstrated how digital tools could offer audiences new levels of immersion and agency, fostering a unique connection between users and the narrative environment. By the late 20th and early 21st centuries, IDNs had evolved significantly, incorporating real-time decision-making, spatial exploration, and narrative branching as standard features in interactive storytelling. Video games emerged as a prominent medium for IDNs, integrating user agency with complex narratives to create personalized storytelling experiences. Games like *Myst* (1993) and *The Last Express* (1997) used exploration and branching narratives to engage players in interactive worlds where their decisions shaped the story's progression. Myst, a graphic adventure game developed by Rand and Robyn Miller, allowed players to explore a mysterious island filled with puzzles, while *The Last Express*, designed by Jordan Mechner, used real-time progression to give players control over a narrative set aboard the Orient Express. These games exemplified how interactive media could merge narrative depth with gameplay, leading to a new era of digital storytelling where user agency was central to the narrative experience. As digital technology advanced, interactive cinema, hypertext fiction, and video games began to converge, leading to hybrid forms of IDNs that leveraged interactivity in increasingly complex ways. The focus shifted from merely providing choices to crafting intricate systems that responded dynamically to user actions, enabling more sophisticated and personalized narrative experiences. Interactive documentaries, educational simulations, and immersive VR environments have continued this tradition, applying the principles of IDNs to a range of disciplines and genres (Koenitz et al., 2015).

3.1.2 Definition of IDN

Koenitz et al.(2015) provide a comprehensive model that addresses the unique requirements of IDNs. He highlights that traditional narrative theory often fails to capture the complexities of interactive media, necessitating a specialized framework for IDN. Koenitz emphasizes that IDNs are defined by a triadic relationship: a system (the digital artifact), a participatory process (the user's engagement), and a product (the realized narrative). This model foregrounds the procedural and participatory nature of IDNs, describing them as systems of *potential narratives* that only manifest fully through user interaction.

3.1.3 Components of IDN

The following essential components of IDNs help in analyzing and designing these narratives effectively:

System: In Koenitz's model, the system refers to the underlying digital architecture, encompassing software, programming code, assets, and hardware that collectively represent potential narratives. This component is akin to an interactive framework or environment within which users interact.

Process: This is the participatory aspect of IDN, involving the real-time engagement of users. The process shapes the IDN's outcome, with user choices altering narrative progression. Unlike traditional narrative forms where the structure is fixed, in IDNs, the narrative emerges dynamically as the user interacts with the system.

Product: The product is the specific instantiation of the narrative, generated through interaction. It is a recorded or observed "walkthrough" of the story, capturing the particular narrative path chosen by the user. Each narrative instantiation is unique, as the system provides multiple potential outcomes based on user input.

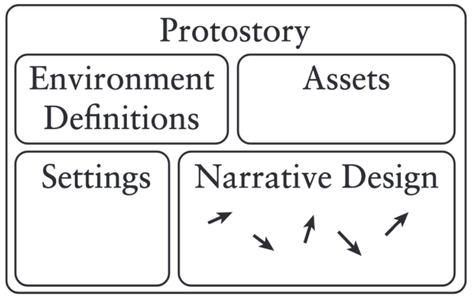
Koenitz's conceptualization allows IDNs to be viewed not merely as narratives with interactive elements but as a distinct narrative form in which story structure and user agency are inseparable.

3.1.4 IDN Framework

In response to the limitations of adapting traditional narrative theories to digital media, Koenitz (2015) proposes an IDN-specific framework that reflects the procedural and interactive qualities unique to this form. His theory identifies three primary constructs within IDN: *protostory, narrative design, and narrative vectors*.

The concept of protostory reflects the IDN's capacity for potential narratives. Protostory comprises the various elements such as assets, settings, and interactive sequences that constitute the IDN's narrative environment (see picture 3.1). Unlike traditional narratives, where story structure is fixed, the protostory in IDNs exists as a flexible, procedural blueprint. It allows for multiple narrative paths, with each user journey representing a unique realization of the story. This construct resonates with prototype-based programming in computer science, where the program's content and behavior can shift dynamically. In an IDN, protostory serves as a fluid space for interaction, with the narrative emerging in real time based on user actions.

Koenitz introduces narrative design as the structuring principle within protostory, encompassing the segmentation, sequencing, and connection of narrative elements. Narrative design ensures that IDNs retain coherence even as they adapt to user interactions. The narrative design of an IDN is dynamic; it adjusts to present new information, characters, or conflicts based on user engagement. For instance, in a murder mystery game, the narrative design might introduce new clues or suspects as the user explores, creating a structured yet adaptive narrative path. Narrative design is critical for guiding users through the IDN without imposing a rigid structure, allowing for fluidity while maintaining a cohesive storyline. To navigate the non-linear, branching paths of IDNs, Koenitz introduces the concept of *narrative vectors*: substructures that give direction and ensure coherence. Narrative vectors work like signposts, guiding users toward specific events or plot points. For instance, a narrative vector might be a conflict or turning point, such as the discovery of a key clue or an interaction with a central character. These vectors create a flow within the IDN, maintaining engagement and narrative momentum even as users exercise agency.



Picture 3.1 – Protostory diagram (Koenitz, 2015).

3.1.5 Other Theoretical Models

Numerous scholars, including Koenitz, Murray, and Ryan have proposed models to articulate how IDNs operate within digital media. The frameworks they provide collectively illustrate various analytical approaches and design principles, shaping how IDNs are understood and utilized in both academic and practical contexts (Koenitz et al., 2015). Murray's framework of digital media emphasizes four properties: *procedural*, *participatory, spatial,* and *encyclopedic*. These properties describe digital media's capacity to execute rules, enable user participation, represent space, and store vast amounts of data. Agency and immersion are pivotal concepts in IDNs, shaping how users engage with and experience these dynamic storytelling forms. Agency refers to the user's capacity to make meaningful choices that influence the narrative's progression and outcome. This empowerment transforms users from passive recipients into active participants, allowing them to navigate and co-create the story. Immersion, on the other hand, denotes the depth of the user's engagement and absorption within the narrative world. A highly immersive IDN captivates users, making them feel as though they are part of the story's environment and events. The interplay between agency and immersion is complex and can be paradoxical. While agency enhances engagement by granting control, excessive or poorly implemented choices can disrupt immersion, reminding users of the artificiality of the experience. Conversely, a highly immersive environment that limits user choices may lead to feelings of constraint, diminishing the sense of agency. Achieving a harmonious balance between these elements is crucial for creating compelling IDNs. Ryan (2001) builds on the idea that narratives are cognitive constructs, applicable across various media. Her framework integrates spatial theory, describing how users mentally map digital environments within IDNs. Ryan's work reconciles interactivity with traditional narrative structure, positing that IDNs create cognitive maps that users navigate, forming narrative meaning through spatial exploration and choice-making.

3.1.6 Insights for ARGs through comparison with IDN

ARGs can be interpreted as a dynamic variation of Interactive Digital Narratives, as they share key interactive principles, albeit with unique characteristics like multi-platform experiences and collaborative play. While ARGs extend beyond purely digital interfaces and are typically designed for group participation, they still align closely with the three core components of IDNs. In an ARG, the system encompasses the entirety of the game mechanics, narrative elements, and structural design that make up the game's framework. This includes everything from story-driven websites and cryptic messages to real-world interactions and digital tools, all of which combine to form a cohesive storytelling environment. The process within ARGs emerges when individual players actively engage with the game, whether by solving puzzles, deciphering clues, or interacting with narrative elements. Each player's engagement contributes to an evolving, interactive experience that is continually shaped by individual actions. Finally, the product of an ARG is the collective journey experienced by all participants. Unlike single-player experiences, the product of an ARG extends beyond individual memories; it becomes a shared story that leaves a lasting impact on its community of players. This collective narrative, enriched by real-world events and digital encounters, creates a memorable, often transformative experience that embodies the participatory essence of IDNs in a unique, socially immersive format. A final point of comparison between IDN and ARG design methods lies in their approach of narrative design/interactive authoring. Both rely on guiding users along a narrative path that preserves their freedom to interact meaningfully, all while maintaining control over a cohesive, well-structured plot. This shared approach balances user agency with narrative coherence, ensuring that players feel a sense of autonomy without compromising the story's direction or depth.

3.2 Interactive Storytelling

Interactive Storytelling (IS) can be inserted in the family of Interactive Digital Narratives. It gained quite a bit of traction in the game design research world thanks to Crawfords' extreme passion and hope for this genre to change the landscape of digital experiences.

Chris Crawford is widely regarded as a pioneer in interactive storytelling, significantly shaping the field of narrative-driven digital experiences. Beginning his career as a Game Designer at Atari in the late 1970s, Crawford became known for innovative games like *Eastern Front 1941* (1981) and *Balance of Power* (1985), which emphasized strategic thinking and player engagement. After Atari's collapse, Crawford left conventional game design, committing himself to interactive storytelling, a promising field he believed had the potential to revolutionize digital media. In his book, Crawford (2013) outlines the principles of interactive storytelling as a dynamic and evolving narrative experience distinct from traditional linear storytelling or gameplay. Through platforms like Storytron, Crawford sought to develop technology capable of generating adaptive story experiences, emphasizing meaningful character interactions and flexible outcomes that respond to player input. Crawford's approach frames interactive storytelling as an intersection of technology and narrative, where players can shape and influence the story in real-time, with technology enabling dynamic responses from the story environment.

3.2.1 Definition of IS

Interactive storytelling can, thus, be defined as narrative games in which players influence story outcomes through their choices, creating an adaptive, player-centric experience. Unlike linear stories with predetermined paths, IS is designed as an evolving *storyworld* where players engage in cycles of decision-making and feedback, leading to different possible narrative outcomes. This interactivity is a cyclic process where player actions and choices directly impact the story's direction and responses. Key components of IS include:

Dynamic Narrative Structure: In contrast to linear storytelling, interactive narratives adjust dynamically based on player input. This results in a story that evolves rather than follows a strict path, responding to player actions in real-time to create a seamless experience that feels personalized.

Character Interaction: Crawford emphasizes that interaction with characters is central to IS. These interactions are designed to respond to players' choices, with the narrative developing around the relationships and conflicts established between characters. This requires a complex system where characters' actions and emotions influence the progression of the story.

Responsive Environment: IS relies on an

environment that reacts meaningfully to player choices, providing feedback that reinforces the player's sense of impact. By adjusting plot elements, character motivations, and environmental responses, the storyworld feels immersive, encouraging players to explore different narrative pathways and revisit their decisions to see how alternative choices affect the story.

3.2.2 Crawford's Framework for Interactive Storytelling

Early IS frameworks relied on simple branching tree structures, where each player choice results in a different path but with limited narrative depth. While branching allows for multiple outcomes, it can create shallow experiences as players tend to encounter only a few, pre-set storylines. To counter this, Crawford proposes using *state variables*: a dynamic system that adapts to each player's actions by continuously tracking changes in character states, plot developments, and player decisions. Unlike rigid branching paths, state-variable frameworks adjust in real-time, creating an expansive range of narrative possibilities that give players greater freedom and allow for more nuanced storytelling. A key element of Crawford's framework is the use of *Engines* for interactive storytelling. Engines are the software systems that power IS, responsible for controlling characters, managing player interactions, and determining possible outcomes. Crawford identifies several types of engines, including:

Event-Based Engines: These engines operate by triggering specific events based on the player's interactions. For example, if a player performs a particular action, an event that influences the story, such as a character's reaction or a plot twist, may be activated. This helps control the flow of the narrative by linking story events to player decisions.

Clock-Based Engines: These engines introduce timed elements, where certain events occur at predetermined intervals, regardless of player actions. This can add urgency or create natural progressions in the story, with certain plot developments triggered by time rather than player interaction alone.

Plot-Based Engines: These engines focus on ensuring that the narrative remains cohesive by guiding the player through major plot points, adapting based on player interactions. By emphasizing plot continuity, these engines help players feel as though they are progressing through a coherent story while still allowing for individual agency.

Engines are critical for controlling character behavior and narrative outcomes, enabling complex story structures where characters' responses and narrative developments feel natural. For instance, plot-based engines may have characters adapt to players' actions by adjusting relationships, motivations, and emotional responses, creating an experience that feels personalized yet coherent. Engines thus play a foundational role in interactive storytelling, balancing player freedom with narrative structure and ensuring that the IS experience remains immersive and engaging throughout.

3.2.3 Petri-Net-Driven Interactive Storytelling Frameworks

Petri nets, first conceptualized by Carl Adam Petri, are a mathematical modeling tool primarily used to represent discrete event systems. With their unique structure of places, transitions, and tokens, Petri nets allow for visualizing and analyzing concurrent processes, an essential feature for dynamic and interactive storytelling environments. Each place in a Petri net represents a state or condition, while *transitions* signify events that move the system from one state to another. This structure is particularly advantageous for storytelling frameworks where narrative progression depends on character actions and external events. Petri nets have been applied effectively in plot-based interactive storytelling, where each scene is represented as a goal within a state-based model, facilitating narrative control in a complex, user-driven environment (El-Sattar 2008). By applying Petri nets, El-Sattar's framework addresses challenges like narrative coherence, ensuring that each user interaction leads to meaningful story progression. This system demonstrates how Petri nets can be used to maintain narrative flow in interactive stories, especially when users have the freedom to shape the story's direction. El-Sattar's (2008) work introduced a plot generation framework using Petri nets, specifically focusing on narrative control and reachability analysis. In this framework, each scene is treated as a goal, and the Petri net structure ensures that the story reaches various narrative states based on user interactions. Scenes can be atomic (simple goals) or composite (complex goals involving multiple actions or subplots). The Petri net's state transitions allow for different story branches to unfold naturally, maintaining narrative coherence even with high player agency. This approach of utilizing Petri nets for plot generation is particularly beneficial for interactive dramas and narrative-driven games. By enabling conditional transitions between scenes, the framework allows players to experience a story that adapts to their decisions while preserving the narrative structure established by the creator. For instance, in the case of an interactive story set in a medieval village, player actions, such as aiding characters or pursuing specific quests, trigger different transitions that alter the story's course. Through Petri-net-based modeling, designers can ensure that the narrative remains engaging, coherent, and responsive to user input. Korečko et al. (2022) expanded the use of Petri-net-driven frameworks by integrating them into web-based extended reality (XR) for educational scenarios. Their approach demonstrates the versatility of Petri nets in defining interactive scenarios within virtual environments, which can be applied to both education and storytelling. By creating Place/Transition nets (PT nets), Korečko and colleagues mapped out user interactions within a virtual environment, allowing each action to trigger specific transitions in the storyline. This application enhances educational content, making it more engaging by using virtual worlds where learners' actions have meaningful impacts on narrative flow. In Korečko's prototype, a historical exposition on the Enlightenment era in the Habsburg monarchy was developed. Here, students navigate through various tasks, such as identifying historical figures or completing challenges related to significant reforms of the period, while each task progression is managed by Petri net-based transitions. This setup ensures that each student's learning path aligns with educational goals, yet adapts based on their individual interactions, thus reinforcing learning objectives through immersive engagement. Petri nets in these educational environments function as a bridge between user actions and narrative states, allowing for interactive storytelling that is educationally relevant. The framework supports non-linear storytelling in educational scenarios, providing flexibility to adapt the story and its outcomes based on user choices, which enhances both engagement and knowledge retention. One of the primary strengths of Petri-net-driven storytelling frameworks is their ability to model complex, non-linear narratives with minimal loss of narrative coherence. Some of the core advantages include:

Concurrent Story Branching: Petri nets allow for multiple storylines to progress concurrently, enabling rich, multi-layered narratives that can respond to user actions dynamically. This characteristic aligns with interactive storytelling's goal to create immersive and responsive narratives.

Clear Visualization of Story States: Petri nets' graphical notation provides clear visualizations of story states and transitions. This clarity helps both designers and players understand the potential pathways within a narrative, making it easier to follow the storyline while allowing for informed decision-making.

Formal Analysis Capabilities: Petri nets allow designers to use formal analysis techniques to verify and optimize narrative structures.

El-Sattar highlights the use of invariant calculus and coverability graphs to ensure the narrative remains logically consistent and that all transitions are achievable based on initial conditions.

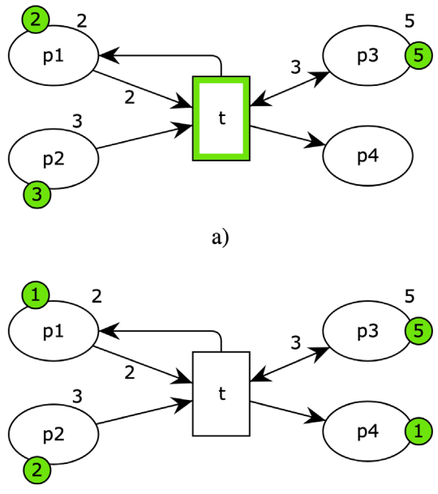
Flexibility for Real-Time Modifications: Petri-net-driven systems can adapt to real-time changes, enabling designers to modify scenarios based on user feedback or new narrative insights without reconstructing the entire framework. For example, in educational environments, instructors can adjust learning scenarios within the framework to better match learning objectives without disrupting the existing Petri net model.

The adoption of Petri nets in interactive storytelling frameworks has inspired various narrative control mechanisms that address user agency and adaptive storytelling. Researchers have continued to explore the potential of Petri nets for diverse applications, such as real-time scenario adaptation and enhanced narrative branching. Korečko et al.'s application in virtual education points to the future potential of combining Petri nets with XR to create fully immersive storytelling experiences that support both entertainment and educational objectives. Furthermore, the integration of advanced Petri net dialects, such as Coloured Petri Nets (CPNs), offers an opportunity to develop richer and more complex story scenarios. CPNs add another layer of flexibility by introducing data types and conditional transitions, enabling even more intricate interactions and responsive narrative structures. Such developments open the door to advanced storytelling in XR and interactive media, where each player's journey can be customized in real-time based on their specific choices, background, and preferences.

In the context of interactive storytelling and educational technology, Petri nets offer a solution to the longstanding challenge of balancing user agency with narrative coherence. Through further exploration of Petri nets and their dialects, future frameworks can build upon this foundational work to create more immersive, adaptable, and meaningful storytelling experiences that seamlessly blend interactivity with narrative depth.

3.2.4 Insights for ARGs through comparison with IS

While both interactive storytelling and Alternate Reality Games aim to engage players through narrative-driven experiences, they differ significantly in structure, interaction, and execution. Crawford's model of interactive storytelling generally operates within a controlled, virtual environment, where engines manage character responses, player actions, and the unfolding of the narrative. In IS, the story is contained within a self-sustained digital space where the narrative adapts to player choices in real-time.



Picture 3.2 – Example of a Petri Net (Korečko, 2022).

ARGs, however, blend digital and physical spaces to create a pervasive, multi-platform experience that unfolds across various media. The level of narrative control also differs greatly between IS and ARGs.

In interactive storytelling, narrative control remains with the game designer through predefined yet flexible engines that keep the story contained within a range of possible outcomes. The designer can anticipate most interactions within the virtual environment, resulting in a balanced experience that is both adaptable and structured. Conversely, ARGs often rely on player-driven actions and are designed to incorporate unpredictability. PMs use interactive authoring and in doing so must be ready to respond to players' decisions and discoveries in real time, creating a highly decentralized form of storytelling. Another key difference lies in player interaction dynamics. In Crawford's model of interactive storytelling, the focus is on narrative depth and emotional connection to characters. Player interactions are primarily narrative choices that influence character relationships and plot events, emphasizing a personalized but solitary engagement. ARGs, even when putting emphasis on game character interaction to create a high level of immersion they rely on collaboration and community to do so. They are often designed to be played collectively, where players pool information, solve puzzles, and interact in real-time to progress the story. This social aspect not only makes ARGs distinct from IS but also introduces challenges in maintaining narrative coherence while managing multiple player inputs simultaneously.

Despite these differences, both interactive storytelling and ARGs share core objectives: they prioritize player engagement, seek to blur the line between game and reality, and aim to immerse players deeply in their storyworlds. Both forms encourage players to invest emotionally and intellectually in the narrative, whether through character-driven decision-making or through problem-solving and collaboration. Ultimately, Crawford's interactive storytelling approach demonstrates the potential of narrative-driven experiences to offer players meaningful interactions that go beyond traditional linear storytelling, emphasizing player agency and an adaptive narrative as the cornerstones of immersive storytelling experiences; an important insight to take in consideration while designing Alternate Reality Games.

On the other hand, the use of Petri nets in interactive storytelling frameworks provides valuable insights that can inspire design choices for an ARG Design Framework. Petri nets' structured approach to managing concurrent story branches, user-driven events, and state-based transitions aligns well with the needs of ARGs, where narratives unfold across various real-world and digital platforms. By adopting Petri net principles, an ARG framework could integrate tiered levels of participation, dynamically adapting the narrative based on player actions while maintaining coherence across multiple paths. This state-based modeling approach could help ARG designers create rich, layered experiences that respond intuitively to player interactions, balancing open-ended gameplay with a guided narrative arc. However, despite these insights, integrating Petri nets into a practical ARG design approach would be challenging. ARGs often rely on organic storytelling, creative problem-solving, and flexible narrative structures that adapt quickly to player dynamics and engagement levels. The formal, mathematical nature of Petri nets may not align with the intuitive and fluid approach preferred by many ARG designers. Additionally, the technical requirements and complex setup involved in using Petri nets might prove cumbersome in creative environments where spontaneity and adaptability are essential. Therefore, while Petri-net principles could inform the conceptual structure of ARG frameworks, implementing them directly might require a level of technical rigor and foresight that conflicts with the experimental, interactive essence of ARG design.

3.3 Trajectories Framework

The idea of *Trajectories*, developed by Benford et al. (2009) in the study of tangible interfaces and interactive experiences in museums and galleries, is that a participant of any transmedia experience navigates through *places, times, roles* and *interfaces* while maintaining a sense of coherence. These journeys are steered by the participants but are shaped by the authors' choices of space, time and structure. Finally, they might involve encounters among participants. The main issue of trajectories is continuity, because of the extended nature of these experiences, when merging and mixing the use of digital media and physical spaces. Benford takes the dramaturgical ideas of time, space, plot and characters explored by Pfister (1998) and remodels them into space, time, roles and interfaces.

Space is a complex hybrid structure of connected layered levels that provide the place where the action unfolds. These places can be adjacent, connected or overlaid, allowing participants to experience them in different ways, following trajectories and crossing from one to another.

Time is a hybrid temporal structure that is composed of five layers:

- *Story time* – Temporal structure of the fictional universe.
- *Plot time* – Order and timing of events of the story.
- *Schedule time* – The time when the events are made available to participants.
- *Interaction time* – The moment in which the participants are ready and willing to interact with the content.
- *Perceived Time* – How participants ultimately recognize the timing of the story as a result of their interaction.

Roles are varied and defined by the individual engagement with the experience.

- *Participants* – The main target of the experience.
- *Spectators* – Members of the public that witness the actions of the participants.
  - *Audience* – Spectators that are part of the performance frame.
  - *Bystanders* – Unwitting spectators of the performance.
- *Actors* – Performers that allow the experience for participants and spectators
- *Operators* – They manage, from behind the scene, the technology necessary for the experience to happen.

An individual may follow a trajectory through different roles as part of the overall experience.

An environments of *Interfaces* creates the trajectories that a participant follows. Position, alignment, lighting and form of the interface are crucial in their development. Interfaces are essentially touchpoints where the participant is prompted to interact. Thus, user-centered design concepts of affordance and heuristic are fundamental in the development of interfaces.

Trajectories are ideally continuous but there are moments where the experience must cross between one state and another. This is the definition of a transition and it must be carefully designed to preserve continuity. Some key transitions are: *Beginning and Ending, Roles & Interfaces, Physical & Digital World, Temporal Transition, Transition across seems in the infrastructure*.

3.3.1 Opportunities for ARGs

This concept applies flawlessly to ARG development and should be taken in consideration as a construct for the planning of an Alternate Reality Game experience. The continuity issue relates directly to the *TINAG* principle and how a coherent and believable experience makes for realistic and immersive games, making participants enjoy the journey more than the destination itself (Jerret, 2023). During ARG planning a PM should focus on the definition of Story Time, Plot Time and Schedule Time. Interaction Time has to be considered while the game is running if the PMs plan on producing new content while the players are interacting with the story. Finally, Perceived Time could be an useful evaluation tool at the end of an ARG experience to measure the players' appreciation of the experience. The concept of transition is clearly applicable to ARGs, but it is important to note that in ARGs, since the TINAG principle must be followed, it is even harder and more important to craft a correct transition, so that players can enjoy the experience while the curtain of *gaming reality* remains intact. The Trajectory framework is a valuable source of inspiration for the development of an ARG Design Framework because it contains interesting insights for a conceptually adjacent experience.

3.4 User-Centered Design Framework and Tools

The User-Centered Design (UCD) framework is a methodological approach to design that revolves around prioritizing the needs, contexts, and behaviors of end-users throughout the entire design process. Rooted in principles advocated by Don Norman and Jakob Nielsen, UCD emphasizes creating products that are both functional and intuitive, aiming to deliver highly satisfying user experiences while reducing usability risks (Norman & Nielsen, 2020). The human-centered nature of UCD allows designers to mitigate potential design flaws early by incorporating user feedback through iterative cycles, ultimately refining solutions in alignment with real user needs (Nielsen, 1993). Norman and Nielsen's UCD model follows an iterative structure, typically composed of four core phases: understanding users, defining requirements, ideation, and evaluation. Each phase integrates tools and methods to deepen designers' comprehension of users, making UCD a flexible yet rigorous framework that can be adapted across various industries, from digital interfaces to physical products (Norman, 2013). By continually returning to the user perspective at each stage, UCD improves not only usability but also reduces development risks by allowing for constant testing, refining, and validation, ensuring products are genuinely aligned with user expectations.

3.4.1 Initial Research and Empathy Phase

A fundamental component of UCD is the initial research phase, where designers actively engage with potential users to develop an empathetic understanding of their needs, motivations, and pain points. Research methods such as user interviews, surveys, contextual inquiry, and observational studies are commonly used in this phase to gather qualitative and quantitative insights directly from the target audience (Norman, 2013). Observational studies, for instance, offer designers a way to witness users interacting with similar products or services in real-world environments, which can reveal patterns and challenges that users themselves may not articulate. These research techniques are foundational to UCD, forming the basis for all subsequent design decisions (Nielsen, 2012). One essential aspect of this phase is empathy-building, as highlighted by IDEO's *Human-Centered Design Toolkit*, which describes empathy as key to developing solutions that resonate with users on a practical and emotional level. The empathy process involves immersing designers in the lives and experiences of users, fostering a deeper understanding of the user's perspective (IDEO, 2015). By internalizing user perspectives, designers are better equipped to create solutions that address real issues rather than assumptions, aligning product functionality with genuine needs.

3.4.2 User Journey Mapping and Defining Requirements

Once initial insights are gathered, designers often use user journey mapping to visualize the flow of interactions users will have with the product. This tool represents users' experiences across various stages, capturing their emotions, thoughts, and actions at each touchpoint. Journey mapping is particularly valuable for identifying pain points and moments of delight, enabling designers to pinpoint opportunities to streamline the experience (*Journey Mapping 101*, 2018). This tool supports a holistic view of user interactions, extending beyond isolated features to consider the entire journey. Mapping a user's journey not only aids in understanding but also serves as a foundation for defining clear, actionable design requirements. Requirements should reflect user needs, problems, and goals, and provide a structured outline of what the design must achieve. Personas, archetypes representing key user groups, often complement journey mapping by encapsulating shared traits, needs, and frustrations within a relatable profile (Cooper et al., 2014). By creating personas, designers ensure that solutions are tailored to specific user types rather than generalized assumptions.

3.4.3 Ideation, Prototyping, and Iterative Design

In the ideation and design phase, designers generate multiple concepts and solutions based on the research findings. Techniques such as sketching, brainstorming, wireframing, and prototyping play crucial roles in translating abstract ideas into tangible designs. Wireframes provide a basic visual structure, allowing designers to focus on functionality and layout without being distracted by details, while prototypes offer a closer approximation of the final product (Norman, 2013). These tools enable designers to present initial concepts to stakeholders and test them with users, obtaining feedback that can guide further refinements. The UCD framework emphasizes iterative testing and refinement as essential processes. Nielsen (1993) emphasizes that each prototype should undergo multiple rounds of usability testing with users, allowing designers to identify issues early and adapt solutions accordingly. This iterative cycle of testing, feedback, and refinement improves usability and ensures alignment with user needs, reducing the likelihood of costly redesigns at later stages. The feedback loop central to UCD not only streamlines product development but also allows teams to uncover innovative solutions that may not emerge in a single design pass.

3.4.4 Evaluation, Usability Testing, and Validation

The final stage of the UCD framework is evaluation and usability testing, where the design is tested in realistic conditions to verify its usability, functionality, and overall effectiveness. Testing can include methods like A/B testing, task analysis, and think-aloud protocols, allowing users to articulate their thoughts as they interact with the design (Nielsen, 2012). These sessions reveal whether the product meets users' expectations and functions as intended, validating or challenging previous design decisions. According to Nielsen, usability testing is critical, as it exposes usability flaws that may not be apparent to the design team, allowing for timely corrections before launch (Nielsen, 1993).

3.4.5 Approach for ARG Design

Applying UCD principles to an ARG design framework could greatly enhance ARG experiences by focusing on players' needs and immersion. ARGs, which blend real-world elements with digital storytelling, demand a cohesive and engaging narrative structure that resonates with players. Adapting tools like user journey mapping could allow designers to chart the ARG player journey across various real-world and digital interactions, helping to ensure a smooth, immersive flow. By mapping emotional highs and lows throughout the game, designers can optimize for player engagement, building suspense and satisfaction into the narrative progression. The iterative nature of UCD also supports the complexity of ARG design. By developing prototypes of game mechanics, story elements, and puzzles, and testing these with users, designers can refine each component based on player feedback. This process aligns with Nielsen's emphasis on iterative testing to improve usability, making ARG experiences more intuitive and compelling. By grounding ARG design in UCD principles, designers can create immersive, user-centered experiences that captivate players and elevate the genre's potential.

4

Alternate Reality Game Design Framework

With these foundational elements in place, we now turn to the methodology by which the ARG Design Framework has been structured. This framework is aimed at creating an organized process to guide ARG designers through a clear sequence of phases, along with tools that facilitate structured, iterative development.

4.1 Goals

To establish this framework, we first define its goals in relation to the core research questions.

The first objective is to create a structured list of sequential phases that allows ARG designers to ideate, develop, and refine their concepts in a fast and systematic manner, streamlining the development process from the initial idea to a fully operational ARG. Achieving this requires the framework to introduce key ARG concepts to designers, explaining and illustrating these through practical examples. This foundational knowledge will be coupled with user-centered design techniques, encouraging designers to build clear, engaging narratives while proactively considering player interactions. By doing so, designers will be equipped to maintain control over the narrative's progression through the principles of interactive authoring, even as they anticipate and incorporate player agency and interaction into the story's flow. The second major goal focuses on creating specialized design tools for each phase, enabling designers to apply structured methodologies that foster narrative cohesion and enhance interactivity. This part of the framework aims to equip designers with tools that facilitate idea generation, rapid iteration, and logical linkage of concepts through visual aids. These tools are developed with an emphasis on usability, enabling designers to organize, test, and refine their ideas efficiently, ensuring that the ARG remains coherent and engaging from start to finish.

By guiding designers through the systematic planning of the ARG story, the framework not only facilitates a logically connected and immersive experience but also helps outline a comprehensive asset list. This allows for smoother transitions from the design and prototyping phases to final testing and deployment. Ultimately, the framework aims to provide a robust, user-friendly approach that empowers novice and experienced ARG designers alike to create well-planned, player-centered ARGs, from ideation to the launch of a full-fledged Alternate Reality Game.

4.2 Methodology for the Design of Phases and Tools

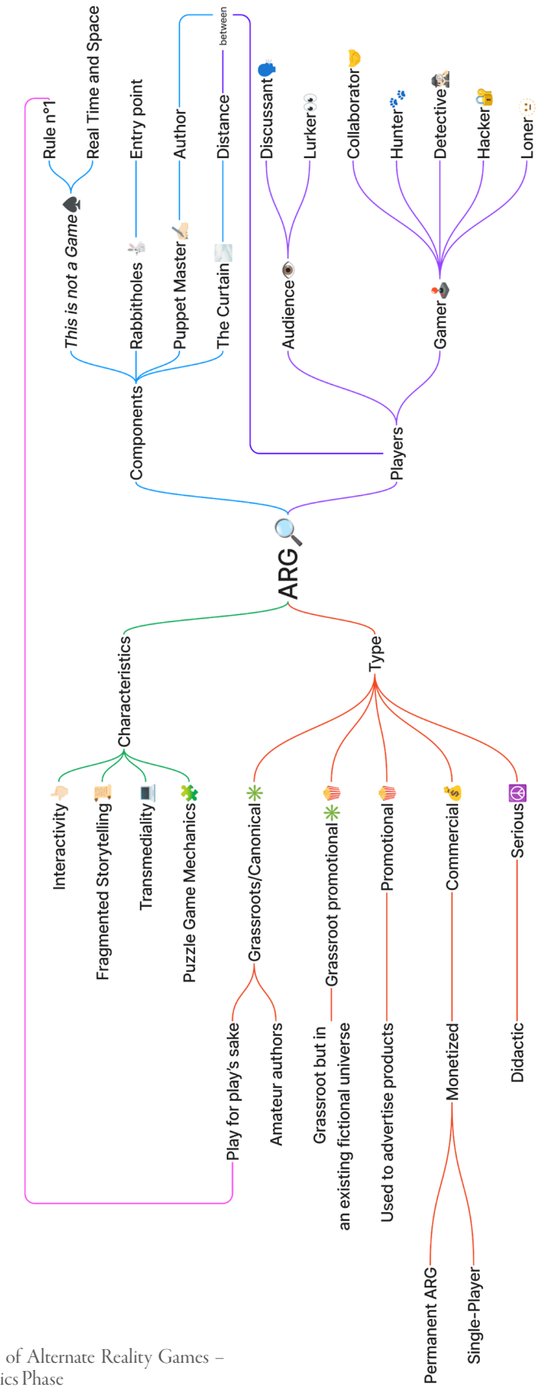
After setting the goals for the framework, we reviewed the ARG literature and drew from multiple existing ARG frameworks, UCD principles, and IDN and IS theory to build the ARG Design Framework. By integrating these core theories, the framework provides new PMs with a structured and adaptable toolkit for ARG development. The ARG Design Framework draws from the works of Ruiz-García, de Beer and Bothma, who proposed essential ARG elements that serve as a foundation for the overall structure. We adapted these principles into a modular format that new PMs could easily access through easily readable "cards" that convey the most amount of information possible in the short and digestible format. Each card rapidly introduces key design principles, enabling PMs to understand complex concepts and apply them flexibly across varied ARG projects. This synthesis helped establish six main phases within the framework: *ARG Basics, Ideation Phase, Design Phase, Development Phase, Playtesting Phase, ARG Running*.

Each phase was thought out to support PMs in systematically advancing ARG development, and contextually relevant tools were tailored to the specific demands of the phases we later decided to test with specific workshops.

4.2.1 ARG Basics

The first phase of the framework, the ARG Basics phase, serves as a foundational research step where PMs become familiar with the core elements of an ARG, including its rules and customs, and are exposed to concise examples to build a foundational understanding. To support rapid immersion into ARGs, two main tools are provided: a Mind Map and a set of summary cards, known as ARG Basics Cards.

The Mind Map (see picture 4.1) outlines the fundamental concepts, guiding designers through key aspects like the *TINAG* principle, multi-platform storytelling, and player interaction mechanics. These concepts are then distilled into the ARG Basics Cards (see picture 4.2), which provide bite-sized, accessible information on essential ARG elements such as: main theoretical components and type of common ARGs. Together, these tools equip designers with a structured introduction to the genre, helping to ground their understanding before moving on to idea generation.



Picture 4.1 – Mind Map of Alternate Reality Games – Created for the ARG Basics Phase

What is an Alternate Reality Game?

Alternate Reality Games are **interactive**, **narrative**, **transmedia** game experiences that use **fragmented storytelling**, classic **game mechanics** and the **real time and space** as a component to immerse a co-operative group of players in a fictional but believable world, where their actions change the outcome of the story.

What are the main components of an ARG?

TINAG:
Acronym for *This is not a Game* that sets the basis for a mechanical and rule system, and founds the philosophy and aesthetics that govern most Alternate Reality Games: The player live a hyperreality, where they experience something that feels real but is fictional.

Puppetmasters:
The directors of the game. The creators, writers and developers who set the guidelines, write the story and design the game elements, mechanics, puzzles and subplots, modifying them, if necessary, according to the players' interactions. They are usually anonymous and work as a team, playing a combined role of opponent and assistant. The puppeteer would represent a mode of production.

Rabbitholes:
These are the entry points to the game. Evoking the rabbit hole in Lewis Carroll's Alice in Wonderland (1865), rabbitholes are gateways to the diegetic universe, calls to play or in marketing terminology calls to action (CTA).
They can be known by players like in ARGs of an educational or training nature or by respecting the principle of TINAG, camouflaged in an anomaly that happens in the participant's routine and that also leads them to the gameworld, which is the real world. Rabbitholes would be narrative devices.

The Curtain:
The curtain is defined by the space that separates the players from the puppetmaster, a metaphor for the distance between the diegetic and the real, an intersection, a threshold that inevitably confronts the two entities in play and represents the social contract made by both. The curtain is the conceptual framework

What type of ARG do exist?

Grassroots:
The ARG that embodies the conventions of the genre more faithfully, more closely. The grassroots or canonical ARGs is that based on the premise of play for play's sake, whose backbone is playful but with the narrative as its heart.

Grassroot promotional:
Grassroots ARG but located in a prefabricated fictional universe and that looks like an official promotion effort of this one. In these cases, we witness a kind of appropriation by the puppeteers who, either as an exercise in fan art, or taking advantage of the media pull and the facilities it provides, locate the narrative within a world of fiction already created, become spontaneous and, in most cases, illegal co-creators without official permission.

Serious:
We define the serious ARGs as those whose objective are didactic, organizational or of fomenting the critical spirit on the reality of the player.

Promotional:
ARGs associated to some brand or product and that are articulated as part of an advertising campaign to solve a specific marketing objective related to these. Commonly used to advertise cultural products such as films, series, video games, recordings, but also observable in other markets, from cars to computer operating systems, promotional ARGs are a creative form of advertising that is increasingly valued for its loyalty and branding potential.

Commercial:
The commercial ARG as those conceived with a commercial objective and designed to pursue an economic return, only being enjoyable in its entirety after payment by the players. Either paying a priori for the full game, or by subscription and enjoying certain content.

Picture 4.2 – ARG Basic Cards, created for the ARG Basics Phase, are bit-sized descriptions of important information and components of ARGs.

4.2.2 Ideation Phase

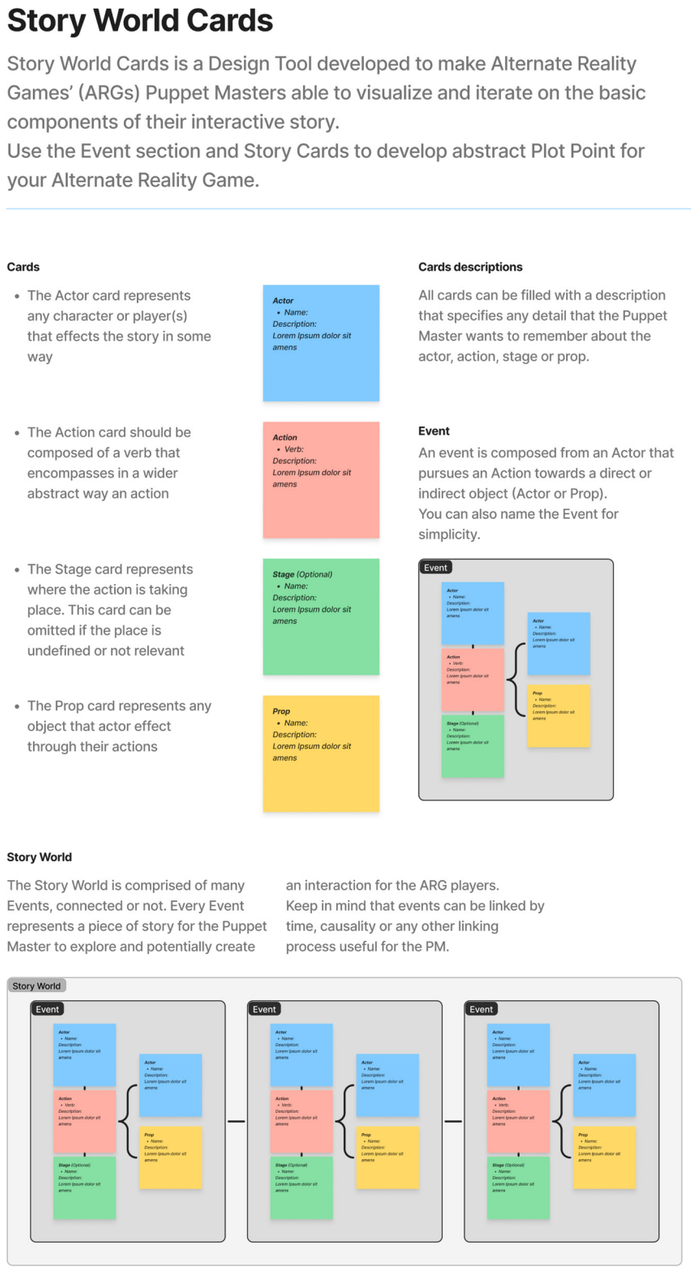
Drawing from Design Thinking methodologies (Interaction Design Foundation, 2016), the Ideation phase encourages designers to explore and expand potential ideas freely. This phase includes research, brainstorming and mind mapping exercises that enable PMs to consider all possible directions for their ARG narrative and gameplay structure.

The goal here is to facilitate idea exploration without constraints, encouraging PMs to cast a wide net and explore diverse concepts. This exploration is organized using a Brainstorming Map tool, a visual exercise that helps designers expand initial ideas and explore connections across narrative possibilities, interactive elements, and player engagement strategies. Once an initial direction is chosen, this phase concludes with a more focused Mind Mapping exercise, helping designers organize their ideas and solidify the narrative path forward.

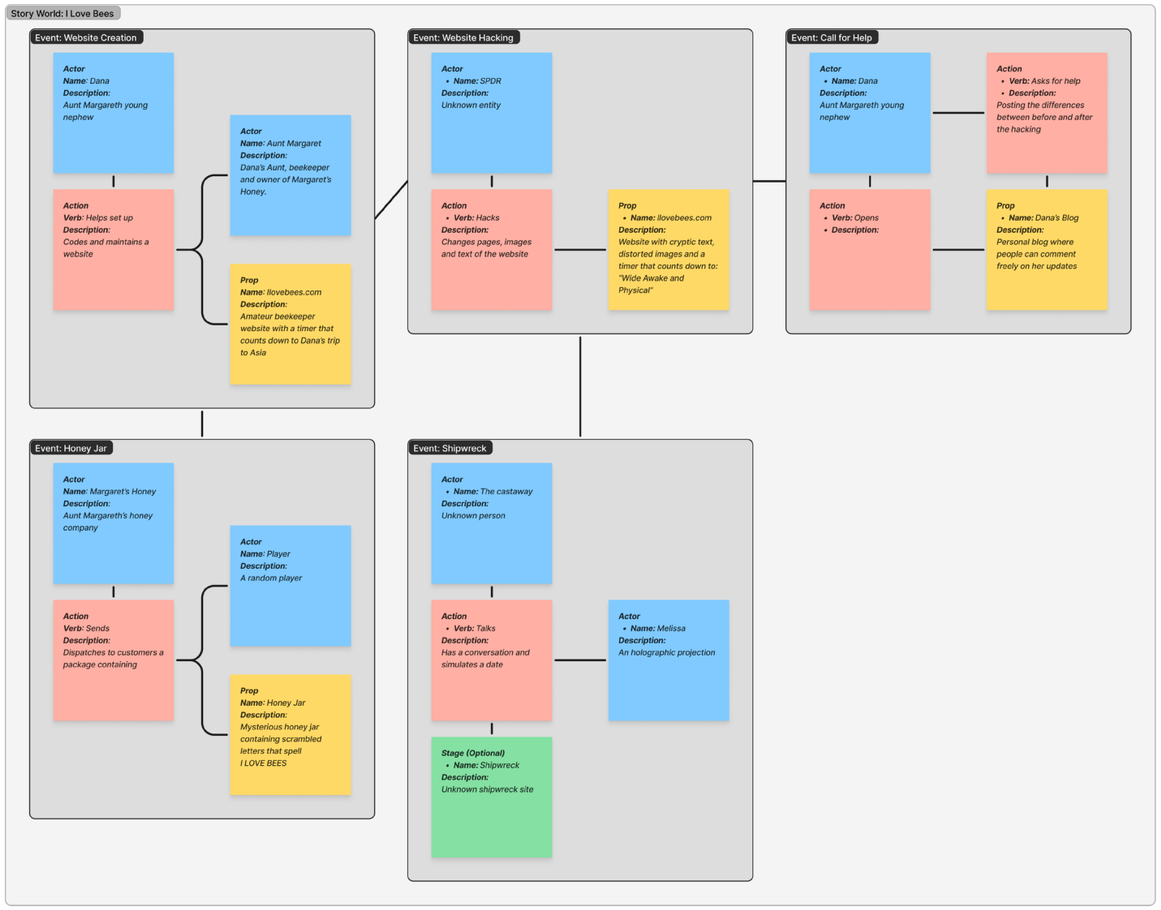
4.2.3 Design Phase

The Design phase is where ideas from the Ideation phase are fleshed out into a detailed, cohesive narrative and interaction framework. This phase leverages principles from adjacent fields, particularly Interactive Storytelling and Interactive Digital Narratives, which share similar principles of immersive storytelling and player engagement. The phase is divided into two key sub-phases: *Story World Design* and *Interaction Design* and draws from UCD principles for the nature of its iterative and prototyping processes; we structured the framework to support continuous refinement and multiple repetitions. This iterative approach enables PMs to revisit and enhance components based on better understanding of the story and possible user interactions.

Story World Design: This sub-phase involves developing the game's fictional universe and narrative structure. Here, designers use a tool called *Story World Cards* (see picture 4.3), which is inspired by the storytelling methodologies of Szulborski and Crawford. We placed an emphasis on narrative-driven design, which is critical for immersive ARG experiences. We developed tools influenced by Crawford's interactive storytelling logic, aiming to facilitate story progression while allowing for iterative refinement. This flexibility allows PMs to iteratively author content and forecast user interactions, ensuring that each story arc remains engaging and relevant across potential gameplay paths. The *Story World Cards* are a template consisting of four core cards, each representing foundational elements of a single event in the narrative world: *Actor*, the subject of the event; *Action*, a verb that describes the main activity of the scene; *Stage*, represents where the action is taking place (can be omitted if the place is undefined or not relevant) and *Prop*, the object that the actor is effecting through their action. By filling out and connecting these cards, PMs can build a comprehensive *storyworld* that provides context and motivation for player actions, laying the groundwork for a richly developed, interconnected narrative.



Picture 4.3 – Story World Cards – Tool developed for the Design Phase



Picture 4.4 – Story World Cards example using I Love Bees as a case study

Interaction Design: In this sub-phase, designers focus on aligning player interactions with the narrative events established in the *Story World Design* phase. This step uses the *Player Journey Map* (see picture 4.5), a tool we adapted from the User Journey Map and merged it with Benford's Trajectory Framework to provide a user-centered perspective on player engagement. This adaptation enabled the development of a custom tool that guides PMs in mapping player experiences while identifying touchpoints for enhanced engagement. The *Player Journey Map* frames player interactions across time and space, aligning them with key narrative moments. This mapping process ensures that the ARG's events and player actions are coherently planned, enhancing the narrative's immersion and flow.

By the end of the Design phase, PMs should have a solid blueprint for the ARG, including both the story world and planned player interactions.

To develop the *Design Phase* tools and to organize the first three phases of the framework we utilized FigJam, a digital whiteboarding platform. FigJam's collaborative capabilities allowed us to build templates for each tool ensuring they were intuitive and straightforward for PMs to implement.

Player Journey Map

The Player Journey Map is a Design Tool used to define the interaction timeline of an Alternate Reality Game.
The five parts of this map can help Puppet Masters pinpoint when and how the player can interact with the content of the story.

The PJM can be divided in two main sections called:
System and Process.
The System is the sum of all game mechanics (Space and Interfaces) and narrative ideas (Timeline of Events).

The Process is the moment in which the players engages with the system, and the instantiated narrative defines their Trajectory.

System

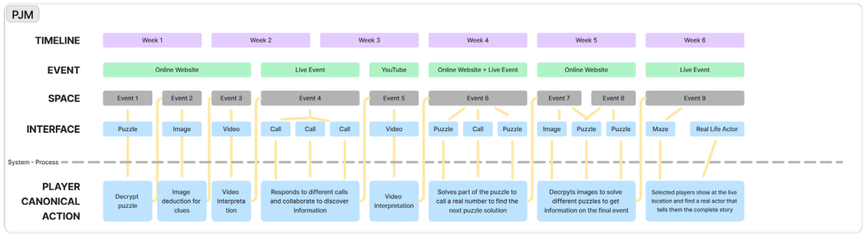
- The Timeline is the visual representation of the days or weeks in which the ARG runs. The Puppet Master can decide in detail how long and in which detail to plan interactions.
- The Events defined with the Story World Cards are going to be placed in the expected chronological order of appearance for the players.
- The Space represents any physical, digital or overlapped representation of a place where the players and characters' action unfolds.
- The Interface are the touchpoints of the interaction. Any webpage, video, image, riddle or puzzle can be described as an interface.

Process and Trajectory

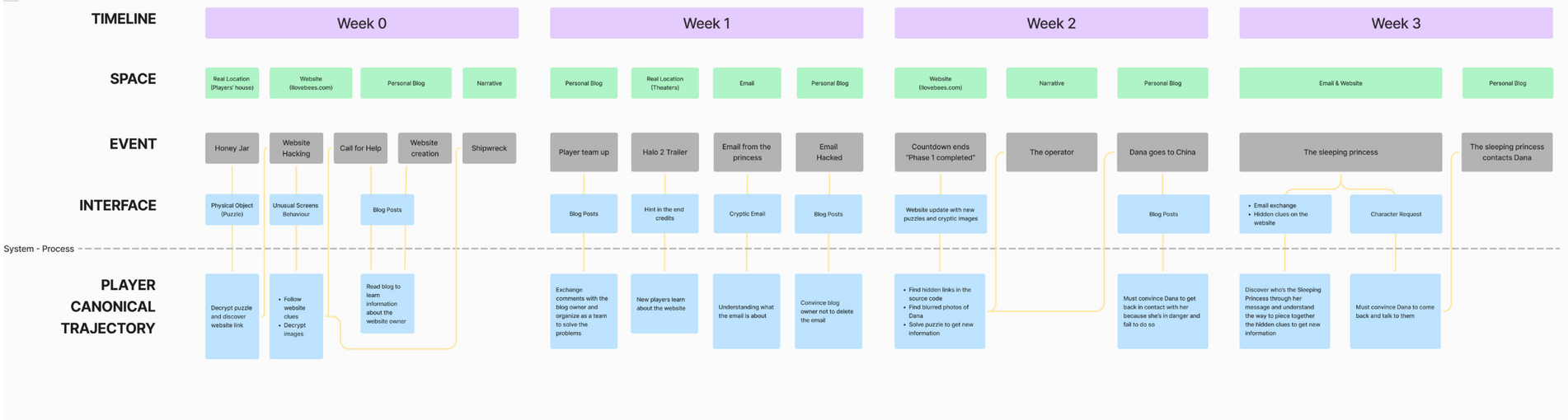
- The Player Canonical Action is the expected results of players' interactions with the interface. What players should do at any given moment or how they should solve a puzzle is for the Puppet Master the canonical Trajectory of interaction. This is just a prediction, Puppet Masters should always be aware that players can find different ways to respond to what is shown to them. To visualise it in the map PMs can use connector to show the sequence of actions and reactions between System and players.

PMs should embrace players diversion from this planned trajectory and modify events and interfaces in order to enhance immersion, interactivity and emotional engagement.

Player Journey Map template



Picture 4.5 – Player Journey Map– Tool developed for the Design Phase.



Picture 4.6 – Player Journey Map example using *I Love Bees* as a case study.

4.2.4 Development Phase

With the narrative and interaction framework established, the *Development phase* focuses on creating the actual content that players will engage with during the ARG. This involves producing the media elements such as web pages, videos, audio files, and puzzles defined in the previous phase.

In this phase, designers translate conceptual elements into tangible assets that bring the ARG to life. For instance, if a storyline involves a mysterious audio message from a character, the audio must be recorded, edited, and integrated into the game structure. Similarly, puzzles that players will encounter need to be designed, tested, and embedded in the game. Here, the asset list developed serves as a reference point, ensuring that all necessary materials are created coherently according to the planned interaction.

4.2.5 Playtesting Phase

The *Playtesting phase* is critical for ensuring that the ARG runs smoothly and provides a compelling player experience. PMs select a small group of playtesters who will experience the ARG from start to finish, providing feedback on gameplay, narrative coherence, and interaction flow.

During this phase, playtesters go through each element of the ARG, allowing PMs to identify and resolve any technical or narrative issues. The feedback gathered helps refine player interactions and adjust pacing to maintain immersion. Iteration is key here; based on playtester input, designers can make adjustments to enhance the overall experience, whether by adjusting difficulty levels in puzzles or improving the clarity of narrative cues.

4.2.6 ARG Running

In the final phase, *ARG Running*, the ARG goes live, and PMs launch the full experience, interacting with players in real time. This phase is dynamic and requires continuous monitoring and flexibility, as designers must be prepared to respond to players' actions, questions, and choices as they navigate the ARG.

Here, PMs utilize adaptive storytelling techniques, making adjustments to the narrative or interactions based on player responses. This phase underscores the real-time, responsive nature of ARGs, where the PMs' role is not only to guide players through the experience but to respond to their input, enhancing immersion and engagement through active, ongoing interaction.

4.3 Conclusion

Each phase in this framework has been designed to guide ARG designers from conceptualization to execution. By following this structured approach, PMs can build immersive ARGs that engage players, anticipate interactive challenges, and adapt to player responses, creating a cohesive and compelling experience. This framework, and the associated tools, also make it easier for novice designers to navigate the complex process of ARG development, from idea generation to live gameplay.

5

Whiskey
Hotel
Echo
November
November
Yankee
Oscar
Uniform
Alfa
Romeo
Echo
Romeo
Echo
Alfa
Delta
Yankee

User Testing

The testing phase is a crucial step in evaluating the effectiveness of any design framework, especially one tailored for ARGs. Given the interactive and narrative-rich nature of ARGs, their development requires careful consideration of how different phases and tools align to create an engaging and immersive experience.

5.1 Goals

The ARG Design Framework developed for this research aims to assist designers in efficiently developing, iterating, and prototyping ideas while maintaining cohesion across interactive narrative elements. The primary research question driving this investigation directly shapes the goals and expectations for the testing phase.

Due to time constraints, only half of the ARG Design Framework was predisposed for testing, focusing on key phases and tools intended to introduce designers to ARG development and provide a structured, accessible approach. Testing the full framework would have provided a more comprehensive evaluation; however, the chosen subset enabled meaningful insights within the limited timeframe. The main goals of the testing phase were thus to (1) assess the framework's usability and accessibility for individuals with no prior experience in ARG design, (2) understand whether the structured steps and tools facilitated an intuitive understanding of ARG development, and (3) gauge if participants could quickly immerse themselves in the ARG development process through the framework.

5.1.1 Usability and Accessibility

A structured design framework must be intuitive and accessible to individuals without prior experience in a specific field, and ARG design is no exception. One of the main goals of testing was to determine whether the participants, who were creatively inclined but inexperienced in ARG design, could understand and navigate the phases and tools provided in the framework. ARGs can be complex, requiring designers to create layered narratives, coordinate various media channels, and think through audience engagement. Consequently, the usability of a framework in this field relies on how well it can simplify this complexity and guide users step-by-step.

5.1.2 Intuitive Understanding

In the development of ARGs, maintaining narrative coherence while allowing for interactive, flexible design is often a challenge. Thus, the second goal of the testing phase was to evaluate whether the phases and tools provided in the framework made sense in terms of structure and flow. Each phase should logically build on the previous, helping participants develop a cohesive storyline that still leaves room for audience interaction and flexibility. The testing phase sought to uncover any points where participants felt confused or disjointed in their workflow, which could indicate a lack of coherence in the framework. By observing how easily participants could move from one phase to the next, valuable insight could be gained into whether the framework's structure truly supports the iterative, interactive nature of ARG design. If participants found the phases easy to follow and understood how each tool connected to the ARG development process, it would suggest that the framework aligns well with the creative flow of ARG design.

5.1.3 ARG Immersion

Finally, the testing phase aimed to see whether the framework encouraged participants to think immersively and consider the interactive narrative elements central to ARGs. A well-designed ARG framework should naturally guide participants into considering how different story elements will be experienced by players, how the audience will interact with the narrative, and how to balance immersion with storytelling. Through workshops, the goal was to identify whether the framework inspired participants to think critically and creatively about their designs from the perspective of player interaction. If the phases and tools facilitated a natural immersion into ARG thinking, then the framework could be said to support the efficient development and prototyping of interactive narratives.

In summary, the testing phase of the ARG Design Framework aimed to explore how the structured steps and tools supported creative, inexperienced individuals in navigating ARG design. By focusing on usability, structural coherence, and immersive design thinking, the framework's potential to assist designers in developing, iterating, and prototyping ARGs was put to the test. Insights from this phase contribute to understanding whether a structured design framework can indeed help ARG designers efficiently create cohesive, interactive narratives, as posited in the research question.

5.2 Testing methods

Workshops were chosen as the primary method for testing the ARG Design Framework to create an interactive, collaborative environment where participants could engage deeply with the framework's phases and tools. This method aligns with Sufi et al. (2018), which emphasizes that workshops can serve as effective environments for exploring specific topics, transferring knowledge, and creating new insights through structured activities that engage participants directly in the subject matter. In testing a complex design framework like the one for ARGs, workshops provide a controlled yet flexible space to observe participant interactions with the framework, gather qualitative insights, and adjust for unforeseen challenges.

5.2.1 Advantages and Case Studies

A primary advantage of using workshops for testing the ARG Design Framework is the ability to facilitate hands-on, collaborative interactions that allow for immediate feedback and reflection. ARG development is inherently interactive and requires designers to think in terms of player experience and engagement. Through workshops, participants can interact directly with the framework, enabling real-time feedback and the opportunity to observe participants' problem-solving and thought processes. The workshop format encourages group discussions and collaborative learning, which align well with the ARG framework's focus on storytelling, out of the box thinking, and creative emergence.

Workshops also allow for dynamic adjustments based on participant feedback (Sufi et al., 2018), creating iterative improvement possibilities that improve both the workshop process and the tool being tested. This approach aligns with ARG research conducted by Gutierrez et al. (2011), which utilized workshops to test the *fAR-PLAY* framework; a similar tool designed to assist in the development of augmented/alternate reality games. By observing how participants engaged with the framework's components in real-time, the researchers could identify areas where further guidance or structural adjustments were needed. Additionally, ARG workshops conducted by Bonsignore et al. (2016b) to co-design an educational ARG framework with teens provide an example of workshops as a valuable method for participant-driven insights. In this study, teens were involved in co-designing an ARG, resulting in valuable user-centered insights that shaped the final framework. This supports the decision to use workshops for the ARG Design Framework testing, as they enable in-depth engagement, providing a platform for participants to reflect, collaborate, and give critical feedback on usability and accessibility. Another case study that inspired this approach was Turner and Taboada (2021) work on using collaborative story-making and world-building workshops to foster creative exploration and dismantle conventional design constraints. In their research, participants engaged in activities inspired by tabletop role-playing games (TRPGs) to co-create fictional worlds and narratives, providing a space to challenge normalized design methodologies and experiment with new, open-ended approaches. Their focus on creating *nurturing spaces* for collaborative and imaginative exploration is particularly relevant to this study's workshops. Just as Turner and Taboada's participants could explore ideas freely, participants in the ARG Design Framework testing needed an environment where they could engage openly with the framework, experimenting with its tools and phases in a manner aligned with ARG principles of immersion and interactivity. This study underscores the value of *active imagination*, a method that enables participants to imagine alternate realities and storytelling techniques, key competencies in ARG design. Thus, workshops are also an ideal setting for qualitative data collection, which is essential when evaluating complex frameworks that involve creative thinking, problem-solving, and storytelling. The workshop environment allows facilitators to observe participants' responses to specific tasks, assess their understanding of the framework, and gather detailed feedback on the framework's usability and coherence. It is crucial to gather varied, real-time feedback from participants to measure the impact of a workshop, especially when the goal is to test a system's accessibility and functionality (Sufi et al., 2018).

The ARG Design Framework's goals are to assist new designers in navigating the complexities of ARG creation, introduce them to its structured phases, and offer tools for ideation and iteration. By using workshops as the testing method, facilitators could gauge whether participants understood the framework and found it helpful for translating their ideas into practical ARG concepts. This qualitative feedback was essential for understanding how accessible the framework was for participants with limited ARG experience, as their responses provide an authentic measure of the framework's introductory value.

5.2.2 Limitations and Justification

While workshops offer significant advantages, they are not without challenges, particularly concerning scheduling and participant availability within limited time frames. Conducting workshops for testing requires intensive coordination and can be affected by participants' availability, which was a significant consideration in this study. Additionally, ARGs are often unfamiliar to new designers, necessitating a balance between structured guidance and creative freedom during the workshop. Facilitators played an essential role in guiding discussions and ensuring participants could explore the framework while staying aligned with its intended structure. Moreover, one challenge in this context was that workshops limit the number of participants due to time and resource constraints. This can reduce the generalizability of findings. Nevertheless, by focusing on designers with interests closely related to ARGs, such as video games, board games, and theater, this testing approach could still generate valuable insights relevant to potential framework users.

The decision to use workshops as a testing method for the ARG Design Framework was motivated by their suitability for fostering collaborative, hands-on learning environments, which align well with the interactive, player-focused nature of ARGs. Drawing on research by Sufi et al. (2018), Gutierrez et al. (2011), and Bonsignore et al. (2016b), workshops provided a flexible yet structured format to explore whether the framework's tools effectively introduced participants to ARG development. Despite challenges with scheduling and participant availability, the workshops yielded qualitative insights into the framework's usability, accessibility, and coherence. This testing method ultimately allowed for a real-time evaluation of the framework's effectiveness in supporting designers through the complex, creative process of ARG creation.

5.3 Selection Criteria for User Testers

The selection of participants for testing the ARG Design Framework posed unique challenges due to time constraints, the short duration of each workshop, and the need to conduct sessions within a limited availability window. Consequently, establishing rigid selection criteria was complex and required balancing methodological rigor with practical feasibility. This approach involved choosing participants who were accessible within the timeframe and possessed relevant skills and familiarity levels that aligned with the framework's goals.

5.3.1 Occupation

The primary criterion for participant selection was occupation, with a focus on recruiting designers who also had specific interests in domains closely related to ARGs, such as video games, board games, and theater. These areas share important qualities with ARG design, for example: storytelling, interactivity, and audience engagement. Participants with these interests were prioritized because they brought relevant perspectives on the framework's effectiveness in creating immersive, interactive experiences. This alignment allowed participants to engage with the framework more intuitively and critique it through a lens familiar with game-like narratives, contributing to more nuanced insights on its usability. Designers were also chosen for their experience in group work, problem-solving, and creative exploration, as ARG development involves collaborative efforts and iterative processes. With their background in design, these participants could adapt quickly to new tools and structured phases, making them ideal candidates for evaluating a design framework. Designers' familiarity with conceptual and hands-on creation processes enabled them to provide informed feedback on the framework's structural coherence and accessibility. However, this criterion was also influenced by practical necessity. Recruiting participants with both specific expertise and limited availability posed challenges given the timeframe and workshop schedule. Designers represented a participant group that was accessible and well-suited to critically engage with the framework's structure and phases. Although this may introduce some limitations regarding generalizability, designers with related interests provided a relevant testing group reflective of creative professionals who may, in various capacities, apply the framework to ARG or similar projects.

This focus on relevant occupations and interests, though shaped by feasibility, ultimately contributed to meaningful feedback on how the framework might function in real-world creative and design settings.

5.3.2 Familiarity with ARGs

Another key selection criterion was familiarity with ARGs. Participants chosen had a basic awareness of ARGs; they knew of their existence and general concept but had never participated in or created an ARG themselves. This selection was strategic, as the framework was intended to introduce newcomers to ARG development in a structured and accessible way. By selecting individuals with limited ARG exposure, the testing could better reveal whether the framework succeeded in demystifying ARG design and guiding beginners through its core processes. Participants with prior ARG experience might have skewed results by bringing preconceived notions or advanced knowledge that could influence their perception of the framework's usability. By contrast, participants with slight ARG familiarity offered a fresh perspective, allowing for an evaluation of whether the framework could effectively bridge the gap for newcomers.

5.3.3 Selection Method

To identify suitable participants for the workshop, a targeted recruitment strategy was employed. A total of 43 design students from Politecnico di Milano were initially invited to participate through a Creativity Self-Assessment Questionnaire developed by Kaufman et al. (2009) (APPENDIX A). This questionnaire served multiple purposes: it collected data on participants' self-assessed familiarity with various creativity domains, such as Drama, Arts, Interaction, and Math/Science, and it also gathered demographic information, including age, gender, and field of study. The latter data points were critical in evaluating the students' academic backgrounds and their potential fit for a study on ARG design, given that design experience and familiarity with ARGs were necessary factors for participation in this research.

The Creativity Self-Assessment Questionnaire provided an effective measure for determining participants' predispositions and strengths across different creative domains, which allowed for the identification of candidates with a natural inclination toward ARG-related skills. The selection criteria for this study were chosen to ensure that participants possessed not only the requisite creative background but also the capacity to approach ARG development with a fresh perspective unencumbered by prior participation in ARGs. Specifically, the selection process considered three key factors:

Familiarity with ARG Concepts: From the initial pool of 43 students, participants were screened based on their self-reported familiarity with ARGs. Only those who selected the option "I am familiar with the concept but I have not participated in any ARG" were considered for inclusion in the study. This criterion was essential to recruit individuals who had a basic understanding of ARGs but who had not yet engaged in this form of interactive storytelling. This approach aimed to ensure that participants could approach the ARG design framework without preconceived biases or experiences that might influence their design decisions.

Creative Domain Alignment: Another primary criterion focused on participants' self-assessed creative domains. Preference was given to individuals whose creativity leaned toward Drama, Arts, or Interaction; fields that are particularly relevant to ARG design, which requires a blend of narrative structuring, character development, and interactive engagement. Participants with strengths in these areas were more likely to possess the necessary sensibilities for immersive storytelling and transmedia narrative construction, which are foundational to effective ARG design. The mean response within the Art, Drama and Interaction domain was selected from Silvia et al. (2012) and it was set as a minimum threshold for the participant to be chosen for the workshops. If the participants did not feel confident in at least one of these creative fields they were excluded from the research.

Availability within Workshop Time Frame: Practical considerations also informed the selection process. Participants' schedules and availability during the designated workshop period were factored in to ensure a full commitment to the workshop activities. Given the intensive and structured nature of the ARG design workshops, it was imperative to recruit individuals who could reliably participate throughout the entire process, contributing to both individual and group activities without interruption.

Following the completion of the questionnaire and the application of these selection criteria, a final cohort of 12 participants was chosen from the original pool of 43. This group represented a balance of relevant creative inclinations and logistical availability, ensuring a focused yet diverse sample capable of engaging meaningfully with the ARG design process. The use of the Creativity Self-Assessment Questionnaire not only facilitated a nuanced understanding of each participant's creative strengths but also helped establish a baseline for future evaluations of the workshop's effectiveness. By selecting participants with a defined creative and conceptual foundation in Drama, Arts, and Interaction yet limited direct experience with ARGs, the study was positioned to yield insights into the impact of the structured ARG Design Framework on novice designers.

5.3.4 Limitations and Justification

While the selection criteria were tailored to fit practical constraints, they do introduce certain methodological limitations. The choice of designers and ARG-familiar participants may narrow the scope of insights obtained, potentially limiting the framework's generalizability to other populations, such as educators or game enthusiasts with no design background. Nonetheless, the participants selected were well-positioned to offer valuable feedback. Their design knowledge enabled them to engage with and critique the structure and tools of the framework effectively, providing actionable insights on its usability and coherence. Additionally, their slight familiarity with ARGs allowed for an authentic evaluation of the framework's accessibility for newcomers.

In summary, the selection criteria of occupation and ARG familiarity, while shaped by practical considerations, ensured that participants could engage meaningfully with the framework. Their insights thus provided a foundation for assessing the framework's ability to guide users through ARG design, fulfilling the core objectives of the testing phase within the constraints of the research.

5.4 Workshops and Evaluation Methodology

The design and evaluation of these workshops are integral to understanding how effectively participants can engage with the ARG Design Framework. The workshop structure is divided into a control group and two experimental groups to test the framework's impact on ARG development and to compare the approach between unstructured and structured ARG design. This method allows for a comparative analysis, enabling conclusions about the usability, coherence, and overall effectiveness of the framework in guiding ARG design. The decisions around this structure were made to capture qualitative insights from participants with varying degrees of methodological guidance, assessing how structured tools and design steps influence their creative processes and final outputs. The workshops are framed around user-centered evaluation principles, specifically focusing on participant feedback and comparative analysis between groups. For the evaluation, we employed a mixed-method approach, primarily relying on feedback from post-test questionnaires and a comparative analysis of the produced designs. The comparative analysis draws on de Beer and Bothma's (2016) conceptual framework, which provides a structured means to visualize ARG components. This enables the analysis of differences in the outputs and participant responses between the groups, allowing us to evaluate how effectively the structured framework supports ARG design processes.

5.4.1 Workshop Structure

The workshops were structured as follows and were performed by 3 groups of 4 testers plus a facilitator that was always present to answer questions and help if the testers ever felt stuck.

Control Group

1. **Workshop Explanation + Pre-test Questionnaire** (5 min): Initial briefing on the workshop's purpose and a pre-test questionnaire to capture baseline knowledge and expectations.
2. **Introduction to Basic ART Concepts** (10 min): A concise overview of ARG fundamentals to ensure all participants have a common understanding of the genre's key elements.
3. **ARG Example** (5 min): A brief example ARG is shared to illustrate the possibilities and challenges inherent in ARG design.
4. **Brief** (5 min): Participants are given the design brief, outlining the objectives and key elements to consider during their design process.
5. **Independent Work – No Methodological Guidance** (3 hours): Participants are asked to design an ARG independently without any prescribed methodology or tools, allowing them to approach the task freely based on their understanding.

Workshop Brief:

"You are a team of 4 Puppet Masters and your goal is to design and plan a short ARG (max 4 weeks) about a secret, a curiosity, or peculiarity of the city of Milan. Your goal is not to create the single assets of the experience but to define and envision them, laying down the characters, events and interactions between the game and the players. You will have to decide the scope of the ARG according to the 4 main existing types."

6. **Post-test Questionnaire** (10 min): Participants complete a post-test questionnaire, reflecting on their experience and assessing their confidence in and satisfaction with the design process.

Experimental Groups (2 Groups)

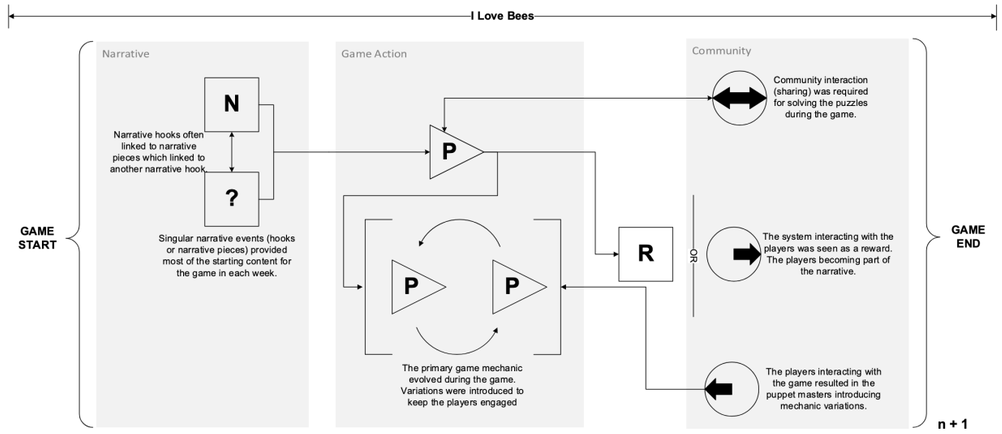
1. **Workshop Explanation + Pre-test Questionnaire** (5 min): An initial explanation of the workshop's purpose and a pre-test questionnaire to capture participants' initial understanding.
2. **Framework Phase 1 – ARG Basics and Examples** (15 min): A foundational overview of ARG concepts is provided through the ARG Basics Card tool, ensuring that participants have a shared understanding of the genre's basics. A concrete example of an ARG is provided to contextualize the genre's design challenges.
3. **Brief** (5 min): Participants receive a brief with clear design objectives, establishing the focus of their ARG project.
4. **Framework Phase 2 – Ideation Phase** (45 min): Brainstorming and Mind Mapping tools encourage participants to generate ideas collaboratively within the framework's structure, promoting creativity while aligning with the design goals.
5. **Framework Phase 3 – Design Phase**:

   - *Tool Explanation* (15 min): Participants are introduced to the tools provided by the framework, ensuring they understand how each tool supports the design process.

   - *Story World Cards Tool* (1 hour): Participants use the Story World Cards Tool to define the ARG's setting, characters, and key narrative elements, anchoring their story in a structured and coherent world.

   - *Player Journey Map Tool* (1 hour): In the final part of the design phase, participants utilize the Player Journey Map Tool to structure the ARG's player experience, focusing on the sequence of interactions and engagements designed to guide players through the narrative.

6. **Post-test Questionnaire** (10 min): Participants complete a post-test questionnaire to evaluate the effectiveness of the framework and tools and their satisfaction with the topic and the design process.



Picture 5.1 – Game summary of *I Love Bees* (de Beer, 2015) used as example in the ARG Basic Phase.

5.4.2 Evaluation Methods

To assess the outcomes and impact of the structured design framework, the evaluation combines user feedback from pre- and post-test questionnaires with a comparative analysis of the outputs from each group. The comparison between the control and experimental groups focuses on identifying how structured support affects the design process, creativity, and overall coherence of the ARGs produced.

The questionnaires capture participants' reflections on their experience, key indicators include participants' confidence in their designs, perceived ease of use for each tool, and satisfaction with the design outcomes (APPENDIX B). In addition to feedback, a comparative analysis using de Beer and Bothma's (2016) conceptual framework helps in the comparison of the output among the different groups and successful ARGs. This framework provides a systematic approach to assess learning outcomes and creative processes by examining elements like problem-solving strategies, decision-making processes, and collaborative dynamics. This analysis is expected to reveal the strong points and the flaws of the framework in the process of aiding novice ARG designers in the development of an immersive, transmedia experience, through a quick introduction and tools that allow for narrative cohesion and experience planning.

5.5 Workshop 1 – Control Group

5.5.1 Participants

The Control Group was composed of individuals that responded to the self-assessment questionnaire as shown in table (5.1).

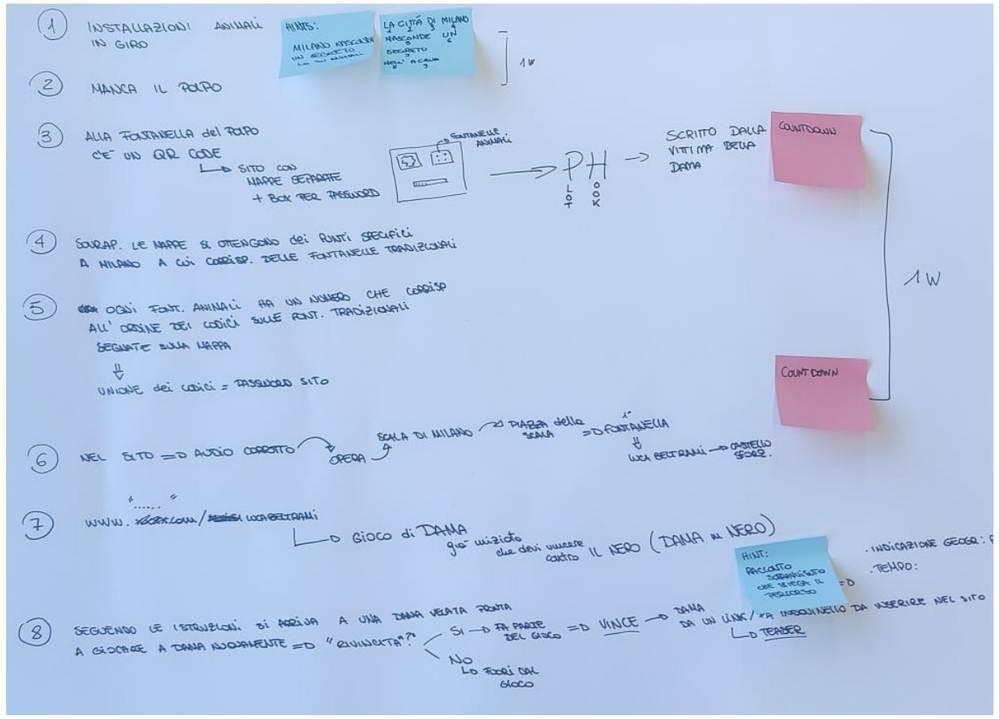
Table 5.1 – Creativity Domain Self-Assessment Mean. Control Group

Tester	DRAMA Domain Mean	ART Domain Mean	INTERACTION Domain Mean	Field of Study
#1	3.167	**5.000**	**4.167**	Digital and Interaction Design
#2	3.167	**4.333**	**4.333**	Digital and Interaction Design
#3	**3.667**	**4.333**	3.5	Communicati on Design
#4	**4.667**	**4.000**	3.667	Communicati on Design
Threshold	3.208	3.746	4.08	

5.5.2 Shadowing – Summary

After a brief introduction covering the workshop goals, ARG Basics, and specific brief, participants were given autonomy to tackle the task. The facilitator (the thesis researcher) remained available throughout to provide guidance and support if participants encountered difficulties.

Initially, the testers concentrated on establishing the story's main concept, taking around five minutes for this preliminary brainstorming. Subsequently, they spent 43 minutes researching ideas that aligned with the brief, with a notable emphasis on developing puzzles to integrate into the storyline. Throughout this exploration, their main challenge centered around maintaining logical coherence in the narrative and puzzle structure. To streamline their approach, testers decided to reverse-engineer the narrative by starting from the players' end goal and constructing the storyline and puzzles backward from this point. During this phase, they encountered difficulties in deciding on the type of ARG they wanted to create (weighing options such as grassroots, promotional, or serious ARGs) and eventually opted to explore themes inspired by city legends. With the final reveal of the ARG concept in place, the group turned their attention to designing the initial Rabbit Hole. They then devoted an hour and 15 minutes to organizing the storyline and constructing a timeline of key events. This led them to map out connections between various ideas, laying down puzzle concepts beginning from the Rabbit Hole and onward through the narrative. At this stage, Tester #3 proposed using a User Journey Map to plan player interactions within the game, which helped the team organize their ideas into distinct hints, puzzles, plot hooks, and narrative segments. The facilitator encouraged them to think through the timing of events and interactions, as they had not initially considered the real-life timeline. In response, testers developed a three-week timeline with set cooldowns and a defined end date for the ARG experience (see picture 5.2). Upon reviewing their progress, the testers concluded that the ARG would serve as a promotional experience for a fictional mystery video game set in Milan. Satisfied with their outcomes, the group decided that no additional time was needed and concluded the session 45 minutes ahead of the scheduled endpoint.



Picture 5.2 – Final output of Control Group

5.5.3 Post-Workshop Survey – Answers and insight

In the post-workshop survey, all participants from the control group reported an increased understanding of ARG concepts, objectives, types, and challenges, paired with high satisfaction in their work. The survey underscored that experienced designers, even with limited pre-existing knowledge of ARGs, can generate creative ideas and build structured plans in a condensed time frame.

Tester #4 commented, "The brief introduction on the topic was very useful to give us the right direction to build an ARG." This feedback highlights the importance of familiarizing participants with nuanced aspects of the topic before initiating the design process. Conversely, Tester #1 provided constructive feedback on the workshop's methodology, suggesting that a more visually organized presentation could have clarified potential uncertainties from the outset. Additionally, Tester #1 recommended that a more focused brief with a clearly defined goal might have allowed the group to concentrate more on the creative elements of ART design, reducing the time spent on logistical or non-creative decisions. This feedback illustrates potential areas for improvement in future iterations, particularly the value of visual aids in explaining complex concepts and the benefits of setting precise goals to optimize creative focus.

5.5.4 "La Dama in Nero" – ARG Representation

Here, a summary and representation of the ARG designed and planned by the Control Group according to de Beer and Bothma (2016) conceptual framework:

Week 1

1.0 **MISCELLANEOUS – HOOK**

Weird animal statues appear in Milan. Every animal has a word written on it.

1.0.1 **EXTERNAL INTERACTION**

Traditional media channels and social media should pick up this strange occurrence

and make the public aware of it.

1.1 **PUZZLE**

The words on the statues, when put in the correct order, spell: "La Città di Milano Nasconde un Segreto nell'Acqua"

1.1.1 Players should connect the 9 animals and the sentence on them to Milan's water

fountains, specifically the one located in the City Life neighborhood.

1.1.2 Players should find odd that one animal is missing between the giant statues and the fountains: The octopus.

1.2 **LEADING MECHANISM**

On the Octopus fountain, players will find a QR code that leads to a specific website *[URL of the website was not decided by the PMs].*

1.3 **NARRATIVE HOOK**

A text written by the victim of "La Dama in Nero". In this text, the story of what happened to this victim *[actual story part undefined].*

1.3.1 *OPTIONAL* – **SYSTEM TO PLAYER INTERACTION**

If the players find the website too soon a countdown leading to the beginning of week 2 is present on the main page.

Week 2

2.0 **PUZZLE**

On the website, two maps are shown one next to the other. One of the maps shows the location of the "animal" water fountains numbered. The other one is a normal map of Milan.

Beneath the maps there's a password field.

2.0.1 Players need to overlap them to discover the position of 10 more water fountains scattered around the city.

2.0.2 On each fountain a letter is found. The sum of the letters, put in the correct order (numbers on the map), reveals the password for the website.

2.1 **PUZZLE**

The website shows a corrupted audio file.

2.0.1 Players need to decrypt it to discover a piece of an opera that plays at La Scala di Milano.

2.2 **PLAYER WITH PLAYER INTERACTION**

Players should discover, by getting to the place of the first water fountain, that the game is hinting at the origins of Milan's water fountains. They need to collaborate to discover the name Luca Beltrami (inventor of the fountains) and use it as a URL on the first website.

2.2.1 *[website.com]*/lucabeltrami.html

Week 3

3.0 **PUZZLE**

A game of checkers (dama in italian) already started is available to play on the new page of the website and the players need to win to go on.

3.1 **LEAD IN MECHANISM**

Coordinates of Parco Sempione and a specific time slot is displayed when you win the game of checkers.

3.1.1 **NARRATIVE HOOK**

A piece of narrative lore hints that the root to take inside Parco Sempione, is what the victim of La Dama in Nero took the night he disappeared.

3.2 **PLAYER WITH SYSTEM INTERACTION**

Any player that shows up in the correct location at the correct time will find La Dama in Nero with a game of checkers in front of her.

3.2.1 If the player sits down, she will ask for a revenge – a clever PM tactic to gauge if the person in front of her is actually a player.

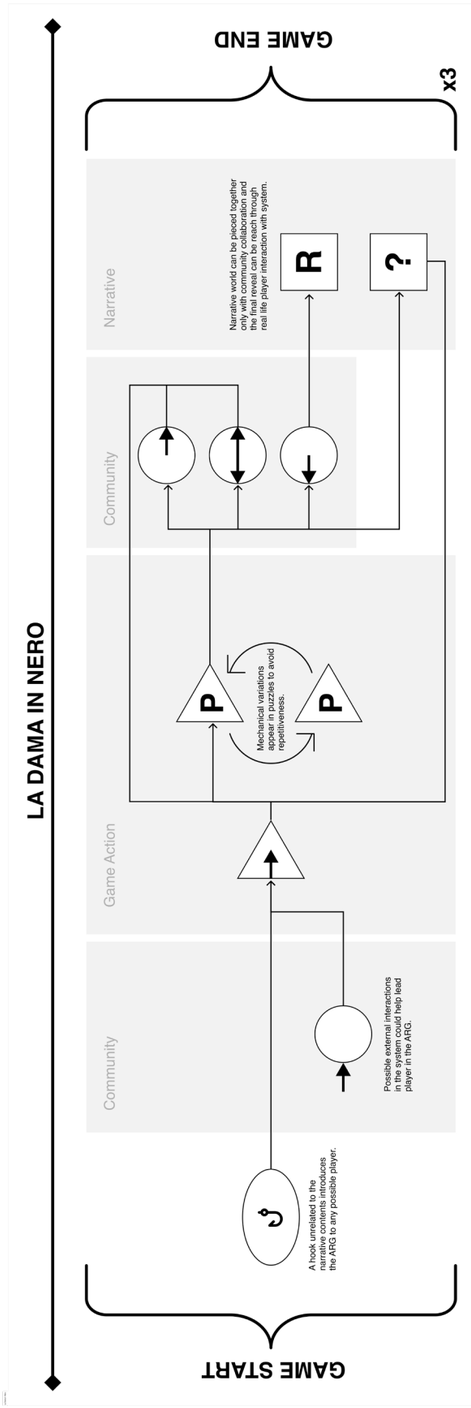
3.3 **NARRATIVE REWARD**

After beating La Dama in Nero at the checkers game she will give the player a note.

This note contains a link to the end of the ARG, with full explanation of the promotional nature and discounts for the upcoming video game.

Using the visual summary produced through de Beer and Bothma's (2016) conceptual framework, notable similarities emerge between the Control Group's output and the design of the well-known ARG *I Love Bees* (2001)(see picture 5.1). These parallels can, in part, be logically attributed to the testers' prior exposure to *I Love Bees* as it served as the primary case study presented at the start of the workshop. However, this comparison provides valuable insights into how designers, even with limited time and structure, can creatively adapt and apply familiar ARG elements to new contexts. One of the most striking observations is how the limited duration of the planned ARG led testers to focus on refining a working formula that balanced puzzles and fragmented storytelling. With only a short time frame, they iterated puzzle mechanics and narrative fragments with a strong emphasis on cohesion and flexibility, considering potential shifts in player behavior and puzzle-solving skills. This iterative approach allowed them to adapt to the constraints, fostering a dynamic gameplay experience where the ARG's flow could evolve based on the participants' interactions. The summary also highlights the testers' adept use of transmedia storytelling elements, a hallmark of the ARG genre. By encouraging players to explore various locations around the city, solve cryptic puzzles online, and uncover hidden layers of narrative, the testers effectively leveraged multiple media channels to create an immersive experience. This transmedia approach allowed them to build a compelling and interactive world despite not following a predefined framework, proving that experienced designers often rely on intuitive processes and design tools to structure and express their ideas. Notably, while the absence of a structured framework might have posed challenges, it did not prevent the testers from crafting an engaging ARG. Their output shows a clear influence from I Love Bees (see picture x.xx), as they adapted its familiar tropes and puzzle formats to fit the workshop's brief. The testers prioritized puzzle design as a central feature, around which they built a streamlined narrative. This focus allowed them to create a story framework simple enough for a three-week ARG, demonstrating that a clear puzzle-centric approach can provide the structural backbone for shorter ARGs without overwhelming players with overly complex storytelling.

In summary, the Control Group's ARG demonstrates how experienced designers can adapt familiar structures to create meaningful, cohesive gameplay experiences. Their work highlighted that in a shorter ARG it could be valuable to base the narration on puzzles, this helped them reduce the number of characters and made them coherent to the interactions designed.



Picture 5.3 – ARG summary visualization of Control Group output using de Beer and Bothma (2016) conceptual framework.

5.6 Workshop 2 – Experimental Group

5.6.1 Participants

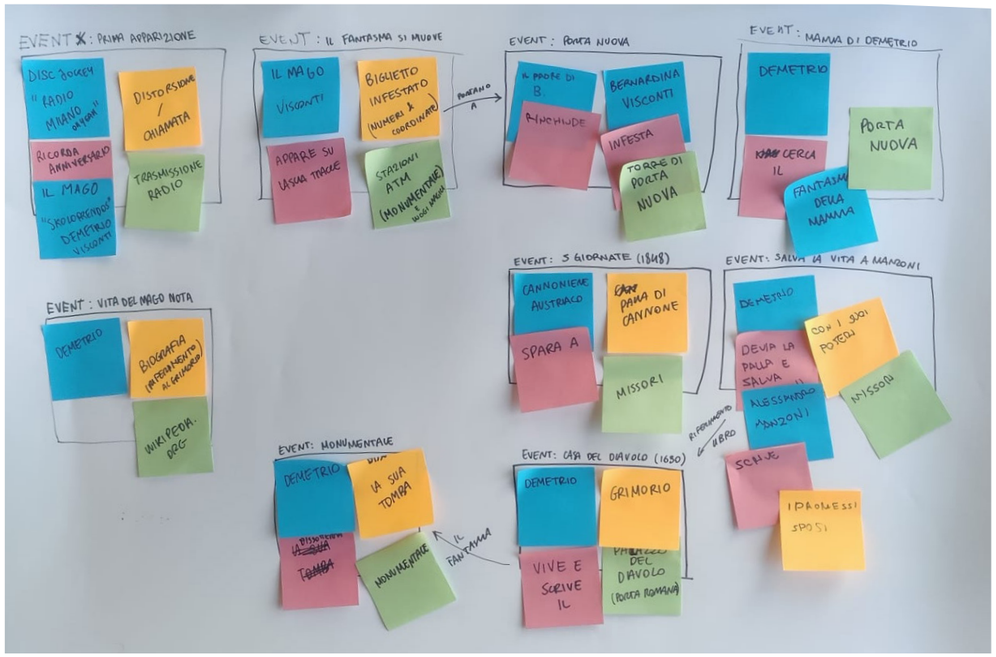
Group 2 was composed of individuals that responded to the self-assessment questionnaire as shown in table (5.2).

Table 5.2 – Creativity Domain Self-Assessment Mean. First Experimental Group

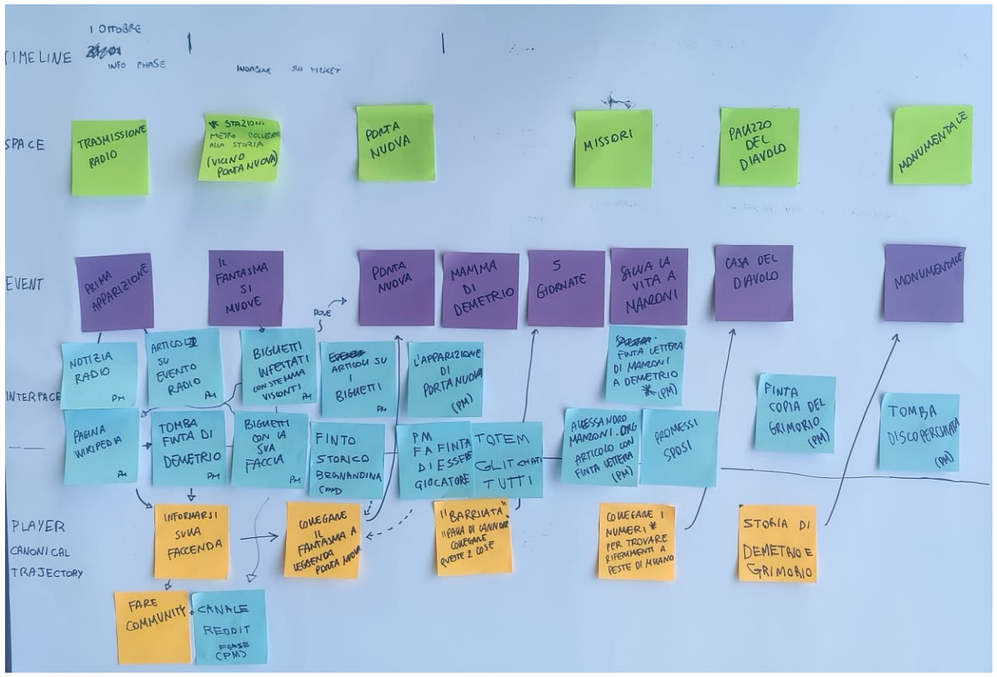
Tester	DRAMA Domain Mean	ART Domain Mean	INTERACTION Domain Mean	Field of Study
#5	3.000	**5.333**	3.833	Digital and Interaction Design
#6	**4.333**	**4.667**	3.833	Digital and Interaction Design
#7	2.667	**4.667**	3.167	Digital and Interaction Design
#8	2.667	3.667	**4.5**	Digital and Interaction Design
Threshold	3.208	3.746	4.08	

5.6.2 Shadowing – Summary

After the introductory segment covering the workshop brief and Phase 1 of the framework (ARG Basics Phase), participants were transitioned into Phase 2 – the Ideation Phase. They were allocated 45 minutes for brainstorming and mapping. As in the previous group session, the facilitator (the thesis researcher) remained present throughout, providing guidance and addressing questions, particularly if participants encountered challenges. The session began with testers exploring a variety of themes, blending different ideas and concepts. Early discussions revealed a strong interest in developing a Serious ARG, with participants weighing the advantages of this direction over a Promotional ARG approach. However, they encountered initial obstacles, especially around integrating multiple media formats and deciding on the ARG's thematic focus. Ultimately, the testers committed to a Serious ARG pathway, recognizing the importance of aligning storytelling elements with the ARG's intended type. Challenges arose as they grappled with distinguishing which parts of the narrative should be realistic versus fictional, resulting in a thoughtful yet complex decision-making process. Following a ten-minute break, participants were introduced to the *Story World Cards*. They were allotted an hour for this sub-phase. Despite the tool's intended purpose, the testers initially reverted to brainstorming without using the cards. Divergent perspectives between Tester #5 and Tester #6 disrupted the flow, slowing progress and creating challenges in effectively leveraging the tool. Although the facilitator's further clarification helped, it was evident that Tester #6 did not fully grasp the intended application of the *Story World Cards*. The group eventually decided to structure their ARG around an external event as the primary rabbit hole, where they began mapping out individual plot points, aiming to interlink these with real-world historical events. However, tension persisted; while Testers #5 and #6 debated narrative connections, Testers #6 and #7 seemed less inclined to actively contribute. This initial mapping process proved helpful in clarifying the logical flow and connections among ideas, making it easier to envision how these might be presented to players. Following a brief orientation on the *Player Journey Map tool*, participants were provided another hour to refine their work. As testers began populating the map with events and anticipated player actions, Tester #6 asked, "Where do we put the actions we [as Puppet Masters] do?" The facilitator clarified that PMs should ideally intervene only when players are completely disoriented, focusing on shaping interactions through story and puzzle design rather than direct involvement. A noticeable gap emerged as testers attempted to incorporate puzzles to tie story events together. Struggling to conceptualize how players would uncover pieces of the narrative, testers suggested that the PMs might need to assume the role of a player to build an online community forum, where they could subtly influence and guide the player interactions.



Picture 5.4 – *Story World Cards* tool used by the first Experimental Group



Picture 5.5 – *Player Journey Map* used by the first Experimental Group

5.6.3 Post-Workshop Survey – Answers and insight

Feedback from the second group underscored a range of issues encountered during the workshop, many of which became evident through the post-workshop survey. A majority of participants felt that the allotted time was insufficient. Notably, in contrast with the control group, certain testers entered the workshop with a high degree of confidence in their prior ARG knowledge, which was reflected in their lower post-workshop assessment scores and only moderate satisfaction with the workshop's outcomes. Tester #5 attributed the workshop's difficulties to the tight timeframe and frequent disagreements among Puppet Masters, which led to further delays and disruptions. Tester #6 provided feedback on the Story World Cards, suggesting that incorporating "interface" options within the tool would help users better link various story events, thereby enhancing continuity. Tester #7 expressed, "I felt like the time was too short to find interesting and connectable plot points. [...] Another key point is that we lost focus on the feasibility of the project, which, I think, led us to become entangled in overly complex ideas. [...] For workshops like this, I would recommend icebreaker activities to help participants familiarize themselves with each other before diving into the task."

This feedback suggests that future iterations could benefit from an adjusted timeframe, a clearer emphasis on tool usage, and possibly introductory activities to facilitate group cohesion, which could enhance focus and productivity within the workshop setting.

5.6.4 "Visconti - Un fantasma a Milano" – ARG Visual Representation

Here, a summary and representation of the ARG designed and planned by the first Experimental Group according to de Beer and Bothma (2016) conceptual framework:

Week 1

1.0 **EXTERNAL INTERACTION | LEAD IN MECHANISM**

On a famous local Radio Channel the anniversary of the death of Demetrio Visconti gets announced, a mysterious [fictional] character in Milan's history.

1.0.1 **EXTERNAL INTERACTION**

Social Media like Instagram news pages and TikTok talk about the weird character making it more known to the public.

1.1 **SYSTEM WITH PLAYERS INTERACTION**

Fake Wikipedia pages can be found when searching online about Demetrio Visconti.

1.1.1 A Reddit and Discord channels [online forums] are set up by PMs for players to meet and discuss.

1.2 **PLAYERS WITH PLAYERS INTERACTION**

Players that decide to look up the fictional character get in touch with every information that has been set up by the PMs and should discuss and reach the conclusion that there's something more to discover.

1.3 **NARRATIVE REWARD | THEMATIC LINK**

Players discover that the character is a ghost and that is moving around Milan.

Week 2

2.0 **NARRATIVE HOOK**

The ghost is linked to Porta Nuova in Milan. PMs scatter tickets with linking images (Visconti's heraldry) and Demetrio's face around Porta Nuova.

2.1 **PLAYER WITH PLAYERS INTERACTION**

By researching Visconti and Porta Nuova players should be able to find information about the mysterious appearance of a ghost.

2.2 **NARRATIVE REWARD | THEMATIC LINK**

Through *[undefined]* pieces of information, players should be able to link the character to the infamous " Five Days of Milan".

Week 3

3.0 **NARRATIVE HOOK**

Demetrio Visconti is linked to real historical character: Alessandro Manzoni.

3.1 **SYSTEM WITH PLAYERS INTERACTION**

PMs should show through the forum channels a *[fictional]* letter found during the research.

This letter links even more the two characters and their lives.

3.2 **PLAYER WITH PLAYERS INTERACTION**

Players, by analyzing the letter and checking up dates online, should discover that they died at the same time.

3.3 **NARRATIVE REWARD | THEMATIC LINK**

Players understand that the mystery is focused around the secret tomb of Demetrio Visconti.

Week 4

4.0 **NARRATIVE HOOK**

If they died together, they probably were buried in the same place.

4.0.1 **PLAYER WITH PLAYER INTERACTION**

Players should share knowledge about Alessandro Manzoni, discover about his life and the place where he was buried.

4.1 **PLAYER WITH SYSTEM INTERACTION**

Players should go visit Cimitero Monumentale and finally discover the mystery of the ARG. The secret tomb of Demetrio Visconti.

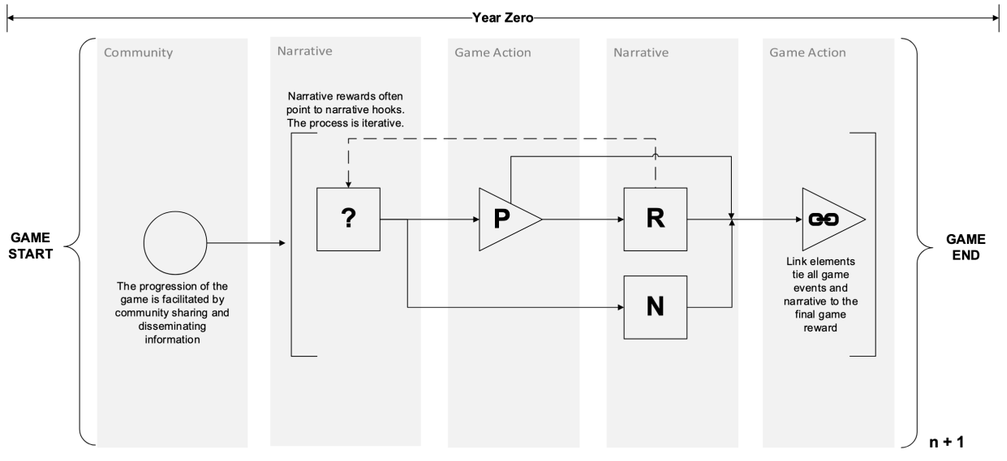
4.2 **NARRATIVE REWARD | THEMATIC LINK**

At the end of the game the PMs reveal themselves and the scope of the ARG: To share light on many interesting historical facts about the city.

Despite the challenges encountered during the workshop, the first experimental group successfully outlined a short ARG that employed intricate storytelling techniques to fulfill a clear objective: to create a Serious ARG centered on Milan's historical figures and events (see picture 5.6). This outcome is especially notable given the group's perceived limited time and the complexity of the final goal that they strived for. Despite initial struggles with the design framework, the testers navigated these difficulties by leveraging creativity and intuition, ultimately producing a coherent ARG structure that achieved its educational goals. One of the most compelling aspects of the group's design lies in its design alignment with the *Year Zero* (2007) case study (see picture 5.7), even though the testers did not have direct access to the ARG summary for Year Zero during their work. A particularly interesting similarity is that both ARGs guide players to engage deeply with specific topics by fostering awareness through gameplay and encouraging collaborative community interactions. This method enables players to gain knowledge of historical content not simply by passive observation but through active participation and connection with others, which is central to Serious ARGs. In both cases, the ARGs utilize the community's knowledge-sharing dynamics to weave together story fragments, encouraging players to collaboratively construct a coherent and immersive narrative. Despite difficulties in utilizing the design framework fully, the testers intuitively captured the essence of a potentially effective ARG experience. By focusing on community-driven knowledge sharing, they organically developed a Serious ARG experience that emphasizes learning through interaction, exploration, and narrative construction.

Ultimately, the first experimental group's work shows the effectiveness of ARG design principles highlighted in the framework. The focus on storytelling allowed them to achieve very specific output. Their ability to mirror elements of Year Zero illustrates the alignment between ARG design framework and expected output. This outcome suggests that, with the right foundational examples, even novice ARG designers can harness the complexity of ARGs to create meaningful and educational experiences.

Picture 5.6 – ARG summary visualization of Experimental Group 1 output using de Beer and Bothma (2016) conceptual framework



Picture 5.7 – Game summary of *Year Zero* (2007) by de Beer (2015).

5.7 Workshop 3 – Experimental Group

5.7.1 Participants

Group 3 was composed of individuals that responded to the self-assessment questionnaire as shown in table (5.3).

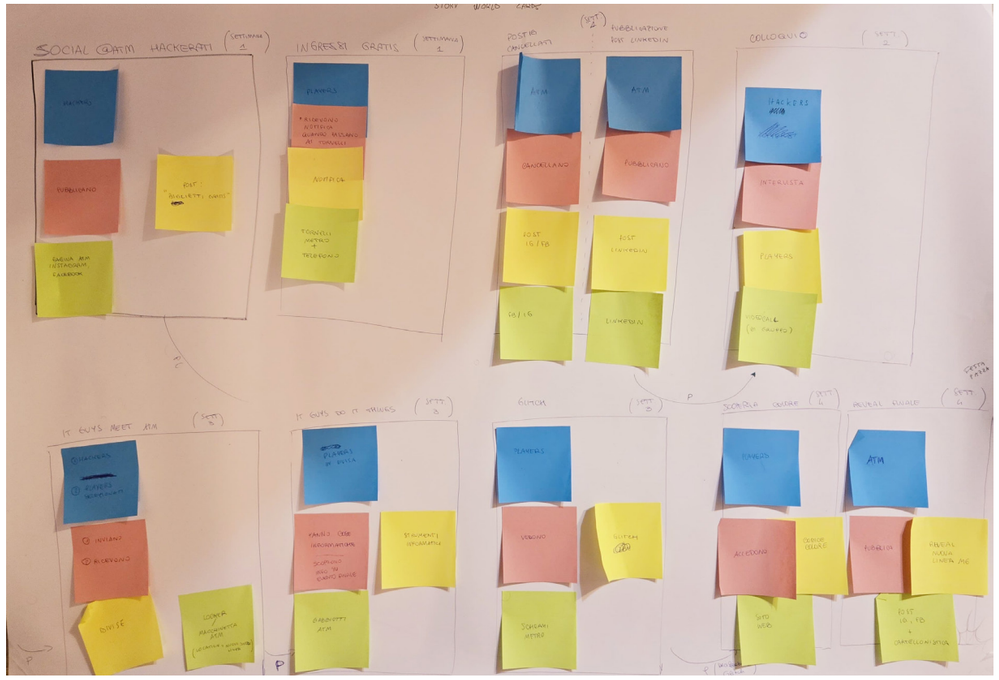
Table 5.3 – Creativity Domain Self-Assessment Mean. Second Experimental Group

Tester	DRAMA Domain Mean	ART Domain Mean	INTERACTION Domain Mean	Field of Study
#9	**4.000**	**4.667**	3.833	Digital and Interaction Design
#10	**4.000**	3.000	3.833	Digital and Interaction Design
#11	3.167	**4.667**	4.333	Digital and Interaction Design
#12	2.500	**4.667**	2.667	Communication Design
Threshold	3.208	3.746	4.08	

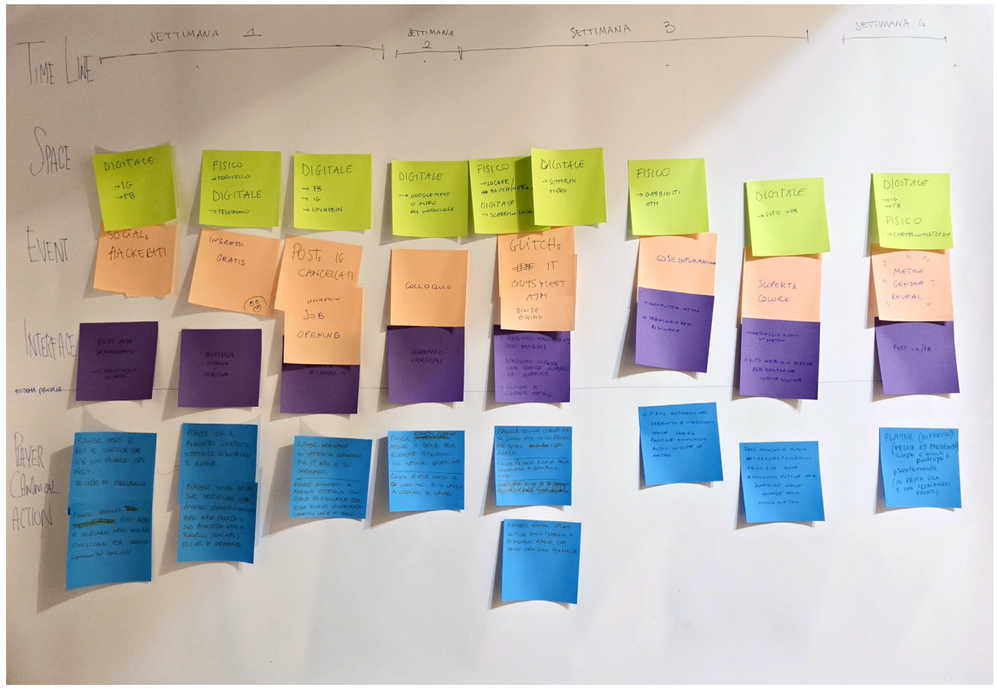
5.7.2 Shadowing – Summary

For the second experimental group, a similar methodology was applied. Following the introductory segment covering the workshop overview, brief, and Phase 1 of the framework (ARG Basics Phase), participants were introduced to Phase 2 – the Ideation Phase. They were given 45 minutes to complete the brainstorming and mapping exercises, with the facilitator (the thesis researcher) remaining present to provide guidance and steer the workshop as needed.

To start, the testers agreed on the importance of defining a clear goal before delving into the story details. Tester #9 voiced concerns over the complexity of ARG design, while Tester #10, having a strong understanding of ARG objectives, encouraged Testers #9 and #11 to consider a more manageable approach. Throughout, the facilitator offered positive reinforcement to help participants feel comfortable exploring a range of ideas without hesitation. Tester #12 contributed insightful suggestions that helped refine the team's direction. When the team encountered challenges in conceptualizing how different types of people might interact with the game incidentally, the facilitator intervened to offer guidance. This led the group to decide on a Promotional ARG focus. Subsequent discussions centered on determining an appropriate difficulty level for puzzles and balancing these to suit their intended audience. Tester #11 proposed the idea of player factions to introduce interactive dynamics and sought clarification from the facilitator on the desired level of puzzle detail. The facilitator emphasized that, in these early framework phases, it was more important to establish a coherent and logical narrative structure than to finalize puzzle specifics.After a ten-minute break, participants were introduced to the *Story World Cards* and given an hour to work with this tool. The team initially brainstormed events and story timelines but noted the difficulty of balancing realism without veering into conspiracy-laden narratives. During this brainstorming, they opted not to immediately use the *Story World Cards*, prompting the facilitator to offer further explanation. The testers then decided to outline a timeline before defining specific events. Tester #9 raised a concern that players might take unintended actions that border on illegality in their pursuit of game goals. This concern underscored the importance of designing puzzles and interactions with clear boundaries. Additionally, the testers questioned how the puzzles might be integrated with the *Story World Cards*, to which the facilitator clarified that the primary aim of this tool was to support narrative structure, rather than puzzle visualization. As they worked, testers found it somewhat challenging to create coherent "sentences" for each event using the *Story World Cards* and expressed some confusion over how players would react to the events they designed. Following an orientation on the *Player Journey Map*, testers resumed their work, seeking clarification on how to incorporate events into the map. With the facilitator's guidance, they quickly grasped the map's functionality, allowing them to efficiently organize events, interactions, and interfaces. This facilitated smoother reasoning around previously discussed concepts, and the testers completed the workshop 35 minutes ahead of the scheduled end time.



Picture 5.8 – *Story World Cards* tool used by the second Experimental Group



Picture 5.9 – *Player Journey Map* used by the second Experimental Group

5.7.3 Post-Workshop Survey – Answers and insight

The feedback from this third group provided valuable insights. Participants reported feeling confident in their increased knowledge and generally satisfied with their results, though they offered useful suggestions for improving the tools used in the workshop. Tester #10 found the *Story World Cards* somewhat restrictive, while the *Player Journey Map* proved highly effective for organizing and structuring the elements created earlier. Tester #11 expressed uncertainty over the level of detail expected with each tool, indicating a need for clearer instructions in the workshop's introduction. Finally, Tester #12 suggested the addition of a timeline tool to the *Story World Cards*, believing it would aid in organizing the sequence of events more effectively.

These observations highlight areas for potential refinement, underscoring a need for tool adjustments and clearer workshop guidance to enhance future implementations of this research framework.

5.7.4 "ATM vs Hackers" – ARG Visual Representation

Here, a summary and representation of the ARG designed and planned by the second Experimental Group according to de Beer and Bothma (2016) conceptual framework:

Week 1

1.0 **MISCELLANEOUS | HOOK**

Social media pages of Azienda Trasporti Milanesi (ATM) gets hacked for a day. Posting a cryptic message on the main Instagram page.

1.1 **PUZZLE**

The hacked post has a cryptic message. When solved it gives out a free ticket for Milan's Metro system.

1.2 **PLAYERS WITH SYSTEM INTERACTION**

When a player uses Milan's Metro in Week 1 with the free "hacked" ticket a weird notification appears on the player's phone.

1.3 **LEAD IN MECHANISM**

If the players follow the notification they get redirected to a job application directly from what looks like an ATM official website. They are looking for experts against hackers attacks.

Week 2

2.0 **SYSTEM WITH PLAYER INTERACTION**

Hackers disguised as ATM call whoever applied for an interview and ask them for help in fixing some weird glitches around the city.

2.1 **PLAYERS WITH PLAYER INTERACTION**

Players organize to go around the metro station and fix some screens and electronics.

2.1.1 Some more attentive players could understand that the request comes from the hackers themselves and try to oppose them.

Week 3

3.0 **LEAD IN MECHANISM**

Following the instructions from the hackers, players find all the screens to fix.

3.1 **PUZZLE**

Players have to solve an [undefined] number and type of cryptic puzzles.

3.2 **NARRATIVE REWARD | THEMATIC LINK**

The result of the solving shows names of what looks like metro stations that don't exist.

3.3 **LEAD IN MECHANISM**

Attentive players can hear in the metro an out of place audio message that props them to a specific website.

3.4 **PUZZLE**

On this new website players solve a puzzle to decode what looks like an RGB color code.

3.5 **NARRATIVE REWARD | THEMATIC LINK**

Players understand that the link between this color code and the names found earlier can underline a new metro line that is going to be announced soon.

Week 4

4.0 **SYSTEM WITH PLAYER INTERACTION**

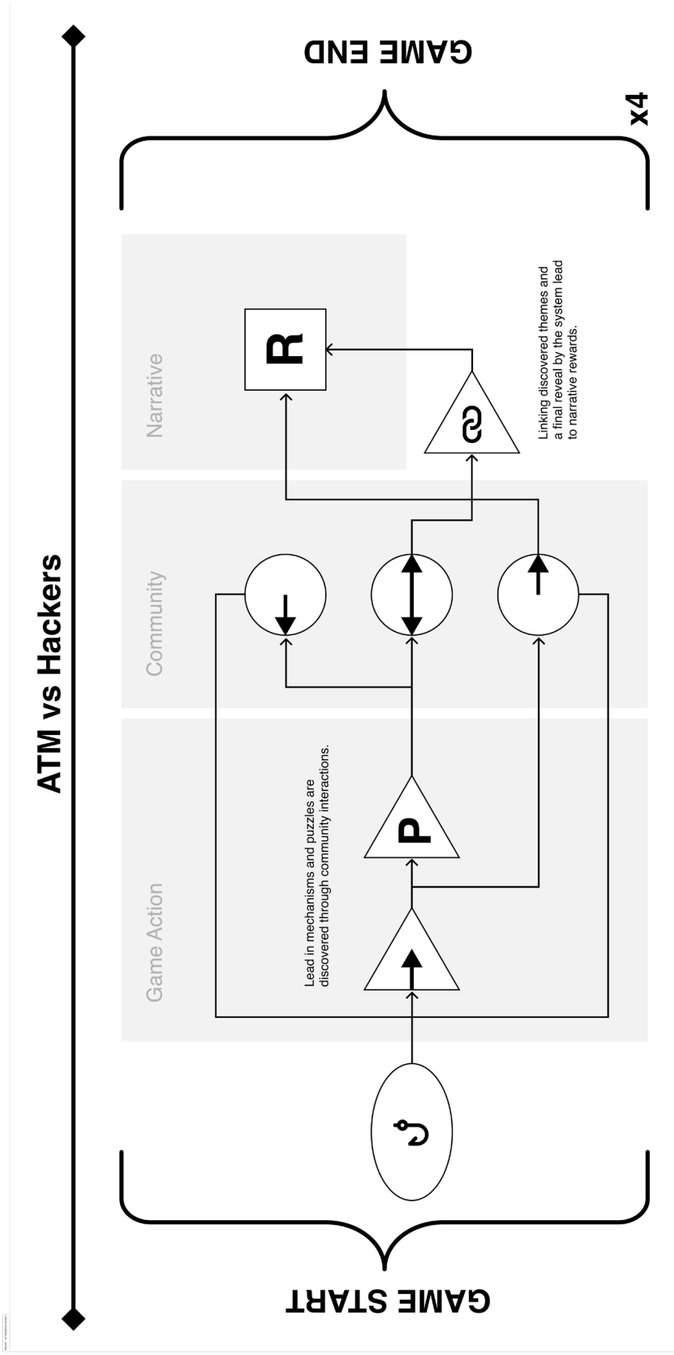
Social media pages of ATM announces that since the hackers were trying to ruin the surprise of the new metro line announcement they will come forth and tell the public first.

4.1 **NARRATIVE REWARD**

The final reward for the player is the explanation of this ARG campaign to reveal the new metro line, showing everyone how engaging it was to participate.

The second experimental group demonstrated a natural aptitude for working with the tools and phases of the ARG Design Framework, showing a level of proficiency that allowed them to move seamlessly through each stage of development. Their efforts resulted in a distinct experience aimed at a broad audience within the city of Milan, expanding the scope of their short ARG to fit within the Promotional ARG category. The storytelling emphasis embedded in the design tools provided a clear structure for planning key events and organizing the timeline. This framework allowed the testers to systematically map out the flow of the ARG and ensure cohesive narrative progression. They thoughtfully incorporated player collaboration, designing opportunities for individuals to interact and work together throughout the ARG, and included general puzzle concepts that could foster engagement without requiring complex setup or lengthy player preparation. Although they refrained from diving deeply into the minutiae of puzzle mechanics, they skillfully used the tools to produce a well-rounded overview of the ARG's structure, creating a foundation that could easily be expanded upon.

The blend of components in their ARG reflects parallels to prominent ARGs like *I Love Bees* (2001) and *Year Zero* (2007), both known for immersive experiences that incorporate real-world interaction, community involvement, puzzle-based progression and thematic links. Yet, despite these familiar elements, the group's structure also exhibited a unique perspective, deviating from established patterns to incorporate fresh ideas and interactions that were rarely discussed in existing ARG literature. This originality, combined with their ability to integrate classic ARG elements, gave their project a distinct identity, bridging traditional ARG techniques with innovative approaches tailored to a modern audience. The second experimental group's work illustrates the flexibility of the ARG Design Framework, particularly in its ability to support the development of ARGs that both honor genre conventions and push creative boundaries. Their approach reflects how, even at a high level, the structured use of storytelling tools can yield a comprehensive ARG overview with ample room for further refinement. By blending familiar ARG mechanics with new, location-specific interactions and considering a broad player base, they designed an experience capable of attracting diverse participants and fostering community engagement. This balance of innovation and adherence to ARG conventions exemplifies how the framework enables designers to create ARGs that are both grounded in genre expectations and enriched by inventive new ideas.



Picture 5.10 – ARG summary visualization of Experimental Group 2 output using de Beer and Bothma (2016) conceptual framework.

6

Discussion

The primary goal of this thesis was to design and evaluate a structured Alternate Reality Game (ARG) Design Framework to facilitate the development of ARGs for individuals with limited experience in the field. By combining established principles in interaction design and user-centered methodologies with ARG-specific tools, the framework aimed to simplify the ARG development process while retaining its creative complexity. This research sought to contribute an accessible, iterative approach to ARG creation, enabling newcomers to engage with the genre through guided workshops and structured design phases.

The evaluation of the ARG Design Framework was conducted through workshops structured around three groups: a Control Group, which operated without methodological guidance, and two Experimental Groups that utilized the framework's tools and structured phases. The Control Group's free-form approach allowed participants to rely on intuition and previous knowledge, whereas the Experimental Groups were supported by the framework's structured phases, including tools like *Story World Cards* and *Player Journey Maps*. This comparative testing methodology allowed for a nuanced analysis of the framework's impact on creativity, coherence, and usability in ARG design.

6.1 Insights from Testing

Despite inherent limitations, such as time constraints and a relatively small sample size, the workshops yielded valuable insights into the usability and effectiveness of the framework. Testing with creative participants allowed for feedback on how approachable the framework was and whether it lowered the barrier to ARG development. This qualitative insight was essential for evaluating if the framework could serve as a learning tool for newcomers. If participants found it easy to engage with the process, this would suggest that the framework successfully demystified ARG development, aligning with the overall goal of making the design process accessible. Participants in the Experimental Groups found that the phased approach and design tools helped them create cohesive narratives while considering player engagement and interactive storytelling elements. These insights underscore the importance of such a framework for novice designers, as it lowers barriers to entry into ARG creation. The workshops showed that even participants with minimal ARG experience could create complex, coherent ARG structures by following the framework's guidelines. This finding is significant for ARG designers, as it suggests that structured frameworks can democratize ARG development, making it accessible to a broader audience beyond expert game designers. This research can thus serve as a foundation for future design tools tailored to ARG development.

6.2 Identifying Intuitive Design Patterns

The Control Group's workshop provided valuable insights into the intuitive processes that designers employ when tasked with ARG development. Without the structured support of the framework, the Control Group participants exhibited a natural inclination towards puzzle-based, transmedia storytelling, aligning their design with familiar ARG elements observed in well-known projects such as *I Love Bees* (2001). Their approach demonstrated how experienced designers, even when working without structured guidance, rely on innate understanding of narrative structure, player engagement, and media integration. This freeform approach enabled the Control Group to produce an ARG with a cohesive story, albeit one that was heavily influenced by the initial example they were shown. This reliance on a storytelling-driven approach, influenced by familiar ARG tropes, underscores the value of having a structured framework, which can help steer designers toward innovative and unique ARG experiences rather than iterations of pre-existing formats. The feedback from this group highlighted areas for improving the workshop format, such as providing more focused briefs or additional visual aids, which could better support designers in conceptualizing ARGs without leaning too heavily on external examples.

6.3 Strengths and Flaws of the Framework

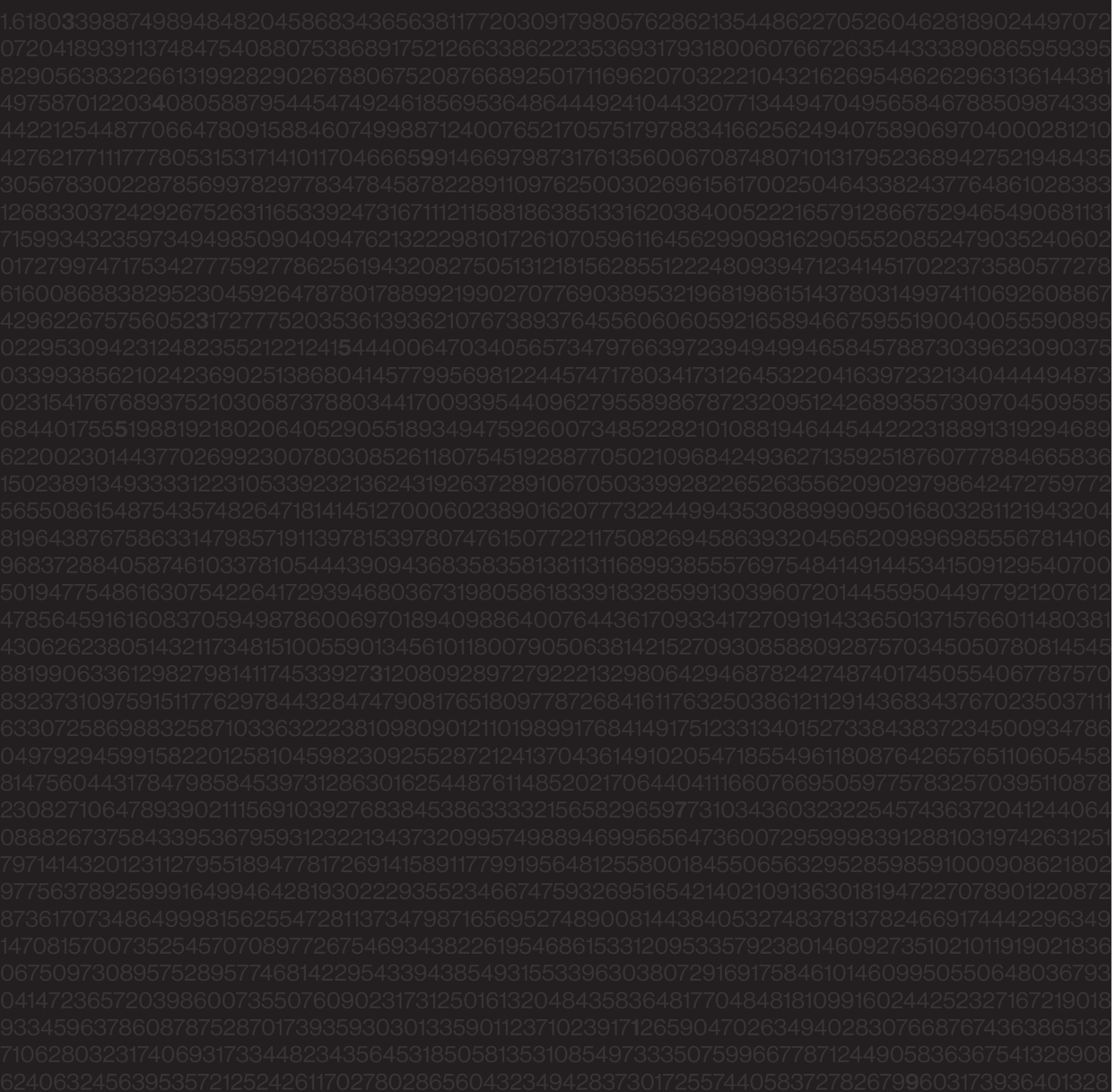
Both Experimental Groups displayed notable strengths in using the framework to explore novel ARG concepts, yet they also encountered limitations that suggest areas for refinement. Group 1, for instance, struggled initially to adapt to the tools but ultimately succeeded in creating a structured narrative that reflected an understanding of ARG principles. This group's final ARG concept shared thematic similarities with Year Zero (, particularly in how it encouraged players to collaboratively uncover historical content through gameplay. This outcome suggests the framework's capacity to guide designers towards creating experiences that emphasize learning and community engagement, yet the group's challenges with tool integration point to a need for clearer tool instructions and possibly more streamlined design phases. Similarly, Group 2 effectively combined familiar ARG mechanics with fresh ideas specific to their local context. They demonstrated an aptitude for leveraging the framework's storytelling tools to produce a structured ARG outline that balanced traditional ARG mechanics with unique, location-based elements. However, the group's feedback also suggested that some of the tools, such as the Story World Cards, could benefit from additional examples or guidance on use, as participants struggled initially to understand how to best integrate these into their design process. These insights reveal how the framework can be refined to better support creativity while providing the structure necessary to avoid ambiguity and confusion.

6.4 Qualitative Analysis of Results

A qualitative comparison of the ARGs produced by each group reveals distinct differences between storytelling-driven and puzzle-driven approaches. The Control Group, influenced by the familiar example of I Love Bees, created a cohesive ARG that leaned heavily on puzzles as the central narrative device. This puzzle-driven approach allowed the group to structure their ARG around a series of challenges, leading to a streamlined narrative with clear objectives. This approach might lead to the conclusion that puzzle-centric ARGs can be effective in short-duration projects, as they enable designers to create engaging content without the need for intricate storytelling . This goes in slight contrast with experts' ideas such as Szulborski (2005) and Crawford (2013), because that would further make the experience closer to a predetermined game, lacking the some fundamental components of ARGs: the deep immersion in a believable story.

In contrast, both Experimental Groups developed ARGs that incorporated classic ARG elements, such as puzzles and transmedia storytelling, but did so in ways that showcased their unique, creative interpretations. These groups used the framework to experiment with complex storylines and player interactions, focusing on building immersive narratives that extended beyond a mere sequence of puzzles. By doing so, they produced ARG structures that showcased the versatility of ARGs as vehicles for interactive storytelling. This comparison highlights the framework's potential to support designers in creating ARGs that balance storytelling and player interaction, emphasizing the role of narrative cohesion in producing immersive experiences.

7



Future Research and Conclusions

7.1 Limitations

The study was designed to assess the usability and effectiveness of the ARG Design Framework, targeting designers with limited ARG experience. However, several limitations impacted its scope and generalizability:

Selection Criteria

Participants were selected based on their familiarity with ARG concepts and their alignment with creative domains such as drama, arts, and interaction. Although this focus on relevant experience allowed for nuanced insights, it may have limited the findings' applicability to audiences with entirely different backgrounds. Testing the framework with individuals from diverse fields could reveal broader usability patterns.

Limited Time

Time constraints shaped the workshops, leading to a condensed testing process where only the initial phases of the framework were explored. Due to this limitation, participants could not fully engage with the Development, Playtesting, and ARG Running phases, which are crucial for understanding the full potential of the framework in real-world ARG development.

Number of Participants

The study involved a limited number of participants (three groups of four individuals each), which affects the ability to generalize findings. A larger sample would allow for more robust conclusions and increase the validity of the insights derived from user feedback.

Restricted Scope of Testing

Due to the workshop's format, only half of the ARG Design Framework was tested, specifically the Ideation and Design phases. Consequently, insights were limited to the framework's initial usability rather than its efficacy in guiding the full ARG development cycle.

7.2 Improvement and Future Research

Several tools within the framework, such as the *Story World Cards* and *Player Journey Map*, received constructive feedback from participants who encountered usability challenges. For example, some participants found the *Story World Cards* restrictive and suggested adding a timeline component to aid in event sequencing. Future iterations should incorporate these refinements, such as clearer instructions and additional visual aids to improve comprehension and usability. Enhancing these tools based on user input could make the framework more intuitive and accessible for ARG newcomers.Future research could benefit from a larger and more diverse pool of participants, encompassing both seasoned ARG designers and complete novices. This approach would provide insight into whether the framework serves as a universal tool adaptable to varied experience levels. Such diversity could further validate the framework's flexibility and reveal whether distinct design backgrounds influence how users approach ARG development.

To fully assess the framework's applicability, future research should include all phases: Development, Playtesting, and ARG Running. Extending testing to these phases would offer a comprehensive evaluation, allowing researchers to explore whether user-centered design (UCD) methodologies support ARG development in complex scenarios. Testing the Playtesting and ARG Running phases would also reveal how the framework adapts to real-time player interactions and ongoing narrative adjustments.

7.3 Conclusion

This thesis set out to create an ARG Design Framework that guides novice designers through the complexities of ARG development. The framework's initial testing through workshops demonstrated its potential to structure the ARG creation process effectively. Using structured phases and tools, the framework provided participants with a systematic approach to ideation and narrative construction, helping them conceptualize ARGs that emphasized player immersion, storytelling, and interactive mechanics.

Overall, this thesis contributes to the field of ARG design by introducing a new structured framework that supports novice designers in creating immersive and interactive experiences. With continued refinement and testing, this framework has the potential to serve as a foundational tool for ARG development, offering a structured yet flexible approach to storytelling, player engagement, and interactive narrative construction.

8

Bibliography

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Abd El-Sattar, H. K. H. (2008). A New Framework for Plot-Based Interactive Storytelling Generation. *2008 Fifth International Conference on Computer Graphics, Imaging and Visualisation*, 317–322. https://doi.org/10.1109/CGIV.2008.50

Alternate reality game A Labyrinth offers a model for new media in a distanced age. (2020, June 24). In Practice: The Official University of Chicago Arts Blog. https://www.uchicagoartsblog.art/archive/2020/5/27/alternate-reality-game-a-labyrinth

Al-Kodmany, K. (2001). Visualization Tools and Methods for Participatory Planning and Design. *Journal of Urban Technology, 8*(2), 1–37. https://doi.org/10.1080/106307301316904772

Andersen, M. (2024, August 16). Gravity Falls and a Decade Long Education in (Bill) Ciphering. *ARGNet: Alternate Reality Gaming Network.* https://www.argn.com/2024/08/gravity_falls_and_a_decade_long_education_in_bill_ciphering/

Aylett, R. (Ed.). (2010). *Interactive storytelling: Third Joint Conference on Interactive Digital Storytelling, ICIDS 2010, Edinburgh, UK, November 1-3, 2010: proceedings.* Joint International Conference on Interactive Digital Storytelling, Berlin ; New York. Springer.

Barve, C., Hajarnis, S., Karnik, D., & Riedl, M. (2010). WeQuest: A Mobile Alternate Reality Gaming Platform and Intelligent End-User Authoring Tool. *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment, 6(1)*, 217–218. https://doi.org/10.1609/aiide.v6i1.12378

Basri, N. (2020). The Effect of Applying Mind Mapping Methods in Writing Descriptive Text. 3(2).

Benford, S., Giannachi, G., Koleva, B., & Rodden, T. (2009). From interaction to trajectories: Designing coherent journeys through user experiences. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 709–718. https://doi.org/10.1145/1518701.1518812

Bonnardel, N., & Didier, J. (2020). Brainstorming variants to favor creative design. *Applied Ergonomics, 83*, 102987. https://doi.org/10.1016/j.apergo.2019.102987

Bonsignore, E. (2012). Designing alternate reality games. *CHI '12 Extended Abstracts on Human Factors in Computing Systems*, 911–914. https://doi.org/10.1145/2212776.2212863

Bonsignore, E., Hansen, D., Kraus, K., & Ruppel, M. (2012). Alternate Reality Games as Platforms for Practicing 21st-Century Literacies. *International Journal of Learning and Media, 4(1)*, 25–54. https://doi.org/10.1162/IJLM_a_00086

Bonsignore, E., Hansen, D., Pellicone, A., Ahn, J., Kraus, K., Shumway, S., Kaczmarek, K., Parkin, J., Cardon, J., Sheets, J., Holl-Jensen, C., & Koepfler, J. (2016b). Traversing Transmedia Together: Co-designing an Educational Alternate Reality Game For Teens, With Teens. *Proceedings of The 15th International Conference on Interaction Design and Children, 11–24*. https://doi.org/10.1145/2930674.2930712

Bonsignore, E., Moulder, V., Neustaedter, C., Hansen, D., Kraus, K., & Druin, A. (2014). Design tactics for authentic interactive fiction: Insights from alternate reality game designers. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 947–950*. https://doi.org/10.1145/2556288.2557245

Bossen, C., Dindler, C., & Iversen, O. S. (2016a). Evaluation in participatory design: A literature survey. *Proceedings of the 14th Participatory Design Conference: Full Papers - Volume 1, 151–160.* https://doi.org/10.1145/2940299.2940303

Buskermolen, D. O., & Terken, J. (2012). Co-constructing stories: A participatory design technique to elicit in-depth user feedback and suggestions about design concepts. *Proceedings of the 12th Participatory Design Conference: Exploratory Papers, Workshop Descriptions, Industry Cases - Volume 2, 33–36*. https://doi.org/10.1145/2348144.2348156

Crawford, C. (2013). *Chris Crawford on interactive storytelling* (Second edition). New Riders.

Cooper, A., Reimann, R., Cronin, D., & Noessel, C. (2014). *About face: the essentials of interaction* design. John Wiley & Sons.

De Beer, K.(2015). Analysing alternate reality games based on game design theory to propose a conceptual framework. *University of Pretoria* (South Africa).

De Beer, K., & Bothma, T. (2016). Alternate reality games (ARG) as innovative digital information sources. *Library Hi Tech, 34(3)*, 433–453. https://doi.org/10.1108/LHT-02-2016-0018

Dena, C. (2008). Emerging Participatory Culture Practices: Player-Created Tiers in Alternate Reality Games. *Convergence: The International Journal of Research into New Media Technologies, 14(1)*, 41–57. https://doi.org/10.1177/1354856507084418

Dörner, R., Göbel, S., Effelsberg, W., & Wiemeyer, J. (2016). *Serious games (No. 1)*. Cham: Springer.

D'Eon, M. F., & Eva, K. W. (2009). Self-Assessments for Workshop Evaluations. *American Journal of Evaluation, 30(2)*, 259–261. https://doi.org/10.1177/1098214009334366

D'Eon, M., Sadownik, L., Harrison, A., & Nation, J. (2008). Using Self-Assessments to Detect Workshop Success: Do They Work? *American Journal of Evaluation, 29(1)*, 92–98. https://doi.org/10.1177/1098214007312630

El-Nasr, M. S., Bishko, L., Zammitto, V., Nixon, M., Vasilikos, A. V., & Wei, H. (2009). Believable Characters. In B. Furht (Ed.), *Handbook of Multimedia for Digital Entertainment and Arts* (pp. 497–528). Springer US. https://doi.org/10.1007/978-0-387-89024-1_22

Göbel, S., Iurgel, I., & Malkewitz, R. (Eds.). (2006). *Technologies for Interactive Digital Storytelling and Entertainment: Third International Conference, TIDES 2006, Darmstadt, Germany, December 4-6, 2006, Proceedings.* Springer Berlin Heidelberg. https://doi.org/10.1007/11944577

Göbel, S., Salvatore, L., & Konrad, R. (2008). StoryTec: A Digital Storytelling Platform for the Authoring and Experiencing of Interactive and Non-Linear Stories. *2008 International Conference on Automated Solutions for Cross Media Content and Multi-Channel Distribution,* 103–110. https://doi.org/10.1109/AXMEDIS.2008.45

Gutierrez, L., Nikolaidis, I., Stroulia, E., Douglas, S., Rockwell, G., Boechler, P., Carbonaro, M., & King, S. (2011). fAR-PLAY: A framework to develop Augmented/Alternate Reality Games. *2011 IEEE International Conference on Pervasive Computing and Communications Workshops (PERCOM Workshops)*, 531–536. https://doi.org/10.1109/PERCOMW.2011.5766947

Holloway-Attaway, L., & Murray, J. T. (Eds.). (2023). *Interactive Storytelling: 16th International Conference on Interactive Digital Storytelling, ICIDS 2023, Kobe, Japan, November 11–15, 2023, Proceedings, Part I (Vol. 14383)*. Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-47655-6

Hsu, S. H., Chang, J.-W., & Lee, C.-C. (2013). Designing Attractive Gamification Features for Collaborative Storytelling Websites. *Cyberpsychology, Behavior, and Social Networking, 16(6)*, 428–435. https://doi.org/10.1089/cyber.2012.0492

Huizinga, J. (1949). *Homo Ludens Ils 86* (1st ed.). Routledge. https://doi.org/10.4324/9781315824161

Ibrahim, R., & Jaafar, A. (2009). Educational games (EG) design framework: Combination of game design, pedagogy and content modeling. *2009 International Conference on Electrical Engineering and Informatics*, 293–298. https://doi.org/10.1109/ICEEI.2009.5254771

Interaction Design Foundation - IxDF. (2016). What is Design Thinking (DT)?. *Interaction Design Foundation - IxDF*. https://www.interaction-design.org/literature/topics/design-thinking

Jenkins, H. (2006) Convergence Culture: Where Old and New Media Collide. *New York: New York University Press.*

Jerrett, A. (2023). "It's About What We Take with Us and What We Leave Behind": Investigating the Transformative Potential of Pervasive Games with Various Stakeholders. In: Holloway-Attaway, L., Murray, J.T. (eds) *Interactive Storytelling. ICIDS 2023. Lecture Notes in Computer Science, vol 14383.* Springer, Cham. https://doi.org/10.1007/978-3-031-47655-6_28

Joyce, M. (1993). *Afternoon, a story*. Leonardo, 26(1), 79-80.

Johnson, R. E. (1997). Frameworks = (components + patterns). *Communications of the ACM, 40(10)*, 39–42. https://doi.org/10.1145/262793.262799

Journey Mapping 101. (2018). Nielsen Norman Group. Retrieved November 13, 2024, from https://www.nngroup.com/articles/journey-mapping-101/

Jumail, Rambli, D. R. A., & Sulaiman, S. (2011). G-Flash: An authoring tool for guided digital storytelling. *2011 IEEE Symposium on Computers & Informatics, 396–401*. https://doi.org/10.1109/ISCI.2011.5958948

Kankainen, A., Vaajakallio, K., Kantola, V., & Mattelmäki, T. (2012). Storytelling Group – a co-design method for service design. *Behaviour & Information Technology, 31(3)*, 221–230. https://doi.org/10.1080/0144929X.2011.563794

Kaufman, J. C , Cole, J. C , & Baer, J. (2009). The construct of creativity: A structural model for self-reported creativity ratings. *Journal of Creative Behavior, 43*, 119-134. https://doi.org/10.1002/j.2162-6057.2009.tb01310.x

Kaufman, J. C. (2012). Counting the muses: Development of the Kaufman Domains of Creativity Scale (K-DOCS). *Psychology of Aesthetics, Creativity, and the Arts, 6(4)*, 298–308. https://doi.org/10.1037/a0029751

Kensing, F., Simonsen, J., & Bodker, K. (1998). MUST: A Method for Participatory Design. *Human–Computer Interaction, 13(2)*, 167–198. https://doi.org/10.1207/s15327051hci1302_3

Kim, N. W., Bach, B., Im, H., Schriber, S., Gross, M., & Pfister, H. (2018). Visualizing Nonlinear Narratives with Story Curves. *IEEE Transactions on Visualization and Computer Graphics, 24(1)*, 595–604. https://doi.org/10.1109/TVCG.2017.2744118

Kim, S., Moon, S., Han, S., & Chan, J. (2011). Programming the story: Interactive storytelling system. *Informatica, 35(2)*.

Koenitz, H., Ferri, G., Haahr, M., Sezen, D., & Sezen, T. I. (Eds.). (2015). *Interactive digital narrative: History, theory and practice.* Routledge, Taylor & Francis Group.

Koenitz, H., Sezen, T. I., Ferri, G., Haahr, M., Sezen, D., & Ç atak, G. (Eds.). (2013). *Interactive Storytelling: 6th International Conference, ICIDS 2013, Istanbul, Turkey, November 6-9, 2013, Proceedings (Vol. 8230)*. Springer International Publishing. https://doi.org/10.1007/978-3-319-02756-2

Korečko, Š., Sobota, B., Mattová, M., & Kašela, A. (2022). Petri-Net-Driven Educational Scenarios in Web-Based Extended Reality. *2022 IEEE 16th International Scientific Conference on Informatics (Informatics)*, 163–167. https://doi.org/10.1109/Informatics57926.2022.10083401

Lal, S., Donnelly, C., & Shin, J. (2015). Digital Storytelling: An Innovative Tool for Practice, Education, and Research. *Occupational Therapy In Health Care, 29(1)*, 54–62. https://doi.org/10.3109/07380577.2014.958888

Lévy, P. (2002). *L'intelligenza collettiva. Per un'antropologia del cyberspazio.* Feltrinelli editore.

Liedtka, J. (2015). Perspective: Linking Design Thinking with Innovation Outcomes through Cognitive Bias Reduction. *Journal of Product Innovation Management, 32(6)*, 925–938. https://doi.org/10.1111/jpim.12163

Marie-Laure Ryan. (2009). From Narrative Games to Playable Stories: Toward a Poetics of Interactive Narrative. *StoryWorlds: A Journal of Narrative Studies, 1(1)*, 43–59. https://doi.org/10.1353/stw.0.0003

Mason, S. (2013). On Games and Links: Extending the Vocabulary of Agency and Immersion in Interactive Narratives. *Interactive Storytelling*, 25–34. https://doi.org/10.1007/978-3-319-02756-2_3

McGonigal, J. (2003). A real little game: The performance of belief in pervasive play. *Proceedings of DiGRA 2003.*

McGonigal, J. E. (2006). *This might be a game: ubiquitous play and performance at the turn of the twenty-first century* (Doctoral dissertation, University of California, Berkeley).

McGonigal, J. (2008). Why I love bees: A case study in collective intelligence gaming. *The ecology of games: Connecting youth, games, and learning*, 199-228.

McKenzie, B. (2023). Dungeons and dragons and digital writing: A case study of worldbuilding. *Journal of University Teaching and Learning Practice, 20(2)*. https://doi.org/10.53761/1.20.02.10

Mildner, P., John, B., Moch, A., & Effelsberg, W. (2014). Creation of custom-made serious games with user-generated learning content. *2014 13th Annual Workshop on Network and Systems Support for Games*, 1–6. https://doi.org/10.1109/NetGames.2014.7008959

Nielsen, J. (1994). *Usability Engineering*. Morgan Kaufmann.

Norman, D. (2013). *The Design of Everyday Things: Revised and Expanded Edition*. Basic Books.

Norman, D. A., & Draper, S. W. (1986). *User Centered System Design: New Perspectives on Human-computer Interaction.* Lawrence Erlbaum Associates. https://books.google.it/books?id=IR9FAAAAYAAJ

Ollila, E. M. I., Suomela, R., & Holopainen, J. (2008). Using prototypes in early pervasive game development. *Computers in Entertainment, 6(2)*, 1–17. https://doi.org/10.1145/1371216.1371220

Pellerin, R., & Perrier, N. (2019). A review of methods, techniques and tools for project planning and control. *International Journal of Production Research, 57(7)*, 2160–2178. https://doi.org/10.1080/00207543.2018.1524168

Queensland University of Technology, & Turner, J. (2021, July 22). Story-making: Re-imagining possible futures through collaborative world-building approaches. *Pluriversal Design Special Interest*

Group. Pivot 2021 Dismantling/Reassembling: Tools for Alternative Futures. https://doi.org/10.21606/pluriversal.2021.0040

Riedl, M. O., & Young, R. M. (2010). Narrative Planning: Balancing Plot and Character. *Journal of Artificial Intelligence Research, 39*, 217–268. https://doi.org/10.1613/jair.2989

Rösch, N., Tiberius, V., & Kraus, S. (2023). Design thinking for innovation: Context factors, process, and outcomes. *European Journal of Innovation Management, 26(7)*, 160–176. https://doi.org/10.1108/EJIM-03-2022-0164

Royce, J. (2018). Narrative and Collaborative World Building in Tabletop Role-Playing Games. https://doi.org/10.17615/58qq-5027

Ruiz-García, D. (2020). Alternate reality games: Defining gender through an updated taxonomy. *In CoSECivi* (pp. 24-35).

Schoenau-Fog, H., Bruni, L. E., Louchart, S., & Baceviciute, S. (Eds.). (2015). *Interactive Storytelling: 8th International Conference on Interactive Digital Storytelling, ICIDS 2015, Copenhagen, Denmark, November 30 - December 4, 2015, Proceedings (Vol. 9445)*. Springer International Publishing. https://doi.org/10.1007/978-3-319-27036-4

Shirvani, A. (2019). Towards More Believable Characters Using Personality and Emotion. *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment, 15(1)*, 230–232. https://doi.org/10.1609/aiide.v15i1.5253

Schwarz, H. P. (1997). Media-art-history: Media Museum ZKM| Center for Art and Media Karlsruhe.

Si, M., Thue, D., André, E., Lester, J. C., Tanenbaum, T. J., & Zammitto, V. (Eds.). (2011). *Interactive Storytelling: Fourth International Conference on Interactive Digital Storytelling, ICIDS 2011, Vancouver, Canada, November 28 – 1 December, 2011. Proceedings (Vol. 7069)*. Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-25289-1

Silvia, P. J., Wigert, B., Reiter-Palmon, R., & Kaufman, J. C. (2012). Assessing creativity with self-report scales: A review and empirical evaluation. *Psychology of Aesthetics, Creativity, and the Arts, 6(1)*, 19–34. https://doi.org/10.1037/a0024071

Solarski, C. (2017). *Interactive stories and video game art: A storytelling framework for game design.* CRC Press.

Spierling, U., & Szilas, N. (Eds.). (2008). *Interactive storytelling: First Joint International Conference on Interactive Digital Storytelling, ICIDS 2008, Erfurt, Germany, November 26-29, 2008: proceedings.* Joint International Conference on Interactive Digital Storytelling, Berlin ; New York. Springer.

Stanescu, R. (2014). *Designing a conceptual framework for reusable Alternate Reality Games (Dissertation, Malmö högskola/Teknik och samhälle)*. Retrieved from https://urn.kb.se/resolve?urn=urn:nbn:se:mau:diva-20221

Stewart, S. (2001). Introduction to the A.I. Web Game. http://www.seanstewart.org/beast/intro/ archived at *Wayback Machine* (https://web.archive.org/) > http://www.seanstewart.org/beast/intro/ citing a capture dated 30 August 2003.

Sufi, S., Nenadic, A., Silva, R., Duckles, B., Simera, I., De Beyer, J. A., Struthers, C., Nurmikko-Fuller, T., Bellis, L., Miah, W., Wilde, A., Emsley, I., Philippe, O., Balzano, M., Coelho, S., Ford, H., Jones, C., & Higgins, V. (2018). Ten simple rules for measuring the impact of workshops. *PLOS Computational Biology, 14(8)*, e1006191. https://doi.org/10.1371/journal.pcbi.1006191

Susi, T., Johannesson, M., & Backlund, P. (2007). Serious Games : An Overview. Retrieved from *Institutionen för kommunikation och information* website: https://urn.kb.se/resolve?urn=urn:nbn:se:his:diva-1279

Szulborski, D. (2005). *This is not a game: A guide to alternate reality gaming*. Incunabula.

Tallyn, E. (2000). *Applying Narrative Theory to the Design of Digital Interactive Narratives with the Aim of Understanding and Enhancing Participant Engagement* (Doctoral dissertation, University of the West of England at Bristol).

Taylor, & Kolko, B. (2003). Boundary Spaces. *Information, Communication & Society, 6(4)*, 497–522. https://doi.org/10.1080/1369118032000163231

Nielsen, J., Norman, D. (1998). The Definition of User Experience (UX). *Nielsen Norman Group.* Retrieved November 13, 2024, from https://www.nngroup.com/articles/definition-user-experience/

Waidelich, L., Richter, A., Kolmel, B., & Bulander, R. (2018). Design Thinking Process Model Review. *2018 IEEE International Conference on Engineering, Technology and Innovation (ICE/ITMC)*, 1–9. https://doi.org/10.1109/ICE.2018.8436281

Waddington, D. I. (2013). A Parallel World for the World Bank: A Case Study of Urgent: Evoke, An Educational Alternate Reality Game. *Revue internationale des technologies en pédagogie universitaire / International Journal of Technologies in Higher Education, 10(3)*, 42–56. https://doi.org/10.7202/1035578ar

Why So Serious? (2007). TV Tropes. Retrieved November 17, 2024, from https://tvtropes.org/pmwiki/pmwiki.php/ARG/WhySoSerious

APPENDIX A

Creativity Self-Assessment for ARG Design Workshop

Hi! In this questionnaire you will find scales and items regarding your creativity and personal experience with Alternate Reality Games (ARGs).
The purpose of this questionnaire is to find participants for an ARG Design workshop.
The workshop will be conducted as part of a Master's thesis in the Digital & Interaction Design course at Politecnico di Milano.

The estimated time to complete this questionnaire is less than 5 minutes!
Participating in this questionnaire is voluntary and you can quit at any moment, all answers are anonymous.
If you have any questions feel free to contact the provided e-mail address:
giovanni1.pacifico@mail.polimi.it

Thank you for your time!

Please read every question carefully!

* Obbligatoria

Creativity Scale

Please rate your **creativity** in the following domains. Try to make a judgment about your own creativity in relationship to other people who have a similar background as you do. Thank you! How creative would you rate yourself in:

1. *

	Not at all creative	Not very creative	A little creative	Somewhat creative	Very creative	Extremely creative
Acting	○	○	○	○	○	○
Algebra/Geometry	○	○	○	○	○	○
Chemistry	○	○	○	○	○	○
Computers/Computer Science	○	○	○	○	○	○
Crafts	○	○	○	○	○	○
Dancing	○	○	○	○	○	○
Literature/Criticism	○	○	○	○	○	○
Interior Design/Decorating	○	○	○	○	○	○
Keeping a Journal/Blog	○	○	○	○	○	○
Leadership	○	○	○	○	○	○

2. *

	Not at all creative	Not very creative	A little creative	Somewhat creative	Very creative	Extremely creative
Life Sciences/Biology	◯	◯	◯	◯	◯	◯
Logic/Puzzles	◯	◯	◯	◯	◯	◯
Mechanical Abilities	◯	◯	◯	◯	◯	◯
Money Management	◯	◯	◯	◯	◯	◯
Painting/Drawing	◯	◯	◯	◯	◯	◯
Playing with Children	◯	◯	◯	◯	◯	◯
Selling People Things	◯	◯	◯	◯	◯	◯
Solving Personal Problems	◯	◯	◯	◯	◯	◯
Teaching/Education	◯	◯	◯	◯	◯	◯
Vocal Performance/Singing	◯	◯	◯	◯	◯	◯
Writing Poetry/Prose	◯	◯	◯	◯	◯	◯

3. Age in years (e.g. 24) *

4. Gender *

- ◯ Male
- ◯ Female
- ◯ Other
- ◯ Prefer not to say

5. Last completed level of education (e.g. if you're currently enrolled in a master's course your last completed level is bachelor's degree) *

- ◯ High School
- ◯ Bachelor's Degree
- ◯ Master's Degree
- ◯ Doctoral Degree

6. Field of Study (e.g. Communication Design) *

7. Experience with Alternate Reality Games (ARGs) *

- ◯ I am not familiar with the concept
- ◯ I am familiar with the concept but I have not participated in any ARG
- ◯ I have participated in one or more ARGs
- ◯ I have designed/developed one or more ARGs

Alternate Reality Games Workshop

Alternate Reality Games are **interactive**, **narrative**, **transmedia** game experiences that use fragmented **storytelling**, classic **game mechanics** and the real time and space as a component to immerse a co-operative group of players in a fictional but believable world, where their actions change the outcome of the story.

The objective of the workshop will be to ideate, design and plan the story and player's interaction for an ARG.
The testers will be guided through the process and will be clearly instructed on methods and outcomes.

If you want to know more about the workshops feel free to contact the following e-mail address:
giovanni1.pacifico@mail.polimi.it

8. Would you be interested in participating in the ARG Design workshop? Please, if so, write down your e-mail so we can contact you.

APPENDIX B

Pre-Workshop Survey

It was the same among all groups and it had a first section dedicated to Privacy Policy Agreement and a second section to re-assess personal knowledge about the topic of ARG.

Introduction & Consent to Privacy Policy

Siete stati invitati a partecipare come tester in una ricerca di tesi magistrale riguardante lo sviluppo di un design framework per Alternate Reality Games (ARG).Partecipando a questo studio, di partecipare a un workshop (della durata di circa 4 ore) e di compilare un questionario di post-testing.

Prima di acconsentire alla partecipazione, si prega di leggere il nostro Testing INFORMATION SHEET.docx.

Per domande o dubbi, contattatemi (giovanni1.pacifico@mail.polimi.it).

Il/la sottoscritto/a, su base volontaria, come scelta di libero arbitrio e avendo consultato l'informativa relativa al progetto, nel rispetto dell'art. 13 del Regolamento UE 2016/679 del 27 aprile 2016 relativo alla protezione delle persone fisiche con riguardo al trattamento dei dati personali, nonché alla libera circolazione di tali dati, acconsente a partecipare al presente studio di ricerca.

You have been invited to participate as a tester in a master's thesis research regarding the development of a design framework for Alternate Reality Games (ARG).

By participating in this study, you attend a workshop (lasting approximately 4 hours) and complete a post-testing questionnaire.

Before agreeing to participate, please read our Testing INFORMATION SHEET.docx.

For questions or doubts, contact me (giovanni1.pacifico@mail.polimi.it).

The undersigned, on a voluntary basis, as a choice of free will and having consulted the information relating to the project, in compliance with the art. 13 of EU Regulation 2016/679 of 27 April 2016 relating to the protection of natural persons with regard to the processing of personal data, as well as the free movement of such data, consents to participate in this research study.

CONSENT TO PARTICIPATE TO THE STUDY

Accetto volontariamente, come scelta di libero arbitrio, di partecipare a questo studio. / Voluntarily, as a choice under free will, agree to participate in this study.

Yes/Si – No

Sono consapevole di potermi ritirare in qualsiasi momento senza conseguenze. / I understand I can withdraw at any time without consequences.

Yes/Si – No

Sono consapevole che non trarrò alcun beneficio diretto dalla partecipazione a questo studio. / I understand that I will not benefit directly from participating in this study.

Yes/Si – No

CONSENT TO DATA USE

Mi sono stati spiegati lo scopo e la natura della ricerca e ho avuto la possibilità di porre domande. / I have had the purpose and nature of the research explained to me and had the opportunity to ask questions.

Yes/Si – No

Acconsento alla ripresa di contenuti audiovisivi durante la mia partecipazione. / I agree that audio-visual contents may be taken during my participation.

Yes/Si – No

Sono a conoscenza del fatto che le mie informazioni saranno utilizzate esclusivamente ai fini del progetto. / I understand that my information will be used solely for project purposes.

Yes/Si – No

Sono consapevole che estratti anonimi dell'attività possono essere citati nella tesi e nella comunicazione, compresi rapporti, documenti, articoli scientifici, workshop, attività di comunicazione, ecc. / I understand that anonymised extracts from the activity may be quoted in the thesis and in communication, including reports, documents, scientific papers, workshops, communication activities etc.

Yes/Si – No

Sono consapevole che i dati saranno conservati esclusivamente all'interno del team del progetto e saranno conservati per cinque (5) anni dopo la fine del progetto. Tutte le copie saranno distrutte cinque (5) anni dopo la fine del progetto. / I understand that data will be retained solely within the project team and will be kept for five (5) years after the end of the project. All copies will be destroyed five (5) years after the end of the project.

Yes/Si – No

Sono consapevole di poter richiedere la cancellazione delle informazioni da me fornite in questo studio di ricerca durante il progetto (se non ancora anonimizzate) ed entro i cinque (5) anni successivi al progetto, presentando una richiesta allo studente che gestisce questa attività. / I understand that I can request to have the information that I provide in this research study deleted during the project (if not yet anonymised) and within the five (5) year term after the project by submitting a request to the student running this activity.

Yes/Si – No

Pre-Test Questions

In quale ambito studi?

Quanto conosci l'argomento Alternate Reality Game? (I suoi componenti, gli obiettivi, lo stile, le tipologie) da 1 (Per niente) a 5 (Totalmente).

Post-Workshop Survey

Control Group

Quanto conosci l'argomento Alternate Reality Game dopo aver partecipato a questo workshop? (I suoi componenti, gli obiettivi, lo stile, le tipologie) da 1 (Per niente) a 5 (Totalmente).

Dopo questo workshop, con quale probabilità considereresti l'utilizzo di un Alternate Reality Game per un progetto creativo/artistico da 1 (Per niente) a 5 (Sicuramente)?

Dopo questo workshop, con quale probabilità considereresti l'utilizzo di un Alternate Reality Game come una strategia di marketing da 1 (Per niente) a 5 (Sicuramente)?

La prossima volta che ti capiterà di creare un Alternate Reality Game, con quale probabilità utilizzerai gli stessi metodi/tools che hai usato durante questo workshop da 1 (Per niente) a 5 (Sicuramente)?

Quanto sei soddisfatto con il risultato di questo workshop da 1 (Per niente) a 5 (Totalmente)?

Credi che il tempo a disposizione fosse abbastanza?

Avrei avuto bisogno di molto più tempo
Avrei avuto bisogno di un po' più tempo
Il tempo era adeguato
Sarebbe bastato un po' meno tempo
Sarebbe bastato molto meno tempo

Per favore, lascia qualsiasi tipo di feedback! (Workshop, risultati, metodi, argomento)

Experimental Groups

Quanto conosci l'argomento Alternate Reality Game dopo aver partecipato a questo workshop? (I suoi componenti, gli obiettivi, lo stile, le tipologie) da 1 (Per niente) a 5 (Totalmente).

Dopo questo workshop, con quale probabilità considereresti l'utilizzo di un Alternate Reality Game

per un progetto creativo/artistico da 1 (Per niente) a 5 (Sicuramente)?

Dopo questo workshop, con quale probabilità considereresti l'utilizzo di un Alternate Reality Game come una strategia di marketing da 1 (Per niente) a 5 (Sicuramente)?

La prossima volta che ti capiterà di creare un Alternate Reality Game, con quale probabilità utilizzerai gli stessi metodi/tools che hai usato durante questo workshop da 1 (Per niente) a 5 (Sicuramente)?

Quanto sono state chiare le metodologie e i tool utilizzati durante il workshop da 1 (Per niente) a 5 (Totalmente)?

Quanto sono state facili da utilizzare le metodologie e i tool durante il workshop da 1 (Per niente) a 5 (Totalmente)?

Quanto sei soddisfatto con il risultato di questo workshop da 1 (Per niente) a 5 (Totalmente)?

Credi che il tempo a disposizione fosse abbastanza?
Avrei avuto bisogno di molto più tempo
Avrei avuto bisogno di un po' più tempo
Il tempo era adeguato
Sarebbe bastato un po' meno tempo
Sarebbe bastato molto meno tempo

Per favore, lascia qualsiasi tipo di feedback! (Workshop, risultati, metodi, argomento)