WALTER PICCOLO

STORY KNOTS.

A COLLABORATIVE FRAMEWORK FOR
THE NARRATIVE DESIGN OF INTERACTIVE
DIGITAL NARRATIVES

S T O R Y

K N O T S.

A COLLABORATIVE FRAMEWORK FOR THE NARRATIVE DESIGN OF INTERACTIVE DIGITAL NARRATIVES

Walter Piccolo
893918

Supervisor: Ilaria Mariani
Co-supervisor: Gabriele Ferri

Politecnico di Milano
School of Design
M.sc Digital and Interaction design
AY 2020/2021

POLITECNICO
MILANO 1863

SCUOLA DEL DESIGN

TABLE OF FIGURES

The study of Interactive Digital Narratives (IDN) is a vibrant research field with a tight connection to disparate disciplines like interaction design, game studies, cognitive science, art and programming. The artefacts belonging to this category have grown a wide and enduring interest because they provide users with an active role in the digital environment and a dramatic agency over the narrative discourse. Among them, digital games are the typology of IDN that have seen the most impressive evolution over time.

Based on this premise, this study investigates possible approaches on the narrative design process of IDNs. It reviews a wide and interdisciplinary literature that covers interaction design, game design and narratology and it explores the state of the art of the matter, largely focusing on digital games as the most representative, yet mature, type of IDN, with a virtuous history of technological innovation and successful case studies.

In doing so, it detects and recognizes the problematic nature of their narrative design, an often neglected practice that is still in need of scientific investigation. This study particularly recognizes the need for a clearer communication on narrative-centered topics between different departments and the necessity of shared and well-established working tools.

As a result, knowledge from different fields was collected, studied and discussed, allowing the creation of a theoretical framework for the narrative design of digital games within teams. The framework eventually informed the design of an

analogue card-based tool. Its features, usability and effectiveness have all been shaped through an iterative co-design session at the *Amsterdam University of Applied Science* and, subsequently, they have been tested with possible users and stakeholders (like indie game developers and design students). Finally, the data and insights that stemmed from this process has been reworked in a digital environment, leading to the design of a collaborative tool for supporting the design of interactive digital narratives.

INTRODUCTION

The following study is positioned under the domain of interaction and communication design, and more specifically it fits into the interdisciplinary field of Interactive Digital Narratives (IDN).

IDN has seen rising interest since its early days in the 70s – when experimentations like *Eliza* (**1966**) and *Colossal Cave Adventure* (**1976**) opened up to a new way of experiencing narratives through interactivity – and today is a vibrant field, with connections to the most disparate disciplines, like interaction design, games studies, cognitive science, narratology, media studies, art and programming. The main reason for this ongoing interest is the seemingly unstoppable technological advancement that, in a matter of decades, has fulfilled the dream of breaking the fourth wall, entering into fictional worlds and taking an active role into the narrative discourse. This is clearly noticeable when observing the field of digital games, that have evolved from rough artefacts to sophisticated digital environments with realistic 3D graphics and complex interactions.

Digital games are without any doubt the most emblematic type of IDN, as they feed a thriving and growing market and offer the opportunity to investigate relevant case studies that go beyond the mere boundaries of entertainment. As a matter of fact, digital games (and IDNs in general) have evolved from a prerogative of practitioners with a specific set of skills rooted in computer science to an accessible resource that is available to practitioners from the most disparate fields, like education or even health. As of today many tools, softwares and design

resources (like *Twine, Unity 3D* or *Blender*) are even available for free, allowing emerging authors, enthusiasts and independent teams to distribute their games alongside big AAA companies.

The endless opportunities of this new way of experiencing content have created a kaleidoscopic field (MURRAY, 2018) that finds its strength in its heterogeneous contributions and experimentations, in which theory and practice are always intertwined. However, being a relatively young field, IDN is still in need of its own formalization and best practices, that have been greatly discussed in the last years. This study intends to join these discussions, by merging practices from the fields of interaction design and communication design with the ones of applied narratology – here meant as the *"transfer of narratology methods and findings to professional practices"* (MOENANDAR, 2018) –. The narrative design of IDN is a particularly complex and polarizing topic, that in the past has led to the well-known *ludologist vs narratologist* debate and that today is still in need of scientific investigation.

Chapter one sets off this study by delineating the state of the art of IDN. As the result from an in-depth desk research and literary review – that adopted as its foundational models the contributions from Laurel (1991), Murray (1997) and Koenitz (2015) – it analyzes the history and evolution of the field, the existing terminological discrepancies and its foundational elements. In its second part, the chapter focuses on the field of digital games, which are widely considered as the most representative, yet mature, type of IDN. The problematic nature of narrativity and its related theoretical positions are discussed as well.

Chapter two is centered on narrative design. In the first part, it focuses on the definition of the practice, with particular attention to the connections that it has with the overall design process of a digital game. In the second part, the chapter discusses the most common narrative theories and conventions

that are commonly implied in IDNs. The chapter eventually concludes that narrative design is a neglected process, that still presents several impediments:

- There isn't an established script format for the interactive narrative. The world, characters and plots are created and managed through a variety of documents, from word and excel to common screenwriting softwares.

- Communication between the different departments on narrative-centered topics is fragmented and inadequate; developers are forced to interpret complex decisions without possessing the sufficient knowledge. Furthermore they can not access a platform in which they can contribute to the design process.

- It is often impossible to test game narratives during the prototyping phase. Early forms of gameplay can be experienced pretty early on the development, however narrative isn't included.

Chapter three details the methodology that informed this study, and the research questions that have stemmed from the desk research and literary review of the state of the art:

> **Leading RQ:**
> How to build and share narrative information during
> the design phase of a digital game?
>
> **Secondary RQs:**
> How can teams confront on narrative-centered topics?
> How to control and improve narrative consistency during
> the design phase?

In its second part, the chapter describes the project methodology adopted to answer the research questions and that has eventually led to the generation of a theoretical framework.

Chapter four details the structure and features of the framework and its related card-based supporting tool, which has been co-designed at the *Amsterdam University of Applied science.*

Subsequently, the chapter returns the results of the testing sessions that have been held with students and stakeholders between Amsterdam and the *Politecnico di Milano*.

The resulting insights allowed to refine and validate the project that, alongside the secondary data from the desk research and literary review, contributed to the final outcome of this study: *Story Knots*, a collaborative framework for the narrative design of interactive digital narratives.

The final framework has been reworked in a digital environment and made available for everyone to use, with the hope to stimulate further improvements and discussions on the topic.

INTERACTIVE DIGITAL NARRATIVES

The study is positioned under the domain of interaction and communication design, and more specifically it fits into the interdisciplinary field that is known as Interactive Digital Narratives (IDN). IDN has seen a steady and rising interest since its early days in the 70s, when experimentations like 1966's *Eliza* and 1976's *Colossal game* adventure opened up to a new way of experiencing narrativity through interactivity, the former being the first chatbot (Murray, 2018) and the latter being the first text-based game and the precursor of adventure games (Lessard, 2013).

The opportunity to take an active role into the narrative discourse and gain dramatic agency has always captivated the attention of many and it has been chased for centuries, although these attempts have always been characterized by a low level of interactivity and agency given to the user.

However the advent of computer technology and its constant developments put this desire closer to reach, getting to a large audience that in the 80s made the fortune of video games companies like *Atari* (Crawford, 1992) and that, as of today, are passionately playing interactive dramas like Quantic Dream's *Detroit: Become Human* (2018) or Naughy Dog's *The Last Of Us* (2013), and even enjoying interactive movies such as Netflix's *Bandersnatch* (2019).

For more than forty years these artefacts (interactive installation pieces, AR and transmedia experiences, interactive movies and digital games) have sparked a growing interest, powered on one hand by the enormous technological advan-

cements and, on the other, by the tight connections to different fields, such as art, programming, cognitive science, interaction design and game studies (KOENITZ ET AL., 2015A).

Furthermore, IDN has evolved from a prerogative of practitioners with a specific set of skills (rooted in computer science) and has slowly enabled non-programmers to design interactive narratives (ENGSTRÖM, 2019) with increasingly easier, yet powerful, tools such as automated platforms, AI bots or dedicated story engines and softwares. This availability of means has turned IDN design into a more accessible and manageable process and has thus given the opportunity to many authors and enthusiasts to experiment, regardless of their background: in fact, notable IDN case studies have stemmed from areas that might seem very far apart, like the academia – Mateas and Stern's *Façade* (2003) –, the entertainment industry – Ninja Theory's *Hellblade: Senua's sacrifice* (2017) – or even the educational and health fields – an useful example for the latter is discussed in chap. 4 -. The result, as stated by Murray, is a kaleidoscopic field (2018), in which theory and practice are always intertwined and that is in need of its own formalization (KOENITZ, 2014), as well as its own case studies and best practices, able to guide IDN practitioners as well as emerging narrators or researchers.

This study intends to join the discussions on this phenomenon, by merging practices from the fields of interaction design and communication design with the ones of applied narratology – here meant as the *"transfer of narratology methods and findings to professional practices"* (MOENANDAR, 2018). Going beyond the discussion of the blurred features that characterise the rising figure of the narrative designer, the aim of this thesis is to frame and validate a possible cooperative design approach for building interactive narratives.

The nature of the topic situates this study in a broad and interdisciplinary stream of literature. In light of this reasoning

and considering the extension of the field, the study and its experimentation have been intentionally narrowed only to the field of digital games, a term here used referring to the entire field and embracing arcade, computer, console and mobile games in all their diversity (KERR, 2006).

The development of digital games has been skyrocketing since the 80s, generating a new, profitable market that in 2019 alone was considered worth 138.7 Billion dollars (NEWZOO, 2019). While many of the topics from here on discussed could be applied virtually to any field of interactive narrative, the resources, opportunities and audience insight of the digital game territory makes it the most suitable to study; being also the first one to acknowledge the importance of narrative designers in 2006, when designer Stephen Dineheart was formally employed by RELIC/THQ Vancouver with this job title for the *Medal of Honor* franchise (DESPAIN, 2007).

This discussion adopts as its very foundation the definition Interactive Digital Narrative (IDN henceforth), meant as *"a digital medium that changes according to the user input"* (KOENITZ ET AL., 2015A), joining the recent efforts toward a common theory and culture around the field of interactive stories. This chapter highlights in its first part the main characteristics of IDN, pointing out the different theoretical positions around the field that, as of today, are being discussed. It also examines the evolution of the field under a research perspective, the efforts towards a unifying definition and the main constituents of an IDN artefacts that have been described starting from Murray's book *Hamlet of the Holodeck* (1997). The second part of this chapter instead focuses on the application field of digital games, connoting them as one of the three possible IDN trajectories coined by Koenitz (text-based, cinematic and ludic) and discussing its state of the art.

1.1
IDN. STATE OF THE ART AND DEFINITIONS

Since the birth of digital technologies, the way we tell stories has greatly changed in the past 40 years. The procedural, participatory, spatial and encyclopedic properties that define digital environments (MURRAY, 1997) were finally able to fulfill audience's desire of entering the narration and make impactful choices on the story and for the characters (chap. 1.1.3.). However the artefacts that hold the power to embody this possibility, turning it into a feasible aspect, have been labeled throughout the years in different ways, from interactive stories to interactive narratives, from interactive dramas to interactive fictions (chap. 1.1.2.), resulting in an unclear shared language.

In recent times the umbrella term Interactive Digital Narrative (IDN) has been coined with the intent to encompass all the different manifestation of a narrative that is experienced through a participatory process – whether it is a digital game, an interactive movie, an AR narration or a transmedia experience –, emphatically claiming that these artefacts are new expressive narrative forms delivered through digital media, with their own narratology and best practices (KOENITZ ET AL., 2015A). Several are the successful examples of IDN – both in the academia, like Mateas and Stern's *Façade* (MATEAS & STERN, 2003), and in the entertainment industry, like Naughty Dog's *The Last of Us* (2013) –, but IDN as a research field is a relatively novel domain, with a recent history and multiple theoretical discussions that, as today, are still occupying researchers and practitioners all around the globe (chap. 1.1.1.).

1.1.1 Evolution and theoretical positions

The research around IDN is vivid and vibrant, and its roots are deeply established in our past, being bound to the human desire to communicate and participate in narration: the power to make the fourth wall of a story permeable and enter the narrative to participate in what will unfold has been a universal dream that human beings have been chasing for centuries (KOENITZ ET AL., 2015A). As a matter of fact, researches on the African oral traditions have testified many times this desire to unify the role of the creator and the audience in a communal ethos through their rituals; most of them inherently narrative, like the re-telling of cautionary tales. In these circumstances the narrator usually advances the plot, often inflecting familiar events for the crowd in ways that surprise and delight, and the participants interrupt to reinforce a point, savor a moment or comment a particular action (AGAWU, 2007). This call and response process, that still exists in African-American churches, has been of particular interest in the debate about the narrative structure of an interactive story (JENNINGS, 1996). Even throughout western history, though, there had been attempts to involve the audiences into the narrative discourse since the Roman Empire (SLATER, 1996), especially with theatrical and public performances. A notable example is Augusto Boal's *Theatre of the oppressed*, in which theatre became the opportunity to cope with societal issues and forms of oppression by reenacting them on stage: Boal's approach to theatre literally blurred the fourth wall and allowed the audience to become actively involved on the play, creating the new category of the spect-actor (FRASCA, 2001). Being already interested with the concepts of interactivity, engagement, narrative coherence and authorship, experimentations of this kind were of particular interest for the IDN field and became of significant prominence when this experiences started to be transposed into the vir-

tual environments, with the outgrowth of Human-Computer interaction (HCI) and the advent of personal computing.

As discussed by Murray, the origin of interactive digital stories can start with the Gilgamesh poem or even with the *Bible*, but it is the moment in which storytelling becomes *"interactive and built out of computational bits"* (2018, PAG. 3) that marks the real foundation of the IDN field.

Until the late 1970s, HCI was a specialty area in computer science and the only humans who interacted with computers were information technology professionals, however this status quo suddenly changed with the emergence of personal computing that made everyone in the world a potential computer user (CARROLL, 2009), hinting at new and exciting ways in which content could be experienced. The world-wide spreading of computers in the 1980s not only defined a new audience, but also attracted practitioners from many disciplines and with backgrounds from various fields. These new authors, coming from computer science, literary studies, communication and media studies (KOENITZ ET AL., 2013), were claiming that the advent of digital media was radically changing the way *"narrative content is being created, shared, experienced and interpreted"* (KOENITZ ET AL., 2015A, PAG. 1). Thus, the first IDN experimentations were trying to merge narrativity and interactivity into a virtual environment, while also reshaping the relationship between the narrator and the narratè.

As a matter of fact, IDN authors soon started feeling rather confident with the notion of relinquishing some of their authorial control to users, players and interactors, and were not seeing themselves anymore as *"the creators of a singular vision, but as designers of a expressive potential"* (KOENITZ ET AL., 2015A, PAG. 3): something similar (at least from the very perspective of building narratives) was already happening in Boal's *Theatre of the oppressed* or in role playing games like *Dungeons and Dragons* (introduced in 1974, first published by *Tactical Studies Rules*), in

which the creation of a narrative discourse was a collective experience.

Among the earliest IDN efforts and experimentations, Koenitz considers the 1976 text-based game *Colossal Cave Adventure* (CROWTHER, 1975) as the first milestone of this new field. He argues that this game marked the beginning of the Interactive Fiction genre, while also having a considerable commercial success and influence on similar titles over the years. However Murray, after spending more than 25 years at MIT, considers the 1966 Joseph Weizenbaum's program *Eliza* as the only candidate for the spot, since it introduced for the first time in history a digital interactive character to the world (2018). In *Eliza* the player becomes the patient of an automated psychotherapist, interacting through articulate questions and answers. The program has always been labeled as the first chatbot in history, even if Weizenbaum did not invent the conversation by trying to recreate an actual therapy interview, but rather adopting different narrative tropes.

In the 80s and the 90s, assisted by the evolution of technology, IDN clearly became a field of study *"not only rich in expressive forms, but also in theoretical perspectives"* (KOENITZ ET AL., 2013), that diversified its practical efforts into three different and clear trajectories: text-based narratives, interactive movies and videogames.

In the last decade of the century, driven by the milestone publication of Laurel's *Computers as Theatre* (1991) and Murray's *Hamlet on the Holodeck* (1997), scholars engaged in a meta-reflection on the defining characteristics of IDN, while the advent of the game studies as a discipline allowed the emergence of a group of scholars called ludologists, which posed itself in contrast with other positions, hence identified with the term narratologist. They were seeing games as a radically different alternative to narratives and, in the words of Jesper

Juul, clearly stated that *"computer games [were] simply not a narrative medium"* (**1999, PAG. 1**). At the beginning of the new century, within the newborn scientific field of game studies, this dichotomy between a narrative-oriented approach (supported by IDN scholars) and a game-oriented approach (supported by the ludologist) gave birth to a today overcame discussion, often referred to as the narratology vs ludology debate (chap. 1.2.3.).

The plethora of discussions that spawned through the years – of which the narratology vs ludology debate is just the most popular – reflect the often far apart fields from which practitioners, scholars and researchers are coming from and can be roughly summarized in *"IDN as a technical problem to solve"* and *"IDN as a new expressive form"* (**KOENITZ ET AL., 2013**). In order to better frame the state of the art and understand this kaleidoscopic view of perspectives, it is deemed valuable to catalog the main theoretical traditions *(fig. 1.1)*.

The IDN field of study has been expanding both in its scope and in its intents for the last forty years, empowered by the growing interest in the topic, the enormous technological advancements and the tight connections to other research fields, such as game studies, cognitive science and interaction design (**KOENITZ ET AL., 2015A**). Today it can rely both on a thriving academic discussion and on some popular case studies, such as Netflix's interactive movie *Bandersnatch* (**2019**) or David Cage's video games.

However, the act of seeing computers as *"the most capacious medium ever invented, promising infinite resources"* (**MURRAY, 1997, PAG. 101**) might have overshadowed the challenge of producing compelling and captivating narrative experiences, which are also pleasant to consume in terms of contents.

The state of the art suggests that the narrative design of IDN experiences with such a twofold attention to meaningful play experiences and engaging narrative is still often overlooked, resulting in narratives and characters that *"remain shallow, static and lack in believability, dramatic engagement and narrative deve-*

Figure 1. 1

List of IDN theoretical tradtions (KOENITZ ET AL., 2013)

Murray (1997)
IDN is an emerging expressive form
within the specific affordances of digital media

Mateas (1991), Laurel (2002)
IDN is an interactive version of linear Aristotelian drama

Ryan (2006)
IDN is a design problem in combining the opposing areas
of narrative and interactivity

Montfort (2005)
In IDN the outcome can be described in terms
of story/discourse, but we lack a description of the system

Davenport (1988)
IDN is an extension of the documentary tradition
in giving the interactor agency and allowing her
to discover the truth

Jennings (1996), Harrel (2009)
IDN is an extension of the African cyclical narrative tradition
and ritual interventions by the audience, which invites
many readings and also allows cultural biased computing

Hayles (2008)
IDN works with an important literary aspect that takes
advantage of capabilities and contexts provided
by the stand-alone or networked computer

Wardrip-Fruin (2009)
IDN is the potential of expressive processing
within the realm of fiction

Rieser (2002)
In IDN the encoding of mood, emotion and their syntax takes
precedence over plot and traditional forms of narrative technique

lopment" (ᴋᴏᴇɴɪᴛᴢ ᴇᴛ ᴀʟ., 2015ᴀ, ᴘᴀɢ. 2). In consequence, IDN is still infancy compared to other narratives and it needs a formalization able to convey and frame the complexity of the field and empower the new generations of authors that are willing to convey their messages through this peculiar medium.

This holds distinctly true with an extremely popular type of IDN, digital games: a thriving field with an impressive evolution over a rather short span of time. On one side, the big tech and entertainment companies follow the constant need of staying relevant by pushing hardware and software limitations with countless innovations. On the other hand, the means necessary to design a game are now available to everyone (often for free), empowering a new batch of independent authors and amateurs to create a game in a matter of days.

However, this new scenario hasn't been paired with a well-structured knowledge on interactive storytelling and, overall, there is a shocking lack of studies on how developers work with narratives (ᴇɴɢsᴛʀöᴍ, 2020). While big companies can now afford to recognize the importance of narrative design, small and independent teams still struggle to sustain and find the right tools and frameworks, that might result in a general disregarding of everything that is narrative during the design process and will eventually impact the final user experience.

1.1.2 Toward a unifying definition

Efforts to generate a shared and consistent terminology for IDN can be traced back to the 1980s but, to this date, the IDN field of study has *"framed but not solved its initial conceptual problems"* (ᴍᴏɴᴛғᴏʀᴛ ɪɴ ᴋᴏᴇɴɪᴛᴢ ᴇᴛ ᴀʟ., 2015ᴀ, ᴘᴀɢ. x), with discussions amongst scholars often identifying several potential opportunities for misunderstanding (ᴋᴏᴇɴɪᴛᴢ, 2014). Even if the same terminology is used, particular terms or concepts can have very different meanings depending on the different theore-

tical tradition of origin (par 1.1.1), resulting in ambiguity in the academic discussions or even when communicating with parties outside the academia context (KOENITZ ET AL., 2013). A good evidence of that is the very own name of the field.

Throughout the years there has been an abundance of terms that were trying to frame a narrative that could change according to the user input. *Fig. 1.2* outlines an overview synthesizing the different perspectives on the topic, which are detailedly discussed in the paragraph that follows. The term interactive storytelling is probably the most common, although ambiguous because of its inherent polysemy and connection to a large variety of artefacts. It is largely used by prominent practitioner Cris Crawford (2013) and, with its variant interactive digital storytelling, it appears in the *ICIDS (International Conference on Interactive Digital Storytelling)* acronym. Another common term, especially employed in education, is the more general interactive narrative (MARIANI & CIANCIA, 2019A).

The term interactive drama, instead, was introduced in the 1980s by the practitioners of Carnegie Mellon University's *Oz project* (BATES, 1992), that later inspired one of the most successful IDNs to date, Mateas and Stern's *Façade* (2003): an hybrid experimentation that achieved popularity beyond the research field and quite revolutionized the field gaming field by bringing to life complex AI-driven characters that interact with the users in many and unpredictable ways (ADAMS, 2005). The term is still used by scholars (SZILAS, 2002) and even in the mainstream field, by video game writers such as David Cage (LEJACQ, 2013).

Eventually, in scientific publications it is not uncommon to meet other formulations, like interactive fiction (MONTFORT, 2005; REYES & DETTORI, 2019) or narrative games (KOENITZ ET AL., 2015A). It is easy to demonstrate that these labels are all accurate, since they inherit the theoretical view from the application field of origin and imply more or less subtle meaning nuances. Interactive drama is employed when discussing narratives with a strong emotional arc, a scenic rendering of characters' beha-

Figure I. 2

List of the most common definitions of interactive narratives

INTERACTIVE STORYTELLING/ NARRATIVE
(Crawford, 2013), (Mariani & Ciancia, 2019a)
Widespread term that centers on the narrative aspects of the artefact, without focusing on the output (digital games, VR platforms, transmedia experiences). It is especially implied in the academic field, although rather ambiguous, due to its inherent polysemy and connection to a large variety of artefact

INTERACTIVE DRAMA
(Bates, 1992), (Szilas, 2002), (LeJacq, 2013)
Term employed when discussing narratives with a strong emotional arc, a scenic rendering of characters' behaviour and a careful detailing of events, often arranged according to linear neo-aristotelian story structures.

INTERACTIVE FICTION (IF)
(West, 1996), (Arinbjarnar et al., 2009)
Term often applied when referring to a specific subgenre of text-based narratives in which text is, to a certain degree, interactive.

NARRATIVE GAMES
(Montfort, 2005)
Medium-oriented term that focuses on the output and is used to define digital games with a strong narrative core (i.e. Heavy Rain or Firewatch).

INTERACTIVE DIGITAL NARRATIVE (IDN)
(Roth & Koenitz, 2017)
Umbrella term coined in the academic field with the attempt to encompass a vast range of manifestations (digital games, interactive movies, AR/VR experiences) and overcome possible ambiguities. IDNS are expressive narrative form in digital media implemented as a computational system and experienced through a participatory process by the user.

viour and a careful detailing of events, often arranged according to linear neo-aristotelian story structures (ARINBJARNAR ET AL., 2009). Interactive narrative is often used for systems that generate a high-level plot outline, while Interactive Fiction is often applied when referring to a specific subgenre of narrative in which text is, to a certain degree, interactive (WEST, 1996). On the other hand, terms like narrative games, employed at the *Game Developers Conference (GDC)*, clearly shows their connection to a more medium-oriented approach .

Montfort, in the preface of *Interactive Digital Narrative: History, Theory and Practice* (2015A, PAG. X) wrote that:

> "These different terms suggest their own different emphases and connections (to artificial intelligence or narrative theory, or traditions and theories of drama, or ludic interaction and video gaming) while, at the same time, the people working under these banners, and others, do truly share many common assumptions, use many similar techniques, and are often informed by each other's work"

The genesis of the term IDN is the attempt to overcome this nomenclature gap by making a concrete step toward a common theory. It comes from the efforts of different scholars, to find an umbrella term able to encompass a vast range of manifestations that includes digital games, documentaries, installation pieces, and AR/VR experiences (ROTH & KOENITZ, 2017).

Interactive digital narrative (IDN) defines both the field of study – as an *"interdisciplinary field, which includes scholars and practitioners with backgrounds in multiple disciplines"* (KOENITZ ET AL., 2015A, PAG. 1) – and the artefact, as a digital medium that changes according to the user input (KOENITZ ET AL., 2015A).

In its most recent formulation, Koenitz articulates more on the digital factor of these new systems, defining IDN as an *"expressive narrative form in digital media implemented as a computational system [...] and experienced through a participatory process"* (ROTH & KOENITZ, 2017, PAG. 180). This formulation significantly highlights the struggles to consider IDNs as a new narrative media with

their own narratology, which heralds not only *"a change in the technology of representation, and in the opportunities for artistic expression, but also a challenge to existing concepts in narrative theory, such as the role of the author and the concept of a single unified plot"* (KOENITZ, 2010, PAG. 2).

IDN tries to overcome the basic assumptions around narrative in the western world on several levels: as a matter of fact, Koenitz argues that *"traditional narratology has little to say about digital procedurality"* (2015A, PAG. 112), because it doesn't take into account computers' computational factor. The notion of digital procedurality covers a fundamental role in the IDN reasoning; as such it is explained in the next paragraph through Murray's seminal perspective on digital media artefacts and their features (par 1.1.3). The adoption of the IDN field of study challenges the way narrative is told, giving to the audience the ability to make meaningful choices and to see their effects (MURRAY, 1997). It clearly shows that narrative theory as it is cannot fully account for these changed conditions and clearly wants to stimulate a fervent and relevant discussion around new narrative paradigms, trajectories and best practices.

1.1.3 IDN constituents

If Laurel in *Computers as Theatres* (1991) was the first to touch on the expressive potential of computers in the act of designing narratives in which the audience is allowed to have a certain level of agency, Murray was the first to deliver a clear analysis of the main IDN constituents, providing the foundation of a well-defined framework for understanding digital media artefacts (KOENITZ ET AL., 2015A).

In *Hamlet on the Holodeck*, Murray defines these constituents as *"the four essential properties of digital environments"* *(fig. 1.3)*. In particular she says that digital environments are procedural, participatory, spatial and encyclopedic (1997, PAG.71).

Figure I. 3

Properties of the digital environment and the user experience
in a IDN artefact, as defined by Murray (1997)
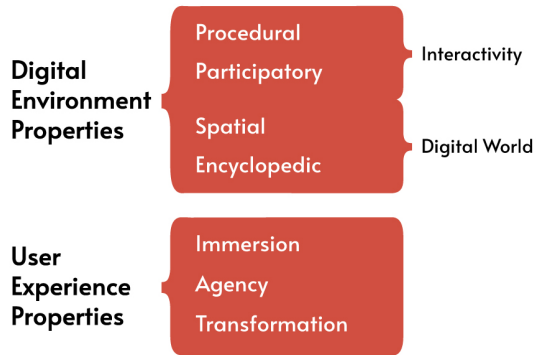
The first two properties, the procedural affordances (the computer's ability to execute a set of rules) and the participatory affordances (the computer's ability to react to user input), describe the phenomenon of interactivity. The definition of interactivity adopted for this discussion comes from Crawford (**2013, PAG. 28**) as *"a cyclic process between two or more active agents in which each agent alternately listens, thinks and speaks – a conversation of sorts"*. Instead, the spatial affordances (the computer's ability to represent space) and the encyclopedic affordances (the computer's ability to represent and process huge amounts of data) help to make digital creations seem *"as explorable and extensive as the actual world"* (**MURRAY, 1997, PAG. 71**). The computers' ability to represent worlds – or, even better, their preoccupation with space (**AARSETH, 2001B**) – has been regarded as one of the crucial points of the IDN revolution, especially by ludologists. Following the formulation of the digital environment constituen-

Figure I. 4

High level view of IDN (KOENITZ ET AL., 2015)
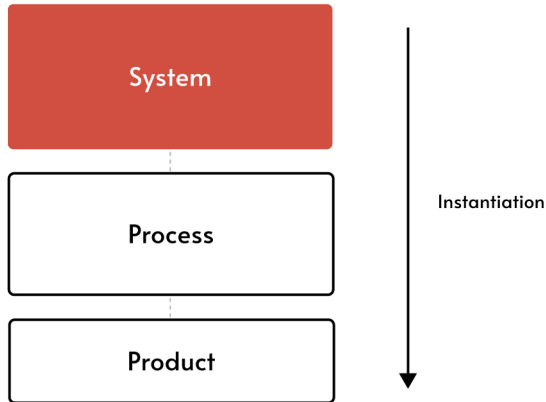
ts, Murray also defines three phenomenological categories (or pleasures) able to describe the user's experience during the interaction *(fig. 1.3)*: immersion, agency and transformation.

Immersion is the ability of a digital artefact to hold our interest and cause the suspension of disbelief, giving the sensation of being surrounded by a completely other reality (MURRAY, 1997). **Agency** is the satisfying power to make meaningful action and see the results of decisions and choices (MURRAY, 1997), the user's ability to affect or change in a meaningful and intelligible way the digital artefact. **Transformation**, finally, is the computer's ability to create alter egos:

> "The transformative power of the computer is particularly seductive in narrative environments. It makes us eager for masquerade, eager to pick up the joystick and become a cowboy or a space fighter" (Murray, 1997, pag. 154)

Figure I. 5

Theoretical model of IDN systems (KOENITZ ET AL., 2015)
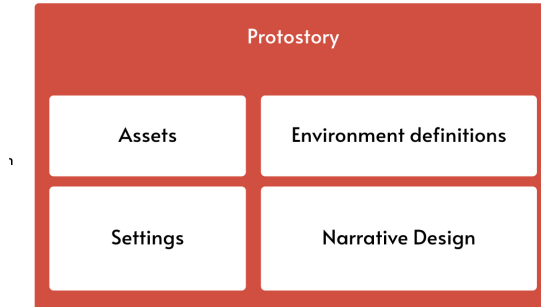
Once defined the main IDN constituents, it is necessary for the understanding of this research to adopt and discuss in depth one of the many theoretical models that explains the functioning of IDN. Even if the product of a Interactive Digital Narrative might be considered as a narrative in a more traditional sense, the tools and methods of classical narratology cannot be effectively applied to describe the phenomenon, since they are not taking into account the interactive process to produce the output and the computer systems (KOENITZ ET AL., 2015A).

Koenitz suggests that IDN needs to be understood as *"comprised of system, process and product"* (KOENITZ ET AL., 2015A, PAG. 97) *(fig. 1.4).* He uses the term *system* to define the combination of software and hardware (including programming codes, controllers and displays) that contains several potential narratives. When the user engages in an interaction a *process* is initiated, in which the

user has agency over the different system opportunities. The result of this *process* is a single instantiated narrative that, given the high complexity of the system, can vary from user to user (ᴋᴏᴇɴɪᴛᴢ ᴇᴛ ᴀʟ., 2015ᴀ). Given the quality of IDN as a system, traditional narrative concepts like *plot* and *story* need to be revised as their original meaning is outdated considered in this new context. For this reason Koenitz introduces three new terms, as the foundation of a specific narratology for IDN: *protostory, narrative design and narrative vector* (ᴋᴏᴇɴɪᴛᴢ ᴇᴛ ᴀʟ., 2015ᴀ, ᴘᴀɢ. 99). The *protostory* is a procedural blueprint that defines the space of potential narratives contained in one IDN system, and describes both concrete programming codes and interactive interfaces.

The term *narrative design*, or *narrative segmentation* (ᴍᴀᴛᴇᴀs & sᴛᴇʀɴ, 2003) describes the structure encapsulated inside a *protostory*, and includes the sequencing of elements as well as the connections between them. The actual design of these segmentations and the way they are linked is the very foundation of this research's prototype and it is discussed in depth in chapter 2. Finally, the *narrative vectors* are roughly the equivalent to the plot points in legacy media (ꜰɪᴇʟᴅ, 1994), and they describe substructures encapsulated inside a narrative design that provide a specific direction. The interdepencies between a system, a process and a product, and their declination in protostory, narrative design and narrative vectors results in a theoretical IDN framework, as seen in *(fig. 1.5)*.

1.2
DIGITAL GAMES AS IDN

The object of study of this discussion belongs to the field of digital games, here reputed as the most representative, yet mature, type of IDN, with its virtuous history of technological innovation, successful case studies and ongoing academical interest. But IDN artifacts are shapeshifting systems that can hardly be encapsulated into distinct and absolute categories, which won't be able to clearly return the entire spectrum of experiences arising from the narrative. The field of digital games itself can include artefacts that are very different one from the other, such as a violent first-person shooters thought for entertainment and a rehabilitation experience for cancer patients, or a fantasy open-world adventure and a serious game about immigration.

Thus, the second part of this first chapter sets up by making a general classification of IDN artefacts, openly knowing that it is one of the many possible approaches and it is far from being even remotely exhaustive (par. 1.2.1.). The classification here adopted comes from *Interactive digital narrative: history, theory and practice* by Koenitz and colleagues (2015ᴀ), which approaches IDN artefacts by focusing on their form (their visual and physical manifestation) and eventually defines three possible IDN trajectories: text-based, cinematic and ludic, with digital games belonging to the latter.

Subsequently, the chapter focuses on defining the matter of interest, starting by justifying the use of the denomination digital games (instead of the more popular videogames or computer games), as an umbrella term that can embrace arca-

de, computer, console and mobile games all together. A brief description of its evolution and state of the art follows (par. 1.2.2.). Any possible sub-classification or discussion about digital games based on genre has been voluntarily avoided and considered unproductive, since the aim of the study is to validate a collaborative framework for the narrative design of any digital game and because, above all, this discussion focuses on digital games solely as narrative artefacts.

In conclusion, the last part of the chapter is focused on justifying this last statement (par. 1.2.3.). It eviscerates this stance first by diving into the problem and the debate that it sparked (known as the narratologists vs ludologists debate) and then, following some semiotic and theoretical reasoning, it eventually solidifies into three statements that marks the foundation of this research:

- The fact that some games are more abstract than other does not necessarily mean that they lack narrativity.
- Digital games are dispositives (or *story machines*) that generate different plots each time they are played.
- Game designers can't eventually control the entire narrativity of the game.

1.2.1 IDN Trajectories

As of today, the diversity and richness of IDNs have always led to partial classifications. These attempts might be considered effective in connection with the context or field in which they are formulated – like entertainment, or learning (SPIERLING, 2005) – but they are unable to clearly return the entire spectrum of experiences arising from interactive narratives. IDNs are narratives instantiated by a user-system interaction that varies from user to user (par.1.1.3.) and precisely because of this shapeshifting nature it's impossible to frame IDN artefacts

into fixed and absolute categories, such as genre (CIARLINI ET AL., 2010), used media, technology or narrative structure. Thus, the classification here adopted is one of the many possible: it doesn't want to be considered exhaustive, but is preoccupied in framing the facets of digital games as a type of IDN. It comes from the book *Interactive digital narrative: history, theory and practice* by Koenitz and colleagues (2015B), in which IDN is approached defining three main trajectories, centered on their form (the visual and physical manifestation of the artefacts):

- *Text-based* IDN.
- *Cinematic* IDN.
- *Ludic* IDN.

These trajectories are not exclusive because the same artefact can be easily related to different trajectories.

Text-based IDNs are interactive narratives rendered in the form of text on a screen, in which the user has agency over the story by using the keyboard. Two are the main sub-genres: interactive fiction (in which narrative is rendered procedurally and text is often accompanied by graphic elements) and hypertext fiction, an attempt to formulate a new literary genre that could not be represented on paper (NELSON, 1965).

Interactive fictions (IF), also known as text-based games *(fig. 1.6)*, are one of the first manifestations of computer games (WEST, 1996), in which the user controls, using text inputs, the game state (rendered on a screen as a textual description of events, environments and, less frequently, dialogues). The early text adventures owed their existence solely to computing, being essentially narration-action loops able to process parsed text inputs (ATKINSON ET AL., 2019). An example of a prompted game state would be:

```
You enter a dark room. It's pitch black and you can't see
anything. Behind you the door to the corridor is still open.
```

Figure I. 6

*Screen taken from a reconstruction of Crowther's Colossal Cave adventure (**1977**)*
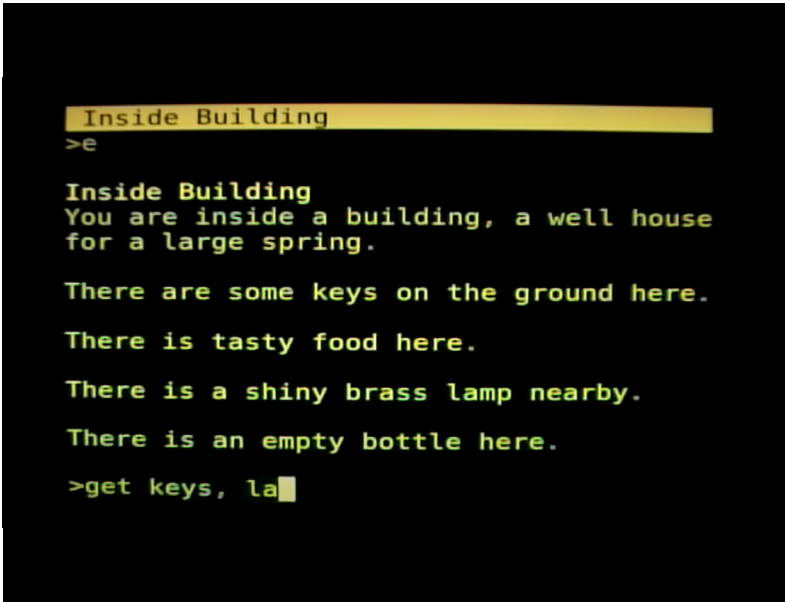
Examples of a verb/ verb noun input by the user are:

> **"Take lamp", "Go back", "Check inventory".**

The title *Colossal Cave Adventure* is considered the first ever published text-based game. Written for fun by Will Crowther in 1975 and expanded by Don Woods in 1977, the game was distributed for free before having its first commercial release in 1981 by the software company *Toolworks* (MONTFORT, 2005). Adventure was met with great success since its very first days, eventually spawning an entire segment of software industry (BILOFSKY, 2014). However the genre achieved mainstream success with the software company *Infocom*, that published the *Zork* games between 1980 and 1982 (ATKINSON ET AL., 2019). These early interactive fiction games typically involved exploration, treasure hunting and fantasy references (ATKINSON ET AL., 2019) and later became more sophisticated, incorporating different graphical

elements (WEST, 1996). At their peak they were able to understand full sentences and integrated complex narratives with puzzles that not only were controlling the revelation of the narrative but also generating narrative through typing (MONTFORT, 2005).

Between the titles published in these years, it is worth mentioning two wildly popular interactive fictions that were based on books: *The Hobbit* (1982) and *The Hitchhiker's Guide to the Galaxy* (1984). The latter is an interesting artefact because it involved the development of the author of the original book, that expanded the original story in what can be considered for all intents a transmedia narrative attempt.

The popularity of interactive fiction started to decline in the '90s, when graphic interfaces became popular and led to the exploitation of digital games. However, in the new century, the need of new authors and game creators of a cost-effective tool, with which they could express their vision easily, led to the resurgence of IF as an expressive genre, opposing the direction taken by mainstream games, that were requiring increasingly larger technical teams and softwares (FRIEDHOFF, 2013). The main example of this trend is the birth of *Twine* in 2009, a web platform (also available as a standalone app) that enables the creation of interactive fictions without knowing much about coding. Starting from 2012 *Twine* gained immense exposure, building an active community of authors that used the platform to write not only entertaining choose-your-adventure IF, but also to fight for the representation of diversity in the game industry (HARVEY, 2014). As of today *Twine* is largely used in the educational field, and has been even employed by Charlie Brooker, the creator of Black Mirror, to prototype his interactive movie *Bandersnatch* for Netflix (REYNOLDS, 2018).

Hypertext fiction (HF), or hyperfiction, was conceived as a postmodernist literary genre that would overcome the limitations of the printed book and would embrace the digital media by turning the readers into participants or, as Murray calls them, interactors (1997). Even if it shares many similarities,

hyperfiction is often put in contrast to IF by its authors. An easy discrimination beetween the two subgeneres would be to think IF as a game rendered in the form of the text, and HF as an interactive book that requires to be read on digital screens. Murray defines HF as a set of documents of any kind which are mutually connected through links' (**1997**). The story is split into different chunks of information called lexias, or reading units, (**LANDOW, 1991**) that are accessed in non-sequential order.

Hyperfictions became popular in the 90s with the advent of the world wide web. A notable work is *Afternoon, a story* by Michael Joyce, widely considered as a pioneering and experimental piece of work that is still sold and delivered via USB stick. As of today, authors and are taking HF for granted, having been raised by encyclopedias on CD-ROM (or Wikipedia) and hypertext presentations on powerpoint (**MURRAY, 1997**).

Cinematic IDNs are interactive narratives rendered in the form of moving images and sound (**KOENITZ, 2014**), offering to the interactors the opportunity to impact the story by choosing between different options at predetermined points of the narrative discourse (**SHAUL, 2008**). Cinematic IDNs are often popularized with the terms interactive cinema and interactive film and share a similar evolution to the ludic IDNs to such an extent that interactive movies are often considered digital games (**WEST, 1996**) and digital games are called cinematic when they succeed in establishing a deep emotional engagement with the player (**VEALE, 2012**). As a matter of fact many interactive movies are now available for fruition on gaming platforms, such as *Steam* or *GOG* (**WEBER, 2017**). However, the main difference beetween cinematic IDNs and ludic IDNs (besides the the typology of interaction, that in the latter becomes more complex and articulated) is that interactive cinema presents previously pre-recorded sequences that the interactor can access in a non-linear fashion, while in digital games the sequences are procedural and rendered in real-time. As of today there exists

Figure I. 7

Screen taken from Don Bluth's interactive movie Dragon's Lair (**1983**)
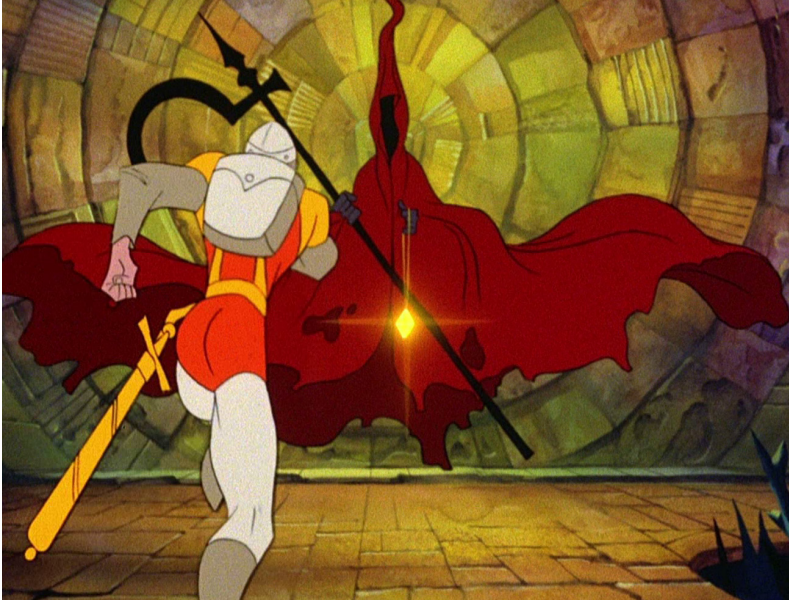
some attempts of real-time manipulation also in interactive cinema (ᴛᴏꜱʜɪʏᴜᴋɪ & ᴍᴀʀɪᴄʜᴀʟ, 2003), but they are still experimental (or artistic) endeavours.

The earliest attempts to combine cinematic experiences and interactivity date back to the 60s. The first ever interactive movie is considered to be *Kinoautomat* by Radúz Činčera in 1967. At nine points during the film the action stopped and the audience was asked to choose between two scenes, the chosen scene was then played by the projectionist (ʜᴀʟᴇꜱ, 2005). However a direct and more complex interaction was not possible until the late 70s with the marketing of the laserdisc technology (by MCA/Philips, Pioneer and RCA), that allowed random access to every point in a video via computer interface (ᴋᴏᴇɴɪ-ᴛᴢ ᴇᴛ ᴀʟ., 2015ʙ). In the following years laserdiscs became more common and various companies invested in the production of interactive movies. A notable example is the 1983 interactive

Figure I. 8

Screen taken from Death Stranding (KOJIMA PRODUCTION, 2019)

movie *Dragon's Lair*, produced by *Advanced Microcomputer Systems* and designed by a former *Walt Disney* animator, Don Bluth *(fig. 1.7)*. That year *Dragon's lair* was considered the most in-fluential game and grossed over $32 million, spawning seve-ral sequels (ARAR, 1984). The laserdisc technology remained in use until late 90s, when it was superseded by the DVD tech-nologies. There were also attempts to make interactive TV programs, like the 2000 danish experiment *D-Dag*, that was showing four different narratives on separate channels, plus an additional channel presenting the directors' commentary (KRAGH-JACOBSEN ET AL., 2000).

Unlike the digital game industry – that in a couple of deca-des skyrocketed, imposing itself as one of the most profitable markets in entertainment (NEWZOO, 2020) – interactive cinema was never able to evolve and become a profitable market. Despite this limitations, as pointed out in Lunenfield's contribution to

Ryan's *Narrative Across Media: The Languages of Storytelling, "the failure of this form has never dampened the enthusiasm of its proponents, and its very lack of success has occasionally inspired even greater fervor to get it right. In this, interactive cinema has ascended into the realm of the mythic"* (2004. p.373). As of today, the biggest efforts in the field (aside from the many scholastic and independent experimentations published every year) are made by the streaming giant Netflix. The platform already offers in its catalogue a variety of interactive movies but is expected to release even more content in the next few years (RAMACHANDRAN, 2019), motivated by the enormous success of its 2019 interactive film *Bandersnatch*.

Ludic IDNs are interactive narratives in which the user engages in a complex interaction able to electronically manipulate images produced in real-time by a computer program, and are identified with the term digital game or, popularly, videogame (par. 1.2.2.). These interactive narratives are the one that benefitted the most from the different technological advancements – such as advanced AI, graphic representation and increased storage capacity *(fig. 1.8)* – and are the ones that undoubtedly popularized IDN to the masses (KOENITZ ET AL., 2015A). Ludic IDNs are, at their core, games (ESPOSITO, 2005), that return a certain narrative through the intertwining of a complex set of mechanics and interactions with the user. The category includes artefacts that are very different one from the other: console games, educational games, experimental games or poetic games. Even some digital activities that are meant to support the recovery of patients (like the one detailed in par. 4.2.1) are to be considered digital games.

The aim of this study is to inspect these special types of IDNs, given their broad spectre of applications, virtuous history of technological innovation, relevant case studies and ongoing academical interest. However it will not delve into the field of game studies (taking for established its terminology); instead it will approach the matter from a narrative point

of view. In this, as argued in par 1.2.3, the study sets foot in a dangerous debate (of which the narratology-ludology is just the tip of the iceberg) and defines digital games as a specific type of interactive digital narrative, consciously implying that every digital game can be, to a certain degree, a narrative artefact.

1.2.2 Digital games: definition and evolution

First and foremost, the category of Ludic IDN can include such artefacts as interactive exhibitions or hybrid digital art. These experimental (or artistic) forms of IDN are not the object of study and will not be considered, since this work is mostly preoccupied with Ludic IDNs that have an understandable design process and a clear reference market (whether it is entertainment, education or health). Therefore the object of this study are digital games. Many scholars – such as Herz (1997), Poole (2000) or Wolf (2002) – use platform-specific terms like video game or console game (KERR, 2006) to refer to the entire area of digital games. This choice is understandable – considering the relative novelty of the field (similarly to what happens with IDN, as discussed in par. 1.1.2) – however, with the formation of the *Digital Games Research Association (DiGRA)* in 2003, digital game emerged as a more suitable term, able to encompass the entire spectrum of application.

This study uses the term digital game in this very acceptation, as an umbrella term that can embrace arcade, computer, console and mobile games all together. Thus, the emphasis will not be on the computational system (or console) that runs the artefact, but on the artefact itself: a text with specific features and meanings, that can be interpreted, studied and designed (HORBAN & MALETSKA, 2019). As a matter of fact, the act of referring to games in relation with a specific console (outside the computer science field) can be misleading: many digital games are now launched, adapted and played on different consoles. *Mojang*

Studios' best selling game *Minecraft* was released in 2009, ported on mobile devices in 2011 and distributed on consoles from 2013; *Nintendo* changed its status as a first-party company when it opened up to third-party game developers with the *Nintendo switch*, with a rich catalogue that now mirrors the ones of *Sony* or *Microsoft* (ᴀᴜsᴛɪɴ, **2019**). Today even games that are launched as console exclusives are subsequently ported, becoming just temporal exclusives: for example the *Crash Bandicoot* franchise, that has been a household name for *Sony* for decades, is now distributed also on computers and Nintendo consoles.

Esposito defines video games as *"a game which we play thanks to an audiovisual apparatus and which can be based on a story"* (**2005,** ᴘᴀɢ. **1**). Rephrasing this interpretation and extending to a larger context, while considering also the importance of interactivity and the digital environment, a suitable definition of digital game could be:

> Digital games are games in which the user plays with a digital environment through the use of a controller.

The first experimentations of games within a digital environment date back to the 60s. Similarly to what happened in the IDN research field with *Eliza* and *Colossal Cave Adventure* (par. 1.1.1), scholars and historians are still debating on which title can be considered the origin of this new cultural form (ᴋᴇʀʀ, **2006**): Poole designates the 1958 MIT experiment *Tennis for Two* (**2000**), while Hertz enthroned Steve Russel's 1962 *Spacewar!* as the first ever digital game (**1997**). Likewise, early text-based games can effectively be considered as digital games, especially in the 70s, when graphic and spatial visualization were still in their infancy.

However digital games began to build interest with the marketing of the first commercial games and the birth of arcade games *(fig. 1.9)*: the most famous one being *Pong*, developed by *Atari* in 1973. In the 80s arcade games reached their peak status, offering different kinds of games, from shooters, to racing

to adventure and sport games. These games were rendered in a 2D environment, usually with monophonic sounds and minimal interaction. Notable titles of this arcade generation are *Space Invaders* (ᴛᴀɪᴛᴏ, **1978**), *Pacman* (ɴᴀᴍᴄᴏ, **1980**), and *Donkey Kong* (ɴɪɴᴛᴇɴᴅᴏ, **1981**). Big gaming companies, that are still in business as of today, saw the light during those years (ᴍᴇᴅᴊᴀʜᴇᴅ & ᴍᴇssᴀᴏᴜᴅɪ, **2018**), like *Bandai*, *Capcom* or *Sega*.

In the same decade digital games started to be commercialized for home use. In 1977 *Atari* introduced the *Atari 2600* console, which was working with cartridges, and in 1983 *Nintendo* released the *Nintendo Entertainment System (NES)* with huge acclaim: this console marked the debut of *SuperMario Bros* (**1985**), *Metroid* (**1986**) and *The legend of Zelda* (**1986**), game franchises that heavily influenced culture and that are still been played by a great number of users.

By the time of the release of the *Playstation* by *Sony* in 1994 and the release of the *Xbox* in 2001 by *Microsoft*, the videogame had become a solid market, moving its first steps in the so-called console war (ᴍᴇᴅᴊᴀʜᴇᴅ & ᴍᴇssᴀᴏᴜᴅɪ, **2018**). During these years games like *Doom* (**1994**), *Sims* (**2000**) and *Grand Theft Auto III* (**2001**) revolutionized the medium.

It is worth mentioning that during these years Mateas and Stern's *Façade* (2003) came out, and carved its own spot among the other successful entertainment-based digital games. Initially developed as an academic experimentation on AI characters, this real-time interactive drama revolutionized the field of gaming by bringing to life complex characters able to interact with the users in many and unpredictable ways. After its release, *Façade* achieved popularity beyond the research field and it still is considered one of the milestones of modern gaming.

Starting from the 90s, with a huge gap in graphic representation, the introduction of 3D environments and a higher sound quality, the field of digital games has always seen an unstoppable and steady rise. Another, more recent, innovation

Figure I. 9

*Screen taken from Nintendo's arcade game Donkey kong (**1981**)*
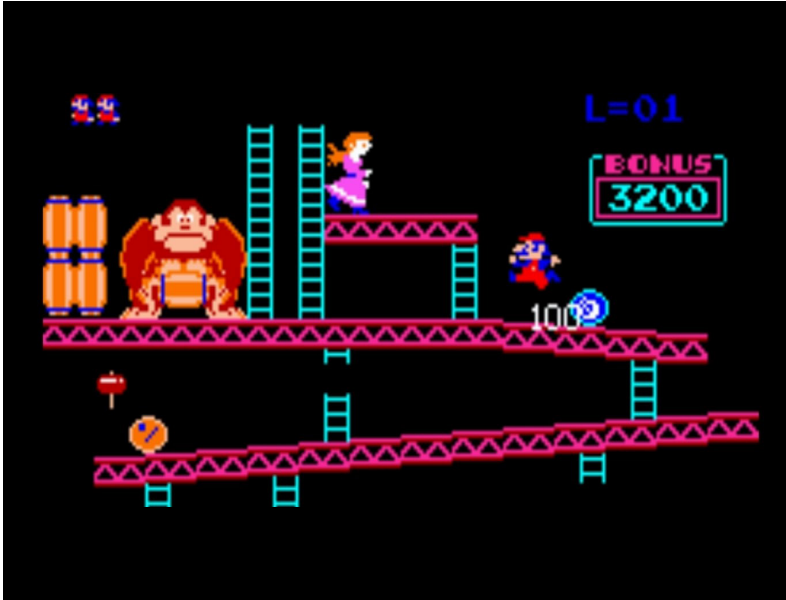
in the field came with the introduction of the internet and the opportunity to play online with other users from everywhere in the world, with games like *World of Warcraft*, *Overwatch* or *Fortnite* becoming massive hits; the latter even being able to gather a community of more than 350 million players (ꜱᴛᴀᴛᴛ, **2020**).

This impressive evolution over a rather short period of time has established digital games as an interesting field of research and experimentation. As pointed out in the book *Understanding Digital Games* by Rutter & Bryce *"the combination of impressive market value and increasingly powerful technology is a frequent starting point in a substantial amount of writing on digital games"* (**2006, ᴘᴀɢ.10**), and rightly so: the business of making digital games has evolved through the years into a remunerative market that rivals, and even surpasses, the one of films and music (ʙᴀʏʟᴇʏ, **2018**). As a matter of fact, in 2020 the digital game market was considered worth 179.7 Billion dollars *(fig. 1.10)*.

Figure I. 10

Digital games revenue stream in the last three years, in billions (IDC, 2020)
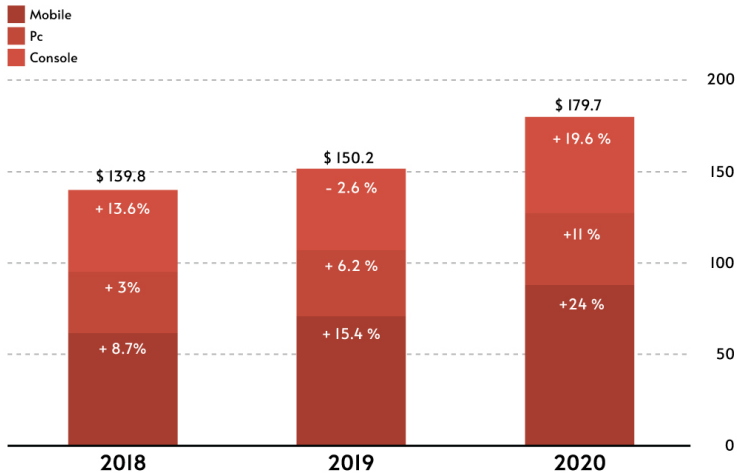
Digital games are impacting society in ways that are still largely discussed in several research contexts: computer science, game studies, interaction design, even literature and social studies. Their impact has created an undeniable cultural revolution that doesn't regard solely the leisure field, but also health, education or activism: the so-called field of serious games. In the last ten years the number of digital games in support of learning or recovery practices or in defense of cultural and political ideologies, has increased tremendously, simultaneously reaching an impressive level of quality and playability (DJAOUTI ET AL., 2015).

Furthermore, with the widespread availability of cheap and easy tools for designing games such as *Unity 3D* or *Unreal* (alongside with open source 3D modeling softwares like *Blender* and a solid online community), the opportunity to publish a digital game is not anymore a prerogative of big companies (also

called AAA game companies): this quickly led to the birth of a new branch of the market, called indiependent gaming (or indie gaming), that often produces smaller, more personal and experimental games (DOMÍNGUEZ, 2019).

Paraphrasing the words of Murray (2018), this kaleidoscope of gamers, coders, writers, designers, artists or even just enthusiasts is one of the main reasons why the research about the design process and the best practices of a digital game are particularly actual. However, the most neglected steps of this design process are, undoubtedly, the one interested in the narrative, probably due to the troubled and complex relationship that still remains between the very idea of game and narrative (par. 1.2.3) and the relative novelty of narrative design practices (par. 2.1.2).

Historically, digital games used to stress on being games with a minimal narrative in order to keep the player engaged (MEDJAHED & MESSAOUDI, 2018) but, in the recent years, this balance has shifted in favour of stories and narrative-based games, both in the AAA (with titles like Quantic Dreams' *Detroit:Become Human* or Santa Monica Studio's *God of War*) and in the indie field (with titles like FullBright's *Gone Home* or Giant Sparrow's *What remains of Edith Finch*). This dichotomy has given birth to the infamous narratology vs ludology debate and is now pushing toward a new set of practices and skills to be implemented into the digital game design process (par.2.1.1).

1.2.3 The dilemma of narrativity in digital games

By approaching digital games as narrative artefacts, this study deliberately sets foot into a slippery and dangerous field that has been the object of controversy and discussion for years. Hence, it is vital to offer to this stance its due clarification.

In the first, experimental, decades of their history, digital games have been often compared to linear narratives or analyzed with inadequate tools that derive from books or movies;

one of the notable examples is the seminal *Computers as Theatre by Laurel* (**1991**), that makes a parallel between human-machine interaction and theatre drawing knowledge from Aristotle's *Poetics* (further discussed in par. 2.2.1).

However, with the advancement and formation of the Game Studies field, digital games began to be seen differently from any other media and to consider the player not only an interpreter, but also an actor (ʜᴏʀʙᴀɴ & ᴍᴀʟᴇᴛsᴋᴀ, **2019**). In fact, as stated by Aarseth in *Cybertext*, *" to claim that there is no difference between games and narratives is to ignore essential qualities of both categories"* (**1997, ᴘᴀɢ. 20**). But the conversation that spawned, mostly preoccupied with the legitimation (or the possible intertwining) of game and story has led to a debate in 2001, marked with the publication of the first issue of the online journal Game Studies (ᴀᴀʀsᴇᴛʜ, **2001ᴀ**): the so-called ludology vs narratology debate.

Ludologists – of which scholars Aarseth, Eskelinen and Frasca have been the most vocal members – claimed that games and narratives were mutually exclusive, while narratologists claimed that gameplay could only be understood in relation to the narrative dimension. Juul, in his 1999 influential publication *A clash between games and narrative*, states that computer games are not a narrative medium (**1999**).

To corroborate this thesis the ludologists have often referred to the category of abstract games, like *Chess* or *Go*, because they do not fill the basic conditions of narrativity (ʀʏᴀɴ, **2005**). The case study that they often point out to is Tetris. As explained by Juul:

> "Tetris [...] contains no frame story or any indication of what you are "really" doing: the squares on the screen seem to be nothing but squares on the screen: You can have a computer game without any narrative elements" (**2001, ᴘᴀɢ. 3**)

On the other side, the narratologist, or narrativist (ꜰʀᴀsᴄᴀ, **2003**), argue that many games have quest structures, and most computer games have protagonists. In *Hamlet on the Holodeck*,

Figure I. II

Screen taken from Taito's Space Invaders (**1977**)
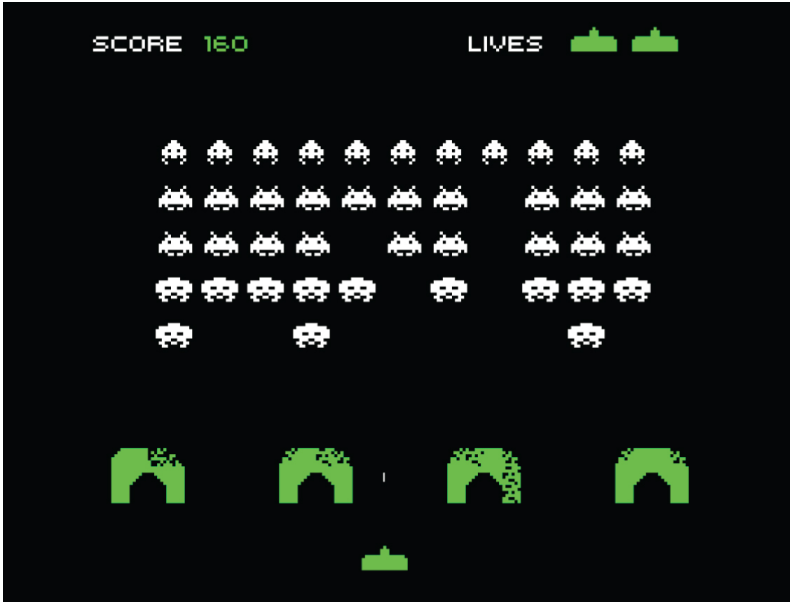
Murray suggests that these similarities indicate that games and narratives are not very far apart (**1997**). Jensen has even gone further, stating that computer games, while being deviant, are narratives (**JENSEN, 1988**).

An explicative case study to corroborate this thesis is the arcade shooter *Space Invaders (fig. 1.11)*. As explained again by Juul, who retracted many of his 1999 argumentations and softened his views on the topic throughout the years:

> "If we play Space Invaders we are presented with an ideal story. [...] It is clear from the science fiction we know that these aliens are evil, so the title suggests a simple structure with a positive state broken by an external evil force. It is the role of the player to recreate this original positive state. This is, of course, a sequence often found in folk tales: An initial state, an overturning of this state, and a restoration of the state." (**JUUL, 2001, PAG 6**)

Figure I. 12

Tetrad from Schell's book The Art of Game Design: A book of lenses (**2008**)
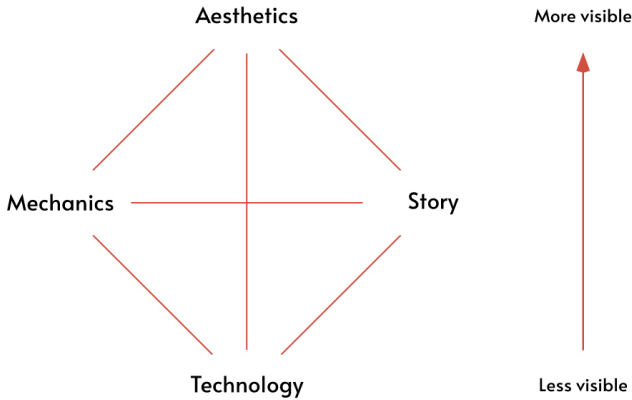
The real fight that narrativist were prosecuting was the legitimation of digital games as a new literary medium (ꜱᴏᴍᴇʀᴅɪɴ, **2016**), aided by the growing interest of story-driven games, both in the indie realm and in the blockbuster field. There have been attempts to recognize this trend on a popular level, above all the *Writers guild of America (WGA)* establishing (but then dropping in 2019, for lack of content) a special award category for game writers (ʙʀᴏᴡɴ, **2019**). Ludologists have defended the independence of digital game studies fearing that it would be overwhelmed by a neo-colonial discourse (ꜰʀᴀꜱᴄᴀ, **2003**) and be incorporated into other studies like Humanities or Media Studies. Aarseth warned about this eventually in his 2001 article on the journal *Game Studies*:

> "Games are not a kind of cinema, or literature, but colonizing attempts from both these fields have already happened, and no doubt will happen again." (**E. Aᴀʀꜱᴇᴛʜ, 2001ᴀ, ᴘᴀɢ.1**)

However, through the years scholars have softened their positions (just like Juul), while some of them have even settled the debate as non-existent, or based on a terminological misunderstanding (FRASCA, 2003), but it is still common to encounter polarizing stances on the topic.

Even if in 2005 Murray formally announced the end of this debate (2005), the coupling of narration and interaction still sparks vivid debates and remains influential, especially in the professional practice of game design, where gameplay and narrative are often seen as opposing parameters (KOENITZ ET AL., 2015B).

Thus, games can't be considered as a mere subset of stories anymore (MURRAY, 2005), but as a vital part of a much broader system in which all the elements are intertwined and perpetually in communication. As a matter of fact, Schell, in his renowned tetrad *(fig. 1.12)*, defines the story only as one of the four components of a game, along with the mechanics, the technology and the aesthetics (2008).

Talking about narrativity in relation to games should go beyond the common sense definition of a narrative with characters that figures in place and time (RYAN, 2006). In this, it is not an heresy to acknowledge digital games as narrative artefacts and, as such, try to make a leap and imagine a process with which it is possible to handle everything that is narrative (namely the narrative design process, as in par. 2.1.2). However, given the possible theoretical misunderstanding, this statement, which is the very foundation of this study, needs to be clearly framed in the light of the aforementioned discussion.

First and foremost, we should distinguish concepts like *narration (or narrative)* from *narrativity* (POST, 2009). Ryan defines narrative as a cognitive construct that transcends media, disciplines, and historical as well as cultural boundaries (2006). Texts of any kind can *have a narrative* (meaning that they are able to invoke a narrative script) or either *be a narrative* (meaning that they are

consciously produced with the aim to evoke specific narrative images). As a matter of fact, digital games without cutscenes, dialogues, text or any sort of linear narrative can still evoke narrativity through the interaction with objects, mechanics or aesthetics, as in *Space Invaders*. Thus, the fact that some games are more abstract than others, does not necessarily mean that they lack narrativity (POST, 2009).

Secondly, digital games are not linear narrations, but dispositives (or story machines) that can generate different plots each time they are played (FERRI IN BERTOLO ET AL., 2014). These story machines share a common trait with traditional storytelling, since they establish how the game works by setting a goal and defining an obstacle (SOLARSKI, 2017). As said by Schell in *The art of game design: a book of lenses* (2008):

> "A good game is like a story machine — generating sequences of events that are very interesting indeed." (2008, PAG. 265)

Finally it is vital to point out that to play a game is to always co-create the narrative with the game. The player and the game take turns reacting to another's actions, creating a sequence of interconnected decisions that collectively comprise a narrative (KREMINSKI, 2017). No matter how carefully designed the game is, the players will inevitably miss some story-relevant details and bring their own perspective, to a certain degree, to the play experience. Thus, the game designers, while being able to craft many elements of the narrative, can't eventually control the entire narrativity of the game: they can only set up *"a possibility space that naturally affords certain kinds of narrative experiences for the player to explore"* (IBID. 2017, PAG. 2).

These three considerations are the very foundation of the narrative design process prospected in the next chapter, which is not intended to outclass the gameplay by imposing narratives with the force but, conversely, it is occupied in conveying narrative information through the game. In the next chapters

it is demonstrated that the best practices emerging from a narrative design approach can greatly improve the entire game design process, especially in smaller (or indie) teams that lack knowledge and are in need to establish a precise communication between professional figures with different backgrounds (such as coders and concept artists, game writers and marketers).

NARRATIVE DESIGN

This discussion focuses on the narrative design of a specific type of IDN: digital games. What probably drives the most excitement toward digital games is their steady and rapid evolution over time. From a technical standpoint they manage to continuously push hardware and software limitations, spawning new aesthetics, mechanics and genres (FROMME & UNGER, 2012). From a design standpoint they always allow new manner of interaction and engagement with the user (ENGSTRÖM, 2020). From an academic standpoint they allow endless experimentation opportunities and topics of study. And finally, from an economic standpoint they provide a fresh and thriving segment of the market, that really is the reason to be for its relentless innovation and investment opportunities. Over the years game studies have advanced the research around the state of the art of digital games in several directions, but the approach of narrative and its related working tools have been shockingly neglected (ENGSTRÖM, 2020), especially during the pre-production phase:

- There isn't an established script format for the interactive narrative. The world, characters and plots are created and managed through a variety of documents, from word and excel to common screenwriting softwares (ENGSTRÖM, 2020).

- Communication between the different departments on narrative-centered topics is fragmented and inadequate; developers are forced to interpret complex decisions wi-

thout possessing the sufficient knowledge. Furthermore they can not access a platform in which they can contribute to the design process (ENGSTRÖM, 2019).

- It is often impossible to test game narratives during the prototyping phase. Early forms of gameplay can be experienced pretty early on the development, however narrative isn't included (NORMAN & KIRAKOWSKI, 2018).

Practitioners and researchers are today more and more focussing their attention on these issues, giving them the expected attention: the *Game Developers Conference (GDC)* is hosting frequent talks about narrative design (MALONEY & STIRPE, 2018; VARA ET AL., 2019; SWORDS, 2020), many design schools are beginning to experiment with the topic (MARIANI & CIANCIA, 2019A) and the industry is trying to incorporate a better narrative sensibility to the design process, with big companies (like *THQ, Ubisoft* and *Naughty Dog*) employing specific figures to oversee the narrative design of their games. The reasons that are driving this change are mainly two: the entitlement of interaction designers, that are finally merging the distance between interaction and narrativity; and the general availability of means, tools and knowledge not only to professionals but also to artists, little entrepreneurs or just researchers from far fields. In the first part of this chapter, the research digs deeper into the relation between narrative and game – defining the process of narrative design as a hybrid practice that falls between ludology, narratology and game design –and then focusing on the issues that originates the design questions of this discussion. In order to address such a meaningful matter of investigation, the second part of the chapter gives a brief overview of the narrative conventions that are commonly used and studied in the field, suggesting that in order to achieve a satisfying narrative design a storyworld-driven approach would suit better than a story-driven one, since the latter implies linear structures that might not perform well in interactive environments.

2.1
NARRATIVE DESIGN IN A DIGITAL GAME

Over the years game studies have advanced the research around the state of the art of digital games in several directions, from theory to interactivity, from future speculation to possibile application in the education field. However, it appears like the field hasn't been much concerned in studying, foreseen and answering questions about their design process. Furthermore what has been neglected is the very approach to narrative, its design and related tools, knowledge and implied skills (ENGSTRÖM, 2020). Luckily practitioners and researchers are today turning to these new issues, giving them the due attention: in point of fact, the *Game Developers Conference (GDC)* is hosting frequent talks about narrative design (MALONEY & STIRPE, 2018; VARA ET AL., 2019; SWORDS, 2020), while many design schools are beginning to experiment with the topic, like in *Politecnico di Milano* (MARIANI & CIANCIA, 2019A).

The reasons that are driving this change are mainly two. Firstly, the entitlement of interaction designers, able to contribute to the advancement of the matter with their heterogeneous backgrounds and set of skills, finally merging the distance between interaction and narrativity. Secondly, a general availability of means, tools and knowledge not only to professionals but also to artists, little entrepreneurs or just researchers from far fields, that are now able to experiment. Softwares like *Twine, Unity and Unreal* are free to download, while websites like youtube, vimeo or *Skillshare* offer hours of tutorials and how-to videos that allow users to design fully working games in a matter of days. However, this new batch of practitioners lack

guidance, best practices, tools and frameworks that allow desi-gners to understand, conceive, and hence organise and mana-ge in a satisfactory way the narrative design of their artefacts, mostly because they are forced to be self-trained. This issue has become a growing area of interest, but while big compa-nies can afford to recognize the importance of narrative desi-gn, small and independent teams still struggle to sustain and find the right knowledge, and this results in a general disregar-ding of everything that is narrative during the design process and eventually impacts the final user experience.

Given this premise, the following chapter section sets with an analysis of the game design dynamic and its relationship with narrativity (par. 2.1.1), moving then to a definition of what narrative design should be and the reasons why the nar-rative designer should be a crucial figure in the game design process (par. 2.1.2).

2.1.1 Narratives in the digital game design process

Production for a digital game is a lengthy process that re-quires years of work and coordination between several de-partments and skilled workers. It is split into three phases: the pre-production (or design phase), the production (or develop-ment phase) and the post-production. Since digital games are their core softwares with art, music and gameplay (ʙᴇᴛʜᴋᴇ, 2003), their development resembles the one of any software, with a rigorous path and clear milestones: pre-alpha, alpha, beta, re-lease candidate, RTM (release to manufacturing), GA (gene-ral availability) and final release, or gold (ᴄʜᴀɴᴅʟᴇʀ, 2009). The pre-production or design phase, however, hasn't been encap-sulated in a well-established methodology yet. In fact it is safe to say that game design, much like every design process, is a rather mysterious one (ꜰᴀʟꜱᴛᴇɪɴ, 2003), since there is not a precise standard or formula and its inherently iterative nature makes

it highly dependent from a variety of factors, making it always different – to a smaller or larger extent.

Some of the underlying causes can be found in the coordination of very different skills and, overall, the fact that game design is a process that requires an appreciation of human nature and of what is *fun* (STAPLETON, 2004) in order for the final product to resonate with the audiences. However the main reason could be that games often act as a showcase for the hardware technology on which they are run: in the rush to innovate technologically, game developers don't make it a priority to create usable interfaces (PAGULAYAN ET AL., 2012). In the last decade a further complexity was added by the democratization and availability of tools and knowledge to the masses, and by the consequent rise to popularity of independent game companies that aim to sell games able to rival the AAA titles already on the market. These independent companies often have at their disposal low budgets and a small development team, and in order to reach the prefixed goal they skip the pre-production phase and jump straight to the development, with a lack of a clear direction, delays, bugs and the so-called feature creep: the disruptive addition of new features during the development. It is not uncommon to find the same issues also in big companies, with many workers forced to crunch before a deadline (SCHREIER, 2020).

In this unstable and fragile environment, the way narratives have been managed during the design phase is still unclear. Starting from the 80s, technology was able to convey more complex interactions and graphics interfaces, resulting also in the advancement of the narrative background, that in the first games was little or non-existent (par.1.2.3). However in most cases the design of a narrative has been treated as a separate task, with many games delegating the telling of a story to cutscenes, dialogues or text boxes. The new century has seen the development of more sophisticated narratives (with bran-

ching stories, multiple endings and AI characters) that, however were static and lacking dramatic engagement. In the last decade a new trend rose to popularity: story-driven games, in which the players could engage in a layered narration, empathize with believable characters and interact with complex digital worlds. All these different approaches have spawned successful and memorable games, however they still have a problematic nature:

- cutscenes still are a controversial topic because they disconnect play time from fictional time (ᴊᴜᴜʟ, 2001) and directly act on the player's agency
- the multiple endings escamotage often adds little to nothing to the immersivity or the narrative experience
- story-driven games are so focused on the story that gameplay is often repetitive and shallow, earning the genre the name of playable stories.

The issue needs to be imputed to the conflict of two different design domains: the design of narratives and the design of interactive experiences (ʙɪᴢᴢᴏᴄᴄʜɪ & ᴡᴏᴏᴅʙᴜʀʏ, 2003). Narrativity is a type of meaning, while interactivity, when implied in entertainment, is a type of play (ʀʏᴀɴ, 2009) and their design asks for a different set of skills. Balancing these two elements is a tricky task: at times the story might overcome the player's action (like in playable stories), or it might be subordinated to the player's action. It is also important to point that narratives in digital games often employ rules and practices from linear storytelling without taking into account the implication of interactivity on the story.

As of today, the digital game industry is trying to incorporate a better narrative sensibility to the design process, with big companies (like *THQ, Ubisoft and Naughty Dog*) employing specific figures to oversee the narrative of their games (par.2.1.2) and conferences like the GDC hosting frequent talks about the topic. Many companies (like *Quantic Dreams*[1] or *SuperMas-*

 [1] https://blog.quanticdream.com/a-tool-for-the-interactive-drama-hot-tech-feather/

sive games) are also developing their own in-house tools for a faster and more efficient management of narratives. However it is the standard for many developers to refuse to add extra time and resources into the already lengthy process of pre-production for a proper development of story and game in tandem (WOOD, 2016). And looking to smaller or indie companies the situation gets even worse. On one side they can access an unprecedented number of resources (from free softwares to the help of online communities), but on the other they are forced to work on a tighter budget, with many workers forced to manage more than one creative task. Eventually, the phenomenon of digital gaming is now interesting also innovators and educators from fields that are very different from entertainment (like health): these practitioners are self-taught and when facing the design of narrative they still do not possess any clear framework, best practice or knowledge. Going beyond game writing and acknowledging narrative design as a vital practice in the pre-production might be the solution for this issue. Moreover, as any design process, it requires its own frameworks and working tools.

2.1.2 What is Narrative Design?

Narrative design is a hybrid practice *(fig. 2.1)* that falls somewhere between the study of play (ludology), the study of story (narratology) and the design of play systems (game design). In other words, narrative design is in charge of crafting the story and managing the narrative consistency of every element in the game, from dialogues to gameplay, from art to music (DINEHART, 2011B). As discussed in the previous paragraph, practices with a specific attention to the story were already existing in the game design process but it is only in relatively recent years that developers and designers started to recognize the need of a professional figure for the task. In fact, the

term *narrative designer* was first utilized in 2006, when designer Stephen Dinehart wrote a specific application for *THQ* Vancouver. A notable sentence of the job description has later become a definition of the role:

> "Working collaboratively with other design oriented team members, the Narrative Designer will be the primary contact with external writing resources for the duration of a production [...] and will act as the champion of the story, script and speech for the entire product" (**Dinehart, 2011a, n.a.**).

In the decade that followed the figure of narrative designer gained more recognition and has now become a recurring position in many AAA companies. The narrative designer is deeply involved in the process of game design, from the creation of the gameplay to the actual development. His final aim is to transport players into the game so that they may forget the confines of reality and believe that their action can affect by all means the game world: it is essential that the game story doesn't contradict the user experience. A successful narrative design occurs in games in which every element (the gameplay, the music, the tone, the characters) compliments the story in a gratifying way for the players, even if it is not story-driven.

In that, the narrative designer doesn't only create the story, characters, plot points and dialogues, but he must also oversee the entire design process in order to avoid any type of ludonarrative dissonance, meant as the mismatch between play and narration (**seraphine, 2016**): similarly to the implication of the flow theory (**csikszentmihalyi, 1990**) when ludonarrative dissonance occurs the players instantly disconnects from the game (**despain & ash, 2016**). Thus, narrative design is not game writing, although the latter is a practise that is incorporated into the process. The role of game writers is to promote the story through the scripts they write, assemble and deliver to the developers; the primary role of the narrative designer, instead, is getting the whole game to tell the same story (**khan, 2020**). This is especially

Figure 2.1

Narrative design is an hybrid practice of different domains (DINEHEART, 2011B)
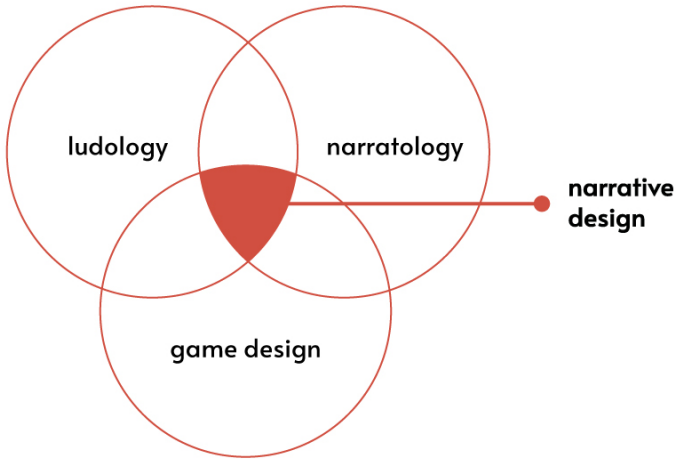
clear when game companies involve authors, like in *EA Game's Undying*: bestselling book author Clive Barker provided the background story, characters description and main plot points, but eventually handled this material to actual game designers that transposed his vision (that was linear) into an interactive experience, adding subtle nuances and narrative layers through gameplay, sound and art (STOKES & STOKES, 2002). To a certain extent, narrative design is much more similar to interaction design than it is to narrative writing, in that it takes care of the users' experience from a narrative standpoint, and has to be involved in the use of hardware and software (ENGSTRÖM, 2020). However, there's still confusion regarding the tools and practices at the narrative designer's disposal. Many game companies have in-house proprietary tools designed for their needs (ENGSTRÖM, 2020), like in the case of 2019 *Supermassive Games' The Dark Anthology: Man of Medan (fig. 2.2)*, but in most cases

Figure 2.2

Screen taken Supermassive studios' proprietary narrative software (**2019**)
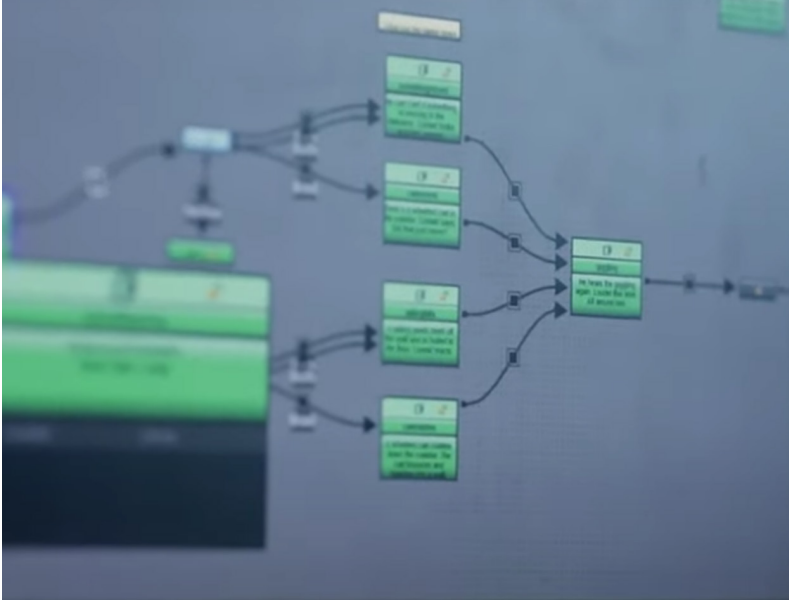
narrative designers, in absence of an established script format, are forced to create and manage their story through a variety of documents: from word and excel to screenwriting software *Final Draft*. This has an impact on the communication with other departments, that are forced to interpret complex narrative decisions without possessing the adequate knowledge or the right platform in which they can contribute to the process (ENGSTRÖM, 2019). Eventually, narrative design is underrated also during testing: while early forms of gameplay can be experienced as early as the development enters the prototype phase, narrative isn't often included and can't be properly evaluated (NORMAN & KIRAKOWSKI, 2018). By looking into these issues the study suggests a framework with which designers can work collectively (chap. 4), aiming at the advancement of narrative design practices, that are strongly in need of investigation.

2.2
NARRATIVE DESIGN THEORY

From the very inception of language the act of telling stories and building narratives has always been the most sophisticated mean of communication for humans, a medium able to incorporate subtle emotional nuances and, at the same time, to reflect the societal context in which it is produced. Throughout history it has adapted and evolved countless times: it has been a tool for survival, a form of artistic expression, a device to pass on memories and even a skill to market products.

The narratology field has studied how these stories are crafted and structured for over a century (notable efforts can be traced back even earlier, with Aristotle's *Poetics*), generating a plethora of taxonomies, frameworks and tools to better understand the way narratives are designed and how they affect our perception of the world. This knowledge has been reworked several times and offers the foundational theory that can be implied in the design of narrative experiences.

The following paragraph examines these theories with particular regard to the ones that interest the IDN field, being the core topic of this study. Fundamental knowledge deriving from the field of practice has been analysed and clustered into three main conventions: *african narrative theories, eastern narrative theories and western narrative theories*. These conventions show that the structures described have been validated by notable case studies and publications, however they are not able in any case to represent in its entirety the wide range of approaches to narrative design.

Paragraph 2.2.2, instead, reflects on the impact that interactivity has had on such conventions. As the audience enters the narrative discourse and gains agency, the story should be able to adapt its dramatic arc, even if to various extents, to fill every moment with meaningful information, to inform the characters and their relationships. In that, the narrative design is not anymore in charge of building stories (a task for story writers) but it focuses on building a narrative system able to engage with the audience on every level. Story worlds (WOLF, 2014) might be the most suitable narrative systems in which narrative conventions, interactivity and technology should merge in order to build a satisfying IDN experience.

2.2.1 Narrative structures and conventions for IDN

As the most suitable tool for communicating complex, inter-related ideas (CRAWFORD, 2013), the act of telling stories has served to teach, excite, calm and bond over communities from the beginning of language (BRYANT & GIGLIO, 2015). Humans introduced storytelling as a mean to tell factual accounts and, primarily, deliver vital information to the community. Stories appeal to our social intelligence and arise out of our interest in monitoring and understanding one another (BOYD, 2009).

Hence, when discussing narrative theories and structures it is necessary to address a plurality of ideologies and assumptions, that possess common points while preserving a strong identity connected to the social environment in which they matured. This plurality is often overlooked in the IDN field: many researchers try to chase a universal narrative model (KOENITZ ET AL., 2018) and several case studies, especially in the digital games field, imply western narrative traditions connected to Aristotle's *Poetics* or Campbell's *Hero's Journey*.

To better illustrate this concept and its implications in the process of making narrative decisions for IDN, it is useful to

make a brief overview of the most influential narrative approaches, pointing out their uniqueness and common elements. This overview has subsequently informed the choice of the main trajectories for the development of the framework and its tool, as detailed in par. 4.1.

African narrative theories build upon a secular oral tradition and relinquish a well-established structure to empower the involvement of the audience. Through a *call and response* process the narrator invites the listeners to interact, by enforcing a plot point, savoring a moment or commenting on particular actions (AGAWU, 2007). In that, african narratives can be labeled as anecdotal stories (EGUDU, 1981) with a free structure, multiple crises and several protagonists that alternate in the same plot (JENNINGS, 1996), exposing a root culture that emphasizes group relationships over a single character's arc. As a matter of fact, the actors of these narrations are often families or members of the same tribe.

As a result of this secular storytelling tradition, the plot doesn't follow any rigid structure. After a brief introduction of the settings and the main characters, the story adapts to the audience's choices and desires and eventually concludes with a lesson about how the story explains something about the state of the world (KOENITZ ET AL., 2018). Following a circular pattern, this final justification is often connected to the very introduction of the story (SACKEY, 1991). Even if underestimated and often linked only to tribal traditions and archetypes, african narrative traditions played an important role in the early discussions about IDNs. Jennings notably discussed this topic, recognizing in the call and response pattern a potential system for meaningful human-computer interactions. Three were the elements of the african narrative structures that appealed to her the most: their openness, their iteration and their fuzzy logic that, mixed together, could closely emulate the complex patterns of human goals, desires and thoughts (1996).

Figure 2. 3
Structure of the narrative Kishotenketsu convention
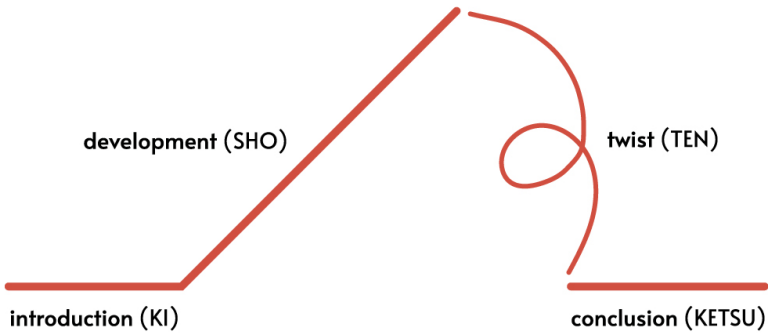
African narrative conventions offer valuable knowledge for IDN structures that, as a matter of fact, have informed the design of the theoretical framework that is detailed in par. 4.1. Users should be introduced to the digital environment through the eyes of a character that will act as their avatar (setting phase), subsequently the story should be able to adapt to the character's choices and desires (interactive plot), and eventually wrap in a meaningful way, possibly following a circular pattern (conclusion).

The most common **eastern narrative tradition** is undoubtedly the *Kishotenketsu*, a four act structure that, contrary to western traditions, doesn't tell a transformative story in which the characters face trauma and change. In fact, narratives that follow this pattern build the plot entirely on a twist rather than on a conflict. Originated in China, the *Kishotenketsu*

was initially implied in four-lines classical poetry compositions and has since evolved and adopted into a dramatic structure especially used in Japan. The four stages of *Kishotenketsu* are the introduction, the development, the twist – that is often tangentially related to the original storyline (HUNTER, 2016) – and the conclusion *(fig. 2.3)*.

This dramatic structure is of particular importance for the digital game field, since it has been used to shape the level Design of many *Super Mario* games, especially *SuperMario 3D Land*. Level director Koichi Hayashida explained that the *Kishotenketsu* structure allows the player to learn a new mechanic in a safe environment (introduction), test it in increasingly challenging quests (development), adapt it to an unexpected situation (twist) and finally master it (conclusion) to complete the level (NUTT, 2012), without the use of invasive tutorials or cutscenes. The *Kishotenketsu* (and its related *Nintendo* case study) offers a valuable view on how narrative design can be envisioned in synergy with the gameplay, so that the users can safely understand the rules of the digital environment, before they dive in the plethora of possibilities that it offers.

There exists many more minor narrative structures and approaches, such as the *Sīra narratives*, that establish several episodic stories in a larger community frame, or the *Epiphanic structure*, in which the character explores the narrative over and over again, gaining knowledge at every iteration (KOENITZ ET AL., 2018). However the most influential narrative traditions, both in the linear and nonlinear narrative field, are without any doubt the **conflict-based narrative conventions** that originated from Aristotle's *Poetics* and that has been reworked several times throughout the centuries, arguably influencing the way modern western narrative is told (ECONOMOPOULOU, 2009). In the *Poetics* Aristotle analyzes the greek tragedy and formulates the rules for its construction. In *chapter VII*, he discusses plot construction, starting from three crucial points:

- the explanation of the protagonist's tragic flaw (*hamartia*)

- the protagonist's moment of truth in which s/he learns something important about her/his identity (*anagnorisis*)

- the protagonist's reversal of fortune, in which s/he descends into tragedy (*peripeteia*).

Aristotle then formulates that every tragedy should have a beginning, a middle part and an ending, a key statement that, together with Campbell's theories (discussed below), has become the foundation for many modern narrative conventions in the western world (ᴇᴄᴏɴᴏᴍᴏᴘᴏᴜʟᴏᴜ, 2009), notably the three-act structure popularized in the screenwriting field by Field (1994) and Mckee (1998). The three act structure divides the story into three different sections *(fig. 2.4)*:

- *Act one: the setup.* The exposition of the main character features, of his world and, primarily, his conflicts. Before the act is over an event that drastically changes the character's habit (the inciting incident) must occur

- *Act two: the confrontation.* This section covers the main actions of the story, telling what the character has/ wants to do to overcome his conflicts. The most meaningful action, should occur in the middle of the story (the midpoint). In the second half of this section follows the main character as he seems closer to failure.

- *Act three: the resolution.* After a climatic series of action, the main character reaches a resolution, for good or for worse.

Aristotle's *Poetics* have been of great importance in the first discussions about IDN conventions. Laurel notably suggested in her seminal work *Computers as Theatre* (1991) that Neo-aristotelian narrative structures should be adapted into the digital environment for satisfying IDNs, as *"a deep, robust, and logically coherent notion of structural elements and dynamics is required– and this is what Aristotle provides"* (1991, ᴘᴀɢ. 36).

Figure 2. 4

The Syd Field narrative paradigm, usually implied in the movie industry (**1994**)
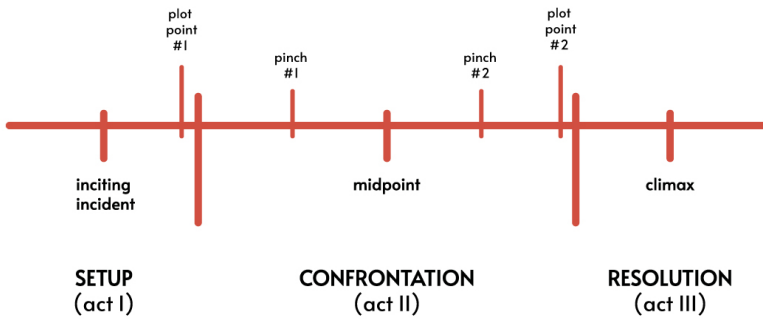
In 1949 Campbell published *The Hero with a Thousand Faces*, an anthropological reflection on the common elements that exist in myths and religions. Along with the *Poetics*, it has shaped the way western narrative is told.

In fact, Campbell's work presents many similarities with Aristotle's theories, such as the flawed hero as the center of the story and the three-part structure. Campbell, however, discusses in detail character archetypes that in the *Poetics* are only vaguely mentioned. But, above all, he asserts that most of the stories could be traced back to a single structure, called the monomyth, or hero's journey *(fig. 2.5)*.

The monomyth obeys a three part structure, broken down in seventeen plot points:

home

- freedom to live
- master of the two worlds
- call to adventure
- refusal of the call
- supernatural aid

return threshold

crossing the threshold

- rescue from without
- magic flight
- refusal of the return
- ultimate boon
- aphoteosis
- atonement with the father
- belly of the whale
- road of trials
- meeting with the Goddess
- woman as the temptress

deep of darkness

---

ordinary world

- return with elisir
- resurrection
- call to adventure
- refusal of the call
- meeting the mentor

ordinary world

road back

crossing the threshold

special world

- test, allies and enemies
- reward
- approach

ordeal

---

character

- change
- need

life/ conscious/ order

return

go

death/ unconscious/ disorder
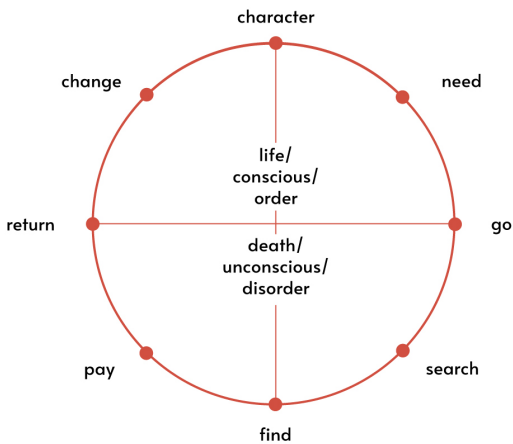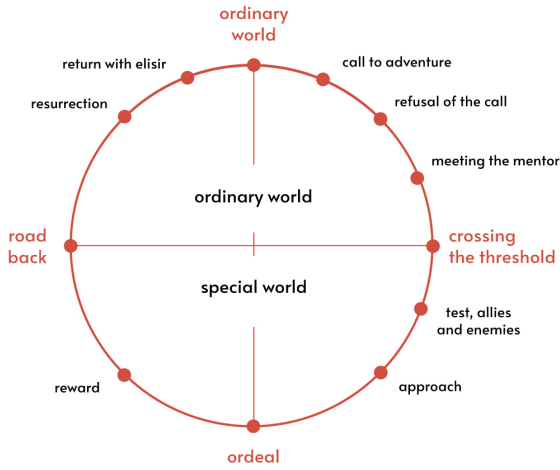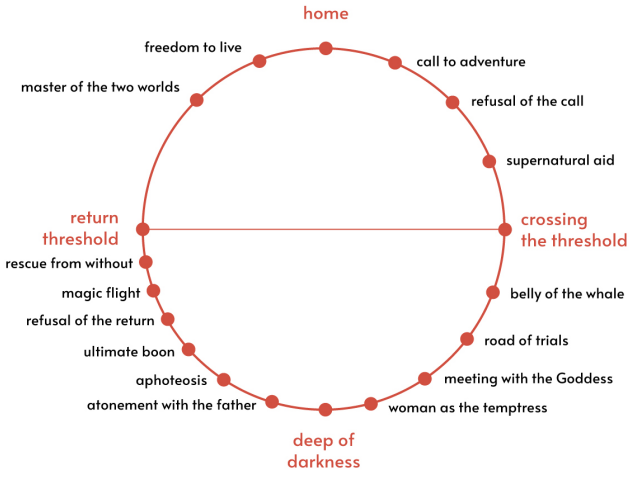
- pay
- search

find

Figure 2.5

*Top: Campbell's monomyth (**1949**). Middle: Vogler's reworking (**1998**).*
*Bottom: Harmon's reworking (**2013**).*

- **Part One: The departure**
  1. *Call to adventure.*
     The protagonist is in a situation of normality. He then receives a call to head off into the unknown.

  2. *Refusal of the call.*
     The protagonist first refuses to heed the call.

  3. *Supernatural aid.*
     The protagonist commits to the quest and receives help from a magical guide or mentor.

  4. *Crossing the threshold.*
     The protagonist actually starts the quest, leaving his normal situation for the unknown, or magic world.

  5. *Belly of the whale.*
     When entering the magic world, the hero encounters a minor danger so that he realizes what are the stakes.

- **Part Two: The initiation**
  6. *The road of trials.*
     The protagonist undergoes a series of tests that he has to overcome in order to proceed.

  7. *The meeting with the Goddess.*
     The protagonist gains an item (that is given or conquered) that will help him in the future.

  8. *Woman as the temptress.*
     The protagonist faces temptations that may lead him to abandon his main quest.

  9. *Atonement with the father.*
     The protagonist must confront what holds the ultimate power against his life.

10. *Apotheosis.*
    The protagonist achieves a great understanding of himself and the challenges he is facing (similarly to Aristotle's anagnorisis).

11. *The ultimate boon.*
    The protagonist finally concludes his quest and achieves the goal that primarily called him to action.

- **Part three: The return**

    12. *The refusal of the return.*
        The protagonist may not want to return to his ordinary life and questions the entire adventure.

    13. *The magic flight.*
        Convinced, the protagonist tries to escape from the magic world.

    14. *Rescue from without.*
        The protagonist finds assistants and guides that bring him back to everyday life.

    15. *Crossing the return threshold.*
        After an exciting adventure, the protagonist struggles to adapt to his old life.

    16. *Master of the two worlds.*
        The protagonist finally manages to balance the magic and ordinary world.

    17. *Freedom to live.*
        The protagonist, freed from his problem, is changed and ready to live life at its fullest.

From its formulation in 1949, the hero's journey has become the landmark convention for western narrative structures. It has been studied and reworked continuously, especially in the movie industry, in the wake of Lucas' notable use of Campbell's theories as the narrative foundation for the *Star Wars* saga in the 70' (LARSEN, 1991). In fact, Field's (1994), Mckee's (1998) and Snyder's (2005) screenwriting manuals all reference and rework

the hero's journey. A significant reworking comes from Vogler (**1998**), that transforms the monomyth structure into a guideline for writers *(fig. 2.5)*, leaving behind the most archetypal elements (such as the woman as temptress) and scaling down the narrative structure to twelve points:

1. *The ordinary world.*
   The protagonist lives an ordinary life

2. *Call to adventure.*
   An incident forces the protagonist to embark on a quest.

3. *Refusal of the call.*
   The protagonist hesitates to answer the call.

4. *Meeting with the mentor.*
   The protagonist gains knowledge and items before embarking on the quest.

5. *Crossing the first threshold.*
   The protagonist commits to the quest.

6. *Test, allies and enemies.*
   The protagonist undergoes a series of tests and trials.

7. *Approach to the innermost cave.*
   The protagonist is almost close to his goal.

8. *The ordeal.*
   The protagonist faces the greatest challenge of the quest and almost fails.

9. *The reward.*
   After winning the challenge, the protagonist experiences the consequences.

10. *The road back.*
    The protagonist returns to the ordinary world.

11. *The resurrection.*
    The protagonist experiences a final challenge.

12. *Return with the elixir.*
    The protagonist improves his life.

Being a highly detailed framework, a great risk of Campbell's hero journey and Vogler's reinterpretation is to force the creation of rigid, unnatural and biased narratives that might perform well as mythic and epic stories, but might not be able to return the complexity of real life and human emotions. In recent times american screenwriter Dan Harmon entered the discussion by adapting again the hero's journey framework and suggesting a new simplified verb-based structure that could be used to generate a wider and more substantial range of narrations (Harmon, 2013) . The structure, called embryo or story circle, consists of eight plot points *(fig. 2.5)*, and has been successfully used in the entertainment industry for more than a decade.

- *You.* A protagonist Is in a Zone of Comfort
- *Need.* The protagonist wants/needs something
- *Go.* The protagonist enters an unfamiliar situation
- *Search.* The protagonist adapts to it
- *Find.* The protagonist gets what he wanted
- *Take.* The protagonist pays a heavy price for it
- *Return.* The protagonist returns to the familiar situation
- *Change.* The protagonist is changed

As a fixed set of points and conventions, western narrative frameworks based on Campbell's archetypes typically result in linear narratives that can hardly be envisioned in an interactive environment. However, recent experimentations in the field of IDN clearly show that the hero's journey might still be a strong choice for interactive narratives when it is considered more as a guideline for dramatic arcs and less like a fixed and constricting structure. A notable case study is Quantic Dream's *Detroit:Become Human* (2018), a digital game in which the user can play as different characters and throughout the gameplay is put in front of more than 1000 choice combinations, that can lead to more than 45 different endings. Even

if it follows an extremely intricate branching structure, each narrative that is presented in the game offers a satisfying and complex dramatic arcs, that are structured according to the modern hero's journey reworkings[2].

For the scope of this research, it is important to clarify that the models mentioned in these paragraphs are commonly used only as skeletons for possible narratives and not as rigid algorithms with strict rules. But, primarily, these are only a few of the possible conventions that can return a satisfying and engaging narrative. As the discussion around narrative design grows, both in the linear and especially in the interactive field, these conventions, theories and frameworks are constantly reworked. As such, they should be considered as an important, however incomplete, part of a much broader discussion on artistic endeavours that, by design, transcends rigid borders, structural impositions or generalizations.

2.2.2 Moving from stories to storyworlds

Regardless of its structure, every narrative implies the creation of an imaginary world in which it is set. It can be only hinted (even implied, if it is an approximation of our reality) or it can be carefully crafted and described, like Tolkien's *Arda* or the Lucas' *Star Wars* Universe.

Today the concept of the storyworld has become a prominent topic of discussion. Contemporary audiences ask to cross the boundaries of linear stories, to immerse themselves into imaginary environments that possess vivid rules and that can host several dramatic arcs and narratives (MARIANI & CIANCIA, 2019A). As technology evolves, interactive and trans-medial experiences have enabled these requests, and even linear media is adapting to this standard, with notable case studies like Disney's *Marvel Cinematic Universe* (2008-PRESENT), NBC's *Chicago franchise* (2012-PRESENT) or Warner Brothers' *Conjuring Universe* (2013-PRESENT).

For IDNs the creation of a storyworld offers an interesting standpoint for their narrative design, as the user gains the agency to follow different dramatic threads into a digital environment. However, even if stories depend on the worlds in which they take place, storyworlds do not rely on narrative structures. Such complexity has been analyzed in the book *Building imaginary worlds: the theory and history of subcreation* (WOLF, 2014). Wolf bases his study on a rigorous literature review and case study analysis, and offers interesting insights into a possible approach for world building. The premise is that every storyworld, as a secondary world (WOLF, 2014), even the most realistic, presents a degree of subcreation from our primary world (the reality), as it belongs to the realm of imagination. Thus, the term is not used with a geographical reference, but as an experiential expression.

Wolf individuates three main properties needed to shape a believable secondary world: invention, completeness and consistency. The more noticeable these three properties are in a storyworld, the more it will differ from our primary world.

Invention is the degree to which *"default assumptions based on the Primary World have been changed, regarding such things as geography, history, culture [...] and so on"* (WOLF, 2014, PAG. 34).Invention is the property that makes secondary a storyworld, and the higher the degree of invention is, the more it will appeal to the audience as fiction.

Completeness is the degree to which *"the world contains explanation of all aspects"* (IBID 2014, PAG. 38) regarding the character's experiences and the background details. The higher the degree of completeness is, the more the storyworld will appeal as feasible and realistic. However, it is impossible to reach true completeness. Such perception can be only approximated, giving the impression to the audience that the secondary world is a believable and coherent place in which they can immerse.

Consistency is the degree to which world details are plausible without contradiction. It is necessary for a world to be taken seriously, even if the more complete a story world is,

the harder it is to remain consistent. As true completeness is impossible to reach, even true consistency will always be unattainable.

In the second part of his study, Wolf (2012) suggests eight important points that should be kept in consideration when building a storyworld:

- *Space.* A space in which events can occur
- *Time.* A duration of time in which events can occur
- *Characters.* Agents that can experience the events.
- *Nature.* All the material elements of the world (flora, fauna, physics)
- *Culture.* Set of knowledge, history and conflicts of the characters.
- *Language.* How the characters communicate.
- *Mythology.* How the culture is understood and remembered.
- *Philosophy.* The worldviews of the world's characters.

The audience experiences storyworlds through the stories they contain. However, considering these bigger clusters in the first stages of the narrative design process enables the opportunity for meaningful and complex stories, especially if meant for an interactive environment.

In that, storyworlds are extremely advantageous for IDN because they are, by definition, systems that contain several potential narratives (par. 1.1.3). This is pretty evident in digital games of the open-world genre. Games like *Grand Theft Auto*, *Red Dead Redemption* or *Cyberpunk* invite the audience to enter a highly detailed storyworld that contains a principal storyline and several side quests that can be experienced seamlessly.

Also sandbox games like *Minecraft* work following this pattern; in this case, however, the narrative opportunities are not given by the system but rather need to be found by the user

(like the instructions to reach the *End*, a space-like dimension that acts as the game's final quest).

The importance of storyworld building in the first steps of IDN narrative design is a major research field in need of further investigation that is being tested, among others, by professors Ciancia and Mariani in their *M.Sc course of Complex Artefacts and System Design Studio at Politecnico di Milano* (MARIANI & CIANCIA, 2019B). This knowledge is the starting point for this study's project, that is detailed in chapter 4.

METHODOLOGY

This study investigates the narrative design process behind interactive digital narratives (IDN). It focuses on digital games as the most representative, yet mature, type of IDN. Encouraged by constant technological innovation, the domain is rich of successful case studies, reflecting how rich, faceted and stimulating this field of research is. However, the state of the art highlights the need to further systematize certain practices, especially in the early design phases, showing that there is room for further development that might embrace a transdisciplinary perspective. The following paragraphs delineates the methodology with which this research was carried out.

3.1. Research methodology

In terms of research methodology, the study relies on a wide transdisciplinary desk research that consists in an in-depth scientific investigation of the narrative design field as a domain that is inherently transdisciplinary. The investigation was mainly conducted within the interactive storytelling, game studies and narratology fields, reaching out to the scientific areas of interaction design, and to a minor extent computer science: 130 papers and 18 case studies were investigated *(fig. 3.1)*. The review granted an extensive perspective on fundamental theories and practices, and identified several approaches employed to design the narrative aspects of digital games. In parallel, the desk research led to analyse the state of the art of IDNs and
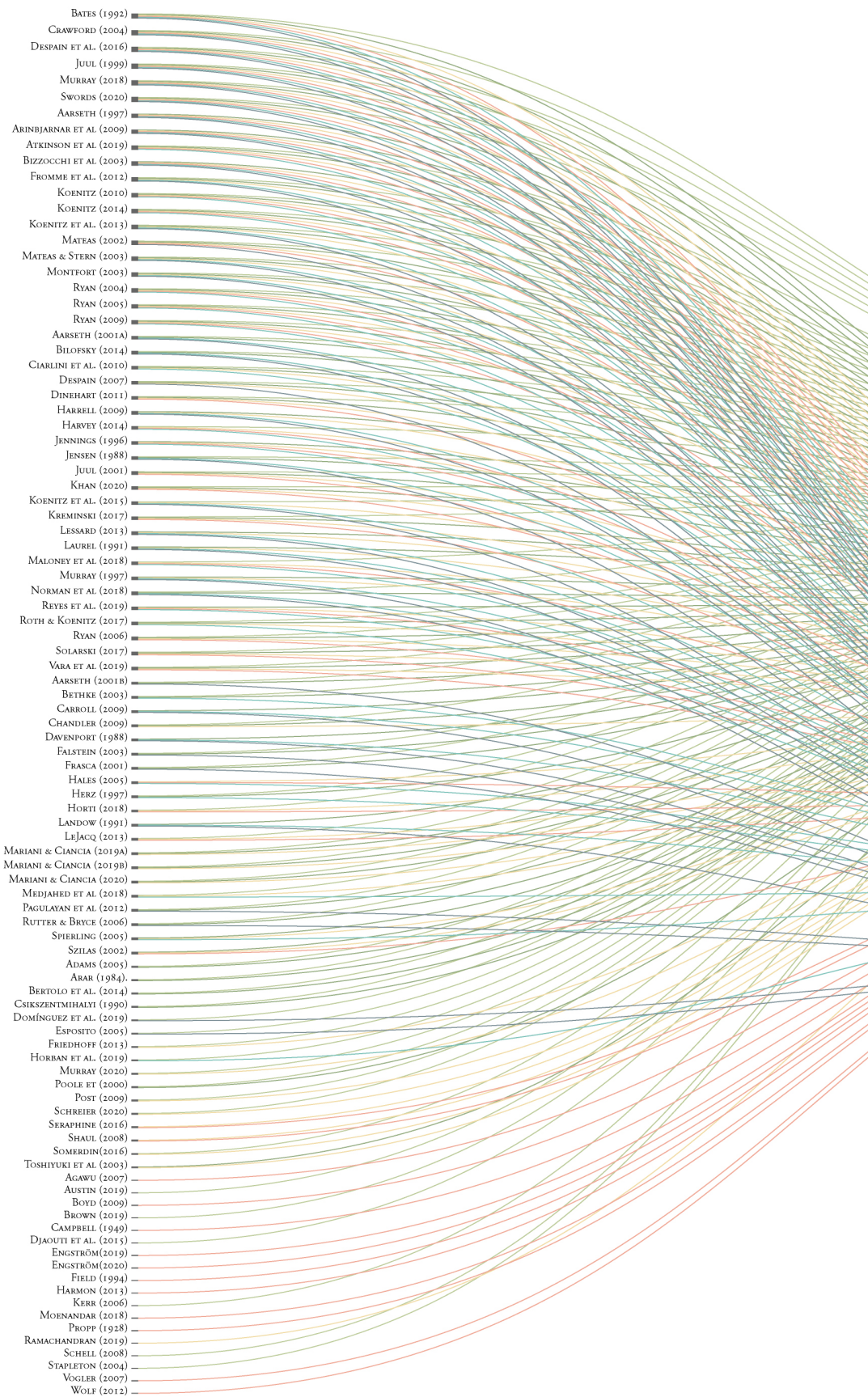
Bates (1992)
Crawford (2004)
Despain et al. (2016)
Juul (1999)
Murray (2018)
Swords (2020)
Aarseth (1997)
Arinbjarnar et al (2009)
Atkinson et al (2019)
Bizzocchi et al (2003)
Fromme et al. (2012)
Koenitz (2010)
Koenitz (2014)
Koenitz et al. (2013)
Mateas (2002)
Mateas & Stern (2003)
Montfort (2003)
Ryan (2004)
Ryan (2005)
Ryan (2009)
Aarseth (2001a)
Bilofsky (2014)
Ciarlini et al. (2010)
Despain (2007)
Dinehart (2011)
Harrell (2009)
Harvey (2014)
Jennings (1996)
Jensen (1988)
Juul (2001)
Khan (2020)
Koenitz et al. (2015)
Kreminski (2017)
Lessard (2013)
Laurel (1991)
Maloney et al (2018)
Murray (1997)
Norman et al (2018)
Reyes et al (2019)
Roth & Koenitz (2017)
Ryan (2006)
Solarski (2017)
Vara et al (2019)
Aarseth (2001b)
Bethke (2003)
Carroll (2009)
Chandler (2009)
Davenport (1988)
Falstein (2003)
Frasca (2001)
Hales (2005)
Herz (1997)
Horti (2018)
Landow (1991)
LeJacq (2013)
Mariani & Ciancia (2019a)
Mariani & Ciancia (2019b)
Mariani & Ciancia (2020)
Medjahed et al (2018)
Pagulayan et al (2012)
Rutter & Bryce (2006)
Spierling (2005)
Szilas (2002)
Adams (2005)
Arar (1984).
Bertolo et al (2014)
Csikszentmihalyi (1990)
Domínguez et al (2019)
Esposito (2005)
Friedhoff (2013)
Horban et al (2019)
Murray (2020)
Poole et (2000)
Post (2009)
Schreier (2020)
Seraphine (2016)
Shaul (2008)
Somerdin(2016)
Toshiyuki et al (2003)
Agawu (2007)
Austin (2019)
Boyd (2009)
Brown (2019)
Campbell (1949)
Djaouti et al (2015)
Engström(2019)
Engström(2020)
Field (1994)
Harmon (2013)
Kerr (2006)
Moenandar (2018)
Propp (1928)
Ramachandran (2019)
Schell (2008)
Stapleton (2004)
Vogler (2007)
Wolf (2012)

Figure 3. 1
Table of the domains investigated during the desk research

GAME STUDIES

INTERACTION DESIGN

INTERACTIVE STORYTELLING

NARRATOLOGY

MEDIA STUDIES

COMPUTER SCIENCE
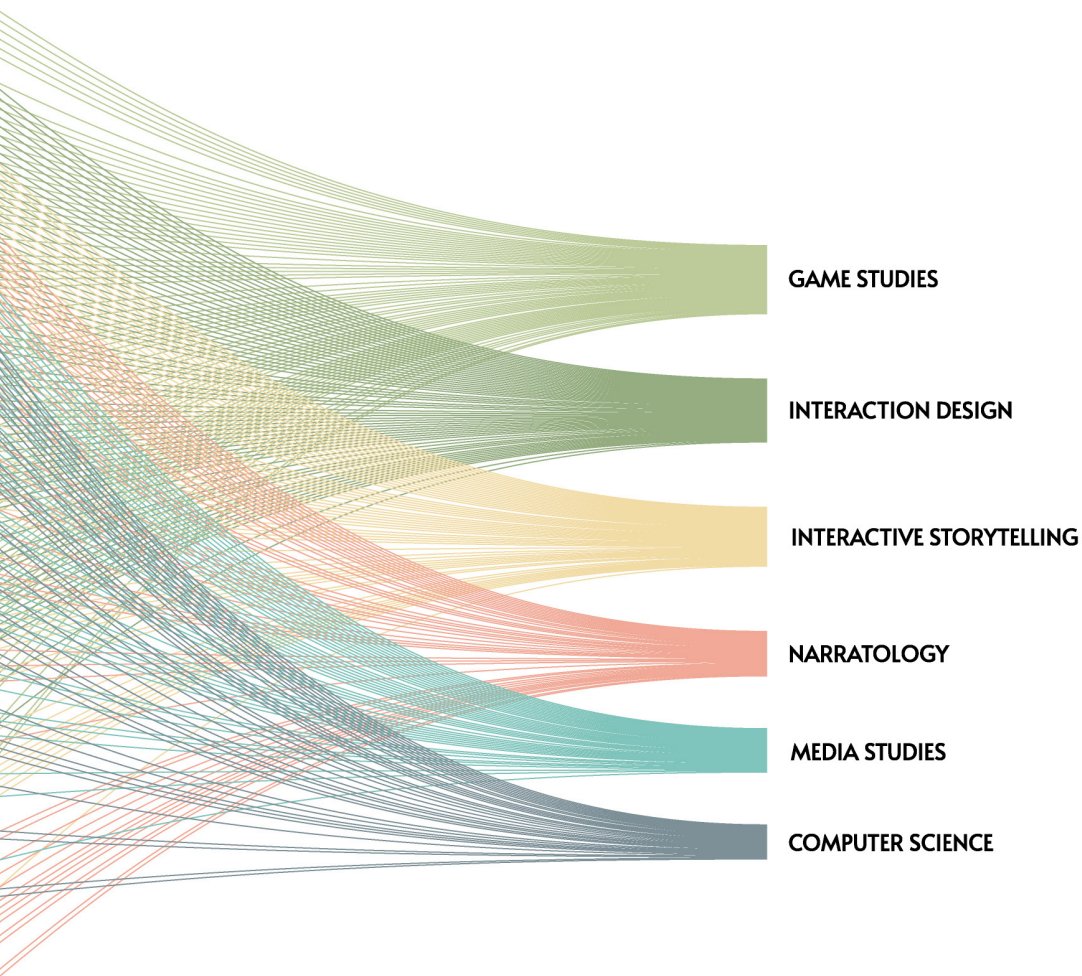
digital games, enquiring relevant case studies and subsequently interviewing stakeholders about possible progresses in the field. Knowledge from different fields was collected, reviewed and synthesized to build a cross-disciplinary tool: a framework for the narrative design of interactive digital narratives.

To validate its efficiency the framework was co-designed in 2019 with a team of four M.sc. Digital Design students at *Amsterdam University of Applied Science* (AUAS) and subsequently tested through a workshop at the Electric Vehicle Supply Equipment *EVBox*. In 2020 two rounds of testing sessions followed, the first held in *Politecnico di Milano* with 50 students of the *M.Sc course of Complex Artefacts and System Design Studio*, the second with the independent digital game team *Attic Box* (both conducted digitally due to the COVID-19 restrictions in Italy). The secondary data was triangulated with the data obtained from the co-design session and follow-up testings. Each session provided moderate participant observations and was wrapped with a semi-structured focus group that would encourage reflexivity about the experience. The data gathered from each experience eventually informed the framework and led to implementations assessed in its final version, *Story Knots*, made available through the *Mirò* platform.

Given this premise, paragraph 3.2 describes the desk research and literature review that informed the research questions (RQs). Paragraph 3.3 describes the experimentations adopted to further the knowledge on the domain, that were held between the *AUAS* and *Politecnico di Milano*.

3.2. Research questions

The research questions of this study derived from a desk research articulated through a transdisciplinary literature review, and the analysis of the state of the art, conducted within the interactive storytelling, game studies, and narratology fields,

also reaching out to media studies literature. The outcomes of the desk research are pointed out in chapter 1. Firstly, the collected data around the state of the art of IDN (par. 1.1.1), its definitions and its constituents (par. 1.1.2, 1.1.3) are presented; then the reasoning focuses on the discussions about the different IDN typologies (par.1.2.1) and their unsettled narrative aspects (par. 1.2.3). In chapter 2 the findings about the most common narrative design practices (par 2.1) and theories available (par. 2.2) are analysed and discussed.

The insights that arose from the desk research underlined the problematic nature of narrative design in an interactive environment, and clearly indicated three general gaps in need of further investigation:

- There isn't an established script format for interactive narratives (ENGSTRÖM, 2020).

- Communication between the different departments on narrative-centered topics is fragmented and inadequate (ENGSTRÖM, 2019).

- It is often impossible to test game narratives during the prototyping phase (NORMAN & KIRAKOWSKI, 2018).

These understandings naturally led to the formulation of the leading RQ of this study, followed by two secondary questions.

Leading RQ:
How to build and share narrative information during the design phase of a digital game?

Secondary RQs:
How can teams confront on narrative-centered topics?
How to control and improve narrative consistency during the design phase?

Once detected the RQs, a series of semi-structured interviews and discussions were conducted at the *Amsterdam University of Applied Science (AUAS)* with members of the play and media research group, led by design researcher and former

member of the ICIDS steering committee Gabriele Ferri. Such discussion has been carried on a four month span period (from September to December 2019) and touched upon the main domain of the study. Ferri and the play and media research group contributed, as stakeholders, to analyze the RQs and to speculate about possible developments in the field, eventually contributing to the formulation of the hypothesis of this research.

> **Hypothesis:**
> A collaborative tool could enable and guide
> the narrative design of digital games

Design processes are generally supported by tools and, especially in the interaction design field, it is not uncommon for teams to map interactive experiences with the aid of frameworks. Furthermore, throughout the years many narrative structures and conventions that could be adapted for interactivity have been translated into card-based systems and maps. Thus, as described in the following paragraph, a co-design iterative process followed, with the intent to gather primary data that, together with the insights collected through the desk research, could eventually inform the design of such collaborative tool.

3.3. Co-designing the framework

As detailed in *fig. 3.2*, once the main RQs had been detected, an early design phase was carried simultaneously with critical discussions and interviews with design researcher Gabriele Ferri and few members of the play and media research group at the *AUAS* that, as stakeholders, freely contributed to suggest best practices and opinions. At this point the research moved to a co-design session (MULLINS, 2020; STEEN, 2013) with a team of four M.sc. Digital Design students at AUAS, involved by the

Figure 3. 2
Design steps followed for the formulation of the framework

Netherlands Institute for Cancer Patients in the development of a digital game. The session was held in November 2019 and participants were asked to approach the narrative design of the game by brainstorming and pitch their ideas on colored post-its, whiteboards and pre-designed cards that represented the possible foundation of the framework. I participated actively as moderator and facilitator on the most complex narrative conventions. The session lasted two days and concluded with a focus group.

The insights collected contributed to the generation of a working analogue prototype, that has been later tested in December 2019 during a workshop in the Amsterdam headquarters

of *EVBOX*, an Electric Vehicle Supply Equipment company interested in the design of interactive narrative experiences with marketing purposes.

The workshop involved 18 participants from the design and marketing departments and lasted 5 hours. After a brief introductory presentation the participants were handed the prototype and worked in groups to develop and pitch an interactive story to the others. In the introductory phase I participated actively, acting as moderator and explaining the main features of the framework, but once the design session started I did not interfere with the groups' decisions.

At the same time, the analogue prototype has been reviewed and discussed with design researchers and teachers Mariana Ciancia and Ilaria Mariani, that highlighted criticalities and suggested improvements to the overall system. The result of this phase is a card-based digital prototype that, as detailed in chap. 4, structures the narrative design process in three distinct phases.

The first phase was tested in *Politecnico di Milano* in March 2020 with the students of the *M.Sc course of Complex Artefacts and System Design Studio*, led by Mariana Ciancia and Ilaria Mariani. After a brief introductory phase (held digitally due to the COVID-19 restrictions in Italy) the students received a digital copy of the prototype and had one week to return the cards fully compiled.

Simultaneously *Attic Box*, an independent digital game team located in Amsterdam, had access to the full prototype, that was tested during an internal brainstorming session with four members of their design team: three game designers, a 3D artist and a concept artist.

Once collected and implemented the findings and the final results of the testings, the framework has been reworked in the *Mirò* collaborative platform and made available for everyone to use, under the name *Story Knots*, with the aim to allow possible improvements and research on the matter.

CHAPTER FOUR .

STORY KNOTS:
A COLLABORATIVE
NARRATIVE FRAMEWORK

As detailed in chapter 3, after the formulation of the main RQ, informed by an in-depth desk research and literature review, the study has moved to the project phase. The preliminary research clearly indicated the neglecting of the narrative design phase, caused by scarce communication between departments about the topic and an impressive lack of adequate tools with which the team could manage such a process. Thus, this study approached the project with the intent to validate a collaborative instrument for the narrative design of IDNs. The main objectives were:

- gather and order the essential narrative informations into the same working space;
- avoid multi-format data (excel, word, final draft) about narrative design;
- support brainstorming sessions;
- encourage collaboration between different department on the topic;
- avoid the overload of technical narrative information;
- generate a blueprint/document that could clearly represent narrative design decisions.

Through a four month visiting scholarship, these intentions have been eviscerated at the AUAS with design researcher Gabriele Ferri and members of the *play and media research group*, eventually leading to the prototypal draft of a card-based system for narrative design that is detailed in par. 4.1.

A co-design session followed, with few AUAS interaction design students. Their heterogeneous backgrounds (which spanned from communication design, fashion design and programming) and their final goal (narrative design of an interactive experience for cancer patients), made them interesting collaborators, as they were perfectly representing the target of this study.

In that occasion the card-based system has been adapted, reworked and improved following the members' input. The result of this session is a refined card-based system that has been subsequently tested in a workshop environment at the electric charging car company *EVBOX*, in *Politecnico di Milano* and by independent game company *Attic Box*. The co-design session and its further testing are described in par. 4.2.

The final result of the project phase is *Story Knots*, a collaborative framework for the narrative design of interactive digital narratives, as outlined in par. 4.3. *Story Knots* has been shaped by triangulating the secondary data from the desk research and literature review and the primary data gathered with the interview, co-design and testing sessions. It has been reworked in the *Mirò* digital platform, and made available for everyone to use with the opportunity of future improvements, as hoped in par.4.3.2.

4.1
OUTLINING THE FRAMEWORK

The theoretical framework that acts as the foundation of the tool has been elaborated through a series of discussions with design researcher Gabriele Ferri and members of the *play and media research group* of the AUAS, and has been followed by a co-design session with four students of their *M.sc interaction design course* (par. 4.2.1).

Structuring took off from an in-depth discussion with Gabriele Ferri about the narrative conventions (par. 2.2.1) that could be implied in the project. This led to a crucial design premise: a *universal narrative model* (KOENITZ ET AL., 2018) is unachievable and, above all, such an attempt can have an harmful effect on the narrative output, that would end up being biased and unrealistic. Aware of this assumption, a decision was made, early in the structuring phase, to pick only a few of the existing narrative conventions, by judging their effectiveness and relevance in the digital game field. Thus it was decided to pick Wolf's worldbuilding concepts (par. 2.2.2), the conflict-based plot conventions that stemmed from Campbell's work – especially Harmon's reworking of the hero's journey (par. 2.2.1) – and several smaller conventions that are listed in par. 4.1.2, par. 4.1.3 and par.4.1.4.

After further discussions, a structuralist approach to character creation – that is recurrent in the IDN field, and is often influenced by Propp's work (1928) – has been deliberately excluded, with the intention to avoid schematic relationships between actors and favour the creation of wider dramatic arcs.

Once chosen the main narrative conventions to be implied for the project, further discussions with the *play and media research group* followed, focusing on the possible structure of the entire narrative design process. Many existing interactive storytelling tools have been analyzed, namely:

- The *Fungus* plugin for the Unity 3D software[1].
- The *Twine* platform.
- The *Ghost* plugin for *Unity 3D* (GUARNERI ET AL., 2017).
- The Game and VR project in the *Celtx* software.

Additionally other analogue tools for narrative design have been studied *(fig. 4.1)*, namely:

- The *Forest Path* for Narrative design
- The stoyworld canvas and story map (VENDITTI, 2017), adopted also in the *M.sc course of Complex Artefacts and System Design Studio* at *Politecnico di Milano*
- The Fabula[2] card deck (BINASCO & DI PASCALE, 2016).

The knowledge that resulted from this investigation informed the structure of a theoretical framework (detailed in par. 4.1.1), that is eventually supported by a card-based tool (par.4.1.2,par. 4.1.3, par. 4.1.4). It follows this fundamental assumptions:

- in order to be effective, narrative information should be clustered
- the narrative clusters should have the possibility to be equipped with tags, that can favour connection between elements and, in a digital environment, could be rendered as a node system
- narrative design should be a top-down process, that starts by eviscerating the main idea and then continues by detailing the specifics through different phases

---

[1] *https://fungusgames.com/*
[2] *https://fabuladeck.com/it*

Figure 4. 1

Top: The fabula card deck. (ʙɪɴᴀsᴄᴏ & ᴅɪ ᴘᴀsᴄᴀʟᴇ, **2016**)
Bottom. 2: Imagis lab storyworld canvas (ᴠᴇɴᴅɪᴛᴛɪ, **2017**).
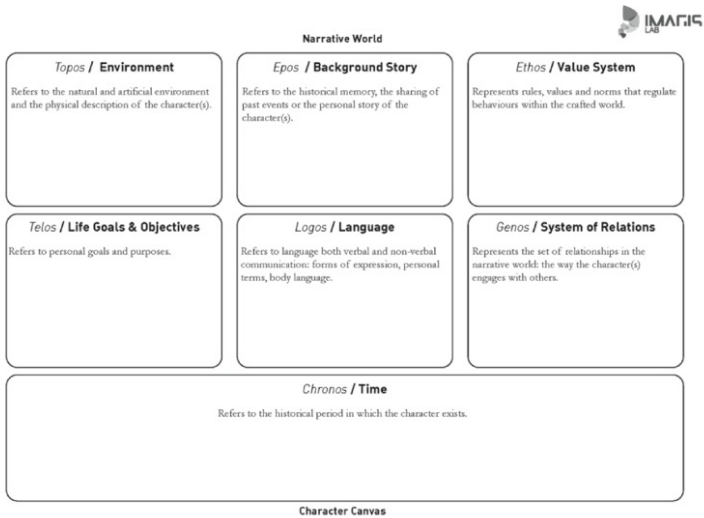
Figure 4.2
Theoretical framework structure

PHASE ONE:
BRAINSTORMING

IDEA (IN FIVE LINES)

time of the world
space of the world

target of the experience
genre of the experience
type of interactivity

notes or furter information

CONCEPT

PHASE TWO:
WORLD BUILDING

ENVIRONMENT
natures of the world
structures of the world

ASSETS
characters of the world
objects of the world

CULTURE
tribes of the world
myths of the world
languages of the world

IMAGINARY WORLD

PHASE THREE:
PLOT STRUCTURING

CONFLICT DEFITION

BRANCHING PLOT

IDN BLUEPRINT

4.1.1 The theoretical framework structure

The theoretical framework that is detailed in this paragraph is structured after the study of the state of the art of IDN and the investigation of existing narrative tools (par. 4.1).

It suggests to split the narrative design process into three distinct phases, following the project process stages suggested by Zimmerman (J. ZIMMERMAN ET AL., 2004), that are commonly implied in the interaction design field:

- Define
- Discover
- Synthetize

Thus, the framework similarly suggests three different stages *(fig. 4.2)*, in which it is possible to:

- define the main idea and rules of the overall experience
- discover, define and cluster every narrative element
- synthesize the knowledge into an interactive plot

For each phase the framework asks to create and cluster different interdependent elements that are rendered in the form of cards to improve their usability.

The first phase, called *brainstorming*, revolves around the definition of seven elements:

- The main *concept*
- The *time* of the story world
- The *space* of the story world
- The *target* of the interactive experience
- The *genre* of the interactive experience
- The type of *interactivity* that defines the experience
- *Notes* or further information to be highlighted

The outcome of the *brainstorming phase* is a fleshed out concept that addresses both the main narrative design trajectories and technical requirements.

The second phase, called *world building*, allows to delineate the imaginary world through the definition of 8 elements, split into three bigger categories:

- *Environment elements*
- *Nature*
- *Structure*
- *Asset elements*
- *Character*
- *Object*
- *Culture elements*
- *Tribe*
- *Myth*
- *Language*

The outcome of this phase is a detailed collection of every feature of the imaginary world in which different narratives can take place.

The third phase, called *plot structuring*, brings together the outcomes of phase one and phase two in the generation of an interactive narrative. Firstly, it asks to choose one of the characters designed in phase two and then it asks to define the main conflict that will guide the entire dramatic arc. Once met these requirements, the framework allows to delineate a branching interactive story through the description and linking of scenes, generated following 8 plot points taken from Harmon's *Story Circle:*

- *You.* A protagonist Is in a Zone of Comfort
- *Need.* The protagonist wants/needs something

- *Go.* The protagonist enters an unfamiliar situation
- *Search.* The protagonist adapts to it
- *Find.* The protagonist gets what he wanted
- *Take.* The protagonist pays a heavy price for it
- *Return.* The protagonist returns to the familiar situation
- *Change.* The protagonist is changed

Together, the three phases of the framework offer a clear overview of the entire narrative system, and a detailed blueprint for the narrative design of every element, that can easily be understood, modified and iterated collaboratively by the design team. As detailed in the next paragraphs, to support this theoretical framework a card-based tool has been envisioned, first as an analogue system and then as a digital collaborative tool.

The cards have been designed to improve the usability and comprehension of the framework in its entirety; thus, they present dedicated space for compilation and hints (often in the form of questions) about the narrative conventions implied.

To improve the clarity and impact of the cards, a color scheme was proposed:

- Neutral colors (in the tones of white, gray and black) for the cards of phase one, so that the concept could come off distinctly and distanziate from the narrative elements of the following phases
- In *phase two*, the green cards define the environment elements (recalling the flora of a world), the orange cards define the assets, while the blue cards (complementary to the assets) define the culture elements.
- In *phase three*, each plot point has been assigned a specific color that is mirrored in its related scene card. The plot points related to the ordinary world are designed with warm colors, while the ones related to the extraordinary world have been designed with cold colors.

4.1.2 Phase One: Brainstorming

The brainstorming phase starts the narrative design process and is dedicated to the generation of the main idea. The aim is to outline a rough vision of the project before diving deeper into the element creation (par. 4.1.3) and the interactive plot (par. 4.1.4). It consists of seven cards *(fig. 4.3)*:

- The *concept* card
- The *time* of the world card
- The *space* of the world card
- The *target* card
- The *genre* card
- The *interactivity* card
- The *notes* card

Every card is designed to have free spaces that need to be filled with text and guides the user in the compilation by asking design questions at the bottom:

- The *concept* card: "What is your idea in 5 lines?"
- The *time* of the world card: "Do you have time rules or conventions in your world?"
- The *space* of the world card: "How is your world like?"
- The *target* card: "What is the target of your story?"
- The *genre* card: "What is/are the genre/s of your story?"
- The *interactivity* card: "How does the audience interact with the story?"
- The *notes* card: "Do you have team memos notes?"

The *concept* card is the core element of this first phase and first to be compiled. It asks the team to insert a title for the project (that can be modified in the future) and to freely detail the story concept in maximum five lines. The choice of a limited number of lines comes from the high concept tradi-

tion that is especially implied in the Hollywood industry when producers ask for succinct pitches and loglines. As described by Snyder in the screenwriting manual *Save The Cat* (2005), the logline should come first when writing because it offers a clear mental picture of the story and puts in focus what the story is about and why it should be told. This primary sparkle of idea is vital since it puts in perspective the entire narrative design process. Further revorwkings and drafts are allowed at any stage of the process, as long as they respect the five-line formula. Taking inspiration from well-known movies, a good concept could be:

> A wealthy businessman and a group of geneticists creates a wildlife park of dinosaurs in a small island near Costa Rica. However a sudden accident puts the visitors in danger and forces them to face the repercussions of bringing these creatures to life.

All the other cards are connected to the concept card (a standard disposition is suggested by the pictograms on the sides) and can be filled without any specific order. They offer the opportunity to deepen and eviscerate the main idea and, as such, their compilation is not strictly necessary for the second phase, even if highly suggested.

The *space* of the world card asks the user to describe how he envisions the world or the Universe in which the story is told. It can be filled with a generic information like *"the story is set between three different solar systems"* or with a more dense description like *"the story is set on a steampunk-esque planet, powered by a thermonuclear core that pollutes the soil, resulting in a distorted and radioactive vegetation"*. The card also offers the opportunity to insert the name of the world/universe.

The *time* of the world card, instead, asks the user to describe if the world in which the story is set possess specific time rules or conventions. For instance, days can last 36 hours or planets can live in perennial darkness. This card is of particular importance when the users already have in mind to play

Figure 4.3
Cards for the first phase of the tool (brainstorming)

with time conventions, such as flashbacks, flashforwards or multi-dimensional realities. Both the space and time card are designed taking their knowledge from Wolf's *Building Imaginary Worlds* (**2014**).

The other cards offer a different, more projectual view on the story, and basically asks the users to reflect on the requirements of their future IDN.

The *target* card asks the user to outline briefly what is the envisioned audience for the final product.

The *genre* card asks the user to define what is (or possibly are) the genres of the story. This choice will eventually influence the entire tone and feel of the story.

The *interactivity* card asks the user to reflect on the way the audience will interact with the story. This is a crucial card since it sets the technical requirements for the entire experience.

Finally, the *notes* card is presented for the user to be filled with any type of additional information that could become helpful in the next stages.

Once compiled all the cards, the *brainstorming* phase can offer a rough but precise overview of the story the user will be telling. Such an overview is then ready to be detailed in the second phase, the world building (par. 4.1.3). As seen in 4.2.2 the *brainstorming* cards structure has been reworked and refined

Figure 4.4

Environment cards for the second phase of the tool (world building)

greatly after the testing sessions, resolving several terminological criticalities and reordering the hierarchy of the cards for a better understanding of the concept.

4.1.3 Phase Two: World Building

The *world building* phase eviscerates the concept idea that stemmed from phase one (par. 4.1.2) and defines the narrative design of every element that exists in the narrative world (like the characters, environments, objects or cultures). Not every element that is created will eventually be useful for the final

story (par. 4.1.4), because a story world can possibly hold infinite plots. However, as already argued in 2.2.2, diving deeper into the details of the imaginary world informs the entire design process and improves the overall audience experience, as it aims to reach an ideal level of invention, completeness and consistency.

The world building phase provides seven cards, divided in three categories:

- The *environment* cards (environment, structure)
- The *asset* cards (character, object)
- The *culture* cards (tribes, myth, language)

Figure 4.5

Asset cards from the second phase of the tool (world building)

The *environment* cards *(fig. 4.4)* are meant to delineate the physical, geological and biological structures and ecosystems of the world. They are of two types: the nature cards and the structures cards.

The *nature* cards are implied when describing environment elements that exist spontaneously. In this category fall small features like plants or flowers, medium features like rivers, valleys or caves, and big features like entire planets.

The *structure* cards, instead, are implied when describing environment elements that have been created with agency (by someone or something). In this category fall small features like bridges, pits and buildings, or bigger features like entire cities.

A special requirement for structure cards to exist is to be linked to a nature card, as they need an environment to be built in. Using a reference from Tolkien's *Lord of the Rings* (1954), the structure *Dark Tower* created with agency by *Sauron* is located in the *Ash Mountains*, north of the *Mordor* region.

Both the *nature* and the *structure* cards come with space for their name and description, as well as a dedicated area in which it is possible to indicate time and space information (helpful when building timelines or maps).

The *asset* cards *(fig. 4.5)* are of two types: the *character* cards and the *object* cards.

Figure 4.6

Culture cards from the second phase of the tool (world building)

The *character* cards are used to describe assets that have agency over the world, meaning that they can impact the environment in a meaningful way (like shaping objects, destroying structures or moving through space). Characters are the most complex elements of a world and, as such, their card is articulated through a series of questions to help the user in maintaining consistency. These questions are formulated gathering knowledge from Wolf (**2014**), Campbell's archetypes (**1949**), Snyder (**2005**) and Tuner's findings on tribes behaviours (**1982**):

- *What is her/his tribe?*
  This question is directly linked to the tribe culture card (detailed below). The tribe is the social group of whi-

ch the character is part. It can of small dimensions like a family or a group of friends, of medium dimensions like actual tribes or clans, or it can be of big dimensions like entire species. Using Rowling's *Harry Potter* saga as a reference, the aforementioned protagonist soon learns that he belongs to the wizard tribe, a social group with distinct rules and behaviours.

- *What are the goals or aspirations?*
  This question will be useful when building the interactive plot in phase three (par. 4.1.4), as it is the premise for future conflicts. It asks the user to detail the everyday goals, dreams and aspirations of the character. It can be

as simple as *"he dreams to become a painter"* or as complex as *"she wants to save the world from climate change"*.

- *What are her/his morals or values?*
  This question eviscerates the beliefs of the character and his vision of the world. Disney's Peter Pan (1953), for instance, doesn't want to grow up, despises the adult world and lives a never-ending childhood.

- *What is the background story?*
  It might be useful for the users to reflect on the background story of a character, as they might be the basis for possible plots or it can inform specific behaviours.

- *What is the appearance?*
  Finally, this final question asks for a physical description of the character.

The *object* cards are used to describe assets that don't have agency over the world. They simply are tools used by characters. They can be small as weapons, gears of clothing items, or big like machines and spaceships.

Both the *character* and the *object* cards can be compiled with name and description, and present a dedicated area for time and space information.

The *culture* card *(fig. 4.6)* is meant to delineate the cultural and abstract features of the world. They have been greatly informed by Wolf work on fictional worlds, following the belief that *"culture, as a means of structuring worlds, [...] relates directly to the experience of its characters, and gives them meaning"* (**2014, PAG. 183**).

Culture cards are of three types: the *tribe* card, the *myth* card and the *language* card.

The *tribe* card frames the features of a social group made of specific members in specific environments, and that all share the same languages, myths and history. In order to be considered valid, this card needs to be linked to other *culture*, *environment* and *asset* cards.

The *myth* card helps the user to shape the myths of the world, here meant as *"information, legends and stories that provide backstories for the current events and settings of a world"* (WOLF, 2014, PAG. 189). They can be epic cycles of the Roman and Greek type, or just simple stories, urban legends or beliefs told between family members or neighbours.

The *language* card, instead, asks the user to describe the possible language of a tribe. Being a complex matter, the creation of new languages is mostly neglected in the narrative design process. However it can be of great importance for the final experience, especially in the digital game field, where players often interact with the fictional world through UIs and text-based artefacts. As argued by Wolf: *"Invented languages may be central to a story world or merely used to add flavor to the background. However, even when only well-constructed glimpses of them appear in a story, these languages add to the narratives and mythologies that they help to support"* (WOLF, 2014, PAG. 189).

A great advantage of having a card-based compilation system is that the user can cluster, archive and connect the materials freely. Furthermore, the world building cards are designed so that the user can fill them following the desired order. Through a series of interdependencies, however, the user is forced to compile several cards before moving to the next phase:

- The *structure* card needs to be linked to a *nature* card
- The *character* card needs to be linked to a *tribe* card
- The *tribe* card needs to be linked to an *environment* card, a *language* card, a *myth* card and several *character* cards

The co-design session and its subsequent testings (par. 4.2), however, highlighted the limits of an analogue tool. Furthermore, they indicated several criticalities and ambiguities in the nomenclature, that has been fixed in the following iterations (par. 4.3).

Figure 4.7
*Conflict card from the third phse of the tool (plot structuring)*

4.1.4 Phase three: plot structure

The *plot structure* phase carries to completion the concept that stemmed from phase one (par. 4.1.2), as it asks the user to gather the narrative elements from phase two (par. 4.1.3) and to put them into a conflict-based interactive plot. It is important to point out that possibly infinite plots can be generated from a single story world. The *plot structure* phase is broken down into two smaller segments:
- The *conflict definition*
- The *branching of the events*

Figure 4.8
Story circle from the third phase of the tool (plot structuring)
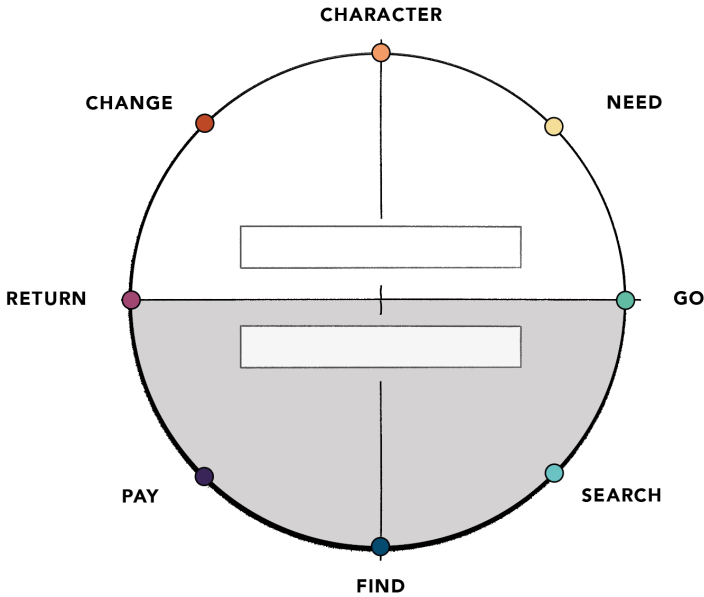
The *conflict definition* is obtained using the conflict card *(fig. 4.7)*. It is shaped following the modern reworkings of Campbell's theories in the filmmaking industry – as in Snyder (2005), Vogler (1998) and McKee (1998) – and it especially takes inspiration from the concept of intention and obstacle proposed by screenwriter Aaron Sorkin, in which *"a character wants something, but something is standing in their way of getting it"*[1]. Thus, this section asks the user to choose a character card from phase two and declare his obstacle.

As this phase finally addresses the potentiality of interactivity, it is possible to have multiple conflicts for the same character: it will be sufficient to compile several *conflict* cards, ope-

Figure 4.9

Scene cards from the third phase of the tool (plot structuring)

(LOCATION)	*(LOCATION)*
WHO IS YOUR HERO? HOW DO WE ENCOUNTER HER/HIM? WHAT IS THE STATUS QUO OF HER/HIS WORLD?	THE HERO REALIZES SHE/HE WANTS SOMETHING. WHAT IS HER/HIS GOAL? AND HER/HIS OBSTACLE?
(LOCATION)	*(LOCATION)*
THE HERO STARTS THE ADVENTURE. WHAT IS THE FIRST STEP THAT SHE/HE DOES TO OVERCOME HER/HIS OBSTACLE?	THE HERO DIFFICULT STEPS (TRIALS, ADVENTURES, QUESTS, ENCOUNTERS) THAT BRING HER/HIM CLOSE TO THE GOAL.
(LOCATION)	*(LOCATION)*
THE TURNING EVENT OF THE HERO'S ADVENTURE. THE HERO FINDS WHAT SHE/HE WANTED BUT...	...NEEDS TO PAY A PRICE (OR LOSE SOMETHING) FOR WHAT SHE/HE WANTED
(LOCATION)	*(LOCATION)*
THE HERO TRIES TO COME BACK TO HER/HIS STATUS QUO, BUT FIRST HAS TO FACE THE FINAL OBSTACLE	THE HERO FINALLY COMES BACK HOME, BUT CHANGED

ning up to different plots that will retain the same subject. What follows is the *branching of the events*, in which the user has to shape the interactive plot by defining the possible events and interactions that will occur. The dramatic arc has been thought following the modern reworkings of Campbell's monomyth (par. 2.2.1), especially the one suggested by Harmon *(fig. 4.8)*. Harmon's *Story Circle* has been chosen for its direct and clear verb-based plot points that can open up to many more narrative possibilities than the precedent hero's journey reworkings.

In the framework each plot point basically functions as a folder that can store many alternative events. These will be then connected to other alternative events in the following plot points. The user can design the events by compiling the scene cards *(fig. 4.9)*, with location and description. To avoid possible ambiguities, each card presents at the bottom a very synthetic sentence that delineates the dramatic aim of the plot point:

- *Character scene:* Who is your hero? How do we encounter her/him? What is the status quo of her/his world?
- *Need scene:* The hero realizes that she/he wants something. What is her/his goal? And her/his obstacles?
- *Go scene*: The hero starts the adventure. What is the first step that she/he does to overcome her/his obstacle?
- *Search scene*: The hero goes through difficult steps (trials, adventures, quests, encounters) that bring her/him closer to the goal.
- *Find scene*: The turning event of the adventure. The hero finds what he needed/wanted but…
- *Pay scene*: …she/he needs to pay a price (or lose something) for it.
- *Return scene*: The hero tries to come back to her/his status quo, but first has to face the final obstacle.
- *Change scene*: The hero comes back home, changed.

Since the scenes are thought to be working for an interactive experience, they can be sorted, grouped and linked freely through a branching structure. The only restriction is in the order of the plot points, that needs to be respected (to facilitate this task, a chromatic scheme has been applied). The outcome of this final phase is an interconnected story that branches between different narrative paths, but that still manages to maintain a consistent dramatic arc throughout the entire experience.

Together with the other two phases, the framework aims to give the right tools to shape every detail of the narrative design experience, while also providing a clear way to communicate with the teams and even test the impact of the narration on the audience.

As described in the following paragraphs, this embrional concept has undergone a co-design session and subsequent testings that helped to gather primary data and helpful insights. The findings collected from these sessions greatly impacted the final result of the research, as they suggested improvements on every aspect of the prototype, from its usability, naming and implementation in a digital environment.

4.2
CO-DESIGN PROCESS AND TESTING

Once outlined the main features (par. 4.1), the framework has undergone an iterative design process that has tested, refined and implemented its final outcome. It followed four stages:

- A co-design session at the AUAS with students of the *M.sc digital design course* (par. 4.2.1)

- A workshop session held at the *Electric Vehicle Supply Equipment company EVBOX*, in which members of the design and marketing department (par. 4.2.2).

- A remote testing session with independent game company *Attic Box* (par. 4.2.2).

- A testing session in *Politecnico di Milano* with the students of the *M.sc course of Complex Artefacts and System Design Studio*, led by Mariana Ciancia and Ilaria Mariani (par. 4.2.2).

Each stage highlighted the weaknesses and the strengths of the framework and led to substantial changes to its usability, interface and features. In particular, the co-design session greatly impacted the following reworkings, as the students were given the opportunity to change and manipulate the framework to better suit their needs.

Of great importance for the entire process was to choose stakeholders and testers that were already occupied with the design of narrative experiences. Through iterative design they had the opportunity to create systems on the field and to play with them instantly (Zimmerman, 2003), eventually making it possible to gather valid primary data for this research:

- The *AUAS* students were already involved by the *Netherlands Institute for Cancer Patients* in the development of a digital game[1].

- *EVBOX* was gathering knowledge for a transmedial marketing experience.

- The *Attic Box* developers were in the pre-production of their first horror game, *Seek*[2].

- The *Politecnico di Milano* students were involved in the creation of a trans-media experience inspired by *United Nations Sustainable Development Goals*[3].

The final result of this process is a solid card-based framework for narrative design, that has then been reworked in a digital environment, as detailed in par. 4.3.

4.2.1 Co-design session at AUAS

The co-design session was held in November 2019 at the *Amsterdam University of Applied Science* (AUAS) with four students from the *M.sc Digital Design course*: Katy Barnard, Pamela Nelson, Danny Nguyen and Steve Savage. The first element of interest came from their heterogeneous backgrounds, which spanned from communication design, fashion design and programming. Only one of the students had narrative design experiences prior to the co-design session, being involved in the design of an indepent videogame, *Seek* (that later tested the improved prototype as described in par. 4.2.2).

At the time, the group had been involved by the *Netherland Cancer Institute* to take over an existing project, called *Terra*[4], that was aiming to improve the cognitive function during the

---

[1] *https://www.masterdigitaldesign.com/case/terra-ii*

[2] *https://www.atticboxgames.com/#/*

[3] *https://sdgs.un.org/#goal_section*

[4] *https://www.masterdigitaldesign.com/case/terra*

recovery process for head, neck and brain cancer patients. In fact, recovery for these subsects often implies aerobic and brain training exercises, and the *Terra* project suggested to merge these activities into a game-like experience that would improve the benefits through fun and gamification. Thus, the previous group had connected a smart exercise bike to *Unity 3D* and created a rough game prototype, that was subsequently handed down to the new group, in charge of designing the narrative that would support the gameplay. The existing constraints for the project were:

- In order to not confront the final users to their health status, the game should avoid human representation
- Gameplay should follow the concept of mirroring. As the player improves in the game, their representation improves (and vice versa)
- The narrative should follow the concept of terraforming. The users need to be entrusted with exploring, transforming and nurturing worlds.

Once defined these requirements, the group received the analogue cards described in par. 4.1 and started working on the actual narrative design of the experience. The session was structured as follow:

- *Pre-design*: the designers read the cards for each phase (brainstorming, world building and plot creation) and made questions or asked for clarification
- *Design*: aided by post-its, paper and a whiteboard the designers brainstormed ideas and compiled the cards
- *Post-design*: the group would pitch and explain the card contents to everyone and suggest possible improvements of the card features

This process has been iterated four times for each of the three phases, proceeding from mud to clarity. I participated actively by explaining and discussing the card design and ma-

Figure 4.10

Images from the co-design held the Amsterdam University of Applied Science
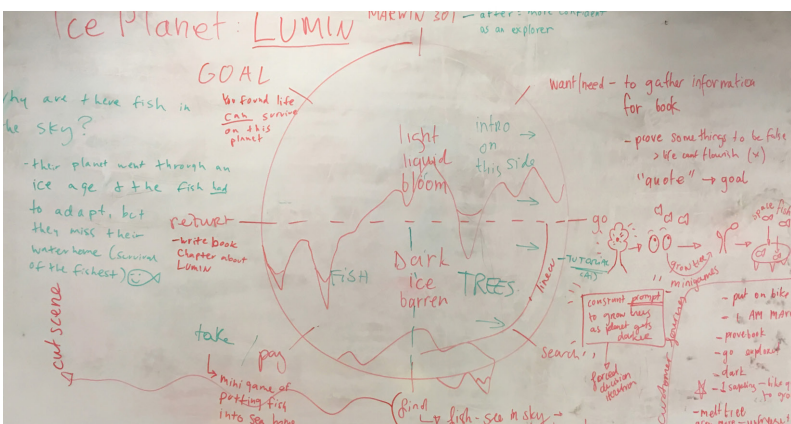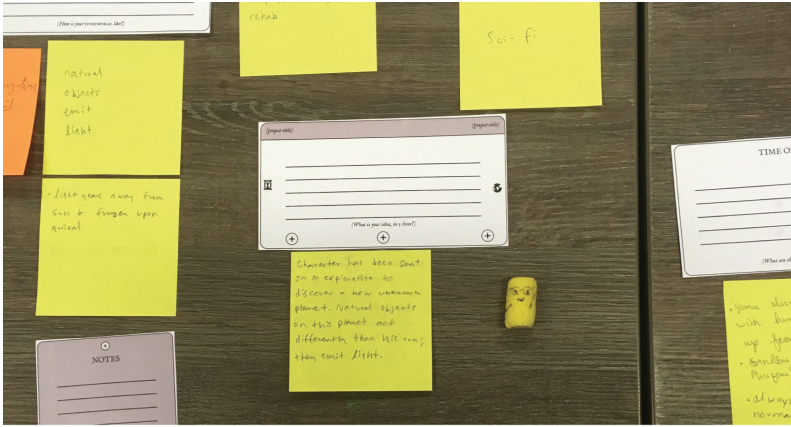
king sure that the suggested improvements would improve the narrative effectiveness of the overall process.

As there were previous constraints, the first phase (*brainstorming*) did not encounter critical issues. Furthermore, the sci-fi setting for *Terra* helped the compilation of the time and space cards smoothly. At first the five-line concept request hadn't been well received by the team, which found it useless and time consuming. However it was eventually re-evaluated in phase two and three as it helped to maintain consistency. The *genre* card manifested immediate benefits, as the sci-fi references and archetypes informed the entire tone of the experience and transformed the neutral setup of *Terra* to a more entertaining game experience.

Phase two (*world building*) was the section that occupied most of the time, as each card required to be understood and processed by the entire team. This phase showed some criticalities:

- Nomenclature was at times misleading, especially for the *tribe* card that wasn't immediately misunderstood

- The analogue media became a constraint, as the team had limited prints of the cards and fixed space for the description. To overcome these limitations post-its were implied *(fig. 4.10)*.

- Collaboration was discouraged during the compilation, as it was hard for the team to work together on the same card.

Phase three (*plot creation*) was the hardest phase to understand for the entire team and the toughest to design, as the card prints were limited. This limitation was overcome with the use of a whiteboard. Furthermore, except for one member, none of the students had prior knowledge on narrative structures, making it extremely hard to think in terms of dramatic arc and conflict. Eventually, this design deadlock had been resolved by guiding the team through notable examples

Figure 4.11
Story circle that resulted from the co-design session with the AUAS students
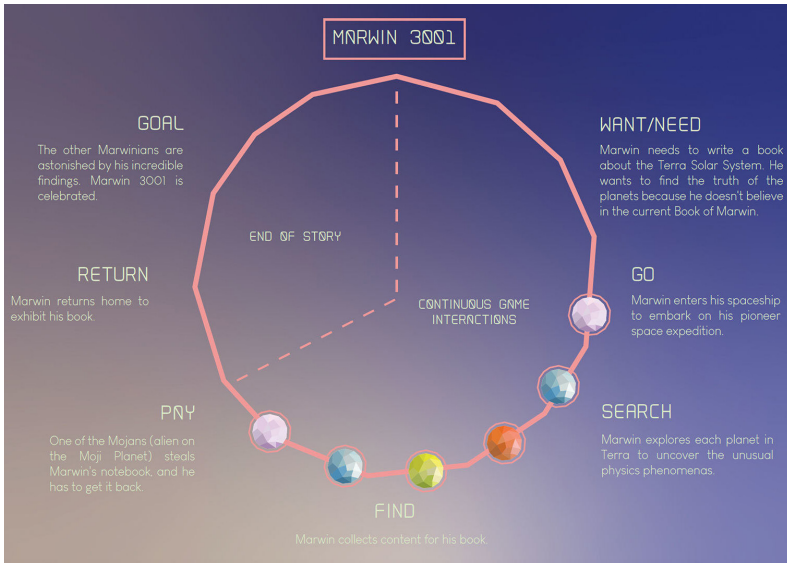
from books and movies. The verb-based plot points, however, were clear and intuitive enough for the students to accomplish a satisfying narrative design by the end of the day.

The outcome of the co-design session is *Terra II*, the story of *Marwin*, an alien from *Planet X* that has been chosen to explore the Terra Solar System for the first time *(fig. 4.11)*. Throughout his quest for knowledge *Marwin* is aided by an AI system called *A.N.N.I.E (Artificial Network Intelligent Entity)*. The *Netherlands Cancer Intistute* patients play as *Marwin*, guiding their smart exercise bike as a spaceship through different planets that can be chosen without a particular order.

The design team expanded the final story with the *Twine* software and even made the game a transmedial experience, offering the patients the opportunity to watch or read the backstory that informs the premise of the gameplay.

The co-design session was followed by a semi-structured focus group. The main findings that have been collected are:

- The framework is extremely helpful as it forces to think about every single detail of the narrative experience, even the one that may not end up in the final experience (Katy B.)

- The second phase is the most helpful (Pamela N.) as it asks to find the meaning to every design decision, and it also keeps in check with the 3D asset creation for the final game (Steve S.)

- Nomenclature is at times confusing and it should be more direct (Danny N.). The tribe card is the most ambiguous one.

- If every step is compiled correctly, the third phase is the most clear and rewarding, as it gathers the previous elements in a meaningful story (Pamela N.). However the scene cards aren't very helpful, as they present limited space for compilation. As a matter of fact the team reworked the plot points on the Twine online platform.

- A digital version of the prototype would be interesting, but only if it would improve collaboration (Danny N.).

4.2.2 Testing

After the co-design session detailed in the previous paragraph, the framework has undergone three subsequent rounds of testing:

- A workshop session held at the *Electric Vehicle Supply Equipment company EVBOX*

- A remote testing session with independent game company *Attic Box*

- A remote testing session with the students of the *M.sc course of Complex Artefacts and System design studio* at *Politecnico di Milano*

The workshop session at *EVBOX* was held in December 2019 with 18 participants from the design and marketing departments of the company, interested in gathering knowledge about narrative design processes for future marketing campaigns *(fig. 4.12)*. None of the attendees have had previous experience in designing interactive narratives. The workshop lasted four hours, broken down as follow:

- a brief and explanation of the cards (30 min)
- design of the narrative (one hour for each phase)
- final pitch of the story (30 min)

The participants were split in groups and cards were handed progressively, based on the reached design phase. In the introductory phase I participated actively, acting as moderator and explaining the main features of the framework, but once the design session started I did not interfere with the groups' decisions. In addition to the cards (that were printed in a limited number for each group) post-its and paper were implied.

During the workshop the framework did not face any particular criticalities, as the *tribe card* has been renamed *group card* and the conflict-based dramatic arc of phase three had been explained through an example. An interesting behaviour that occured during phase two was to rush the compilation of the cards in an unordered way: by the end of the world building phase, two groups noticed that they didn't have character cards to move to the plot generation and had to come back to compilation. Such behaviour was expected at a certain point of the testing, as it was a design choice to avoid any type of already-made character archetypes (par. 4.1). Thus, to avoid future ambiguities, a set of constraints have been added to the final prototype (par. 4.3): in order to proceed to the third phase, the user has to fill at least one character card, one tribe card and one environment card. However, the testing was successful, by the end of the workshop every group eventually managed to pitch a small interactive story.

Figure 4.12
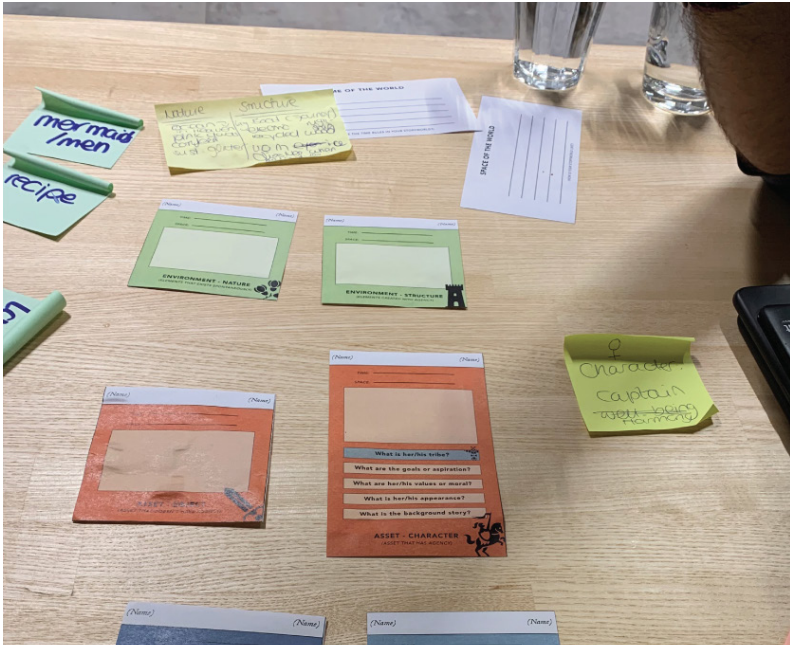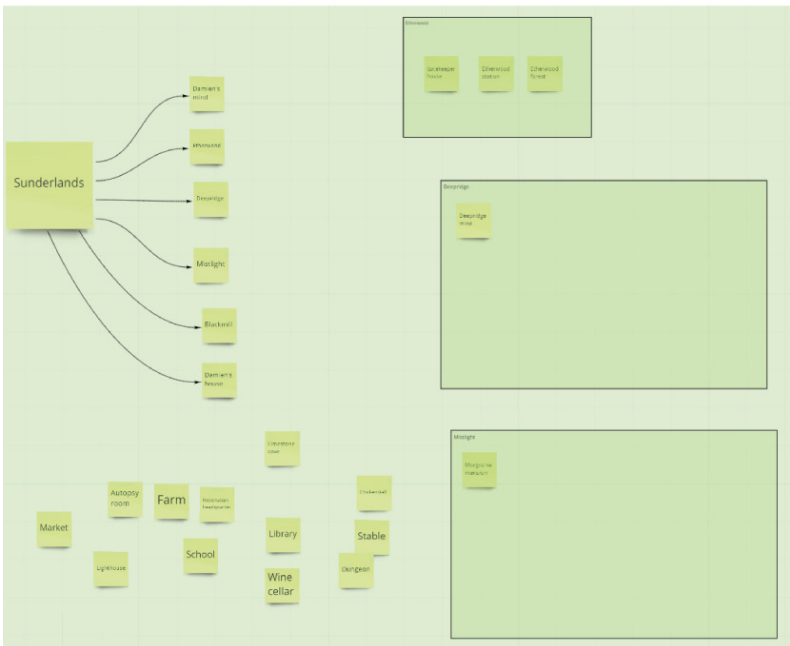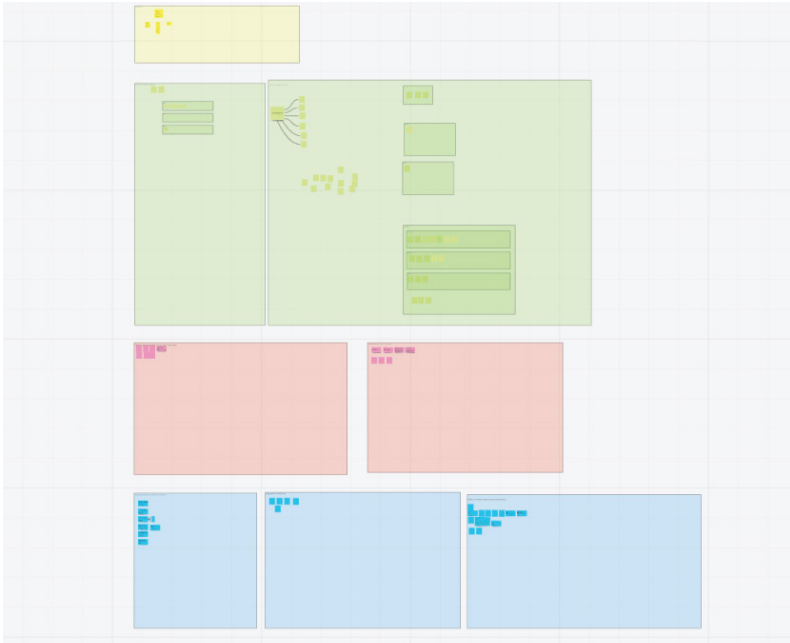
Images from the workshop held at EVBOX Amsterdam

Figure 4.13

Screens from the remote testing on Mirò with Attic Box

In parallel to the *EVBOX* workshop, a digital copy of the cards was handed to dutch independent video game company *Attic Box*, which was developing a horror game called *Seek[1]*. At the times the company had already released a demonstrative gameplay demo and was actively working on fleshing out its narrative premise. The team consisted of 9 developers; of them only three game designers, a 3D artist and a concept artist were involved in the testing. As the artists were unavailable for a live brainstorming session, this testing became a valuable opportunity to start envisioning a digital transposition of the analogue prototype. The team used the *Mirò digital platform (fig. 4.13)* that allowed remote collaboration, custom clustering and linking and, above all, solved the issue of limited space on paper.

The insights gathered from the *Attic Box* team encouraged the potentiality of a collaborative digital prototype, however they also underlined that a rigorous structure is needed in a digital environment. In fact, the users digitalized the cards by themselves, a decision that led to many inaccuracies which could be avoided by releasing a ready-to-use template (par. 4.3).

Finally, the prototype was tested a third time in March 2020 with the students of the *M.Sc course of Complex Artefacts and System Design Studio*, led by Mariana Ciancia and Ilaria Mariani. The course involved 50 students from the M.Sc of *Communication Design* and *Interaction Design*. Prior to this session, the analogue tool was reviewed with the thesis supervisor and dott. Mariana Ciancia that, as lecturer of the M.sc course, offered valuable insights and suggestions to improve the framework:

- In *phase one*, the *target* card has a misleading nomenclature. The term *audience*, instead, could avoid ambiguities.

- In *phase one*, the *interactivity* card has a misleading nomenclature. The term *technology*, instead, has been suggested.

- In *phase one*, besides the *time* and *space* card, it was suggested to add a *people/community* card so that the user could

start thinking about the character that inhabits the fictional world from the concept inception.

- In *phase two*, the *tribe* card has a misleading nomenclature (as already noted in the previous testing sessions). The term *group*, instead, could avoid ambiguities.
- In *phase three*, the *scene* cards need to include the list of characters involved in the event so that the user can track the movements of each character during the entire experience.
- In *phase three*, flashback and flashforward scenes should be indicated during the plot compilation.

Subsequently, the reworked cards for the first phase had been tested with the students of the M.Sc course, which were asked to develop a transmedia narrative experience starting from topics of the *United Nations' Sustainable Development Goals.* Due to the COVID-19 outbreak in Italy, the testing was held remotely *(fig. 4.14)*. After a brief introduction, in which the card features were explained and possible ambiguities cleared, the students received a digital copy of the cards and returned a pdf after a week. As every group managed to compile the cards successfully, the outcomes of the testing successfully validated the improvements to the framework. Thus, the project entered its final phase (par. 4.3), being reworked in a digital environment and released on the *Mirò* digital platform.

Figure 4.14

Screens from the remote testing with the Politecnico di Milano students
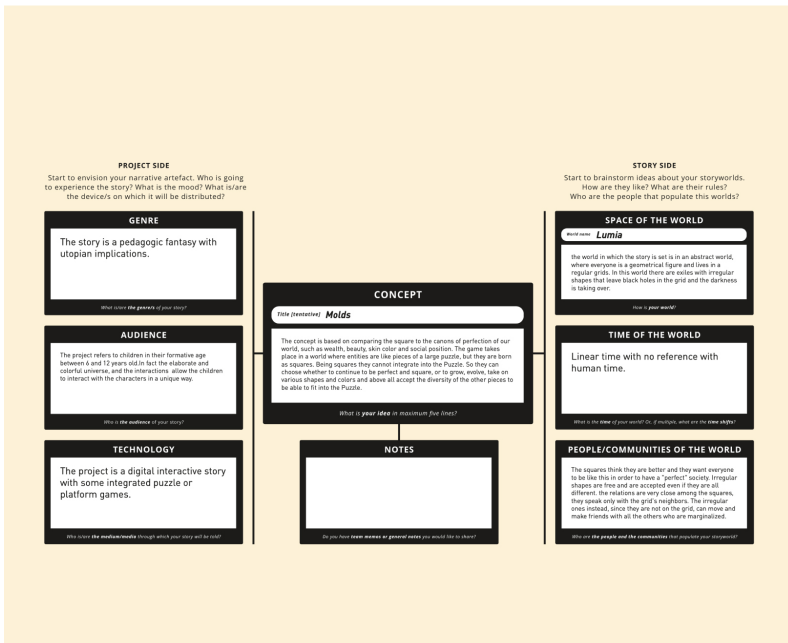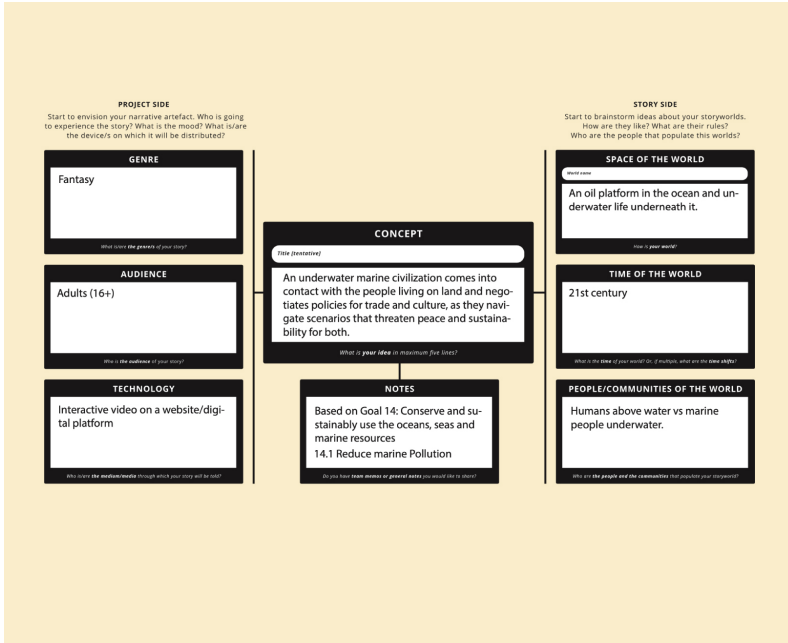
4.3
TOWARD A DIGITAL PROTOTYPE

As the co-design session and the subsequent testings wrapped, the study grasped a sufficient amount of primary data to be triangulated with the secondary knowledge from the desk research and literature review (chapter 1 and 2). The results confirmed the hypothesis of this study, that a collaborative tool could enable the narrative design of digital games.

However the analogue tool highlighted some problematics that a transition to a digital environment could solve:

- *Paper is a limit.* Designers have to print the material and thus can access only a limited amount of cards, with a fixed writing space and the impossibility to store attachment media as audio, video or images. Furthermore, it is almost impossible to collaborate on the same card .

- *Ordering and linking the cards is a complicated and unpractical process.* The introduction of tags in a digital environment can favour automatization, a node-based dynamic connection and smart linking of the material.

- *The analogue cards force the designers to work in the same room.*

The last point is of crucial importance, especially in the light of the COVID-19 outbreak in 2020, that forced a reorganization of teamwork and imposed on many departments the remote working structure. Many speculate that this work-from-home digital approach will become the new normal, even after the COVID-19 will be long vanquished. As a matter of fact, today movie and tv writing[3] are already embracing this philosophy.

---

[3] *https://bit.ly/2RjMADU*

Thus, the opportunity of a digital IDN framework that can be operated remotely and collaboratively offers a valuable direction for future investigations and development in the field. This study joins this conversation by reworking the analogue prototype described in the previous paragraphs in the *Mirò digital platform*: the result is *Story Knots*, a collaborative framework for the narrative design of IDN (par. 4.3.1).

Being aware that the result will only touch on the many benefits that a fully-programmed digital infrastructure would bring, the design of *Story Knots* focuses on its interface and usability, with the hope that further developments would come, improving and supporting the efforts in this direction, as detailed in par. 4.3.2.

4.3.1 Story Knots: a collaborative narrative tool

Story Knots has been designed in the *Mirò visual collaboration platform* for teamwork. The choice has been made following the encouraging results of a prior testing with *Attic Box*, that is detailed in par. 4.2.2. Much like its corresponding analogue prototype, *Story Knots* is split into three distinct design phases:

- the concept ideation
- the world building
- the plot structuring

Each phase comes with a resource banner (containing the cards) and a work board, in which users can cluster their elements. The resource banners should be envisioned as infinite decks from which users draw material. In fact the cards can't be modified inside the banners, they have to be copied and pasted into the work board before any edit. The cards, instead, come with several white spaces for compilation, that already include suggestions and narrative tips to avoid ambiguities.

---

[3] *https://miro.com/app/board/o9J_kgLUjEI=/*

Phase one is structured following the analogue prototype tested with the students of the *M.sc course of Complex Artefacts and System Design Studio (fig. 4.15)*. At the center of the work board there is the concept card; diversely to the previous iterations it only suggests to follow the five-line limit. On the left of the concept card there is the project side column, predisposed to host the technical information about the interactive experience: the *genre card*, the *audience card* and the *technology card*.

On the right side of the *concept card* there is the story side column, predisposed to host the first ideas about the narrative design of the experience: the *space card*, the *time card* and the *people/community card*. Most of the cards maintain the same instructions and features of the one described in par. 4.1.2, however few changes have been made:

- the *target card* had been renamed audience card
- the *interactivity card* had been renamed technology card
- a new card, *people/communities*, have been inserted
- the *note card* has been removed, as the *Mirò platform* already offers plenty of solutions to comment and share notes between the team members (like a messaging and a log system)

Additional space was added at the sides of the columns so that the users can store and compare alternative cards before moving to the next phase.

Like *phase one*, the *world building phase* comes with a resource banner and a work board in which material can be gathered and linked *(fig. 4.16)*. Additionally, a second work board has been created, in which the users can paste the cards following the time or space information that they wrote: by doing so they will be able to visualize rough timelines and maps of the fictional world. Most of the cards maintain the same instructions and features of the one described in par. 4.1.3, however after few ambiguities during the testing sessions, the *tribe card* had been renamed *group card*.

An important feature that *Mirò* enabled to implement is tagging. Each card is equipped with a header that contains two tags: one, that is fixed for its category (*environment, asset, culture*), and one that is editable by the users. For example the character card *Harry Potter* will contain the asset tag and the custom *Harry Potter tag*. The tagged headers allow a faster and more intuitive workflow as they can be copied and pasted in other cards' description. Subsequently the users can use the search button to locate the position of a tag throughout the entire framework, a feature that is really helpful for the overall coherence and consistency of the narrative design.

Phase three is structured similarly to its corresponding analogue phase (par. 4.1.4), as it offers the opportunity to define the main conflict of a story and then to articulate it in an interactive plot *(fig. 4.17)*. However after the testing sessions there have been a few changes:

- The *scene cards* now have a dedicated space in which users can indicate every character present in the event. This implementation, together with a correct tagging of the elements, offers a clear overview of every character's state throughout the entire interactive experience.

- *Flashforward/Flashback icons* have been added to the resource banner, so that the users can easily flag any time deviation throughout the plot.

The *scene cards* can be disposed freely on the work board *(fig. 4.18)*, following the story circle chromatic order for dramatic consistency.

Mirò is an excellent platform since it allows creatives to work remotely on the same project, however it still presents some limitations that could be implemented in the future to improve the overall efficiency of the framework, as discussed in the next paragraph.

Figure 4.15

Figure 4.15
Screen from the phase one of the Mirò digital tool

PRO

Insert your pr

GENRE	**AUDIENCE**	**TECHNOLOGY**
What is/are **the genre/s** of your story?	What is **the audience** of your story?	What is/are **the medium/media** through which your story will be told?

PROJECT SIDE

*What is **your idea**? (possibly in five lines)*

GENRE

*What is/are **the genre/s** of your story?*

AUDIENCE

*What is **the audience** of your story?*

CONC

*What is **your idea**? (p*

TECHNOLOGY

*What is/are **the medium/media** through which your story will be told?*

oject title here

SPACE

What is the name of your STORYWORLD?

How is your world like?

TIME

What is the time fo your world?
Or if multiple, what are the time shifts?

PEOPLE/COMMUNITIES OF THE WORLD

Who are the people and the communities
that populate your world?

STORY SIDE

What is your idea? (possibly in five lines)

SPACE

How is your world like?

ossibly in five lines)

TIME

What is the time of your world?
Or, if multiple, what are the time shifts?

PEOPLE/COMMUNITIES OF THE WORLD

Who are the people and the communities
that populate your world?

Figure 4.16

Screen from the phase two of the Mirò digital tool
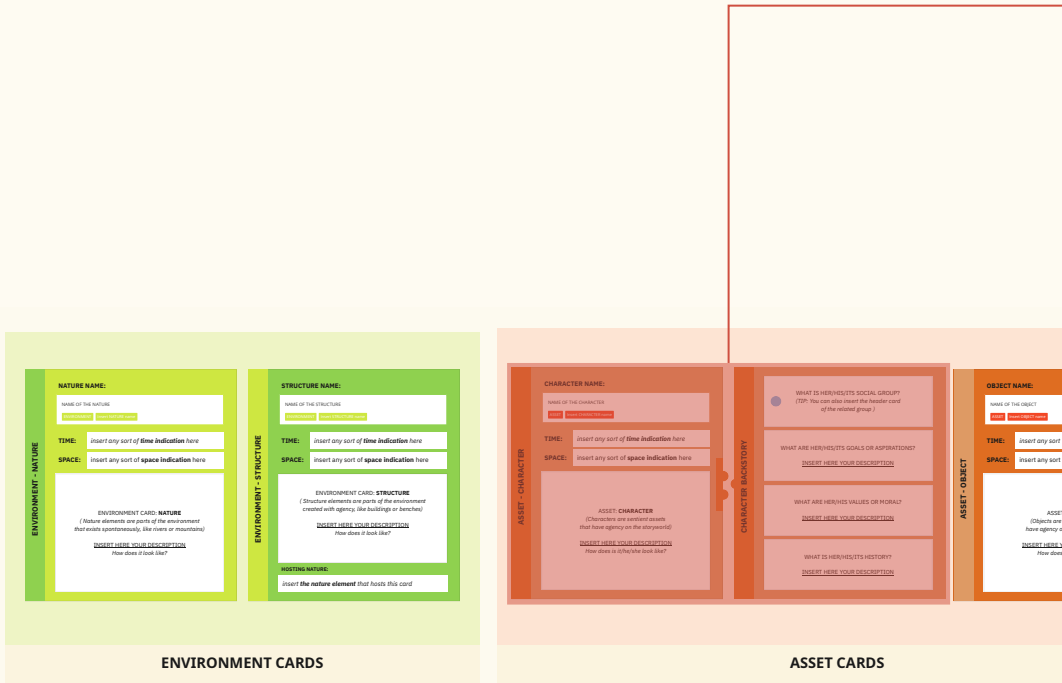
ENVIRONMENT CARDS

ASSET CARDS

ASSET - CHARACTER

CHARACTER NAME:

NAME OF THE CHARACTER

`ASSET` `Insert CHARACTER name`

TIME: insert any sort of *time indication* here

SPACE: insert any sort of *space indication* here

ASSET: **CHARACTER**
*(Characters are sentient assets
that have agency on the storyworld)*

INSERT HERE YOUR DESCRIPTION
How does is it/he/she look like?

CHARACTER BACKSTORY

WHAT IS HER/HIS/ITS SOCIAL GROUP?
*(TIP: You can also insert the header card
of the related group)*

WHAT ARE HER/HIS/ITS GOALS OR ASPIRATIONS?

INSERT HERE YOUR DESCRIPTION

WHAT ARE HER/HIS VALUES OR MORAL?

INSERT HERE YOUR DESCRIPTION

WHAT IS HER/HIS/ITS HISTORY?

INSERT HERE YOUR DESCRIPTION

CULTURE CARDS

CULTURE - GROUP

GROUP NAME:

NAME OF THE GROUP

`CULTURE` `Insert GROUP name`

TIME: insert any sort of *time indication* here

SPACE: insert any sort of *space indication* here

CULTURE: **GROUP**
*(Social group bonded by a language
or shared knowledge, like a tribe
or the inhabitants of the same Planet)*

INSERT HERE YOUR DESCRIPTION
How do they look like?

GROUP BACKSTORY

WHO ARE ITS MEMBERS?
(Tip: You can also copy the header
from the related character cards)

WHAT ARE ITS ENVIRONMENTS?
(Tip: You can also copy the header
from the related environment cards)

WHO ARE ITS LANGUAGES?
(Tip: You can also copy the header
from the related languages cards)

WHO ARE ITS MYTHS?
(Tip: You can also copy the header
from the related myths cards)

WHAT IS ITS HISTORY?

INSERT HERE YOUR DESCRIPTION

CULTURE - MYTH

MYTH NAME:

NAME OF THE MYTH

`CULTURE` `Insert MYTH name`

TIME: insert any sort of *time indication* here

SPACE: insert any sort of *space indication* here

CULTURE: **MYTH**
(Handed down story or information)

INSERT HERE YOUR DESCRIPTION

CULTURE - LANGUAGE

LANGUAGE NAME:

NAME OF THE LANGUAGE

`CULTURE` `Insert LANGUAGE name`

TIME: insert any sort of *time indication* here

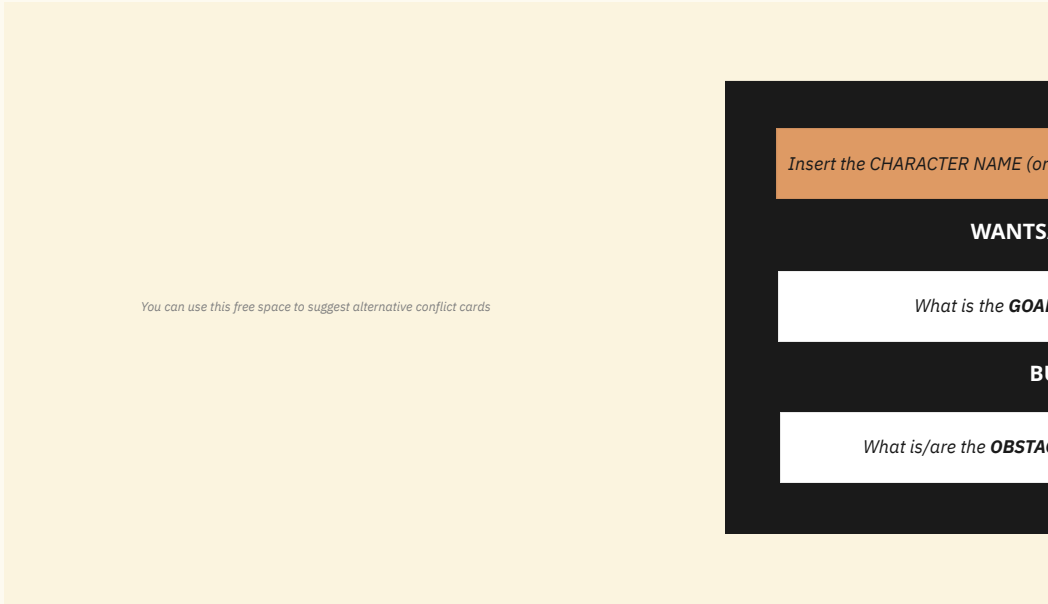**SPACE:** insert any sort of *space indication* here

CULTURE: **LANGUAGE**
(System of communication)

INSERT HERE YOUR DESCRIPTION

Screen from phase three of the Mirò digital tool
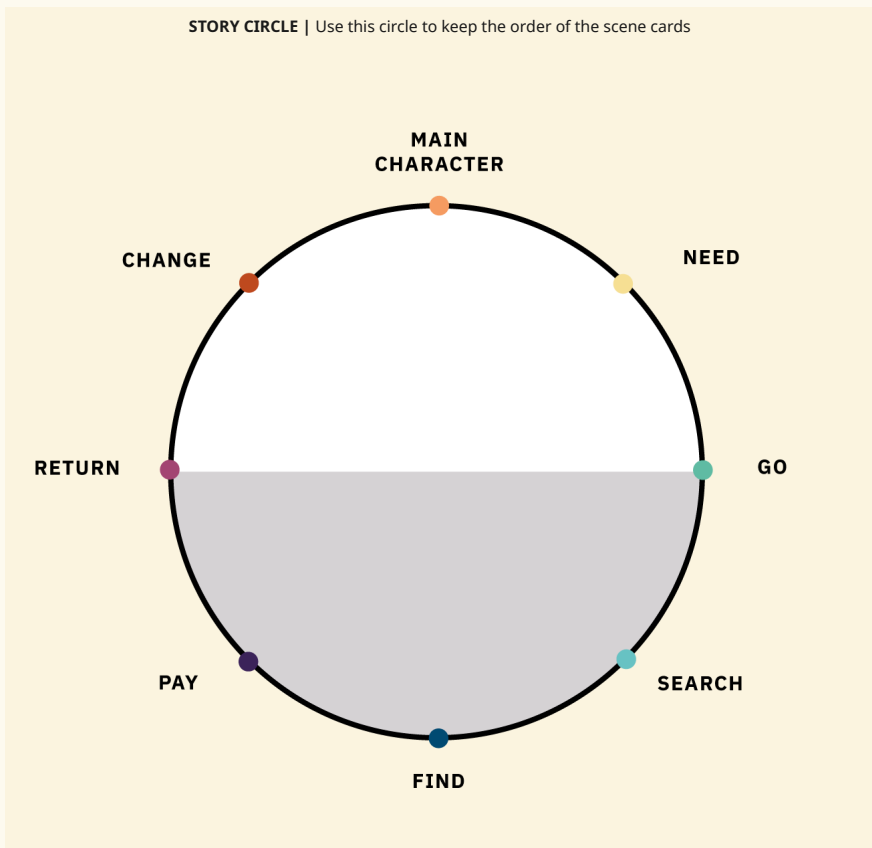
You can use this free space to suggest alternative conflict cards

Insert the CHARACTER NAME (or

WANTS

What is the *GOAl*

BU

What is/are the *OBSTA*

STORY CIRCLE | Use this circle to keep the order of the scene cards

MAIN
CHARACTER

CHANGE

NEED

RETURN

GO

PAY

SEARCH

FIND

You can use this free space to suggest alternative conflict cards

MAIN CHARACTER

SPACE:

*Describe **the space in which the action takes place**. You can also copy the heading of the related card.*

Who is your hero? How do we encounter her/him/it?
What is the status quo of the world?

INSERT HERE YOUR DESCRIPTION

CHARACTERS:

List the characters involved in the scene.

TIP:
You can either copy their icon
or their card heading here.

TIME:

*insert any sort of **time indication** here*

TIME CONVENTIONS | Use the following icons to signal
that a scene is a flashback or a flashforward
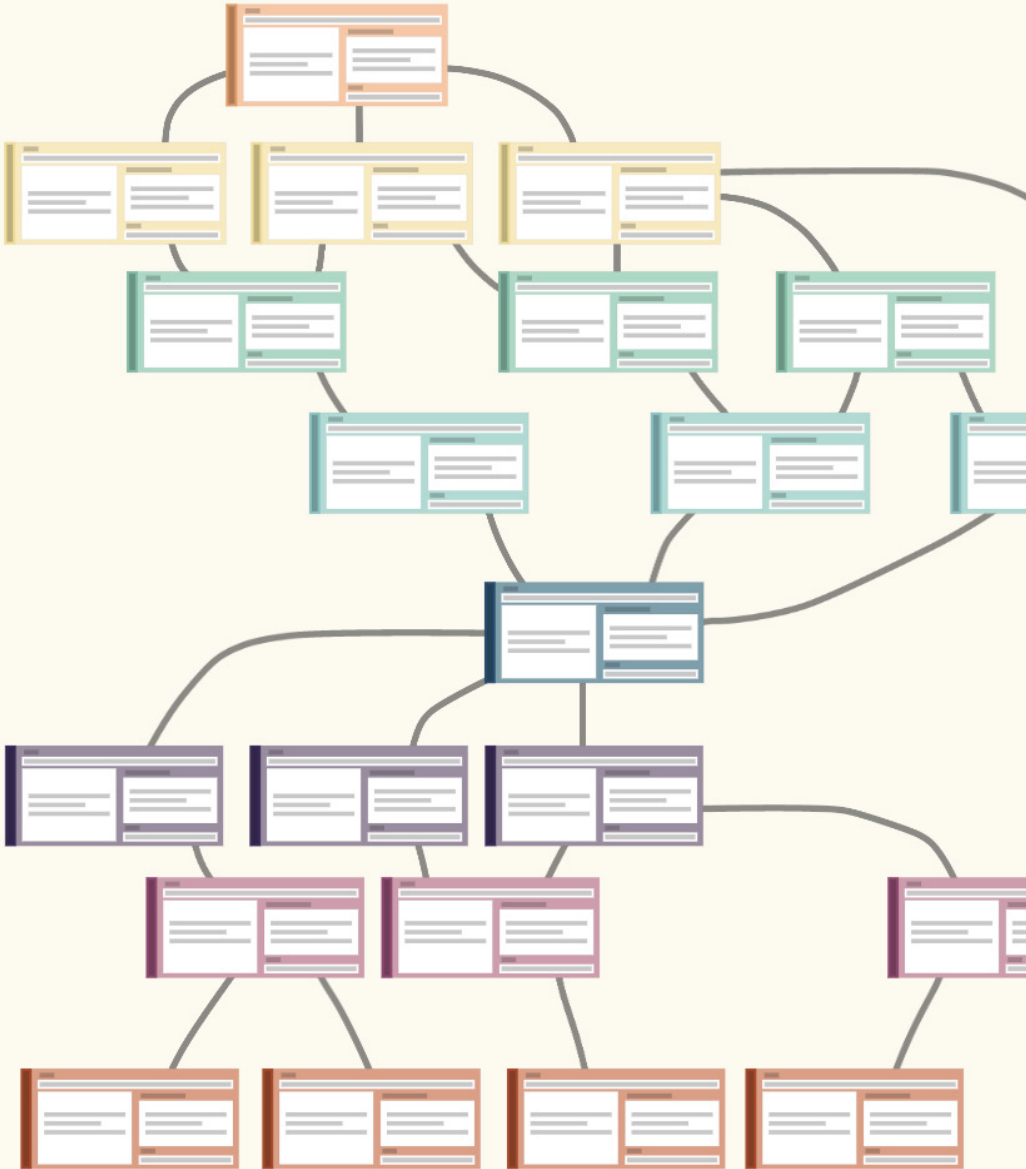
4.3.2 Future developments

The *Story Knots* framework, described in the paragraph above, is the outcome of this study and has been designed triangulating secondary data from the desk research and literature review and primary data from the co-design and testing session of an analogue card-based prototype (par. 4.1, par. 4.2). It is, though, considered a partial step toward a complete and efficient system with which design teams could handle the narrative side of IDNs.

The framework could be refined with new rounds of testing, specifically targeting large groups of stakeholders that could generate crucial insights for its usability and interface improvements.

Furthermore, the *Mirò* visual collaboration platform presents several limitations, mainly because it targets a wide audience with heterogeneous needs (such as interaction designers, service designers or marketing teams). In the future, a completely independent platform could be envisioned (and maybe even coded with the help of professional programmers), improving the effectiveness of the framework and leading to the introduction of new features, such as:

- *An improved tagging system.* At the moment, some cards in the Mirò framework already include tags, but the designers are asked to compile them manually. A smart tagging system that recognizes the type of card and saves automatically its name would greatly speed up searching and clustering activities.

- *Autocomplete feature.* At the moment, designers can refer to cards that are already compiled by copying and pasting their header. An autocomplete feature that automatically suggests the elements' name (similarly to what happens in the Final Draft screenwriting software) would greatly speed up the process.

- *Hyperlinks.* If a compiled card is referenced in a scene (or in another card) it should become a hyperlink that, once clicked, redirects to the referenced card.

- *Smart clustering and linking.* At the moment, clustering and connecting cards is a tough and ununtitive process that should be redesigned so that the designers are allowed to easily create clusters, groups or folders.

- *Tips and suggestions windows.* Boxes containing examples or explanations could be implemented in the system, with the possibility for advanced designers to hide them.

- *Attachment system.* Every card should come with the possibility to attach easily external materials of any kind (like concept arts, 3D models, preview videos or audio) in order to improve communication between the different design departments.

- *Node-based system.* As the scene cards are used to create complex branching structures, a custom node-based system that links them would greatly improve the usability and efficiency of the plot creation phase.

Finally, as already detailed in par. 4.1 and par. 2.2, *Story Knots* has been designed gathering western narrative conflict-based conventions that are deemed of particular interest since they are commonly implied in relevant case studies (both in the linear and in the interactive field).

In the future it would be interesting to implement different narrative conventions and study their behaviour in the interactive field, so that the framework could allow the designers to work with different structures and archetypes.

CONCLUSIONS

This study was attracted to the domain of *interactive digital narratives (IDN)* as its connections to the most disparate practices, from interaction design to game studies, from programming to narratology, have cultivated an exciting and ever changing field of research and experimentation.

The act of telling stories has always been the most sophisticated means of communication for humans, able to incorporate subtle nuances and, at the same time, to reflect the societal context in which they are produced. Throughout history it has evolved countless times: it has been a tool for survival, a form of artistic expression, a device to pass on memories and now is even a skill to market products.

Regardless of their genre, audience or final intent, stories will always appeal to our social intelligence and interest in monitoring reality (BOYD, 2009); thus the opportunity to take an active role into their narrative discourse and even gain agency over the events have been an age-old dream that has been chased for centuries by humanity.

In the late 60s, HCI finally made this dream close to reach (par. 1.1.1), opening to a dense period of exciting experimentations, with *Eliza* (1966) and *Colossal Cave Adventure* (1976) as the forerunner projects. In the 90s the seminal publications by Laurel (1991) and Murray (1997) consolidated the innovative nature of the field and today, in just a few decades, IDN has become a complex and energetic domain that every year generates passionate discussions and relevant case studies.

However IDN is still young and in search of its own theory

and formalization and this could not be any clearer when looking at the field of digital games. They are the most popular and mature type of IDN, as they allow the users to enter into realistic digital environments with sophisticated 3D models and complex interactions, and they even support a market that every year is worth billions of dollars. But when it comes to the narrative side of the experience, digital games often show their weakness, as the act of balancing narrativity and interactivity is a delicate design process that too often does not receive the due attention.

This problematic nature has been addressed several times throughout the years, with the *ludologist vs narratologist debate* (par. 1.2.3) being just the tip of the iceberg in a plethora of discussions between practitioners and researchers.

After an in-depth desk research and investigation of the state of the art of IDN (chap. 1), this study joins the conversation by arguing that narrativity is a foundational element of digital games. The position on the matter is summed up into three main points:

- The fact that some games are more abstract than others, does not necessarily mean that they lack narrativity.

- Digital games are dispositives (or story machines) that generate different plots each time they are played.

- Game designers can't eventually control the entire narrativity of the game.

Once elaborated, these assumptions have informed investigations on the narrative design of digital games (chap.2), a process that is still shockingly neglected on several fronts, like its theoretical knowledge, its related operative tools and the communication with other departments during the design phase.

The study eventually individuated some criticalities, that can be summed up into three points:

- *There isn't an established script format for the interactive narrati-ve.* The world, characters and plots are created and managed through a variety of documents, from word and excel to common screenwriting softwares (ENGSTRÖM, 2020).

- *Communication between the different departments on narrati-ve-centered topics is fragmented and inadequate*; developers are forced to interpret complex decisions without possessing the sufficient knowledge. Furthermore they can not access a platform in which they can contribute to the design process (ENGSTRÖM, 2019).

- *It is often impossible to test game narratives during the prototyping phase.* Early forms of gameplay can be experienced pretty early on the development, however narrative isn't included (NORMAN & KIRAKOWSKI, 2018).

The desk research and literary review has been paired with an appossionate discussion with prof. Gabriele Ferri, design researcher at the *Amsterdam University of Applied Science* and former member of the ICIDS steering committee. Subsequent confrontations have been made also with the *play and media research group* of the University that, as stakeholders, contributed to the investigation of the topic and speculation of possible development in the field. The data that was gathered informed the research questions of the study (chap. 3), and the formulation of an hypothesis, that a collaborative tool could enable and guide the narrative design of digital games.

After studying some relevant case studies and already existing tools, the main requirements of this collaborative tool has been formulated:

- It should gather and order the essential narrative informations into the same working space;

- It should avoid multi-format data (excel, word, final draft) about narrative design;

- It should support brainstorming sessions;

- It should encourage collaboration between different department on the topic;
- It should avoid the overload of technical narrative information;
- It should generate a blueprint/document that could clearly represent narrative design decisions.

This knowledge resulted in the definition of a theoretical framework and a support tool in the form of a card-based analogue system, that has been co-designed with the students of the *Amsterdam University of Applied Science* and subsequently tested with students of *Politecnico di Milano* and various stakeholders (par. 4.2). The theoretical framework advanced the knowledge on narrative design processes by highlighting some best practices:

- In order to be effective, narrative information should be clustered
- The narrative clusters should have the possibility to be equipped with tags, that can favour connection between elements that, in a digital environment, could be rendered as a node system and favour smart linking
- Narrative design should be a top-down process, that starts by eviscerating the main idea and then continues by detailing the specifics through different phases

The knowledge from the primary data and the secondary data was triangulated and summed in the final theoretical framework and supported by a digital collaborative tool, designed on the *Mirò platform* and made available for everyone to use (par. 4.3).

It is hoped that the outcome of this study would advance the literature on the topic, as it merges interactive design and narratology for the betterment of narrative design processes of IDNs artefacts.

The framework and its supporting tool clearly show that the-

re is a necessity of applications, instruments and best practices in the field. But luckily practitioners are turning to these issues in the last years: the *Game Developers Conference* (GDC) is hosting frequent talks about narrative design (Maloney & Stirpe, 2018; Vara et al., 2019; Swords, 2020), while many design schools are beginning to experiment with the topic, like in *Politecnico di Milano* (Mariani & Ciancia, 2019a).

Thus, *Story Knots* suggests a possible design practice that could be eventually picked and deepened in the future with the help of practitioners from different fields, such as programmers and narratologists, as it intends to indicate and follow a research interest that is evolving and solidifying as this study is being written.

BIBLIOGRAPHY

Aarseth, E. (1997). *Cybertext: Perspectives on Ergodic Literature.* JHU Press. Baltimore, Maryland, United States.

Aarseth, E. (2001a). *Computer Game Studies, Year One.* Game Studies, 1

Aarseth, E. (2001b,). *Allegories of Space.The Question of Spatiality in Computer Games.* Research Centre for Contemporary Culture, University of Jyväskylä. Finland.

Adams, E. (2005). *You Must Play Façade , Now! Gamasutra.* (www document, accessed 05.12.2020) HTTPS://WWW.GAMASUTRA.COM/VIEW/FEATURE/130771/THE _ DESIGNERS _ NOTEBOOK _ YOU _ MUST _ .PHP\UC0\U160

Agawu, K. (2007). *The Communal Ethos in African performance: Ritual, Narrative and Music among the Northern Ewe.* Revista Transcultural de Música, 11 .

Antoniades, T. (2017). *Hellblade: Senua's sacrifice.* Ninja Theory.

Arar, Y. (1984). *Videogame demoralize animator.* Spokane Chronicle.(www document, accessed 12.11.2020) **https://news.google.com/newspapers?id=9L-MSAAAAIBAJ&sjid=gvkDAAAAIBAJ&pg=7006,2767290&dq=dragon%27s+lair&hl=en**

Arinbjarnar, M., Barber, H., Kudenko, D. (2009). *A Critical Review of Interactive Drama Systems.* University of York.

Atkinson, T., Baier, H., Copplestone, T., Devlin, S. (2019). *The Text-Based Adventure AI Competition.* IEEE Transactions on Games, 11(3), 260–266. HTTPS://DOI.ORG/10.1109/TG.2019.2896017

Austin, P. L. (2019). *How Nintendo Embrace of Indie Games Is Helping the Switch Win Big.* Time. (www document, accessed 12.11.2020) HTTPS://TIME.COM/5531065/NINTENDO-SWITCH-INDIE-GAMES/

Bates, J. (1992). *The Nature of Characters in Interactive Worlds and The Oz Project.* Carnegie Mellon University, United States.

Bayley, K. (2018). *Streaming drives entertainment sales 9.4% higher in 2018 to sixth consecutive year of growth but physical remains crucial to deliver megahits.* ERA Ltd. (www document, accessed 02.03.2020) HTTP://ERALTD.ORG/NEWS-EVENTS/PRESS-RELEASES/2019/STRE-AMING-DRIVES-ENTERTAINMENT-SALES-94-HIGHER-IN-2018-TO-SIXTH-CONSECUTI-VE-YEAR-OF-GROWTH/

Bertolo, M., Mariani, I., & Ferri, G. (2014). Capitolo 8. Gioco e narrazione. In: *Game Design. Gioco e giocare tra teoria e progetto.* Pearson, Milano; Torino.

Bethke, E. (2003). *Game Development and Production.* Wordware Publishing, Inc.

Bilofsky, W. (2014). *What year did I write my first computer program?* (www document, accessed 09.05.2020) HTTPS://WWW.TOOLWORKS.COM/BILOFSKY/SOFTWARE.HTM

Bizzocchi, J.; Woodbury, R. F. (2003). *A Case Study in the Design of Interactive Narrative: The Subversion of the Interface.* Simulation & Gaming , 34(4), 550–568. https://doi.org/10.1177/1046878103258204

Boyd, B. (2009). *On the origin of stories.* The belknap press of Harvard University press.

Brown, F. (2019, ottobre 4). *Writers Guild of America scraps its videogame writing award.* PC Gamer. (www document, accessed 18.15.2020) HTTPS://WWW.PCGAMER.COM/WRI-TERS-GUILD-OF-AMERICA-SCRAPS-ITS-VIDEOGAME-WRITING-AWARD/

Bryant, R. D. & Giglio, K. (2015). Slay the dragon: Writing great video games. Michael Wiese Production.

Campbell, J. (1949). *The hero with a thousand faces.* Pantheon books, New York.

Carroll, J. M. (2009). *Conceptualizing a possible discipline of human–computer interaction.* Interacting with Computers, 22 .

Chandler, H. M. (2009). *The Game Production Handbook.* Jones & Bartlett Publishers.

Ciarlini, A. E. M., Casanova, M. A., Furtado, A. L., & Veloso, P. A. S. (2010). *Modeling interactive storytelling genres as application domains.* Journal of Intelligent Information Systems , 35 (3), 347–381. HTTPS://DOI.ORG/10.1007/s10844-009-0108-5

Crawford, C. (1992). *The Atari Years.* (www document, accessed 18.11.2020) HTTP://WWW.ERASMATAZZ.COM/LIBRARY/THE-JOURNAL-OF-COMPUTER/JCGD-VOLUME-5/THE-ATARI-YEARS.HTML

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

Crowther, W. (1975). *Colossal Cave Adventure.* Crowther/Woods

Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience.* Harper Collins.

Davenport, G. (1988). *Interactive multimedia on a single screen display.* Computer Graphics Systems, 9.

Despain, W. (2007). *Narrative Design For Company Of Heroes: Stephen Dinehart On Writing For Games.* (www document, accessed 05.12.2019). HTTPS://WWW.GAMASUTRA.COM/VIEW/FEATURE/129954/NARRATIVE _ DESIGN _ FOR _ COMPANY _ OF _ .PHP

Despain, W., & Ash, L. (2016). *Designing for Ludonarrative Harmony.* Southern Methodist University of Guildhall, Plano. United States.

Dinehart, S. E. (2011a). *What is a Narrative Designer?. The Narrative Design Explorer.* (www document, accessed 02.12.2019). HTTP://NARRATIVEDESIGN.ORG/2009/09/WHAT-IS-A-NARRATIVE-DESIGNER-2/

Dinehart, S. E. (2011b). What is Interactive Narrative Design? The Narrative Design Explorer. (www document, accessed 02.12.2019) HTTP://NARRATIVEDESIGN.ORG/2009/09/WHAT-IS-INTERACTIVE-NARRATIVE-DESIGN/

Djaouti, D., Alvarez, J., & Jessel, J.-P. (2015). *Classifying serious games.* (www document, accessed 02.12.2019) HTTP://WWW.LUDOSCIENCE.COM/FILES/RESSOURCES/CLASSIFYING _ SERIOUS _ GAMES.PDF

Dominiguez, E. A. P. (2019). *The design of indie games, a different paradigm.* Bayreuth University, Germany.

Economopoulou, K. (2009). *Aristotle's Poetics in relation to the narrative structure of the screenplay.* Nottingham Trent University, England

Egudu, R. N. (1981). *Achebe and the Igbo Narrative Tradition.* Research in African Literatures , 12 (1), 43–54.

Engström, H. (2019). *'I have a different kind of brain'—A script-centric approach to interactive narratives in games.* Digital Creativity , 30 (1), 1–22. HTTPS://DOI.ORG/10.1080/146262 68.2019.1570942

Engström, H. (2020). *Game development research.* University of Skövde, Sweden.

Esposito, N. (2005). *A Short and Simple Definition of What a Videogame Is.* Proceedings in: Digital Games Research Conference 2005, Changing Views: Worlds in Play, June 16-20, 2005, Vancouver, British Columbia, Canada.

Falstein, N. (2003). *The 400 Project: Using Rules of Game Design.* Australian Game Developers' Conference, Melbourne, Australia.

Field, S. (1994). *Screenplay: The Foundations of Screenwriting.* Dell Publishing Company.

Frasca, G. (2001). *Videogames of the oppressed.* Georgia Institute of Technology, United States. HTTPS://LUDOLOGY.TYPEPAD.COM/WEBLOG/ARTICLES/THESIS/FRASCATHESISVIDEOGAMES.PDF

Frasca, G. (2003). *Ludologists love stories, too: Notes from a debate that never took place.* Proceedings of the 2003 DiGRA International Conference: Level Up.

Friedhoff, J. (2013). *Untangling Twine: A Platform Study.* Proceedings of the 2013 DiGRA International Conference: DeFragging Game Studies.

Fromme, J., & Unger, A. (2012). *Computer Games and New Media Cultures: A Handbook of Digital Games Studies.* Springer Science & Business Media.

Guarneri, A., Ripamonti, L. A., Tissoni, F., Trubian, M., Maggiorini, D., &Gadia, D. (2017). *GHOST: A GHOst STory-writer.* Proceedings of the 12th Biannual Conference on Italian SIGCHI Chapter - CHItaly '17, 1–9. HTTPS://DOI.ORG/10.1145/3125571.3125580

Hales, C. (2005). *Cinematic interaction: From kinoautomat to cause and effect.* Digital Creativity - DIGIT CREATE , 16 , 54–64. HTTPS://DOI.ORG/10.1080/14626260500147777

Hayles, N, K. (2008). *Electronic literature: new horizons for the literary.* University of Norte Dame Press, Notre Dame

Harmon, D. (2013). *You'll Be Perfect When You're Dead: The Collected Online Writings of Dan Harmon.* McGathy Publishing House.

Harrell, D. F. (2009). *Toward a Theory of Phantasmal Media: An Imaginative Cognition- and Computation-Based Approach to Digital Media.* CTheory.net

Harvey, A. (2014). *Twine's revolution: Democratization, depoliticization, and the queering of game design.* University of Leicester.

Herz, J. C. (1997). *Joystick Nation: How Videogames Ate Our Quarters, Won Our Hearts, and Rewired Our Minds.* Little, Brown and Company, United States

Horban, O., & Maletska, M. (2019). *Basic hermeneutic approaches to interpretation of videogames.* Skhid, 5–12. HTTPS://DOI.ORG/10.21847/1728-9343.2019.5(163).181868

Horti, S. (2018). *How The Last Of Us raised the bar for video game narratives.* TechRadar. (www document, accessed 04.06.2020) HTTPS://WWW.TECHRADAR.COM/NEWS/HOW-THE-LAST-OF-US-RAISED-THE-BAR-FOR-VIDEO-GAME-NARRATIVES

Hunter, M. (2016). *From Conflict to Concord: Lessons from the Mouse.* University of Portland.

Jennings, P. (1996). *Narrative Structures for New Media: Towards a New Definition.* Leonardo , 29 . JSTOR. **HTTPS://DOI.ORG/10.2307/1576398**

Jensen, J. F. (1988). *Adventures in Computerville: Games, Interaction & High Tech Paranoia i Arkadia.* Kultur &Klasse, 63.

Juul, J. (1999). *A Clash between game and narrative.* University of Copenhagen, Institute of Nordic Language and Literatur.

Juul, J. (2001). *Games Telling stories?.* Game Studies, 1 (1), 12.

Kerr, A. (2006). *The Business and Culture of Digital Games: Gamework and Gameplay.* SAGE.

Khan, A. (2020). *An introduction to narrative design* (www document, accessed 09.11.2019). **HTTPS://WWW.DSDAMBUSTER.COM**

Koenitz, H. (2010). *Towards a Theoretical Framework for Interactive Digital Narrative.* In: R. Aylett, M. Y. Lim, S. Louchart, P. Petta, & M. Riedl. *Interactive Storytelling* (Vol. 6432, pagg. 176–185). Springer Berlin Heidelberg. **HTTPS://DOI.ORG/10.1007/978-3-642-16638-9 _ 22**

Koenitz, H. (2014). *Five Theses for Interactive Digital Narrative.* In: A. Mitchell, C. Fernández-Vara. *Interactive Storytelling* (Vol. 8832, pagg. 134–139). Springer International Publishing. **HTTPS://DOI.ORG/10.1007/978-3-319-12337-0 _ 13**

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

Koenitz, H., Haahr, M., Ferri, G., &Sezen, T. I. (2013). *First Steps towards a Unified Theory for Interactive Digital Narrative.* **HTTPS://DOI.ORG/10.1007/978-3-642-37919-2 _ 2**

Koenitz, H., Pastena, A., Jansen, D., Lint, B., &Moss, A. (2018). *The Myth of 'Universal' Narrative Models* (pagg. 107–120). **HTTPS://DOI.ORG/10.1007/978-3-030-04028-4 _ 8**

Kragh-Jacobsen, S., Levring, K., Vinterberg, T., &von Trier, L. (2000). *D-Dag.*

Kreminski, M. (2017). *Games as storytelling partners.* Affording Play. HTTPS://MKREMINS. GITHUB.IO/BLOG/GAMES-STORYTELLING-PARTNERS/

Landow, G. P. (1991). *HyperText: The Convergence of Contemporary Critical Theory and Technology* (Parallax: Re-visions of Culture and Society Series). Johns Hopkins University Press.

Larsen, S. (1991). *A Fire in the Mind: The Life of Joseph Campbell*. Doubleday.

Laurel, B. (1991). *Computers as theatre (Second edition).* Addison-Wesley.

LeJacq, Y. (2013). *Beyond: Two Souls creator David Cage on his quest to make an interactive drama.* NBC News. (www document, accessed 12.11.2020) HTTP://WWW.NBCNEWS. COM/TECHNOLOG/BEYOND-TWO-SOULS-CREATOR-DAVID-CAGE-HIS-QUEST-MAKE-IN-TERACTIVE-8C11281954

Lessard, J. (2013). *Adventure Before Adventure Games: A New Look at Crowther and Woods's Seminal Program.* Games and Culture , 8 (3), 119–135. HTTPS://DOI. ORG/10.1177/1555412012473364

Maloney, M., & Stirpe, E. (2018). *Writing and Narrative Design: A Relationship.* (www document accessed 12.05.2021) HTTPS://WWW.YOUTUBE.COM/WATCH?V=8FGBCTI5U-LU&AB _ CHANNEL=GDC

Mariani, I., & Ciancia, M. (2019a). *Building interactive narratives: Characters, stories and in-betweens.* Experimentations and critique. 6844–6853. HTTPS://DOI.ORG/10.21125/ EDULEARN.2019.1643

Mariani, I., & Ciancia, M. (2019b). *Character-driven Narrative Engine. Storytelling System for building interactive narrative experiences.* Proceedings of the 2019 DiGRA International Conference: Game, Play and the Emerging Ludo-Mix , 1–19. HTTP://WWW. DIGRA.ORG/DIGITAL-LIBRARY/PUBLICATIONS/CHARACTER-DRIVEN-NARRATIVE-ENGI-NE-STORYTELLING-SYSTEM-FOR-BUILDING-INTERACTIVE-NARRATIVE-EXPERIENCES/

Mateas, M. (2002). *A Preliminary Poetics for Interactive Drama and Games.* Digital Creativity, 12 . **HTTPS://DOI.ORG/10.1076/DIGC.12.3.140.3224**

Mateas, M., &Stern, A. (2003). *Façade: An Experiment in Building a Fully-Realized Interactive Drama.* Literature, Communication and Culture and College of Computing, Georgia Tech.

McKee, R. (1998). *Story: Substance, Structure, Style and the Principles of Screenwriting.* Methuen.

Medjahed, S. I., & Messaoudi, M. (2018). *Narrative videogames, the literary genre of the digital age.* Cardiff University.

Moenandar, S.-J. (2018). *When not to tell stories: Unnatural narrative in applied narratology.* Frontiers of Narrative Studies, 4(1), 6–20. **HTTPS://DOI.ORG/10.1515/FNS-2018-0002**

Montfort, N. (2005). *Twisty Little Passages: An Approach to Interactive Fiction.* MIT Press.

Mullins, K. (2020). *Co-Designing Co-Design.* Ball state university of Muncie, Indiana. United States.

Murray, J. H. (1997). *Hamlet on the Holodeck.* MIT Press.

Murray, J. H. (2018). *Research into Interactive Digital Narrative: A Kaleidoscopic View.* In R. Rouse, H. Koenitz, & M. Haahr. *Interactive Storytelling* (Vol. 11318, pagg. 3–17). Springer International Publishing. **HTTPS://DOI.ORG/10.1007/978-3-030-04028-4 _ 1**

Murray, J. H. (2020). *The Last Word on Ludology v Narratology in Game Studies.* Proceedings in: DIGRA 2005, Vancouver CA.
Nelson, T. H. (1965). *A file structure for the complex, the changing and the indeterminate.* Vassar College, Poughkeepsie, United States.

NewZoo. (2019). *2019 Global Game Market Report.* **HTTPS://NEWZOO.COM/INSIGHTS/ TREND-REPORTS/NEWZOO-GLOBAL-GAMES-MARKET-REPORT-2020-LIGHT-VERSION/**

Norman, K. L., & Kirakowski, J. (2018). *The Wiley Handbook of Human Computer Interaction.* Issue 995.

Nutt, C. (2012). *The Structure of Fun: Learning from Super Mario 3D Land's Director.* (www document, accessed 09.12.2020) HTTPS://WWW.GAMASUTRA.COM/VIEW/FEATURE/168460/THE _ STRUCTURE _ OF _ FUN _ LEARNING _ .PHP

Pagulayan, R., Keeker, K., Fuller, T., Wixon, D., Romero, R., & Gunn, D. (2012). *User-Centered Design in Games.* In J. Jacko, *Human–Computer Interaction Handbook* (Vol. 20126252, pagg. 795–822). CRC Press. HTTPS://DOI.ORG/10.1201/B11963-39

Poole, S. (2000). *Trigger Happy: Videogames and the Entertainment Revolution.* ArcadePub.

Post, J. (2009). *Bridging the Narratology- Ludology Divide.* The Tetris Case.

Propp, V. (1928). *Morphology of the Folktale (second edition).* University of Texas press.

Ramachandran, N. (2019). *Netflix doubling down on Interactive shows after Bandersnatch.* Variety. (www document, accessed 15.03.2021) HTTPS://VARIETY.COM/2019/DIGITAL/ASIA/NETFLIX-DOUBLING-DOWN-ON-INTERACTIVE-SERIES-BANDERSNATCH-SUCCESS-1203161088/

Reyes, M. C., & Dettori, G. (2019). *Combining Interactive Fiction with Virtual Reality.* Proceedings in: the 9th International Conference on Digital and Interactive Arts.
Reynolds, M. (2018). *The inside story of Bandersnatch, the weirdest Black Mirror tale yet.* Wired UK. (www document, accessed 09.03.2021) HTTPS://WWW.WIRED.CO.UK/ARTICLE/BANDERSNATCH-BLACK-MIRROR-EPISODE-EXPLAINED

Rieser, M. (2002). *The Poetics of Interactivity.* In Rieser, M, Zapp, A. : New Screen Media. Cinema/Art/Narrative

Roth, C., & Koenitz, H. (2017). *Towards Creating a Body of Evidence-based Interactive Digital Narrative Design Knowledge: Approaches and Challenges.* Proceedings of the 2nd International Workshop on Multimedia Alternate Realities - AltMM '17, 19–24. HTTPS://DOI.ORG/10.1145/3132361.3133942

Rutter, J., & Bryce, J. (2006). *Understanding Digital Games.* SAGE.

Ryan, Marie-Laure. (2004). *Narrative Across Media: The Languages of Storytelling.* University of Nebraska Press.

Ryan, Marie-Laure. (2005). *Narrative and the Split Condition of Digital Textuality.* HTTP://WWW.DICHTUNG-DIGITAL.DE/2005/1/RYAN/

Ryan, Marie-Laurie. (2006). *Avatars of Story.* Minneapolis, University of Minnesota Press.

Ryan, Marie-Laurie. (2009). *From Narrative Games To Playable Stories.* In: Storyworlds: A Journal of Narrative Studies vol. 1 (2009), pp. 43-59. University of Nebraska Press

Sackey, Edward. (1991). *Oral tradition and the African novel. In:* Modern Fiction Studies Vol. 37, No. 3, SPECIAL ISSUE: POSTCOLONIAL AFRICAN FICTION (Autumn 1991), pp. 389-407. The Johns Hopkins University Press.

Schell, J. (2008). *The art of game design: A book of lenses.* Elsevier/Morgan Kaufmann.

Schreier, J. (2020). *Naughty Dog Crunches On The Last Of Us II, Developers Wonder How Much Longer This Can Last.* Kotaku.com. (www document, accessed 03.03.2021) KOTAKU.COM/AS-NAUGHTY-DOG-CRUNCHES-ON-THE-LAST-OF-US-II-DEVELOPER-1842289962

Seraphine, F. (2016). *Ludonarrative Dissonance: Is Storytelling About Reaching Harmony?.* University of Tokyo.

Shaul, N. B. (2008). *Hyper-Narrative Interactive Cinema: Problems and Solutions.* BRILL.

Slater, W. J. (1996). *Roman Theater and Society.* University of Michigan Press.

Snyder, B. (2005). *Save the Cat!: The Last Book on Screenwriting You'll Ever Need.* M. Wiese Productions.

Solarski, C. (2017). *Interactive Stories and Video Game Art: A Storytelling Framework for Game Design.* CRC Press.

Somerdin, M. (2016). *The Game Debate: Video Games as Innovative Storytelling.* University of Missouri, St. Louis; United States.

Spierling, U. (2005). *Interactive Digital Storytelling: Towards a Hybrid Conceptual Approach.* Proceedings in: Digital Games Research Conference 2005, Changing Views: Worlds in Play, June 16-20, 2005.

Stapleton, A. J. (2004). *A Methodology for Digital Game Design Research.* University of Technology Sydney.

Statt, N. (2020). *Fortnite is now one of the biggest games ever with 350 million players.* The Verge. (www document, accessed 18.12.2020) HTTPS://WWW.THEVERGE.COM/2020/5/6/21249497/FORTNITE-350-MILLION-REGISTERED-PLAYERS-HOURS-PLAYED-APRIL

Steen, M. (2013). *Co-Design as a Process of Joint Inquiry and Imagination.* Design Issues, 29(2), 16–28. HTTPS://DOI.ORG/10.1162/DESI _ A _ 00207

Stokes, P., & Stokes, S. (2002). *Clive Barker's Revelations.* (www document, accessed 03.04.2021) HTTP://WWW.CLIVEBARKER.INFO/UNDYING.HTML

Swords, A. (2020). *The Forest Paths Method for Accessible Narrative Design.* (www document, accessed 02.02.2021) HTTPS://WWW.YOUTUBE.COM/WATCH?V=MNCYEPCGJO8&AB _ CHANNEL=GDC

Szilas, N. (2002). *Structural models for Interactive Drama.* University of Geneva.

Tolkien, J. R. R. (1954). *The Lord of the Rings.* Allen & Unwin.

Toshiyuki, U., & Marichal, X. (2003). *Real-Time Motion-Based System for Interactive Cinema.* Proceedings in: The Second IEEE and ACM International Symposium, Tokyo.

Turner, V. W. (1982). *From ritual to theatre: The human seriousness of play.* Performing Arts Journal Publications.

Vara, F. C., Weise, M., Short, T. X., Backler, M., Beltran, W., Gilbert, D., & Turner, A. (2019). *The Narrative Innovation Showcase 2019.* (www document, accessed 18.03.2021) HTTPS://WWW.YOUTUBE.COM/WATCH?V=N2X-UQRRKX4& AB _ CHANNEL=GDC

Veale, K. (2012). *«Interactive Cinema» Is an Oxymoron, but May Not Always Be.* Game Studies, 12.HTTP://WWW.CTCS505.COM/WP-CONTENT/UPLOADS/2016/01/VEALE-INTERACTIVE-CINEMA-1.PDF

Venditti, S. (2017). *A Framework for Designing Narrativity on Social Media.* Politecnico di Milano.

Vogler, C. (1998). *The Writer's Journey: Mythic Structure for Writers.* M. Wiese Productions.

Wardrip-Fruin, N.(2009). *Expressive Processing.* MIT Press.

Weber, T. (2017). *Late Shift.* Steam. HTTPS://STORE.STEAMPOWERED.COM/APP/584980/LATE _ SHIFT/

West, N. (1996). *The next generation lexicon.* Next Generation, 15.

Wolf, M. J. P. (2002). *The Medium of the Video Game.* University of Texas Press.
Wolf, M. J. P. (2014). *Building Imaginary Worlds: The Theory and History of Subcreation.* Routledge.

Wood, H. E. (2016). *Playable stories.* University of Exeter, England.

Zimmerman, E. (2003). *Play as research: The iterative design process.* HTTPS://STATIC1.SQUARESPACE.COM/STATIC/579B8AA26B8F5B8F49605C96/T/59921253CD39C3DA5B-D27A6F/1502745178453/ITERATIVE _ DESIGN.PDF

Zimmerman, J., Evenson, S., & Forlizzi, J. (2004). *Discovering and Extracting Knowledge in the Design Project.* Carnegie Mellon University.

bibliography

To my grandfather, Gianni.
Every hero needs a mentor along his quest.
In you, I found mine.