

Interactivity and World in Digital Reading

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Abstract: The article presents a study of interactive digital narratives (IDNs) from the point of view of reader-response theory. It argues that IDNs are distinguished from traditional literature by particular characteristics that arise out of their specific uses of digital media. In its first part it assembles a theoretical toolbox, adapting instruments from diverse fields of research, such as science fiction studies, possible worlds semantics, reader-response theory, and others. Then it applies this toolbox to a number of IDNs, which have been selected so as to illustrate the heterogeneity of the field. Even though the narratives are constructed very differently and produce a variety of readerly effects, the article argues that they share a degree of unity at a more abstract plane of analysis at which the field's inherent attention to issues of interactivity and world building, and to their implementation, comes to focus. Finally, the article argues that IDNs as a field are still in the process of formation, but that they owe much of their innovations to older forms and media, and hence the theoretical instruments for their analysis should also evolve on the basis of existing theories from a wide range of disciplines.

Keywords: interactive digital narratives, digital comics, hypertext fiction, reader-response theory, science fiction studies, possible worlds semantics

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Goals, Motivation and Methodology

The goal of this article is to study the defining characteristics of reading in a digital environment – in the context of the changing potentialities and prerequisites for world building in digital fiction. The study focuses on the changes introduced to the process of reading itself, due to interaction with material media distinct from the printed page, rather than on the novel, social-media conditions for sharing the readerly experience, discussing and using texts, etc. To this analytical purpose, a corpus of digital texts have been selected which stand in clear contrast with print-based literature with regards to processes of reading perception and cognition.¹ The article seeks to outline significant differences in the requirements presented to the reader by the text, so that the position of the implied reader is expanded in this particular context. The selection of digital texts is deliberately heterogeneous, to the point that the separate entries in it might be perceived superficially as having almost nothing in common. In order to argue the opposite, I will first outline a loose theoretical framework that analyzes interactivity and world construction as central to digital reading, and then proceed to apply and test it against the corpus.

1.1. Theoretical models

1.1.1 Science fiction studies

Generic influence over the creation of *interactive digital narratives*² (IDNs) is significant, as is evidenced by the wealth of IDNs that exhibit clear genre characteristics (including the ones analyzed presently). Although socio-cultural specifics probably constitute additional factors for

¹ The article is a significantly shortened version of a longer piece, which focuses on a respectively bigger corpus of works. For this publication, four out of the original nine analyses of primary texts have been selected. Hopefully, they represent a sufficiently diverse sample of digital narratives. Due to the shortening of the analytical section of the article, a number of the instruments presented in the theoretical section may seem somewhat underutilized, but hopefully the available analytical sketches will allow the interested reader to anticipate a fuller application of these theories and perhaps to make use of them elsewhere.

² In the interest of readability, the objects of analysis will also be referred to as “texts” when the meaning of the word is clear in context and its use makes the argument easier to follow. I take the term “IDN” from Harmut Koenitz, “Towards a Specific Theory of Interactive Digital Narrative,” *Interactive Digital Narrative*, edited by Harmut Koenitz, Gabriele Ferri, Mads Haahr, Diğdem Sezen, Tonguç İbrahim Sezen (Abingdon-on-Thames: Routledge, 2015), 107-121.

this imbalance, the current study aims at identifying inherent similarities and affinities between genre and interactive literature. Inasmuch the two categories do not apply to distinct literary species of the same taxonomic order – on the contrary, the two labels are often applicable to the same objects of study – these similarities will be sought in the way texts are read, i.e. in their reception, rather than at a structural plane.

In this sense, I identify models of the implied reader of science fiction (SF) developed within science fiction studies as useful instruments for the analysis of interactivity and worldbuilding aspects in the reception of IDNs. Since speculative worlds are constructed both against the grain of encyclopedic and experiential knowledge of the “real” world, and in close contact with it, the creative mechanisms involved in the process can potentially activate levels of heightened reflexivity and sensitize the reader to that same process. This question is central to Samuel Delany’s influential text *The American Shore*.³ Delany proposes a theory of *the trivalent discourse* of SF:

Realist prose not only does not enter in dialogue with the real world, it is actually voiceless, since what is being heard (and what readers have access to at a very close distance from their experience and memory) is the voice, the discourse of the real world, which ceaselessly talks to and furnishes the text with meanings. Social reality will hold, is what the voice is saying. This is what the readers know they are reading; this is what they expect. Thus, the possibilities talked about by realist prose are those of being tied down to, or untied from (Delany call them “slavery” and “madness,” respectively; Delany 2014: 48). In contrast to this “bilinguality,” [SF] has at its disposal a third discourse. As any fictional text, the SF one too is directed both inward at the construction of the fictional world, and outward at the reader who needs to decode sentences one by one and resituate them as non-metaphoric statements, because it is precisely they that construct the other world in dialogue with the real one. From a third perspective, however, against the second voice in [SF] texts is positioned the voice of the real world which sends its meanings to the SF text as a participant of the dialogue. The good writer [of SF] is able to harmonize the three discourses. The good reader knows about them or at least can sense their presence.⁴

In order to be meaningful, a reading of SF unfolds this third discourse, which is rooted in encyclopedic knowledge of the non-fictional world, but in turns acts upon it as well. Enmeshed in the multiplicative dynamics of new meanings and worlds, the SF text too gains a voice and begins to calibrate the realities with which it operates. The language of SF is not qualitatively

³ Samuel R. Delany, *The American Shore: Meditations on a Tale of Science Fiction* by Thomas M. Disch—“Angouleme” (Middletown, Connecticut: Wesleyan University Press, 2014[1978]).

⁴ Alexander Popov and Vladimir Poleganov, “Читателят на научна фантастика: опитите за читателска теория на жанра” [The Reader of Science Fiction: Attempts at a Reader-response Theory of Genre], *Littera et Lingua*, 13, no. 1 (2016). My translation.

different from the language of non-genre literature, since it grows out of the same semiotic and cognitive principles. The reading protocols of genre, however – namely, the trivalent discursive matrix that must be held stable during every act of reading – differ at least with respect to the quantitative differences between the fictional and non-fictional world, inasmuch the intensity of dialectical interaction between the two constructs focuses attention on deep structural differences between them. This iterative engagement with the third discourse on the part of the genre reader (and writer) results in the sedimentation of certain meaning complexes into iconic signs. These signs provide direct linkages to genre memory, as developed through reading and against normative encyclopedic knowledge. This demarcation of an independent set of worldbuilding elements, existing in dialectical tension with the stable, everyday world and often lexicalized into common vocabulary, is central to the construction of the so-called genre *megatext*.⁵

Similar interpretations of the SF genre can be traced back to the foundational work of Darko Suvin, *Metamorphoses of Science Fiction*.⁶ For instance, Carl Freedman in *Critical Theory and Science Fiction* adapts the second part of Suvin's famous definition of genre: from a "literature of estrangement and cognition"⁷ to a literature that produces a *cognition effect*.⁸ That is, the requirement for a cognitive reaction, interpreted by Suvin as a purely rational, scientific approach to explaining the world, is loosened in order to accommodate a semblance of such a response in the reader, a kind of confidence on his or her part as co-author, that his or her own interpretation of the text and reconstruction of the world is enabled by an internally coherent logic, also deduced from the text by the reader. Importantly, that logic is not necessarily explicit or even fully deducible by the reader in order to allow this level of confidence. This theoretical expansion allows for other genres of the fantastic (or *speculative* genres), like fantasy, to be analyzed within the same framework – through the act of world construction coinciding and overlapping with the act of reading.⁹

⁵ Damien Broderick, *Reading By Starlight: Postmodern Science Fiction* (Abingdon-on-Thames: Routledge, 1995).

⁶ Darko Suvin, *Metamorphoses of Science Fiction: On the Poetics and History of a Literary Genre* (Bern: Peter Lang Publishing, 2016[1979]).

⁷ Ibid, 15-22.

⁸ Carl Freedman, *Critical Theory and Science Fiction* (Middletown, Connecticut: Wesleyan University Press, 2000).

⁹ China Miéville, "Cognition as Ideology: A Dialectic of SF Theory," *Red Planets: Marxism and Science Fiction* (London: Pluto Press, 2009), 231–48.

This research will evaluate the hypothesis that heightened levels of interactivity while reading certain IDNs stimulate the reader to actualize in a self-reflexive manner his or her status of co-author. That is, to try to control the world, or at least activate it in particular ways, so as to confirm or reject his or her own hypotheses about its existence and ontological conditions.

1.1.2 Possible worlds semantics

The ideas outlined in the previous section can be put in productive interaction with the research field of possible worlds semantics. Within it, fictionality is analyzed as a pragmatically determined quality of the text; in *Possible Worlds in Literary Theory*, Ruth Ronen describes fictionality as a particular kind of position against the relevant cultural context, i.e. the corpus of texts perceived as a version of reality.¹⁰ Fictional worlds are non-actualizable possible worlds, and as such, are full of gaps; the act of reading is always aimed at reconstructing them to states of maximal coherence.¹¹ Coherence is measured both externally, with regards to the given, consensual world, and internally, with regards to the fictional one. When such a balance is achieved, this imbues the world with “authenticity” (in the context of this article, synonymous terms might be “worldness” or “worldhood”) – primarily through the complex interaction between focalization and narrativization.¹² The fictional world is a modally structured universe in which objects (including states and events) are grasped by narrative agents in specific ways.

Modal systems in human language provide a convenient starting point for the interpretation of the more general modal structures in fictional universes. In *Heterocosmica*, Lubomír Doležel gives the following schema for the modal operators that structure a world: alethic modal verbs indicate what is possible, impossible, or necessary; deontic operators mark the permissible, impermissible, and compulsory; axiological – what is good, bad, or indifferent; epistemic – what is known, unknown, or what is believed with a certain degree of certainty.¹³ This analysis of worlds in fiction corresponds to an extent with Delany’s idea of the so-called *levels of subjunctivity* which differentiate between genre and non-genre texts – according to him,

¹⁰ Ruth Ronen, *Possible Worlds in Literary Theory* (Cambridge: Cambridge University Press 1994), 12, 20.

¹¹ *Ibid*, 90.

¹² *Ibid*, 177.

¹³ Lubomír Doležel, *Heterocosmica: Fiction and Possible Worlds* (Baltimore: The Johns Hopkins University Press, 2000), 114.

SF, for instance, works with events that could happen (but haven't yet); alternate history – with events that could have happened (but didn't); naturalistic fiction – with such types of events that have already been observed; fantasy – with events that could not happen, etc.¹⁴ Using this modal system for analytical reading has the advantage of affording access to a precise language with which to trace the differences between the given and the fictional: epistemic operators mark historical knowledge, and alethic ones mark ontological distinctions. Deontic and axiological modalities constrain the specific focalizations present in worlds, i.e. what states are perceived as desirable and permissible according to social norms and personal ethics and drives.¹⁵

Out of this theoretical framework, a thesis naturally emerges that the difference between reality and fiction is neither clearly demarcated, nor a static boundary, but rather a mutable line. According to Thomas Pavel, regions of fictionality are historically determined and fictionality itself is a changeable quality;¹⁶ its imaginary meta-spaces are first constructed at the level of social and cultural production, and as such can be elevated or denigrated ontologically with regards to the real world.¹⁷ For instance, mythological systems become loosened during certain historical periods and objects heretofore grasped as really existing leak into regions of fictionality.¹⁸ Fictionality has a geological character and as a “marginal referential practice” is accorded this stature “only in contrast to some culturally determined ossification into normality.”¹⁹ In this way, we can “localize fiction as a peripheral region used for ludic and instructional purposes.”²⁰ The stability of fiction and fictional worlds, according to Pavel, is possible because of conventions of fictionality that require from the community of readers (or more generally, consumers of text) “maximal participation oriented toward the optimal exploitation of textual resources.”²¹

¹⁴ Samuel R. Delany, *The Jewel-hinged Jaw: Notes on the Language of Science Fiction* (Middleton, Connecticut: Wesleyan University Press, 2011[1977]), 10-12. Delany later adopts a more complex model and to an extent gives up on this formulation (see the comment on the *cognition effect* earlier in the article). If, however, this schema is developed in the sense of Doležel and other semanticists of fictional worlds, in combination with the concept of a dialectical communication between “real” and “fictional” worlds, it offers powerful instruments for the analysis of works of fiction (and other semiotic constructs).

¹⁵ Doležel, *Heterocosmica*, 126.

¹⁶ Thomas G. Pavel, *Fictional Worlds* (Cambridge, Massachusetts: Harvard University Press, 1986), 80.

¹⁷ *Ibid*, 90.

¹⁸ *Ibid*, 41.

¹⁹ *Ibid*, 27.

²⁰ *Ibid*, 143.

²¹ *Ibid*, 123.

Another useful moment in Pavel's work is the concept of *dual systems*. A dual system is "a *complex structure* linking two or more universes in a single structure so that there is a detailed correspondence between the components."²² This term is especially productive in the context of interactive digital narratives, in which the medium itself facilitates frequent transitions between the main narrative arc and mini-arcs, between main game and mini-games, etc. That is to say, certain practices are available for the multiplication of such dual structures and for potentially using them to enhance certain global effects.

From this point of view, the present study is interested in the kinds of resources that are made available by interactive texts and what reading practices coalesce around them.

1.1.3 Reader-response theory

The theoretical models from science fiction studies can be related to research in the field of reader-response theory, and specifically, to the act of reading and the implied reader in the work of Wolfgang Iser.²³ In the context of IDNs, Iser's ideas about the reader which is implied by the text seem particularly helpful, since a lot of these digital texts seek precisely to direct their user, but also in some sense to allow him or her an even greater degree of freedom in working with the textual material and the potentialities for (re)constructing the fictional world.

The text models its implied reader via a set of constraints and potentialities integrated within it. The repertoire of the text consists of all of those elements originating from the extratextual reality; in Samuel Delany's framework, this is the encyclopedic knowledge that the reader is supplied with by reality via the text. The different elements of the repertoire are accessible differently to the reader: some are referred to directly by the signs in use, others are connoted by them, and still others exist that can be reconstructed or identified through deliberate imaginative effort – which is often made possible only if the reader can draw on certain knowledge or procedural competences. The third discourse of the speculative world interposes alternative repertoires that need to be reconstructed in contact – and often in contrast – with

²² Ibid, 56.

²³ This research makes partial use of a methodological instrument for analysis developed within "Reading Practices in Bulgaria" project (2018) and more specifically, within the module titled "Modeling the Implied Reader in Bulgaria."

conventional ones. Moreover, speculative genres rely significantly on citationality – such that refers frequently toward the genre megatext, and that can easily activate rich implicit repertoires in experienced genre readers.

The strategies formulated in the text are to an extent similar to the reading protocols discussed by Delany and Broderick – those are the mechanisms, explicit or implicit, through which the reader is directed, controlled, and empowered during the ongoing act of reading. An important point which needs to be borne in mind about the speculative text is that it rarely anticipates heightened levels of figurative reading, and more frequently directs the reader toward a literal interpretation of those linguistic units that are relatively opaque, i.e. it points toward their interpretation as material objects or processes interleaved in the fictional world. The same holds for the implied readerly positions within the text: (self-)rationalizing the specifics of point of view as emerging from the materiality of the world is often a central key to interpreting the text.

The competences assumed by the speculative text are, unsurprisingly, connected to genre knowledge and to a certain state of readiness to construct new worlds. With regards to linguistic competences – it is often the case that such texts rely on verbal clichés that can quickly establish mental transitions to tropes, heroic archetypes, and other elements characteristic of genre literature.

For Iser, these mechanisms both control the act of reading and liberate it to resist the constraints set upon it.²⁴ The gaps opened up by the act of reading invite the reader to assume a position with respect to a particular interpretative horizon, i.e. the possibilities for updating the mental image, which always remains mutable and open to new meanings.²⁵ The possible positions and horizons that can serve to fill in the gaps are a multitude, inasmuch the text communicates different information to each reader (including the same reader who encounters the text at various points in time). IDNs, even more so than speculative texts, embody this principle, thus making possible (inter)active transitions, in addition to passive syntheses of information.

²⁴ Wolfgang Iser, *The Act of Reading* (Baltimore: The Johns Hopkins University Press, 1980[1978]), 57.

²⁵ Bogdana Paskaleva, “Литературният образ в ‘акта на четене’ (‘Актът на четене’ на В. Изер и ‘Лаокоон’ на Лесинг)” [The Literary Image in the “Act of Reading” (“The Act of Reading” by W. Iser and “Laocoön” by Lessing)], *Littera et Lingua*, 13, no. 1 (2016).

In this way, the text-reader pair can be viewed as something akin to a cybernetic system whose coherence is maintained via heterogeneous feedback loops. Reading, according to Iser, is powered by a combination of readerly retentions and protensions: its “concreteness arises out of each new attitude we are forced to adopt toward the text, and the fluidity out of the fact that each new attitude bears the seeds of its own modification.”²⁶ Reading is a reality unfolding. And while the non-speculative text unfolds within the frame of the given world, the speculative one constantly thematizes the worldbuilding process in a field of tension against reality. Negativity as an “unwritten base” of the text makes possible the activation of those meanings that have been deactivated by conventional discursive systems, and in this way unbinds signifiers and enables the reader to point them at alternative world structures, searching for a new state of balance.²⁷

Thus, the repertoire required to read successfully is optimized in a sequence of “coherent deformations.”²⁸ This constant movement toward the horizon of the new world and its own pendulous to and fro with the given world could gradually lay bare the interpretative codes at play:

*The ability to perceive oneself during the process of participation is an essential quality of the aesthetic experience; the observer finds himself in a strange, halfway position: he is involved, and he watches himself being involved.*²⁹

The facility with which the theses articulated in section 1.1.1 can be taken up and adapted from the point of view of reader-response theory is a testament that speculative texts and IDNs (often speculative themselves) make use of partially overlapping readerly apparatuses but prime the thematization of different meaning systems and of interpretative competencies. This pushes to the foreground the task of outlining the strategies through which this is accomplished, bearing in mind the as of yet semi-formed and dynamically developing field of IDNs.

1.1.4 Theory of IDNs

The theorization of interactive fiction has been developed across too many research threads to be meaningfully encompassed in the current article.³⁰ For this reason, I will

²⁶ Iser, *The Act of Reading*, 68.

²⁷ *Ibid*, 225-230.

²⁸ *Ibid*, 81-82.

²⁹ *Ibid*, 134.

straightforwardly enlist a set of concepts whose usefulness will be demonstrated in the analyses of concrete IDNs in the second part of the article.

In her foundational work *Hamlet on the Holodeck*, Janet Murray analyzes digital narratives as *multiform stories*³¹ that reflect both the increased number of modified *affordances* due to digital media and the “emotional conundrums” of the Einsteinian epoch.³² Murray examines digital narrative forms as a kind of *incunabula* – analogous to the first printed books, or to the first attempts at capturing moving objects with a camera, before the form has had a chance to stabilize and develop its characteristic repertoire and strategies for directing the reader/viewer. IDNs often experiment with new media, searching for their own conventions, a state of relative balance:

*Every expressive medium has its own unique patterns of desire; its own way of giving pleasure, of creating beauty, of capturing what we feel to be true about life; its own aesthetic. One of the functions of early artifacts is to awaken the public to these new desires, to create the demand for an intensification of the particular pleasures the medium has to offer.*³³

Murray emphasizes the point, via referencing Marshall McLuhan, that the content of the new media is that of the old, but reworked and thematized differently.³⁴ The producers and consumers of IDNs are involved in the process of exploring the possibilities (the affordances) offered by digitization, as well as their most fitting applications. The latter are often adjacent or identical to those of the older forms, but just as often they can be completely unpredictable, due to the naturalization of their predecessors. The instruments used by IDN producers often seem to form a heterogeneous set of tricks, bound together by no underlying principles and generated in a rather ad-hoc manner. This precise aspect of a sometimes downright chaotic experimentation process, however, makes it possible to think through the new affordances of the digital media – a necessary first condition prior to seeking any unifying theory. Such tricks include micro-worlds

³⁰ See for instance the overviews in Janet H. Murray, *Hamlet on the Holodeck: The Future of Narrative in Cyberspace* (Cambridge: MIT Press, 2017[1997]), and Koenitz, *Towards a Specific Theory*.

³¹ Murray, *Hamlet*, 37.

³² *Ibid*, 40.

³³ *Ibid*, 90.

³⁴ *Ibid*, 92.

within various games and IDNs, the terms and roles created by participants in MUD-narratives,³⁵ multisequential narratives,³⁶ the rhizomatic structure of many IDNs, etc.

Murray highlights four main characteristics of digital narratives, which interact with each other. Digital narratives are: *procedural* (they involve the construction of a narrative via the combination of rules); *participatory* (this construction is carried out from the point of view of the reader); *spatial* (the physical space where the narrative takes place is thematized; the very process of navigating it is also thematized by drawing the reader's attention to its mechanisms); and *encyclopedic* (they are capable of representing and organizing large amounts of heterogeneous data).³⁷ The interaction between procedurality and participation generates a sense of *interactivity*, while the interaction between spatiality and encyclopedicity – of *immersion* in the world and the story. At a still higher level of abstraction, the combination of interactivity and immersion facilitates active *belief creation* in the authenticity of the world.³⁸

These kinds of reactions constitute two of the main pleasures offered by the new media, more intensive and different compared to those of older media. The third kind of pleasure is *transformation* – the readiness with which readers/players disassemble, reassemble, and reshape narrative and world (in some cases this is done at the ontological level, in others – by playing with the points of view and the horizons through which the world is concretized). Murray qualifies IDNs that prompt the reader to engage in active transformation as *kaleidoscopic*, contrasting them with the linear structure of the printed book and the mosaic structure of 20th century media. Such multiform narrations advise their reader to frequently assume new points of view and to investigate objects and processes from different angles. In contrast to postmodern narratives, which typically aim to deconstruct and reject a unified interpretation, kaleidoscopic stories hold the potential to offer multidimensional and dynamic representation, just as the mental image, according to Iser, is always open to new meanings and always anticipating novel

³⁵ Short for *Multi-User Dungeon* – a form of collective narration made possible by a digital text interface and involving the creation of virtual physical dungeons, where players roam during sessions. The participants in the narrative are free to suggest procedural commands, which are granted the power to “create” the world within the collective consensual reality, as well as to contribute to a specific meta-language used to mark situations where a player is “in character” or “out of character.”

³⁶ That is, the thematization of alternating viewpoints, to a degree which would be almost impossible to operationalize in a standard novel, for instance.

³⁷ *Ibid*, 72-87.

³⁸ *Ibid*, 91.

syntheses. The task for the theoretician of IDNs gets a little clearer: to shine a light on narrative primitives, on the mechanisms for their realization, on the rules for their segmentation and assembly, and on the effects that they generate in the reader. Such an analytic scheme could provide a more cogent description of the mutual positioning of various kinds of IDNs and of how they shade into one another.

Koenitz offers a few more theoretical innovations that can be usefully applied in the line of research presented here.³⁹ The outline provided by him highlights some important previous observations in the research area. Citing Herman,⁴⁰ Koenitz describes IDNs as “a form of expression enabled and defined by digital media that tightly integrates interactivity and narrative as a flexible cognitive frame,”⁴¹ thus viewing them in a framework that makes possible the reconstruction of mentally projected worlds.

From Aarseth’s *Cybertext: Perspectives on Ergodic Literature*, Koenitz highlights the definition of cybertexts as ergodic works that require significant effort from the reader in order to be traversed.⁴² However, a certain degree of uncertainty is generated as to whether a particular work is inherently ergodic, or whether this quality is a product of the novelty of the media and the (low) degree of habituation to the new format. Another interesting question is whether ergodicity could either distract from or, on the contrary, enhance the main characteristics of IDNs (procedurality, participation, spatiality, encyclopedicity), whether it is not actually a side-product of specific combinations of these characteristics, much like the aforementioned pleasure types derivable from reading IDNs.

From Marie-Laure Ryan’s work, Koenitz extracts the distinction between *paidia* and *ludus* as a solution to the problem of whether games can be considered as narrative – Ryan interprets *paidia* as an imitation game, in which the player assumes specific roles and in this way constructs a narrative (in contrast to the competitive character of *ludus*).⁴³ Such games, and broadly speaking IDNs, which prompt the player/reader to co-author the world and the story (by

³⁹ Koenitz, *Towards a Specific Theory*.

⁴⁰ David Herman. *Story Logic: Problems and Possibilities of Narrative* (Lincoln, Nebraska: University of Nebraska Press, 2002).

⁴¹ Koenitz, *Towards a Specific Theory*, 92.

⁴² Espen J. Aarseth, *Cybertext: Perspectives on Ergodic Literature*. (Baltimore: The Johns Hopkins University Press, 1997).

⁴³ Marie-Laure Ryan, “Narrative and the Split Condition of Digital Textuality,” *Dichtungdigital: Journal für digitale Ästhetik*, 5, no 34 (2005).

filling in the gaps left by the “text”), can be described as narrative, even when a strong competitive aspect is present.⁴⁴

Koenitz’s original contributions can be summarized in three novel concepts: *protostory*, *narrative design*, and *narrative vector*.⁴⁵ Protostory designates the specific content of a system for generating IDNs, represented as a space of potential narratives.⁴⁶ Narrative design is a concept that is alternative to the plot of a text, one that “describe[s] the structure within a protostory that describes a flexible presentation of a narrative.”⁴⁷ Narrative vectors are “substructures within a narrative design that provide a specific direction.”⁴⁸ They interconnect different parts of the narrative by guiding the reader/player, so that he or she doesn’t get lost in the global space of the protostory and is able to interact predictably with the narrative design. Different types of IDNs would use these three structures in different ways and to different purposes, but their application to the idea of narrative as a cognitive frame for worldbuilding is an act that lays the foundation for an overall theory of interactive reading.

1.2.5 Cognitive studies

Cognitive science can offer a greater diversity of data and models that can be used to theorize IDNs. The current article refrains from attempting a literature overview in this area due to the scale of the task. Nevertheless, I will draw attention to a study from 2017 that offers evidence in support of one key hypothesis, and complicates another hypothesis – both regarding the difference between reading on paper and on a digital device. The two hypotheses are, respectively: 1) concerning the representation of text as auxiliary to or impeding the formation of cognitive maps; 2) concerning the materiality of the text as a factor that influences attentive reading.⁴⁹ The authors provide experimental data on both of the hypotheses. The first one states that the reader literally arranges processed text in a mental spatial structure similar to a map,

⁴⁴ Koenitz, *Towards a Specific Theory*, 94.

⁴⁵ *Ibid*, 99.

⁴⁶ The concept can be related to the mathematical concept of *phase space* – all of the possible states in a given dynamic system; the major narrative furrows in such an analogy would be representable by the concepts of *attractor* and *attractor basin*.

⁴⁷ *Ibid*, 99.

⁴⁸ *Ibid*, 99.

⁴⁹ Jinghui Hou, Justin Rashid, and Kwan Min Lee, “Cognitive Map or Medium Materiality? Reading on Paper and Screen,” *Computers in Human Behavior*, 67 (2017): 84-94.

which subsequently facilitates the intake, memorization, navigation, and integration of narrative. The second one states that printed text activates a phenomenologically broader spectrum of experience, including sensorimotor pathways (coordination between tactile receptors and finger and hand muscles), which offloads to a certain extent effort from the cognitive systems involved in processing text, thereby making its comprehension easier.

The authors report results from an experiment in which three groups of test subjects read one and the same comic book in the following conditions: 1) from paper; 2) from a tablet with comparable dimensions and image quality, showing the comic panels in the same configuration as they appear on paper; 3) from the same kind of tablet, which in this setting shows only one panel per page, thus destroying the initial configuration of text and illustrations. The methodology of this research can be subjected to certain critiques. For instance, it is arguable to what extent reading comics is generalizable to all kinds of reading, inasmuch the placement of panels on the page is significantly more important in comics than it is in traditional books. Despite this, the results of the study are doubtlessly important. Hypothesis one is strongly supported by the empirical data, while there are no statistically significant results in support of hypothesis two. That is, the placement of information in physical space indeed facilitates narrative comprehension (in addition to decreasing fatigue and increasing reading speed). This means that IDNs (as well as other, non-digital narratives) whose design organizes information around landmarks that are prominent for the sensorimotor system would be significantly more accessible and immersive – in support of Janet Murray’s theory of spatiality as a central characteristic of IDNs. The lack of support for hypothesis two means that currently we cannot confirm the thesis that IDNs, such as hypertext literature, are less accessible than printed text because they erase the phenomenological aspect of physical contact with the text.⁵⁰

⁵⁰ Anne Mangen, “Hypertext Fiction Reading: Haptics and Immersion,” *Journal of Research in Reading*, 31, no. 4 (2008): 404-419.

Interactive digital narratives: applying the theory

2.1 Hypertext fiction: *howling dogs*

howling dogs by Porpentine⁵¹ is an example of hypertext literature which handles the format in a different way compared to standard Choose Your Own Adventure books. Instead of frequently putting the reader/player at a crossroads and sending the narrative trajectory in divergent directions, the hypertextual links structure the experience in a different way; namely, they add layers of potential meaning on top of the linked textual segments. *howling dogs* contains almost no choices that actually bear serious effects on the narrative. On the other hand, each link presents possible moves in the textual maze, which in turn add non-verbal information and almost physical sensations over the textual foundation.

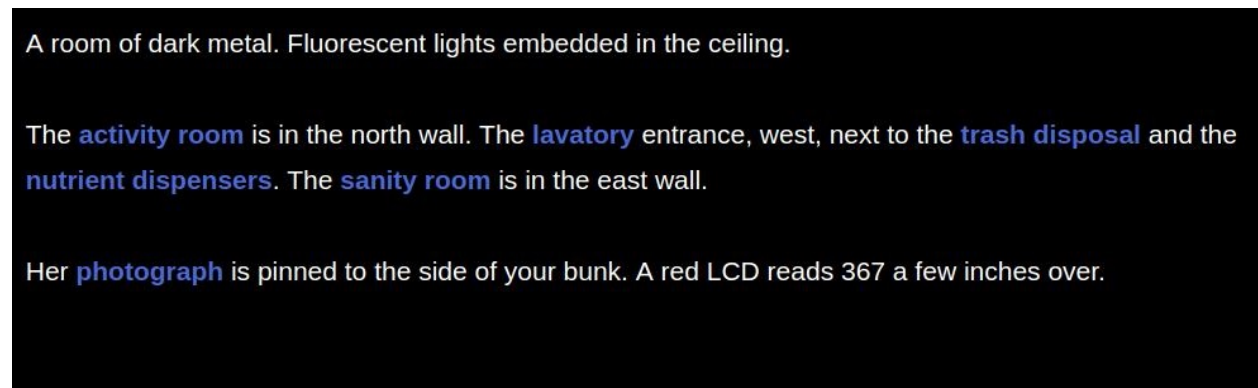


Figure 1: The room at the start of *howling dogs*.

The story of *howling dogs* is resistant to easy description. The reader/player wakes up in an isolated room (see fig. 1). The succinct textual representation of the room, interspersed with hyperlinks, is the starting point from which the player meets each new day. There is a link to “the activity room.” Lavatory. Trash disposal chute. Nutrient dispensers. Sanity room. A woman’s photograph beside the bed. A red screen counting the days since... we don’t know what. Each day the player must take a shower, eat, drink water, and dispose of the garbage. Eventually he or

⁵¹ <http://slimedaughter.com/games/twine/howlingdogs/>

she may visit the sanity room. Only after that can the reader engage with the virtual realities projected by the helmet in the activity room. Each virtual dream starts with a different pixelated image, always telling a different story: of murdering a loved one; of a Borgeisan garden; of a queen and her life-long education in the art of dying at the hands of an inevitable assassin. The narrative, to the extent that such is present, in the “real” world could be taking place in a mental asylum, in a prison, in an underground bunker; we never really learn the truth; perhaps the “real” world, too, is virtual. Gradually the living conditions begin to deteriorate: the water supply is intermittent, the garbage chute stops working, the screens in the sanity room begin to display error messages. The player might begin to suspect that there exists some correlation between the degradation of the physical space and the degradation of the protagonist’s mind, but there is no available method to test that hypothesis.

Visually, *howling dogs* is radically minimalist – each of the screens looks like a black command prompt, with only the hyperlinks marking points of interactivity. Sometimes the link to the next screen is situated at the end of the current text, sometimes it is inside it. Sometimes the semantic bridge between two screens is transparent in its meaning, sometimes there is no apparent connection between the two episodes. Sometimes a screen contains one or two links, sometimes every few words contain a clickable link. The narrative, as mentioned already, is expressed linearly, but the interactivity in this case is manifested as an effect of implicit procedurality – the player, by trial and error, begins to gain knowledge about the functions of the links, to establish correlations between recurrent models and physical and/or emotional spaces. The text is at certain points markedly evocative and generative of third discourses which can fill in the yawning gaps in the texture of meaning. Abstraction alternates and meshes with hyperdetailed physical description. The player, by descending deeper into the delirium-like state of the protagonist, seeks with ever-increasing intensity a hidden, unifying model under the surfaces of the text. Such a model proves to be elusive in the end, and the player eventually realizes that he or she has never been a player in the classic sense, but that it would be hard to claim that he or she has been a reader either. The impossibility of constructing an explanatory model, in some intrusive way, is itself elevated to a model – a model of lack, demarcated by a textual maze in which repetition and form are perhaps just as important as is content.

A certain person was tasked with describing a garden for the records of an empire. To assure objectivity, they were shown this garden through a slit in a piece of opaque black paper.

Through the slit you see spearlike green stalks flowering with tightly knotted purple flowers. A narrow stream winds through the garden. You feel certain that the garden permits a feeling of privacy and enclosure at regular intervals despite the relatively small size of the garden, due to the height and closeness of the stalks, as well as the gentle canopy of long green leaves proliferating from their tips. You can smell the sweetness of the flowers and the freshness of the leaves and water—your nose scrapes against the slit as you press closer to inhale more deeply.

Describe aesthetically: "This garden was certainly created by a soul in accord with Heaven. Surely spirits dwell in this verdant shrine, this majestic expanse of purple buds hanging with wind-wet leaves. I am overcome!"

Describe bureaucratically: "This is a regulation garden in every aspect, save for the tallness of the stalks. The stalks extend at least 12 thumbs above standard."

Describe horticulturally: "The stalks are in full health from leaf to flower. Water runs through in seemingly haphazard curves but closer observation reveals excellent coverage of the entire garden. Pruning and sweeping seems to be done in a timely manner."

Figure 2: One of the “virtual realities” in *howling dogs*.

Anchoring the “player” in the oppressive and schematic space of the textual room – even more oppressive because of its invisibility – and denying her access to a stable model of the fictional world, able to impose order on the constantly self-constructing and self-deconstructing tower of associations and virtual mini-plots, *howling dogs* thematizes transverbal meaning. By interacting with the text, seemingly enriched with hyperlinks, the player arrives at the conclusion that interactivity can result in an even more radical loss of meaning, when choices only create an illusion of control, and through increasingly complex divergences parry relentlessly any attempts at interpretation.

2.2 Narrative games: *80 Days*

*80 Days*⁵² is a game developed by the studio *inkle* and primarily targeted at users of mobile devices. In contrast to other popular mobile games (like, for instance, *Sorcery!*, also developed by *inkle*), *80 Days* utilizes a much larger range of narrative mechanisms made possible by the advent of digital media. The game is a loose adaptation of Jules Verne’s novel

⁵² <https://www.inklestudios.com/80days/>

Around the World in Eighty Days, set in an imaginary alternate reality inspired by the steampunk subgenre of fantasy literature.⁵³ The narrative sets off with Phileas Fogg hiring Passepartout to be his servant on the eponymous voyage around the world. The reader/player takes control over Passepartout, who is tasked with planning the journey and taking care of all necessary logistics.



Fig. 3: The world map. Fig. 4: Exploring locations. Fig. 5: The textual interface.

The game exposes a graphical interface in the shape of a world map with possible routes for circumnavigating the globe (see fig. 3). At the arrival at each separate location, Passepartout can go out scouting in the respective town or other populated place and in this way learn about various possible routes to neighboring locations, entangle himself in subplots, acquire objects of value, etc. The interface with the locations visited by the travelers (fig. 4) also permits the

⁵³ Steampunk is typically characterized by the aesthetics of steam engines. These stories often take place in alternate historical realities in which the harnessing of steam power has led to even greater technological acceleration. Their chronological focus is usually on the Victorian era, or on the American “Wild West,” highlighting issues of imperialism and colonialism. *The Difference Engine* (1990), a novel by Bruce Sterling and William Gibson, is considered to be one of the first significant examples of the genre. Notably, Gibson is also the author of *Neuromancer*, which is considered the foundational text of cyberpunk; he is also credited with coining the word “cyberspace.”

reader/player to visit the local markets, banks, or hotels, as well as to plan the next phases of the journey. The last bit is a very important component of the game experience, since during most of the gameplay the clock never stops counting the time, and the correct management of this resource becomes a major parameter for success. Because the different types of transport (trains, automobiles, carts, ships, aircraft, etc.) depart according to strict or variable timelines, Passeur must decide on the most effective way of spending his spare hours. Oftentimes suboptimal preparation can result in missing the departure of a transport, thus costing Phileas Fogg whole days. One example of the kinds of snags that can have such results is excessive luggage – in case the transport has limited space and cannot afford to carry it.

The temporal constraint, combined with the spatial situatedness of the narrative, produces at any given moment a specific modus of information processing in which the routes traveled and the retentions associated with them interact with the projected routes and the reader/player's protensions (in the sense developed within reader-response theory). All the information collected along the way – about the people and objects that might be encountered at prospective stops, about what objects could be sold expensively or at a high margin further along the way, etc. – conspires to create a psychological state of heightened attention in which the reader/player attempts to memorize facts robustly and to react as fast as possible. These factors alone would not be sufficient to call *80 Days* a fully-fledged narrative instead of, for instance, a competitive tourism simulator. However, together with the textual sequences that the reader goes through when exploring locations, they stabilize the narrative as a procedurally generated set of narrative vectors that at some points boost and at other points impede the strategies deployed by the text in order to keep the reader within certain branches of the narrative space.

80 Days is an example of an IDN that actively makes use of the new medium for modulating reader-response at a basic level. To be more precise: the textual episodes unfold in very short segments, most often consisting of one to two sentences. Even when those are not followed by alternative transitions selectable by the reader, the short information bursts overflowing one into the next by way of the fluid user interface impart a rhythm to the reading act that keeps the reader attentive. Since the chapters in the populated locations are typically short but rich in events and new information, the player is quick to learn that each narrative micro-unit could and should be used and memorized, or at least absorbed within ambient knowledge about the world. Such pieces of information, or affective viewpoints assumed with

regards to the world in certain episodes, can later turn out to be crucial for unlocking subplots further along in time and space. Even when a given piece of the puzzle is not actualized, in a pragmatic sense, toward the goal of completing the journey, the radically shortened feedback loop between text and reader becomes a major instrument for increasing the density of world models and psychologizing the protagonist (in case the reader does want to psychologize Passeurpartout; the converse approach is not precluded).

A good example of the minimalism and effectiveness of the narrative design is found in one of the very first textual sequences – taking place in Paris, the first stop after London. Passeurpartout goes out on a walk about the city and is soon prompted by the interface to provide an aesthetic reaction to the urban environment through which he is moving. One of the available choices is to marvel at the beauty of the city, the other is to express his recognition of the scars that Paris, dear to his heart, bears from the unrest that has occurred not long in the past. The events of 1871 (just a year prior to the fictional present) and the Paris Commune are never directly referred to, but the second choice results in a textual episode that effectively modulates the reader's representation of Passeurpartout, casting him as a patriot and a person who stands in solidarity with the fate of Parisians. These choices have no direct impact on the profile of the protagonist, i.e. they do not predetermine his future reactions in similar or associated situations. This specific quality of the narrative design, however, seems to be even more effective, as the reader is given the liberty to model the character according to her own mental models. In this way the sense of participation is maximally increased, and the reader is given the status of co-author to a much greater extent.

Similar moments of tension and potential openings for making the psychological model of Passeurpartout more precise proliferate as the game progresses. In the world of *80 Days*, imperialism and colonialism are recurrent motifs, especially if the reader acts in accordance with a character model of Passeurpartout that constructs him as bound by solidarity with the fate of others. After proceeding out of Europe and heading toward Africa or Asia, the narrative begins to get tangled more and more frequently in conflicts between colonizers and subaltern populations. The representation of the Orient is increasingly thematized via narrative vignettes that sketch out components of the socio-political make-up of the fictional world. Access to encyclopedic knowledge is, as can be expected, of significant importance – not so much related

to the crossing of geographical space, but rather for constructing rich models of the alternate reality, which, even though different from actual history, remains reliably tethered to it.

Another major motif is the influence that novel technologies exert on everyday and political life. Due to the adoption of so-called “automata,” the world seems to be on a trajectory of slow, but also deep and structural change, observable at all levels of experience: the Austro-Hungarian army is already making use of the machines, the Italian resistance is also using them for its own goals, secret orders are seeking a legendary automaton that possesses a soul, etc. Again, many of these discoveries about the world will manifest as horizons to be integrated in the global reality model only if the reader is willing to follow their lead. The reader who is unexcited by these technological innovations could move through the game with minimal information about such differences existing in potentia in the protostory, constructing a world which is much closer to the one we know from history. Probably a reader of this type would be significantly less inclined to engage with genre compared to the one willing to track down information of this kind and to actively perturb her world model in a way that generates pleasure familiar from other genre texts. According to the developers of the game, one full journey around the globe reveals to the player, in the median case, around 2% of its textual content (which is approximately 750,000 words in total). Bearing in mind how difficult it is to replay the game multiple times without also replaying significant portions of already seen content (an effect of the spatial and temporal constraints of the game), as well as the degree to which many subplots are hidden within the narrative,⁵⁴ it is plausible to suggest that the world and the story would be difficult to exhaust completely even after several hundreds of replays.

The density of the narrative network of *80 Days*, its innovative use of the digital medium, and its intuitive design collectively imbue the act of reading and playing with almost all of the characteristics discussed earlier in the theoretical section. The narrative makes it possible to unfold a third discourse of estrangement and cognition in the sense of Delany and Suvin. Different actualizations of possible worlds in the act of reading require active work with the modal constellations structuring the fictional reality. The high degree of ellipsis and the requirement (non-compulsory, but pleasure-maximizing nonetheless) to maintain a global

⁵⁴ [https://uk.ign.com/wikis/80-days/Tips and Tricks](https://uk.ign.com/wikis/80-days/Tips_and_Tricks) collects some of the more interesting and inaccessible subplots, among which are: meeting Captain Nemo and Jules Verne himself, a journey to center of the Earth, joining the Resistance in a Belgrade crushed by war, etc.

explanative model are naturally subjectable to the analytical methodology outlined within the framework of reader-response theory. The text meets all four criteria defined by Murray for identifying IDNs (procedurality, participation, spatiality, encyclopedicity), which generates a strong sense of simultaneous interactivity, immersion, and desire for transformation. The ergodic character of the narrative is easily perceivable, and the terms “protostory,” “narrative design,” and “narrative vector” are directly applicable. Due to the immense scale and depth of the text, as well as to the complex temporal and spatial interdependencies between its branchings, the reader/player can easily immerse him- or herself both in the viewpoints of both the author and the protagonist. Using the cognitive map of the interface as a set of spatial landmarks that simultaneously unburden and structure the act of reading is another focal feature of the game.

2.3 Digital comics: *Nawlz*

The website www.screendiver.com collects lists of comics that have been produced with a specific design in mind – to be consumed in a digital environment; it also hosts a digital comics manifesto.⁵⁵ The manifesto outlines four major principles of this new artistic form:

1. A digital comic should transcend print.
2. A digital comic should be designed for its intended platform.
3. A digital comic should never take temporal control from the reader.
4. A digital comic should be called a digital comic.

In this subsection I will offer a short glimpse at a digital comic that embodies these principles: *Nawlz*, produced by the artist Stu Campbell (popular as *Sutu*).

*Nawlz*⁵⁶ is a journey into the human mind, cyberspace, and the cybernetic ecosystem of technocapitalism, filtered through the lens of the cyberpunk genre. The digital comic is organized into two “seasons,” consisting of twenty-four episodes in total. The present analysis is mostly based on the first episode. It follows the graffiti artist Harley Chambers and his life in the eponymous city Nawlz. In contrast to other (digital) comics,⁵⁷ this narrative does not structure

⁵⁵ <https://screendiver.com/digital-comics-manifesto/>

⁵⁶ <http://www.nawlz.com>

⁵⁷ See for instance *The Ocean Is Broken* by the same artist: <http://ocean.sutueatsflies.com>

time and space in accordance with a continuous model; on the contrary – spatiotemporal transitions are often represented by sequences of discrete states. The “panels,” to the extent to which such are identifiable, are generated at the points of interaction between the reader and the active zones in the visual field (by pointing the mouse cursor and clicking on them). They occupy various and unpredictable positions, frequently overlaying already present images and text.

There is an intrusive sense that in the futuristic city people’s existence (or at least that of the protagonist) is somehow analogous to the experience of reading the comic itself – it is a multichannel informational deluge, in which new bits of data are constantly irrupting from different directions, meshing into synesthetic constructs, diluting the experience of time, tempting the reader to frequently go back and forth in order to be immersed in “the simulation” of those moments experienced by the protagonist. The first episode of the comic takes place literally in the span of just a few seconds in the fictional world. However, Harley, who is seeking the genesis of a specific thought that has occurred to him, is rewinding his memories, modulating his brain and sporadically interacting with the environment, while he is reliving those past moments, together with the reader, in this distended subjective timescape. The result is a fragmentary narrative that extends cybernetic tentacles in all directions and sediments in the reading mind rather like a multidimensional image, a momentary imprint of the present mediated by Harley’s free associations, the drugs in his brain, and the overlaid virtual and augmented realities. Or perhaps even like a recording of the subconscious processes active in Harley’s mind during this brief time slice – made accessible to the reader via the medium of digital comics.

The spatiotemporal aspect is key to the analysis of *Nawlz* (as with many other digital comics), even though in this case spatial awareness is used rather as an analogue to the labyrinth-like interior of the human mind living in a future overloaded with information. *Nawlz* also demonstrates the potential for encyclopedicity of digital comics. The various active elements on the screen can conjure additional information about themselves, including textual fields that are heavy with technological jargon. Harley deliberately manipulates his brain, visualizing his own manipulations in virtual diagrams, while methodically tracing his associations even in the subconscious mind. Interactive surfaces of augmented reality become covered with text which refers to pieces of music and other artifacts from the fictional world. An illusion is being created that each element of the world – outside and inside the protagonist – is a link along an infinite

chain of signifiers, that his information web is threaded through everything, through all of time. That is, the comic rather creates an illusion that knowledge in this world is organized encyclopedically; it is an illusion tailored to justify the suppression of the readerly expectations for a progressing narrative in favor of an unceasing process of navigation through the contents of the mind and the reflective technocultural surfaces of the cyberpunk city. These heavily saturated webs of signification activate a powerful background process of worldbuilding on the part of the reader, and all the while, nothing that can be likened to a “story” has transpired. Each newly generated sign gives rise to new gaps that the reader must attempt to fill in, shifting in the web that is being woven. The levels of interactivity and desire for transformation of the world are low, but immersion in the new reality is almost full. The artificial organization of comic panels on the printed page is replaced by a much more powerful cognitive map which simulates the experience of time and space in the interiority of the mind itself.

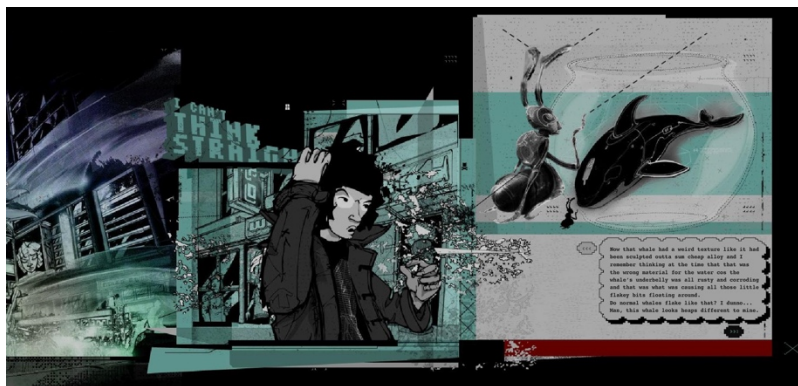




Figure 6: An interactive panel from *Nawlz*: a brain contemplating an ant contemplating a whale.

2.4 Interactive fiction: *Arcadia*

Iain Pears's novel *Arcadia*⁵⁸ lives a double life. It is available as a printed book, but also as an interactive application for users of the iOS operating system, which is actually the format it was originally designed for.⁵⁹ The novel is woven out of ten narrative threads, as seen through separate points of view that crisscross three fictional worlds. In its beginning, this interactive novel urges the reader to take one of six possible roads. In addition to the crossroads of the prologue, which ends with the six prongs of the fork, the reader can at all times consult a topological map of the narrative, upon which the threads cross over and diverge from one another, forming a lengthy and colorful graph of narrative inter-linkages (see fig. 7). Three locations are marked at the bottom of the map, one familiar to us and two unknown: Wildon, Oxford, and Mull.

⁵⁸ <https://apps.apple.com/us/app/arcadia-by-iain-pears/id1003843523>

⁵⁹ <https://www.theguardian.com/books/2015/aug/20/novel-use-for-app-iain-pears-arcadia>

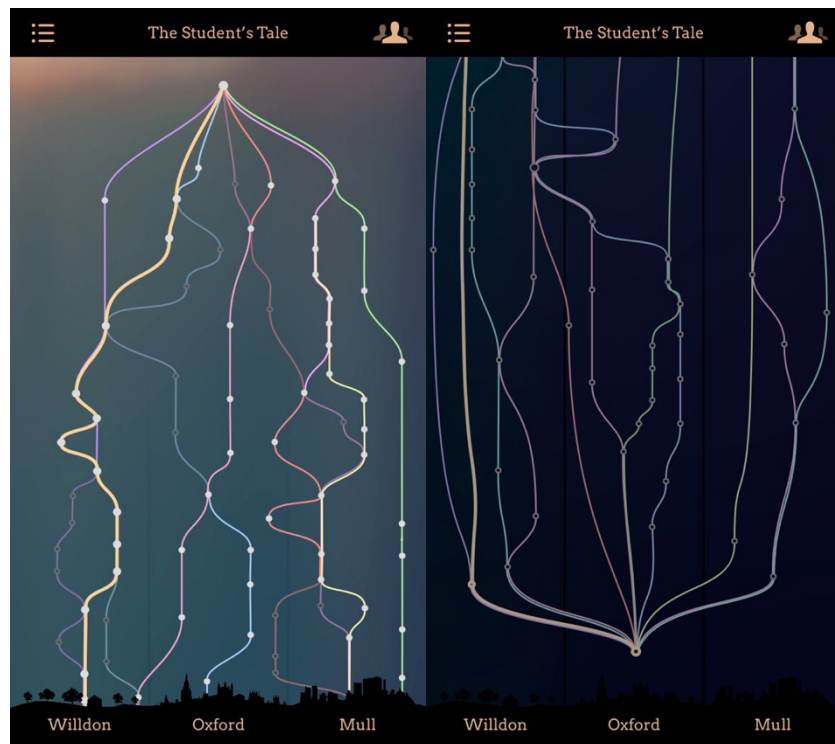


Figure 7: The narrative map of *Arcadia*.

The initial choice of viewpoint (and with it, the choice of fictional world, although this is not entirely obvious from the start) determines to an extent the primary model of the novel's implied reader. If the real readers take the route to the right, going into the policeman's, the assistant's, or the scientist's story, they will find themselves two centuries ahead in the future, when the Scientific Government rules the world through some system of feudal-capitalist relations; human brains carry advanced technology implants for the calibration of thoughts, emotions, and knowledge; and scientists develop new methods for the creation of worlds and traveling backward in time. If they take the middle road, they will be sent to Great Britain in the middle of the 20th century. The left route will take them to a fairy world where sunlight flows like gold and Storytellers sculpt reality. Each of the three worlds can be seen for the first time from several different points of view. Readers can choose to continue reading along with their chosen character or can switch to another one out of the currently available chapters. They could also cross into another world. It is, however, more likely that they spend some time trying to find

their feet in the first piece of reality which they have come into contact with, and only after having found some firm ground underneath them would they explore the other reaches of the map in order to decide whether they want to dwell there longer.

Is this indeed the likelier scenario, though? *Arcadia* is fully deterministic content-wise, with regards to what unfolds in its fictional meta-universe. However, by offering this wealth of viewpoints, situated in three entirely different but connected worlds, each of them relatively confusing for the uninitiated reader, the (proto)text empowers readers to create their own rules for arranging that same (proto)text. One reader might choose a certain thread, and then at each narrative crossroads he or she might choose to leap across into another one; furthermore, the reader could devise a system that would automatically set priorities among the available choices. Or he or she could follow his or her intuition and preferences, but at some point the reader might wonder at the complex meta-construction of worlds and at the protostory, so difficult to traverse in full: “Why am I making these decisions, and not others? Perhaps I am missing the important pieces of information, and perhaps my preferences as a reader will not necessarily result in the most interesting story?”

Naturally, readers are able to read all of the chapters, but they have to pick the way they read them on their own. This means that their decisions, and at least to some extent chance, will determine what will become thematized and what horizons of possibilities will expand before others. When readers reach the fantasy world, maybe their cognitive repertoire will already have integrated models from the science-fictional world, and the interpretative horizon will unfold from the vantage point of the scientific method. Or maybe the reverse will happen? These metanarrative issues inevitably come to the fore in the process of reading, and any attentive reader will want to prepare at least partial solutions to them. For that to happen, he or she will be forced to work with the materials provided by the worlds and stories themselves.

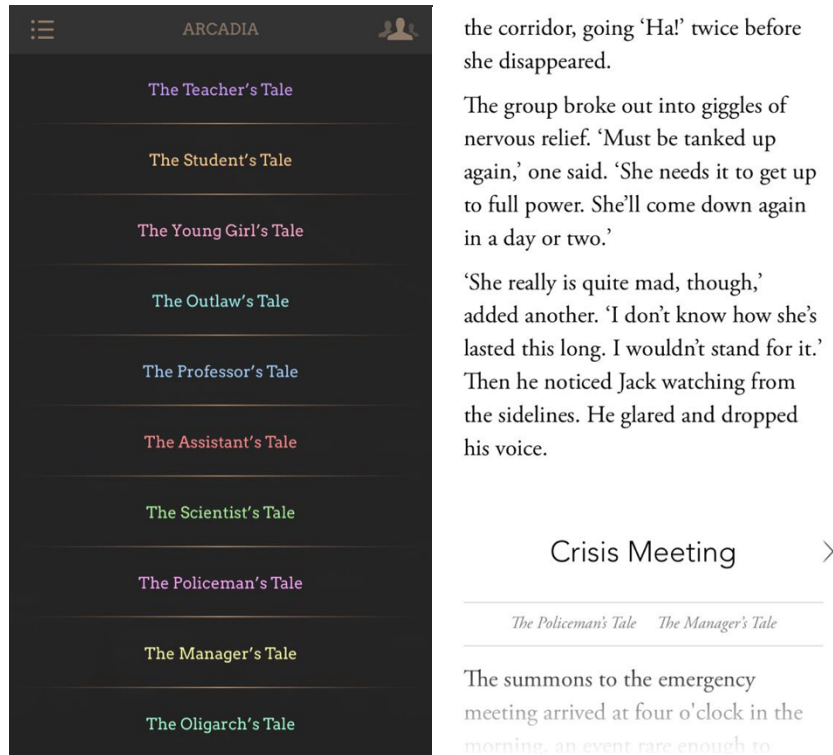


Figure 8: *Arcadia* offers a wealth of combinatorial possibilities.

Arcadia opens up at least three new worlds which enter into a dialogue with the given one: the science-fictional, the fantasy world, and the meta-world, which somehow combines all of them in a unitary construct. To them we can add also the version of Great Britain from the middle of the 20th century, but at least in the initial stages of hypothesis formation, there is no available information that this reality is markedly different from the given one. The trivalent discourse of science fiction goes through a second-order splitting, since at the outset it is impossible to think of the alternative worlds as a unity. Seen through the various viewpoints of the characters, these worlds are distinguished by their own laws and norms (i.e. modal systems), and some of the worlds even attempt to theorize the modal systems of the rest, or even to construct a general theory of worldbuilding and narrative. The gaps, in the sense of Iser, are even visually identifiable – on the interactive map in whose web of already explored spaces and temporal sequences some routes are inevitably left untrodden. The merging of two threads might send the reader backward in time, so that he or she would eventually reach that very same point, but from the other side, thus experiencing the fusion of horizons from both directions. The act of

reading, as conceptualized by Iser and Delany, is even described pseudoscientifically by the scientist of the 22nd century, intent on creating a worldbuilding machine.

The implied reader of *Arcadia*, collapsed into a median value out of the spectrum of possibilities, is not necessarily a literary theoretician, but is probably at least tempted by the idea of constructing his or her own imaginary worlds. The novel constitutes a kind of interactivity machine that coaxes the reader into becoming the text's accomplice and assuming responsibility for concretizing the protostory, for setting up the narrative vectors and at least partially assembling the narrative design, thus determining its procedural aspect. The narrative map is ever-present – as a cognitive map supporting memory and structuring attention (but also ergodically challenging them), as a temporal model of the separate worlds, and as a spatial model of the meta-world. The genre competences implicit in the various points of view (fantasy, science fiction, detective fiction), working within the dense reference network, shape the encyclopedic dimension of the text. Readers of J. R. R. Tolkien, C.S. Lewis, Ursula Le Guin, and viewers of *Doctor Who*, will feel at home in parts of the narrative space; some of these names even appear in the text itself.

Arcadia is an exemplar of *paidia*, of play as the inhabitation of roles. In this case, the roles include not only the ten characters of the novel, but also the narrator, the worldbuilder, and the reader herself, who cannot remain ignorant that she is being modeled by the act of reading – and to a certain extent, by her own self.

Conclusion

The research presented here is a first attempt at systematizing a wide array of terminology, theoretical models, and examples relevant to the study of interactive digital narratives. In its first part, it outlines a theoretical toolbox necessary for locating particular IDNs in an initial coordinate system. The second part contains readings of several IDNs chosen so as to provide a synoptic view of the various narrative shapes afforded by novel digital media and formats. From the vantage point of these readings – hybridized with play and with creative acts which veer ever closer to the activity of writing fiction – it can be concluded that if a field of

IDNs is in existence, it is exceptionally heterogeneous, still fragmented, spread out in different directions, and making use of a multitude of methods. Unearthing a common foundation beneath these methods, however, is a worthy project. If we can think of IDNs as incunabula, as protoforms, it would naturally follow from this that the theoretical instruments to analyze them do not exist as of yet. But if we concur with McLuhan (and with Iser and Delany, too) that the new media always derive their content from the old, those yet unavailable instruments should also be adapted from the old instruments. Bearing in mind the synthetic character of digital media and of their narrative artifacts, a similar degree of convergence can be expected between the theoretical apparatuses highlighted here.

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