Interacting with Words:

Development of a text-based game on language

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ABSTRACT

This paper describes the development process of an Interactive Fiction game focused on the theme of language. The paper includes a brief description of the history of the genre and its definitions, a discussion about its multiple variations and attributes, and an overview of some examples that handled similar subjects.

Then it considers some of the unique properties of the written language and examines language as both a shared and subjective relationship with reality. This is followed by a description of tools and methods adopted in the design process and how the development went — from initial research to the final concept. The results is then described, followed by the user test results and a critical evaluation. At the end, some concluding remarks are included together with possible future developments.
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1. INTRODUCTION

Interactive Fiction is among the earliest types of games: in a time when computer graphics were extremely limited, designers used only text to create intricate puzzles, rich scenarios and compelling characters. Without being able to use images, all they demanded from its players was their imagination. Despite its decline as a commercial product at the end of the 1980s the genre still thrived under a passionate community, continuing to create a diverse set of games ranging from space adventures to slice of life dramas, intricately political commentaries or just light hearted adventures. This resilience against other, more appealing competition, suggests something deeply unique in the medium.

Text is of course a tool for representing language, something so ordinary and ubiquitous in our daily life and yet, when examined closely, so extraordinary. One interesting aspect to be considered is how language impacts our perception of reality.

Taking this into consideration, the aim of this study is to create a game that explores mechanics which could only operate in the written medium while creating an experience that highlighting the impact of language in our perception of reality.

This research question can be complemented by the following subquestions:

- What are the unique qualities of the medium?
- How can language be incorporated as a theme within the game project?

In regard to its structure, this report will start by describing a brief story of Interactive Fiction, it's definition, some characteristics and theories involved. Then, it will discuss language and some of its key aspects. It will include a description of Design Methods followed by development of the Design Process and a description of the final result. Lastly, it will include an evaluation of the results and a brief conclusion.
2. INTERACTIVE FICTION

2.1 A brief history of Interactive Fiction

SOMEWHERE NEARBY IS COLOSSAL CAVE, WHERE OTHERS HAVE FOUND FORTUNES IN TREASURE AND GOLD, THOUGH IT IS RUMORED THAT SOME WHO ENTER ARE NEVER SEEN AGAIN. MAGIC IS SAID TO WORK IN THE CAVE. I WILL BE YOUR EYES AND HANDS. DIRECT ME WITH COMMANDS OF 1 OR 2 WORDS. (ERRORS, SUGGESTIONS, COMPLAINTS TO CROWTHER)

>| |

It was with this words that Adventure instructed its users for the first time. Created by Will Crowther and Don Woods in 1977 (based on an earlier version from Crowther in the previous year), Adventure is often regarded as the first piece of Interactive Fiction (Montfort, 2007). The blinking cursor at the of the prompt is an invitation for the player to type a command (a verb and a noun) which will prompt more answers from the program. During the game, the player must explore the eponymous cave — loosely based on a real location, the Mammoth Cave in Kentucky (Jerz, 2007) — while collecting treasures, navigating mazes, and avoiding traps and enemies. Released over the ARPANET, the game became hugely popular, generating the myth that the computer research in the United States was slowed down by 2 weeks (Lessard, 2013). Adventure not only inspired a new game genre — besides Interactive Fiction, this type of games are often referred as Text Adventures — but would also inspire the first academic work to discuss the cultural impact of videogames, the dissertation Interactive Fiction: The Computer Storygame ‘Adventure’ written in 1985 by Mary Ann Buckles (Scott, 2010) (Montfort, 2005).

The role-playing board game Dungeons & Dragons created by Gary Gygax was a clear inspiration: Aarseth in fact considers D&D “the oral predecessor to computerized, written, adventure games” (Aarseth, 1997). Other precursors of Interactive Fiction would include ELIZA, considered the first chatterbot created by Joseph Weizenbaum between 1964 and 1966 (Montfort, 2005). ELIZA was a program that would enable conversations with the computer using natural language: users would type phrases and according to certain keywords used and the context, the program would display a response (Weizenbaum, 1966).

With the success of Adventure, it didn’t took long for the arise of similar games. In fact, Montfort (2005) notes that creating a similar program became “almost as popular an activity as was playing Adventure”. The most famous (and equally influential) of those was Zork, created by Tim Anderson, Marc Blank, Bruce Daniels, and Dave Lebling between 1977 and 1979. It also consisted of exploring an underground environment, but presented with a better world model and parser (Aarseth, 1997). In 1978, Scott Adams and his company Adventure International would release Adventureland, the first interactive fiction game to be available for a microcomputer and to be distributed commercially (Aarseth, 1997) (Montfort, 2005).

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1 Recent discoveries point out that the tile actually goes to Wander, created by Peter Langston in 1974, and which the source code was found recently (Hope, 2015). But due to its obscurity, it’s evident that the game in not nearly influential as Adventure is.
But no other company would be as influential to the genre as Infocom, who during the 80s released some of the most influential and ambitious works in the genre such as Zork (now released separately as a trilogy,) The Hitchhiker’s Guide to the Galaxy by Douglas Adams and Steve Meretzky, Infidel by Patricia Fogleman and Michael Berlyn, A Mind Forever Voyaging by Steve Meretzky and Trinity by Brian Moriarty (ibid.).

By the end of the 80s, Interactive Fiction, as a commercial endeavor, declined in favor of games with more sophisticated graphical interfaces (Aarseth, 1997). At the same time, though, new IF development tools started to arise. One was TADS (Text Adventure Development System developed by Mike Roberts and released in 1987 (Montfort, 2007). Another was Inform, created by Graham Nelson in 1993 (Nelson, 2001). Those tools fostered many hobbyist developers and players who would interact through Usenet groups, notably rec.arts.int-fiction focused on authoring games and rec.games.int-fiction focused on playing them. Many of these discussions would form the base for theory later compiled at the IF Theory Reader (Jackson-Mead & Wheeler, 2011). These groups also maintained the IF Archive, an extensive database of available titles and the annual IF Competition, who provides a space for shorter games, playable in less than 2 hours (Montfort, 2007). Notable games from this era includes Spider & Web by Andrew Plotkin, Rameses by Stephen Bond, Photopia by Adam Cadre and Galatea by Emily Short.

More recently one particular tool became prominent in the IF scene: leading what has been called the Twine Revolution (Ellison, 2013). Created in 2009 by IF writer Chris Klimas, Twine is a tool for creating hyperlink works that can be exported as HTML pages, being playable in any internet browser. But it was the game designer Anna Anthropy efforts that brought attention (Friedhoff, 2013). By requiring little technical skills from it’s creator, Anthropy encouraged the use of Twine by marginalized groups that otherwise wouldn’t be involved in game creation (Anthropy, 2012). According to Friedhoff (2013), Twine became the “tool of choice for people who want to make games about topics like marginalization, discrimination, disempowerment, mental health, and LGBTQ issues.” Some noteworthy Twine games includes howling dogs by Porpentine and Depression Quest, by Zoë Quinn and Patrick Lindsey.

Other companies, such as Failbetter an Inkle started to develop successfully for the mobile market with games such as Fallen London and 80 Days, respectively. The latter in particular was received with much critical acclaim, being elected the Best Video Game of 20114 by the TIME magazine (Peckham, 2014) and receiving four BAFTA nominations in 2015, for Best British Game, Best Story, Best Mobile Game and Game (Innovation Nominees Announced for the British Academy Games Awards in 2015). Veteran IF writer Andrew Plotkin managed to raise $24,000 through crowdfunding platform Kickstarter for his “1980-style, old-fashioned text game” Hadean Lands (Plotkin, 2010).

And there are new IF games that are still pushing the boundaries of what’s possible within the genre. Bruno Dias’ Voyageur combines text-based mechanics with procedurally generated content. The Ice Bound Concordance by Aaron Reed, Jacob Garbe and N.J apostol is an interactive narrative game and book, employing Augmented Reality features. And event[0] by Ocelot Society is an exploration game where the player interacts with a chatbot like interface.

Lastly, a significant step towards the support of the Interactive Fiction technological infrastructure was the creation of the non-profit Interactive Fiction Technology Foundation (IFTF) in 2016. With the mission of “ensure the ongoing maintenance, improvement, and preservation of the tools and services crucial to the creation and distribution of interactive fiction, as well as the development of new projects to foster the continued growth of this art form.” The IFTF is also currently responsible for the maintenance of the IFComp (Interactive Fiction Technology Foundation, 2017).
2.2 Defining Interactive Fiction

Defining Interactive Fiction is not an easy task: sometimes they are referred as text adventure or text games (Montfort, 2005). Aarseth (2007) refers to them as Adventure Games. Some will include under the term other types of media, such as hypertext fiction, cinematic action games or gamebooks (Douglass, 2007). What most of these terms and media categories have in common is that they can be classified under the term ergodic literature. Coined by Espen Aarseth (1997), ergodic literature refers to a text that requires “nontrivial effort from the reader to traverse the text”. This includes not only electronic media (a division that Aarseth considers “arbitrary and ahistorical”) but also works of non-digital literature such as the ancient text I Ching or the novel Hopscotch, by Julio Cortázar (ibid.).

The term Interactive Fiction while created by Robert Lafore (Mahler, 2011) was popularized during the 80s by Infocom, who included the name in the packaging of all their games (Montfort, 2005). Thus, for most of the time, Interactive Fiction referred specifically to games that involved interaction by typing commands in the parser. Other types of games such as Choose your own Adventure (CYOA) being considered something distinct (Mahler, 2011). And by the end of the 80s, a different type of ergodic literature started to emerge: hypertext fiction (Bernstein, 1999). By using narratives with hypertext, a strategy for organizing textual fragments and connecting them with links, hypertext fiction became popular with works such as 1987 afternoon, a story, by Michael Joyce.

But during the 90s, continuous experiments with the parser started to blur the lines between these three types of ergodic literature (Klimas, 2014). As Douglass (2007) states: “IF is not hypertext fiction, except of course when it is hypertext fiction.” The result is a gradual broadening of what types of games should be considered Interactive Fiction, but not without some tensions (Porpentine, 2012) (Muckenhaupt, 2013) (Klimas, 2014). More recently the genre seems to have accepted the expansion of the term — and the change of game types appearing in competitions seems to be a strong evidence (Klimas, 2014). Perhaps the most telling sign of the consolidation of this shift is the definition by the IFTF (2017):

“The IFTF defines interactive fiction—IF, for short—as a kind of video game where the player’s interactions primarily involve text. Under this broad definition, we can find decades of IF work taking many interesting and innovative forms.”

2.3 Interactive Fiction Characteristics

2.3.2 Types of Interaction

This expansion of the term Interactive Fiction also implies in a wider variety of types of interaction, each entailing different types of experiences. Short (2016) describes some of them under the following criteria:

- **Effort**
  Refers to the amount of work that the player must do to interact.

- **Expressivity**
  How much information a player can insert into a single action. Typing words have more information than clicking on a link, thus being more expressive.

- **Ambiguity**
  How clear is for the player the result of his action. Typing commands have no ambiguity while links can obfuscate their result depending on how they are worded.

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2 Curiously, although it used a command line for the interaction, the parser from Lafore’s games was so primitive that the games would be better described as Choose your own Adventure (Montfort, 2005) (Mahler, 2011).
- **Discoverability**
  How evident the possible interactions are to the player. Hyperlinks are very discoverable, unless disguised while typing commands are less discoverable.

Short (ibid.) also includes two extra categories **Pressure** and **Embodiment**, but they only seem to apply to a narrow variety of IF. Next there are some types of IF and how the qualities apply to them:

- **Hypertext (Twine)**
  Links embedded directly on the text, highly discoverable with moderate to high ambiguity (depending on how the link are labeled)

- **Dragged commands (Texture)**
  Interface where player must drag the verbs to the highlighted nouns in order to interact with the game. Discoverable, since all actions are already listed; expressive, considering the multiple word combinations, and require a little of effort.

- **Choice based narrative (Twine, Choicescr ipt, CYOA, inkl...)**
  Interface where the text is presented and the player is offered a list of possible actions to select. Highly discoverable.

- **Parser based (Inform 7, Quest, etc.)**
  The traditional Interactive Fiction, where the player types commands in the parser. Highly expressive and with moderate effort.

This classification is not fixed, of course — all those values can change depending on how the game is designed. But they offer a good starting point depending on the game requirements.

Again, other types of interaction described by Short but not included in this report: interactions that are also timed (e.g. timed hypertext, timed choice based, etc.), choice based with multiple nodes, quick time events, typing keywords (but without the parser), typing with natural language (namely, chatbots), moving through textual layout, moving through 2D and 3D world, voice selection of keywords, specialist props and whole-body engagement.

2.4 Canonical examples and references
Here are some examples of Interactive Fiction games that use language as either a game mechanic or as a distinct method of storytelling. It is noticeable that all examples presented are parser-based games: and so far the research indicates that there aren’t many examples of other types of IF engaging with the theme of language.

**The Gostak**
Created by Carl Muckenhoupt in 2001, the Gostak is inspired by a phrase coined by Andrew Ingraham to demonstrate how is possible to infer meaning from a sentence solely through the syntax, even if the referents are unknow. The opening of the text reads:

```
Finally, here you are. At the delcot of tondam, where dosesh deave. But the
doshery lutt is crenned with glauds. Glauds! How rorm it would be to pell back
to the bewl and distunk them, distunk the whole delcot, let the drokes uncren
them. But you are the gostak. The gostak distims the dosesh. And no glaud will
vorl them from you.
```

At no moment of the game the words get a translation or explanation. So instead of deciphering what is a Gostak, what is a dash or what verb distim, the player must learn the relationship between them —
In this case, *doshes* are something that are *distimed* by the Gostak. Prior knowledge about genre
conventions might be necessary to infer certain frequent commands, such as “examine” or “go north”
or responses from the game itself.

**For a Change**
Dan Schmidt’s 1999 *For a Change* also uses a distinct style to present an exotic scenario. Here’s a transcript
of a certain scene:

**Under the High Wall (on the resting)**
Sweetness fills the shade of the High Wall to your east. Under this sweetness
lies a small expanse of fod. A mobile releases mildly to the west; far in that
direction a tower proudly plants itself, while the ground rises more slowly to
the south and relaxes to the north.

Spread on the resting is a guidebook.

Sleep gradually departs from your eyes. A small stone has been insinuated into
your hand.

Different from The Gostak, there is nothing *alien* per se in the objects or words described. Instead, *how*
they are employed is part of the logic behind the world. Part of the challenge in this case is
learning this logic and interacting accordingly. So an object named *sONGLANTERN* might require the
player to *sing* as a way of operating the device. As an auxiliary mechanic, the player is given a
Guidebook that contain relevant information.

**Counterfeit Monkey**
If in the previous examples the syntax or the style were the main feature of the game, in Counterfeit
Monkey, created by Emily Short in 2012, the main unit of interaction are words. The setting and
premise are the following:

Anglophone Atlantis has been an independent nation since an April day in 1822,
when a well-aimed shot from their depluralizing cannon reduced the British
colonizing fleet to one ship.

Since then, Atlantis has been the world’s greatest center for linguistic
manipulation, designing letter inserters, word synthesizers, the diminutive
affixer, and a host of other tools for converting one thing to another.
Inventors worldwide pay heavily for that technology, which is where a smuggler
and industrial espionage agent such as yourself can really clean up.

Unfortunately, the Bureau of Orthography has taken a serious interest in your
activities lately. Your face has been recorded and your cover is blown.

Your remaining assets: about eight more hours of a national holiday that’s
spreading the police thin; the most inconvenient damn disguise you’ve ever
worn in your life; and one full-alphabet letter remover.

Good luck getting off the island.

The *full-alphabet remover* is the main tool of interaction: the player can select a letter from the
alphabet, point at some object and remove said letter from the name of the object. For example: if
the player sets the gun to the letter K and shoots a *monkey*, it will literally turn the animal into *money*.
With this mechanic in hands the user can solve puzzles which, by introducing different letter
manipulating tools, gets more and more complex.
3. LANGUAGE AND TEXT

3.1 On text and words

When describing advantages of Interactive Fiction, it is not unusual for its proponents to mention the flexibility of the text, especially for its low cost (Plotkin, 2010) (Porpentine, 2012). It is no surprise that many works of IF are made by only one person. And while that might the fact, Emily Short points out that the benefits of text goes beyond convenience.

"Text is not just cheap. It’s not just the medium you use when you have no resources and no high-end software. It’s a very powerful medium for communicating nuance, viewpoint, interiority, motivation, the experience of the outsider. It’s an artistic medium with its own beauties. And because language is all around us, embodying cultural norms and politics, word-mechanics can address big issues." (Short, 2014)

Indeed many qualities that Short mention seems to be connected to abstracts concepts — viewpoint, interiority, motivation — all ideas that would be much more difficult to convey in visual terms, the major mode of expression in games. Doumont (2002) states that visual communication “lack the accuracy that words are endowed with through conventional association of meaning” and that “words, in a sense, are worth a thousand pictures. They can express abstract concepts unambiguously and concisely, even if not intuitively.” This reveals an entire dimension for thematic explorations unique to the genre, perhaps similar to literary techniques such as stream of consciousness.

Meanwhile, when considering possible interactions, the words themselves might be promising elements for exploration. Consider how Wittgenstein conceptualize words:

"Think of the tools on a tool-box: there might be a hammer, pliers, a saw, a screwdriver, a rule, a glue-pot, nails and screws. - The functions of words are as diverse as the functions of these objects." (Wittgenstein, 1953)

For instance, Borghi & Cimatti (2009) argue that words can go beyond just referring indirectly to things and “must be intended as things/tools of direct experience.” This is similar to Austin’s concept of performative utterance where saying a sentence such as “I give and bequeath my watch to my brother” is also the performance of an action. (Austin, 1962). These examples suggests that words themselves can be an opening for conceptual explorations.

3.2 Language and Reality

Language usually is understood as system of verbal signs (written or spoken) that enables us to communicate with each other (Hervey, 1957). While correct, this understanding downplays the impact that language has in our understanding of reality. It can affect our perception of time (Bylund & Athanasopoulos, 2017) or colors (Winawer et al, 2007), for example.

For language can be understood as an arbitrary categorization of reality — the exact amount of shades of blue inside a spectrum, for example. With a lack of “objective criteria”, it is inevitable that languages will select different categories, building different interpretations of reality (Chandler, 2007). This is very similar to the conclusions that Sapir:

"The fact of the matter is that the 'real world' is to a large extent unconsciously built up on the language habits of the group. No two languages are ever sufficiently similar to be considered as representing the same social reality. The worlds in which different societies live are distinct worlds, not merely the same world with different labels attached." (Sapir, 1929)
In case of Sapir, it is important to note the emphasis on lexical resources (the set of words) of the language for the categorization of reality. (Lamarque, 1997). With all this in mind it is not surprising that, when describing the importance of studying semiotics (the study of signs), Chandler concludes:

"Studying semiotics can assist us to become more aware of reality as a construction and of the roles played by ourselves and others in constructing it. It can help us to realize that information or meaning is not 'contained' in the world or in books, computers or audio-visual media. Meaning is not 'transmitted' to us - we actively create it according to a complex interplay of codes or conventions of which we are normally unaware. Becoming aware of such codes is both inherently fascinating and intellectually empowering." (Chandler, 2007)
4. METHODS

4.1 Double Diamond

According to the Design Council (2007), there is a great variety of design projects and ways of managing them. By analyzing 11 leading global companies they found several parallels between their processes. Based on this collected data, the Design Council developed in 2005 the Double Diamond diagram, a “simple graphical way of describing the design process” (ibid.). Divided into four phases, each describes a “mode of thinking” during the project development: Discover, Define, Develop and Deliver.

Those phases are mapped in two alternating categories, divergent and convergent. The Discovery is the first divergent stage, where the initial idea and inspirations are established. This involves market, design or technology research and the identification of the user needs. Being in the divergent mindset also means that the perspectives must be kept wide open, without rejecting possibilities promptly. Next, the material collected is reviewed and organized. Being a convergent mindset, the Defining stage is where choices are made, based on a synthesis of the previous findings. The result of this process is a description of the design concepts, possible technologies to be employed and themes, aesthetics, and design requirements. Alternating again to a divergent attitude, the Development process is where design alternatives are proposed, developed and tested. This ranges from ideation to user testing. Finally, in the Deliver stage, the solutions are again synthesized, with the implementation of the design and the delivery of the final product. This usually involves activities such as final testing, approval, production, launch, evaluation, and further feedback.

The biggest advantages of the Double Diamond method is its flexibility and scope, being easily adapted to multiple projects categories. It is less concerned with fixed steps or activities and more interested in specific mindsets during the project development.

4.2 Interactive Fiction Methods

When discussing specific methods for creating Interactive Fiction, Short (2009) suggests the following approach method:

“Write the through-line first: come up with your setting and any prototype coding you need to do, and maybe make a list of puzzles/elements that you’d like to see in the finished game. Then create a
simple outline design of the game and implement it so that you have something you can play (even if very quickly) from a beginning to the end, and which contains the most critical turning points of the plot. With that skeleton in place, consider what you like and dislike about the structure; you complicate the game incrementally, fleshing pieces out with new puzzles or improving on the simple puzzles/conversations that you used to start with.”

The creation of a simple outline (with the setting and puzzle ideas roughly defined and implemented) is close to what would be referred as the alpha in software development (Christensson, 2013). This would include a mapping of possible mechanical possibilities, further narrowed down to a rough Game Design Document. The mechanics and design elements then inform other aspects of the game, such as story and overall presentation. From this step building the design process goes towards a more fleshed-out prototype, ready to be tested by other users — what could be referred as a beta stage (Christensson, 2013). According to Short, the great advantage of this approach is having a complete game as early as possible, eliminating some uncertainties about directions during development. This process also gives equal weight to all parts of the game, meaning that the quality and presentation is consistent from beginning to end. She also emphasizes the flexibility from this method, where detecting issues and addressing them is less complicated. Lastly, this process allows the development to stop at any given moment to give room for testing and release.

4.3 Story Structure

![Diagram exemplifying a very basic structure](image)

Figure 5. Diagram exemplifying a very basic structure, named Time Cave (Ashwell, 2015)

Considering that most of Interactive Fiction relies heavily on branching narratives, it is natural that they develop certain formats. By analyzing choice based story structures, Sam Kabo Ashwell (2015) pointed out to some common design patterns found among them. Those suggest possible formats that the stories can assume and how they impact the player experience. Ashwell emphasizes that the patterns are not exclusive (games can adapt multiple patterns) and the list is not exhaustive. Nonetheless, they are useful not only as a starting point but also as a potential guideline for the game overall aesthetic.

4.4 User Testing

During development, the user involvement would take part mainly during two stages: first, the proper Development, where multiple prototype iterations can be assessed by the user, their feedback informing directly the subsequent design steps. This will be executed in a more open ended process, preferably in live sessions where the players can express their response immediately.

Second, a more structured evaluation, using a questionnaire with open-ended questions. This includes inquiries relating to the interaction and usability, and the subjective story experience. One benefit from
questionnaires is the efficiency in applying and analyzing — if kept short (Laugwitz et al, 2008). Albeit less comprehensive and detailed, they allow for a wider user reach.

4.5 Ethical Concerns

No part of the user participation or evaluation uses any procedure that could potentially affect them physically or psychologically, nor involves any other personal or sensitive data. During the user evaluation phase, the participants are clearly informed about the nature and the research goals, with a guarantee that all data collected will be kept anonymous.

4.6 Project plan

The overall process and activities can be seen described in the diagram below. It is also important to note that, while in the diagram all the activities are clearly separated, they seldom advance accordingly, Therefore, overlaps and retreats are to be expected.

![Figure 6. Design Process Diagram](image)
5. DESIGN PROCESS

5.1 Discover

The discovery phase included the research presented and discussed in chapters 2-3 — and the technical aspects such as design tools and types of interaction presented, their advantages and disadvantages. Together, both inform the next step, which is a list of Design Requirements that should be incorporated into the final project.

5.1.1 Practical aspects

The tools considered for the project were Twine and inklewriter (for hypertext and choice based games), Quest and Inform 7 (for parser-based games) and Texture (hybrid). All five are distributed for free, offer an adequate amount of support and documentation, and don’t require advanced programming skills.

Accessibility and challenge
There is a certain tension between accessibility and difficulty: parser games are certainly the most challenging, requiring from the user a certain knowledge of genre conventions and a different mindset than most conventional games — but can also be the most rewarding, offering genuine eureka moments. Meanwhile, hypertext and choice based tools, are the most accessible, requiring at the most basic level, a simple click on links — but sacrificing both challenge and player expression. Texture, being a hybrid, gaps this divide, allowing for a little bit of challenge without requiring any genre repertoire.

Development resources and convenience
In terms of development, most choice-based and hybrid requires little technical knowledge for their most basic functions, being targeted instead to writers with little technical skills. Though both Quest and Inform 7 try to avoid high-level programming (the first by using a more advanced Graphical User Interface and the second by adopting a programming syntax close to natural language), they still present a higher learning curve. The trade-off from approach is evident though: more complexity usually comes with more design possibilities or, at least, ease of implementation. For instance, Inform 7 has world simulation tools readily available, requiring little effort to implement objects hierarchies or spatial relationships. Meanwhile, accomplishing something more complex than the basic function of connecting passages in Twine can become significantly more complicated and laborious.

Distribution
Another important aspect to be considered is means of distribution: nowadays most Interactive Fiction is played online on the browser, instead of being distributed as downloadable files. Quest and Twine generate HTML files, allowing for them to be hosted anywhere for online play — with Quest also having a venue for public hosting. Inform 7 games usually require an interpreter software from the player to run, albeit other programs such as Parchment, can be used for online access — sometimes sacrificing performance. Meanwhile, inklewriter and Texture, like Quest, offer their own sites for publishing the games online.

Look and feel
In terms of presentation, Twine and Quest are one the most flexible engines: both use CSS and Javascript, offering highly customizable layouts — while also allowing the use of images, sounds and animation. Meanwhile, inklewriter and Texture have a standard layout that, whilst attractive and efficient, don’t have big customization options, the result is all games having a similar look and feel. Lastly, Inform 7 offers the least standard variety, and while interface elements such as maps and images are possible, they often require additional software and much more effort.
5.2 Define

5.2.1 Themes and aesthetics

Language is a complex and broad subject, with multiple social and philosophical implications. Also notable is the set of unique characteristics of written language — such as the facility in representing abstract concepts. For this project in specific, the connection between language and reality is particularly promising: there is a tension between the individual and subjective understanding of language and the shared experiences and assumptions required for communication to work. Considering the themes, some qualities aimed for the experience include: Thought provoking, reflective, intriguing and original. Therefore elements of player exploration and expression were prioritized instead of emphasis in challenges or plot-heavy narratives.

By adopting these parameters, two commonly expected elements of interactive fiction were partially discarded: puzzles and choices and consequences. Puzzles can be a double-edged sword: when well designed they can increase player engagement, allow for player expression and create a sense of accomplishment. Bad puzzles in the other hand may offer unnecessary roadblocks, generating frustration and potentially gating the player from progress — sometimes permanently. Branching narratives, on the other hand, can be a powerful mode of player expression and story exploration. At worst, if choices are too broad or ambiguous, they can be perceived as arbitrary or meaningless. Other (subtler) complication is that by presenting choices that are “more correct” or superior than others, they neutralize player expression — and play starts to be about choosing the “correct” path instead of exploration. On the other side, if all paths are equally valid, players might feel compelled to just replay the game over and over until all paths are exhausted, diminishing the impact (or need) of the interaction.

5.2.2 Design Requirements

By considering the technical aspects, time constraints and themes, the Design Requirements can summarized by the following list:

- Accessible for players
- Easy to develop and distribute
- Attractive presentation
- Focus on exploration and experimentation
- Tough provoking, reflective, original

5.2.3 Other

In light of this specifications, the engine chosen was Twine: it is accessible for players, easy to develop, quick to prototype and it is highly customizable in the presentation. Finally, it’s the one where the system most resonates with the theme: as Short (2014) states: “Words are the fundamental unit of Twine.” However, Twine also presents a set of challenges, the most critical being the potential lack of mechanical depth and expressivity from the player.
Lastly, the Design Requirements also points out to possible Story Structures to adapt, namely: the Gauntlet and Loop and Growth. Ashwell (2015). The first is represented with a linear thread and multiple “prunes” that either lead to a dead end or back to the main story. It is commonly used for works “heavily dependent on reflective or rhetorical choice”, is easy to implement and ensures that “most players will see most of the important content” (ibid.). The second, which includes a variation named spoke and hub, also maintains a main thread that loops itself but, depending of variable states, can open or close new branches. This structure, which can co-exist with other types, usually involves the player “following routine activities in a familiar space, engaged in time-travel, or performing tasks at a certain level of abstraction” (ibid.).
5.3 Develop

With the research and Design Requirements in hand, the next step involved turning for the divergent mode again: now for the prototype development and user testing. During this stage, three users provided constant feedback: one through remote communication, the other by live sessions and the third by a combination of both. The communication proceeded in a more dynamic and open approach: sometimes, minutes after the feedback, a new prototype could be sent with new changes already implemented. This process was constant through the entire phase.

![Prototype with the mechanic of creating words](image)

A very useful feature from Twine is the ability to install *macros*, pieces of code that can add interactive features to the game. One of these macros is called "Cycling Links", which creates links that when clicked, replace its contents instead of the standard result, which is leading the player to a new passage. Additionally, the macro also tracks the content changed as a variable, opening up new mechanic openings — a code that the player needed to input correctly, for example. The first prototype involved different words which the player could recombine the syllables, generating new words. The only criteria for the syllable selection as having a variety of letters and avoiding awkward letter combinations, usually by alternating between vowels and consonants. This feature was expanded to manipulating entire categories of words, allowing also for the creation of phrases.

![Prototype with the mechanic of creating phrases](image)

This feature proved to be very effective during testing, especially the word creation. By giving bits of letters instead of whole words, the player enters a more playful mode, since the words themselves don’t convey any meaning, the player is free to choose something of his own liking. After all, the words are his creation, and a simple set of syllables allow for thousands of combinations beyond what the author could expect. One can argue that giving the player the ability to type words would allow for even more player expression — which is true. But then it’s evident that the user would type words or names that he already know: its own choice, for sure, but not his own *invention*.

One technical issue from the macro is that the first version used didn’t allowed variables to be included inside the cycling link — in other words, a word created by the player couldn’t be included further in the creation of the phrase. This issue revealed troublesome aspect of Twine: its fragmented documentation.
Aside from having two different versions (with it’s outdated variant having far more related information), Twine uses three different story formats with different capabilities and programming syntax — making the troubleshooting of some simple issues in a far more difficult task. Fortunately, a different version of the same macro (and the change for the 2.1.3 Twine version and the Harlowe story format) allowed for variables inside cycling links, albeit with certain limitations.

At this point, ideas for a potential story started to emerge — in fact, when describing different types of systems, Short (2014) notes that “a well-defined mechanic becomes a writing prompt. It shapes the kind and amount of content we need to write.” And indeed, the results from manipulating different names resonated closely the title of a short story from Argentinian writer Jorge Luis Borges: “Tlön, Uqbar, Orbis Tertius”.

Told in the first-person, while emulating the style of an an essay, Borges describes the discovery of a fictional country in a pirated encyclopedia — the leads to the discovery of an entire planet complete with descriptions of its philosophy, religion and language. By the end of the story, the narrator concludes that this fictional world — created by a group of conspirators — is starting to manifest in the real world. Elements borrowed directly from the story started to shape the narrative: a late dinner with a friend, the reminiscence of a mysterious name, books with contradictory contents and a mysterious ancient civilization. Additionally, parts of the short story were used as placeholders texts to convey mood and style.

Figure 10. Further layout changes established improved readability and better distinction among interactive elements

In the prototype, additional experiments were made: some involved the creation of concepts with qualities attached to them — at some point, a tooltip was considered for aiding players remembering qualities associated with each invented word. Others consisted of creating different words and establishing relationship between them.
The following day, Bolívar called you from Buenos Aires. He told you he had before him the article on *Ipbiter*, in volume XLVI of the encyclopedia. The heresiarch’s name was not forthcoming, but there was a note on his doctrine, formulated in words almost identical to those he had repeated: the heresiarch had declared that *mirrors* harbour something *chatimous* about them.

One of the users commented positively on the additional layer of interaction when establishing relationship between words — mentioning the process of evaluating if the word “sounds right” according to the context. Others pointed out that although they were able it create words, it didn’t affect the remaining text or any part of the story significantly.

Other suggestions included associating certain syllables to specific attributes, coupling the word creation mechanic directly into qualities — and making certain passages only available according to determined combinations. The issue with associating syllables directly to attributes is that it leads to similar design issues of heavy branched narratives: the sacrifice of player expression in favor of optimal outcome. In general, it was tempting to include more *game like* elements such as stats and puzzles to this mechanic.

Another comment from one of the users proposed the possibility of having the text itself reacting according to the player selected syllables. This imposes the challenge of adding multiple variations depending on the user choices. This results in the exponential growth of the required amount of text — no doubt the reason why many games only feature heavy branching close to their end. Even so, small parts of the text did get implemented to react according to certain player choices, namely when the player describes the characteristic of their invented word. This characteristic was again borrowed from Borges, where he describes one of the hemisphere of the planet having a language that only uses verbs and the other having a language that only uses adjectives.

---

The article, regarding the dogmatic doctrine of the realm, stated:

“The legislators of *Ipbiter* declared that the basic unit of thought is the verb. Therefore, everything in *Tremol* must be defined by what it does or states. A road, for instance, is a walker and a crosser while a mirror is a reflector.”

---

*Figure 11. Layout with a tooltip appearing when the mouse hovered over the marked word*

*Figure 12. One of the few examples of the text reacting according to the player choices*
Close to the end of the game story, the motivation behind the mysterious civilization is revealed to be a search for an idealized language, a narrative element inspired in parts by the short story *City of Glass*, from Paul Auster).

Overall, this *alpha* development stage was the most labor intensive — even more than expected. The process involved a great deal of trial and error — there were far more discarded design alternatives than those adopted in the final design. This also required many write and rewrites which, together with the use of placeholder text, could risk an inconsistent writing style. Although the establishing of an initial mechanic was very successful, it was difficult to apply in a fully satisfying manner. Time constraints prevented further design explorations, leading ultimately to a selection process of which elements should be included and which should be rejected — the criteria being based in the Design Requirements list.
5.4 Deliver

Figure 13. The overall story structure as displayed in Twine interface. Most of the passages follow a linear fashion, with two passages serving as hubs.

During the last stage of development, the final convergent phase, all the interactive elements were put in place — with the majority of the work spent in writing the remaining story while removing any placeholder text. Refinements were made towards the flow of the narrative, with consideration towards the amount of information displayed in each passage.

The article, regarding the dogmatic doctrine of the city, stated:

"The legislators of Lpibter declared that the basic unit of thought is the verb. Therefore, everything in Chatim must be defined by what it does or states. A road, for instance, is a walker and a crosser while a mirror is a reflector."

Figure 14. The color scheme chosen for the final version suggests an old book, with the accents color suggesting common ink pen colors.
Other concerns included choosing a proper color scheme, with a careful distinction between words that can be clicked and words that are simply a result of the player choices. Another important issue was the performance of the game in different operational systems, browsers and devices. Many passages used an Unicode symbol to mark down when a passage would change. This turned out to be a quite troublesome issue: some browsers would render the symbol wrong, with an error glyph or by rendering an emoji with a totally different graphic style.

![Figure 15. Different behaviours for Unicode characters in various environments.](image)

Albeit not a critical issue — it was solved by testing different symbols — it showcased the importance of constant testing and exposed an situation that should’ve been considered from the beginning: the different contexts of use. The (now discarded) tooltip feature being another example: since it requires a mouse over, it would be impossible to implement properly on mobile devices.

The last elements to be added in the game were the title screen and the credits. The title is simply an allusion to the Borges short story: three different words with interesting sounding names: *Hexteria*, *Skaxis* and *Qiameth*. Compared to the previous stages, finishing the beta version was relatively straightforward, leaving the game ready to be exported and evaluated by the users.
6. MAIN RESULTS AND FINAL DESIGN

To describe the final result, the best way is to showcase the game step by step — the full source code can be also found in Appendix 1. The title screen is presented in an interactive manner, all three words are only revealed by clicking on them. The other circular symbol is used to indicate that the passage will change:

![Figure 16. Title Screen](image1)

All this took place four or five years ago.

![Figure 17. Establishing the time frame](image2)
The title is followed by a very brief passage, establishing the time frame and the first-person perspective. This is succeeded by the initial premise, with suggestions of the narration voice and themes:

After a late dinner with my friend Bolívar Escobar, we'd lingered over a discussion on Wittgensteinian language-games, conjecturing an argot with so many subtle variations that multiple groups could use concurrently — recognizing their shared lexicon — but wielding completely different understandings.

Figure 18. Establishing the scene and themes

In the next passage the character is reminded of a strange language and the player is invited to create its first word — he'll have a chance to reconsider this first choice further in the story:

It had this peculiar language called

\[Xyz\]

which could only represent concepts by employing names

Figure 19. Creating the first name and choosing an attribute
The following passage serves for three purposes: advancing the narrative, showing the player that his invented words are highlighted with a different color and allow the code to combine the three variable chosen by the player into a single one. Due to the way Twine works, variables are only set when the passage is loaded, thus requiring them to be declared in a new passage.

I tried to remember the name of this urbs, but other than this Xyzz language, nothing else came to my mind. Alas, unsuccessful in the attempts of recollection, I ended the discussion and decided to go home. On the following weeks, agitated dreams kept me from sleeping.

Figure 20. Seeing the name appearing in the text

At this moment in the story, the narrator is trying to remember the name of the city that employed the language the player just named. After having a dream, in which he remembers about the forgotten society and the player defines its name, he finds a book with the passage:

The article, regarding the dogmatic doctrine of the city, stated:

"The legislators of Asakm declared that the basic unit of thought is the name. Therefore everything in Xyzz will always have an unique name. Hence, a coin given has a different name than a coin received."

About that civilization / About that language

Figure 21. Here the player can see all choices he made so far. This is also an opportunity to go back to the previous passage and change the words and attributes
When calling his colleague to tell about the discovery, the narrator learns that his friend also found about the city in a copy of the same book consulted by him. His discovery, however, contains some slight variations:

Then, he explained about the citizens from

As·an·m

and their quaint language:

X·en·sy

Figure 22. To convey the similarity between the words in this case, the player is only able to interact with one syllable

When noticing the differences, the narrator questions his friend. The player can choose about how to question the friend, deciding if this is done by means of the diction or of that of the content. While the following passages have slight differences, they don’t change the course of the plot.

"Asanm" I repeated to myself, puzzled. But I was even more surprised when he corrected me and described Xensy as a language solely shaped upon the use of actions.

Ask about actions / Ask about his diction

Figure 23. The other attribute for the language is randomized between the options that the player didn’t use before
Both confirm that they are using the same book edition and decide to compare the passages. The player is back to the previous passage with the city description, but now with more text:

Days later Escobar was at my office, the volume VI of the encyclopaedia under his arms. We compared the texts:

"The legislators of Asakm declared that the basic unit of thought is the name. Therefore everything in Xyzzy will always have an unique name. Hence, a coin given has a different name than a coin received."

"The legislators of Asanm declared that the basic unit of thought is the verb. Therefore, everything in Xensy must be defined by what it does or states. A road, for instance, is a walker and a crosster while a mirror is a reflector."

**Figure 24.** This passage makes clear the differences between names and attributes available

The characters disregard the differences between the books and decides to move on. Months later, the protagonist finds himself in possession of a new book (which he can aptly name) and realizes that in it are mentioned the previously created names:

Somehow, the unusual word allured me. The title page complemented:

* A First Atlas of Qzirev. Volume XI. On *Asirm, Asakm, Asanm* and so forth... *

I was bewildered.

**Figure 25.** If the player pays attention, he’ll also note that a third name is generated, based on his previous choices.
This leads to a hub passage containing a key passage in a “foreign language” describing the civilization that hosted the different cities. This text is followed by three symbols:

A colossal empire comprised of numerous cities, with infinite names / Rhoat alhibarllrs davadod rhomsonvos iccetdalg re rhost noxacin ztodanocraels / Znkox ojous roqk gt kdvxkyyout ul znkox kdozykktik

Among the ordinary sections on geography, zoology and anthropology were some more enigmatic portion regarding Qzirev:

Each symbol leads to a different passage about the civilization. The player can go through them in any order — the end of each passage contains a clue necessary to end the game:

The antithesis is the concept of language as a pure psychological phenomenon: that of form. Language is bound to thought and if something can't be imagined, it's simply because it doesn't exist. They referred to this development as Ph.

Figure 26. The hub area with the unreadable text — when clicking through, the words start to shuffle becoming more and more readable.

Figure 27. Although using the same formatting that indicates words created by the player, now the role is reversed: the player must read the words and then “guess” the correct word.
After learning about the civilization and paying attention to the clues at the end of each branch, the player must simply combine all three syllables in the passage:

So this was the whole conundrum, something that could be sequenced as:

**Ph·ac·tos**

Figure 29. This is the only “gated” passage in the entire game.

More than providing a challenge to the player, the intention of this last interaction is to ensure that the player paid the minimal amount of attention regarding the previous texts. If the player inputs the wrong word, he is sent back to the hub.
The last (and longest) passage concludes the story, revealing the motivations behind the ancient civilization, why they created multiple cities with different languages, tying up the themes and ideas explored. This intends to provide some closure in respect to the mysteries presented to the player:

In retrospect, it is obvious that the passage that Bolívar found would be different than mine — as I am sure that many other readers will find many other variations. This near supernatural omnipresent quality of Asanm is what keeps a small part of me away from complete disbelief. In this regard, the potential of this language manipulating the fabric of our existence in this scale is haunting. The creation of Hexteria is my own feeble attempt to counter that — and I hope others will take part in this endeavor.

Figure 29. The last passage containing story in the game.

Figure 30. The end screen. This passage is then followed by the credits.
7. EVALUATION

7.1 User evaluation

As planned, after the conclusion of the beta version of the game, the game was distributed to a group of users along with questionnaires. Eleven users filled the survey, they included students, designers, software developers, game designers, illustrator, aged between 20 and 35 of both genders. The complete set of answers is also included in Appendix 2.

The first part asked about their habits towards games in general, with only 2 users claiming not to play or having familiarity with video games. From those familiar with video games, 6 of them mentioned having played Interactive Fiction games (one of them acknowledged the genre but never played one per se). Of the types of Interactive Fiction games played, 66% of them were described as hyperlink games such as ones made in Twine. Only one user said that it played parser-based games, while other one mentioned in the comments playing Photopia from Adam Cadre — definitely a parser game.

Regarding the game itself, the users were firstly asked about usability issues, such as interaction affordances (ranging from 1, ambiguous to 5, clear) and ease of navigation (ranging from 1, confusing to 5, easy). The answers can be seen below:

While the majority of the answers scored around 4 or 5, it is clear that some players had trouble with navigation, with one user commenting:
“It’s very mysterious and seems to be quite complex, elusive and unpredictable. You don’t really get a grasp of what to expect next.”

The same user added later:

“It is a bit difficult to discern how the choices you make drive the story forward, which in a way can be part of the fun if one decides that there is a puzzle or connection to figure out. I suppose that comes from playing more conventional games and having built up expectations from what a game should behave like.”

This indicates that perhaps links to other passages can be better described, so the player can fully understand the consequence of his clicks. The next question regarded the consistency of the writing, with the following answers:

![Figure 31. Answers regarding writing consistency](image)

This concludes that even though the process involved writing in different moment of the project — including the use of placeholder texts — didn’t resulted in significant impacts in the style.

Lastly, two open-ended questions were included, asking the players to describe the story and to use 5 words to represent the overall experience. There was also a blank space for other comments. Some user comments included:

“In one of the first passages I’ve already been set on a different, but quite similar reality. Maybe it was an influence of Kentucky Route Zero in my head, but it was a good thing. I felt compelled to find out more about the languages. Then discovery after discovery I realized I’ve really been taken somewhere else.”

“I really enjoyed and found it easy to follow. Choosing my own words and seeing how they resolve the story is really enjoyable. The ending felt quite meta and really satisfying to see it all come together.”

“Very entertaining and a great food for thought.”

“I am not a fan of fiction neither of games. To me it was boring because of that, but I can still see the quality of it, the richness in the texts, the subtle and bold graphics, creativity, the smart content and successfully/smooth running functioning program behind it.”

“It's an interesting exploration of the concept of language”

“Intriguing, arising curiosity and inspiring an explorer's spirit"
“I couldn’t tell if it was I who couldn’t fully understand the concepts involved or if that was the game’s purpose. Also, it reminded me of “arrival/story of your life”. Which is nice.”

Figure 32. Tag cloud with qualities mentioned by the users: the more common words being set in larger type.

Not surprisingly, many adjectives referred to the exploratory and mysterious nature of the game, with many other mentioning the theme of language. More unexpected was the amount of engagement and immersion that that the experience provided. It was very gratifying to notice exploratory as one of the most used words, considering that Focus on exploration was listed among the design requirements. Other key terms that overlap between that list and the ones chosen by the users include also Thought provoking and reflective.

Although short, the questionnaire served to give an impression of the experience from the players. And while most of the responses were pretty positive, it is clear that there are still space for improvement, specially in respect to interaction aspects, such as navigation.

7.2 Final Design Evaluation

In regard to the research question, previous findings already showed how the use of the written word is better suited for describing abstract concepts, rather than concrete ones. In the game, part of this was done by the means of the story: strongly focused in ideas and concepts instead of physical actions or spatial interaction. Much of the narrative also focused on characters reading books and encyclopedias, so the protagonist experience and the player experience are closely connected. Lastly, the main mechanic involved manipulating the word themselves: and it’s almost impossible to imagine how this could be achieved in a different medium.

The manipulation of words also performed a role in how players can perceive language: by removing any pre-defined meaning from the word, players are free to create the ones that they find better suited in their
context. Language is also featured heavily in the story, which includes the description of languages with very radical limitations and entire civilizations dedicated in creation of languages capable of manipulating reality.

Though being well received by the users, the game itself still carries a number of shortcomings. The mechanic of creating words is very promising and engaging, but lacks a better integration with the story. The last challenge and some branching narratives are essentially impossible to justify with an argument other than being a showcase of possible features. Thus it’s fair to argue that the end result is much closer to a proof of concept design than a full-fledged game. The final prototype is far from done in fully exploring the possibilities of the interaction. Additionally, the engagement with the theme of language is still done mostly though the story exposition and explanation, instead of the interaction. However, the amount of time that the players dedicated engaging with the mechanics — much more than expected — demonstrates that there is a much valuable interaction to be explored. And of course, this tension between gameplay and story is not exclusive to this game. Yet, this continues to be a significant issue to be addressed in the future. At last, it is important to note that the project engages only with a fraction of the features in language, with far more other openings still being open for exploration.

Regarding the story itself, the user reception was a very positive surprise, especially in how they described the experience as immersive and engaging. Of course a significant amount of credit should go for Borges, who inspired much of the story — and the writing does not get even close to the brilliance of the Argentinian writer. Much more time still needs to be spent in improving characterization and pacing. At the moment, the plot almost rushes to the end, where the player then gets almost overloaded with text. A more deliberate flow would be a welcome addition to the overall game experience.

Lastly, in terms of presentation some few adjustments could be made. Those include the consistence of the space between some lines, an improved, more appealing, title screen and the removal of Unicode characters in favor of images — during the evaluation even more mobile devices presented inconsistencies ins their rendering.

7.3 Process Evaluation

Considering the process, the Double Diamond proved to be one of the most valuable and helpful tools for the project. The clearly delineated mindsets made easy to assess which stage the project was currently in, and what are the expected next steps. Meanwhile, as a tool, Twine served well for most of the project needs — it’s main weakness turned out to be its fragmented documentation. But this was overshadowed by the speed on which prototypes could be created. The possibility of making a quick mockup within minutes certainly helped when working directly with the users. Incidentally, this involvement was hugely beneficial for the development of the alpha version.

The main challenge for the development was bridging the gap between having a good mechanic and having a good game. Much time was spent on trial and error, while other methods would’ve resulted in a more objective process — specially in a project with such a short deadline. Even so, this exploratory phase was very productive and while many design concepts didn’t ended up in the final result, they are far from being useless. Further explorations might even consider bringing some of them back.

In terms of story, the decision of letting the themes and the mechanics inform the plot, instead of the other way around, proved to be a correct one. If done otherwise, many design features might have not even be considered, since they would’ve need to conform to early narrative expectations. By delaying the story development a few steps in the process, the result was a narrative that integrated better with other elements of the project. And while it was mentioned that the mechanic and story never managed to fully integrate, they were far from being at odds which other. Having a different work as source of inspiration obviously helped, shortening significant amounts of work both in terms of inspiration and prototyping.
The story structure also proved to be quite convenient, giving subtle guidance in certain aspects from the narrative, such as the addition of variation and repetition. By being able to see the story structure, it's easy to detect pacing issues such as a long sequence of passages with no other player interaction. Having an idea of the story structure in advance meshes perfectly with the Twine framework of connecting passages. In fact, one advice that should've been followed closer was of having the rough outline finished early on. Many parts of the ending were left unfinished, an aspect that clearly affected the quality of the final passages in the game, which lacked the focus from the beginning.

Lastly, while giving a glimpse of player reactions, the conducted user evaluation were far from being a comprehensive assessment of the design work. While the shortness of que questionnaire allowed the user to fill in more promptly, with the experience still fresh in mind, it sacrificed details and more thoughtful response. Ideally evaluations would be conducted more extensively, both in the amount of questions and respondents.
8. CONCLUSION

Delving in the history and theory of Interactive Fiction is a fascinating journey. By being in a peripheral position, it can indulge itself in more experimental practices. And by having a relatively small community, many avenues of exploration are still open. When treating text not as a limited medium of expression, but just as a different one, equally expressive, many possibilities can emerge. And is impossible to disassociate text with language, a subject usually taken for granted, yet so rich.

Thus came the desire to create a game that operates within the written form, while revealing some of the outstanding components of language. The process involved a great deal of exploration: using Twine resulted in early mechanics that could be tested immediately. And working together with the users during those stages was essential for making the correct design choices. Soon ideas of narratives started to take shape and the adoption of a short literary story as inspiration provided the basis for the plot and style. It took time to develop a final design concept, but at the end there was a game that employed the creation of words as the main mechanic. This interaction not only was expressive, but fully engaged the player in the written word. Meanwhile, the story involved the player investigating encyclopedias and learning about societies with strange and unique languages.

There is still much work to do, from simple details to more fundamental directions, a path from the current proof of concept to a complete exploration of all the mechanical possibilities.

8.1 Perspective

Interactive Fiction as a genre is still thriving, getting more and more diverse both in terms of games and public. I do believe there is a space for Hexteria, Skaxis and Qiameth in this community.

So far the game as been assessed by those mostly unfamiliar with the genre and I’m curious to listen to the community opinion. One big opportunity for this is the 2017 edition of the traditional IFComp, scheduled for this second semester.
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Lastly, I’m grateful for all who invested their valuable time in playing the game and sharing their experience in the questionnaire
REFERENCES


APPENDIX 1
Source code of the final concept
Hexteria Skaxis Qiameth

Name 1
(if: $hub1$ is true)[I recall now the name being]]
(else:)[It was during this discomposure however that the name started dancing in my[$s$]mind:]]

(css: "font-size: 60%;")[

(tw-link class='cyclingLink' data-cycling-texts='["Ip", "Vr", "Bo", "As", "Ll"]' onclick='clickCyclingLink(this, "$n11");'>$n11</tw-link>∙
(tw-link class='cyclingLink' data-cycling-texts='["ib", "ess", "opo", "ak", "om"]' onclick='clickCyclingLink(this, "$n12");'>$n12</tw-link>∙
(tw-link class='cyclingLink' data-cycling-texts='["ter", "biq", "ul", "m", "ar"]' onclick='clickCyclingLink(this, "$n13");'>$n13</tw-link>]

(if: $hub1$ is true)[[☉|Passage]]
(else:)[[☉|Next Day]]

---------------------------------------------

Next Day
(set: $o1 = $n11 + $n12 + $n13)\n
$passage[With this //quasi-miraculous// insight, I was finally able to rest wholly. On the next days, I performed a meticulous search about $red[$o1] in my library. To my disappointment, the only result was a brief entry in the volume VI of 1908 Hastings' //Encyclopædia of Religion and[$s]Ethics/.] [[☉|Passage]]

Language 1
(if: $hub1$ is true)[I recall now the name being]]
(else:)[It had this peculiar language[$s$]called]

(bigg)<tw-link class='cyclingLink' data-cycling-texts='["Ch", "Tr", "Pl", "Bz", "X"]' onclick='clickCyclingLink(this, "$v11");'>$v11</tw-link>∙
(tw-link class='cyclingLink' data-cycling-texts='["at", "em", "obb", "il", "yz"]' onclick='clickCyclingLink(this, "$v12");'>$v12</tw-link>∙
(tw-link class='cyclingLink' data-cycling-texts='["im", "ol", "uk", "ez", "zy"]' onclick='clickCyclingLink(this, "$v13");'>$v13</tw-link></big>
which could only represent concepts by employing[$s]<tw-link class='cyclingLink' data-cycling-texts='["actions", "qualities", "names"]' onclick='clickCyclingLink(this, "$q1");'>$q1</tw-link>

Yes

(set: $l1 = $v11 + $v12 + $v13)\n
I tried to remember the name of this //urbs//, but other than this $red[$l1] language, nothing else came to my mind. Alas, unsuccessful in the attempts of recollection, I ended the discussion and decided to go home. On the following weeks, agitated dreams kept me from[$s]sleeping.]

[[○|Name 1]]

---

Passage

{ 
(set: $hub1 to true) 
(set: $o1 = $n11 + $n12 + $n13) 
(set: $l1 = $v11 + $v12 + $v13) 
(set: $c1 to $o1) } 

The article, regarding the dogmatic doctrine of the city,$[s]stated:]$quote[ //"The legislators of $red[$o1] declared that the basic unit of thought is (if: $q1 is "actions")[the verb. Therefore, everything in $red[$l1] must be defined by what it does or states. A road, for instance, is a walker and a crosser while a mirror is a$[s]reflector."//] 
(if: $q1 is "qualities")[the quality. Therefore, everything in $red[$l1] is described. Thus, books were called 'printed/bound/readable'.]// 
(if: $q1 is "names")[the name. Therefore everything in $red[$l1] will always have an unique name. Hence, a coin given has a different name than a coin[$s]received.]"//] 
(css: "font-size: 50%;")[[[About that civilization|Name 1]] / [[About that language|Language 1]]] 
[[○&#xFE0E|Call]]

---

Name 2
Then, he explained about the citizens from \(n11\)’\(\cdot\)\(n22\)\(\cdot\)’’\(n13\)’ and their quaint language: \(v11\)’\(\cdot\)\(v122\)\(\cdot\)’’\(v132\)

[[⊙|Language 2]]

Language 2

\[
\begin{align*}
& (\text{set: } l2 = v11 + v122 + v132) \\
& (\text{set: } l3 = v112 + v12 + v132) \\
& (\text{set: } o2 = n11 + n22 + n13) \\
& (\text{if: } q1 \text{ is } \text{"actions"})[\text{(set: } q2 \text{ to (either: } \text{"qualities"}, \text{"names"))}] \\
& (\text{if: } q1 \text{ is } \text{"qualities"})[\text{(set: } q2 \text{ to (either: } \text{"actions"}, \text{"names"))}] \\
& (\text{if: } q1 \text{ is } \text{"names"})[\text{(set: } q2 \text{ to (either: } \text{"actions"}, \text{"qualities"))}] \\
\end{align*}
\]

I repeated to myself, puzzled. But I was even more surprised when he corrected me and described \(\text{red}\[l2\] as a language solely shaped upon the use of\(\text{red}\[q2\].\)
Curious

//"A mere errata"//

$passage[

Was our conclusion. That despite both versions being of the same reprint. Other than that brief passage, we couldn't find any other discrepancy or mentions to[$s](set: $jojoca to $o1)<tw-link class='cyclingLink' data-cycling-texts='[$o1", "$o2"]' onclick='clickCyclingLink(this, "$jojoca");'>$jojoca</tw-link>.

[[☉|Many months]]

---

End

(set: $code = $k1 + $k2 + $k3)\n
(if: $code is "Phactos")[$passage[

And here ends this account. More and more signs of $red[$o3] came into my attention since[$s]then.

I'm uncertain if the people from $red[$o3] succeeded in their enterprise. Gödel would certainly refute so. Others mention the rapidly decrease of the number of languages as a progress towards a single idiom. This seems to be equally invalid or, at worst, a sign of the diminishing potential of our universe — a parallel of William[$s]Thomson[$s]proposition.

In retrospect, it is obvious that the passage that Bolívar found would be different than mine — as I am sure that many other readers will find many other variations. This near supernatural omnipresent quality of (set: $jojoca to $o1)<tw-link class='cyclingLink' data-cycling-texts='[$o1", "$o2", "$o4"]' onclick='clickCyclingLink(this, "$jojoca");'>$jojoca</tw-link> is what keeps a small part of me away from complete disbelief. In this regard, the potential of this language manipulating the fabric of our existence in this scale is haunting. The creation of $red[$title] is my own feeble attempt to counter that — and I hope others will take part in[$s]this[$s]endeavor.

(css: "font-size: 85%;")[/Reality is divided up into arbitrary categories by every language and the conceptual world with which each of us is familiar could have been divided up very differently. Indeed, no two languages categorize reality in the same way.
– "Daniel[$s]Chandler"/]

---

(css: "font-size: 60%;")[[[Ask about $q2|About the language]]] / [[[Ask about his diction|About the civilization]]]
Many months

Months later, having already forgotten about the whole episode, I ended up — by circumstances of my occupation — being the possessor of a distinct bundle.

Suddenly

In the midst of our logomachies, I mentioned this remarkable ancient city.

Start

All this took place four or five years ago.

Next

After a late dinner with my friend Bolivar Escobar, we’d lingered over a discussion on Wittgensteinian language-games, conjecturing an argot with so many subtle variations that multiple groups could use concurrently — recognizing their shared lexicon — but wielding completely different understandings.

Call
The next day, I phoned Bolivar to apprise him of my findings. However, before I could fully report my discoveries, he informed me that — while researching for an academic paper on nihilartikels/ and other types of copyright traps, he also found about the community when reading a copy of (what a coincidence!) the //Encyclopædia of Religion and Ethics//.

Hub

The book was written in an unknown language — but one not beyond my philology abilities. It was similar to Aklo in a certain degree: serpentine and luscious — it's decipherment like a feverish hallucination. The $o3's ethos is epitomized by the passage:

Among the ordinary sections on geography, zoology and anthropology were some more enigmatic portion regarding:

About the language

I inquired him about the nature of L1, since I was certain about their exclusive use of $q1. But Escobar was positive that the language was in fact bounded to $q2, having just consulted the tome a few days ago. I asked him for an opportunity to compare the texts.

Heritage

Among the ordinary documents, unsigned contracts and other unremarkable beadedoms there was this hefty blue tome with a yellow spine and a single word in
its[$s]cover.
[[⊙|Name 3]]

Name 3
(css: "font-size: 60%;") [It read, in a faded hot stamp foil:
]
(css: "font-size: 120%;")<tw-link class='cyclingLink' data-cycling-texts='["Jaq", "Qz", "Mi", "Kz", "Fl"]' onclick='clickCyclingLink(this, "$n31"�이행)'>$n31</tw-link>∙<tw-link class='cyclingLink' data-cycling-texts='["en", "ir", "ach", "ön", "at", "ü"]' onclick='clickCyclingLink(this, "$n32")'>$n32</tw-link>∙<tw-link class='cyclingLink' data-cycling-texts='["gid", "ev", "dd", "a", "mer", "ak"]' onclick='clickCyclingLink(this, "$n33")'>$n33</tw-link>

[[⊙|Discovery]]

Discovery
(set: $o3 = $n31 + $n32 + $n33)(set: $o4 = $n11 + $n32 + $n13) $passage[Somehow, the unusual word allured me. The title page[$s]complemented:
] <small>//A First Atlas of "$red[$o3]". Volume XI. On $red[$o4], $red[$o1], $red[$o2] and so forth... //</small>
(css: "font-size:60%;")
I was bewildered.
]
[[⊙|Hub]]
{
(set: $s11 to "A colossal empire comprised of numerous cities, with infinite names")
(set: $s12 to "I cenessin omzato cemztasod ef lumoteus caraos, warh alfalaro limos")
(set: $s13 to "I cenerrin omtaso cemtsarod ef lumoseur capaor, waph alfalapo limor")
(set: $s14 to "G iuruyygr ksvoxk iusvxoykj ul taskxuay iozoky, cozn otlotozk tgsy")
(set: $s21 to "Their inhabitants divided themselves according to their lexical predilections")
(set: $s22 to "Rhoat alhibarilrs davadod rhomsonvos iccetdalg re rhoat noxacin ztodianocraels")
(set: $s23 to "Phoas alhibapilpr davadod phomronvor iccesdalg pe phoas noxacin tsodanocpaelr")
(set: $s24 to "Znkox otnghoztgy jobojkj znksykrbky giuxjotm zu znkox rkdoigr vxkjkorkizouty")
(set: $s31 to "Their idiom like an expression of their existence")
Memory

$\text{passage [In $\textcolor{red}{o3} \text{ there were debates of whether language belongs to the physical or spiritual realm — form or substance. Those in favor of the tangible aspect referred to what can't be expressed through speech. Like so, considering that all physical dimensions in the universe are finite, language must be\[s]\text{of}\[s]\text{//substance//. }]}}$

[[⊙|Memory 2]]

History

$\text{passage [Their late ventures started to experiment with languages within languages. For the variations of $\textcolor{red}{l1}$, $\textcolor{red}{l2}$, $\textcolor{red}{l3}$ //et al// are parts of a blueprint for a larger language, it's pieces now scattered around the\[s]\text{world. }]}$

[[⊙|History 2]]

Truth

$\text{passage [The theologians of $\textcolor{red}{o3}$ aimed for the creation of a language that could describe the essence of the entire cosmos — not dissimilar from the pre-Babelian ambitions of Henry Dark and\[s]\text{Peter\[s]\text{Stillman. } ]}}$

[[⊙|Truth 2]]

Passage 2

$\text{passage [Days later Escobar was at my office, the volume VI of the encyclopaedia under his arms. We compared the\[s]\text{texts:]}$quote[ //"The legislators of $\textcolor{red}{o1}$ declared that the basic unit of thought is (if: $q1$ is "actions")[the verb. Therefore, everything in $\textcolor{red}{l1}$ must be defined by what it does or states. A road, for instance, is a walker and a crosser while a mirror is a\[s]\text{reflector.}\]]
(if: $q1$ is "qualities") [the quality. Therefore, everything in $\text{red}[$l1$]$ is described. Thus, books were called 'printed/bound/readable'.] 

(if: $q1$ is "names") [the name. Therefore everything in $\text{red}[$l1$]$ will always have an unique name. Hence, a coin given has a different name than a coin[$s$]received.]

"The legislators of $\text{red}[$o2$]$ declared that the basic unit of thought is (if: $q2$ is "actions") [the verb. Therefore, everything in $\text{red}[$l2$]$ must be defined by what it does or states. A road, for instance, is a walker and a crosser while a mirror is a[$s$]reflector.] 

(if: $q2$ is "qualities") [the quality. Therefore, everything in $\text{red}[$l2$]$ is described. Thus, books were called 'printed/bound/readable'].

(if: $q2$ is "names") [the name. Therefore everything in $\text{red}[$l2$]$ will always have an unique name. Hence, a coin given has a different name than a coin[$s$]received.]

---

About the civilization

$I$ inquired him about his distinct pronunciation of $\text{red}[$l1$]$ and $\text{red}[$o2$]$, but Bolívar was positive about the correctness of his orthography, having just consulted the tome a few days ago. I asked him for an opportunity to compare the[$s$]texts. 

---

Memory 2

$\text{passage}$ [The antithesis is the concept of language as a pure psychological phenomenon: that of //form/>. Language is bound to thought and if something can't be imagined, it's simply because it doesn't exist. They referred to this development[$s$]as[$s$]$\text{red}[\text{Ph}]$.]

---

Truth 2

$\text{passage}$ [But reality is a convoluted tapestry of phenomenons, impossible to contain. No matter how exhaustive their attempts were, some minutia always slipped through their undertaking. This period was alluded[$s$]as[$s$]$\text{red}[\text{Ac}]$.]
If the result is a language with infinite possibilities, this seems to be deliberate for according to reality ultimately encompasses infinite possibilities. The result is what they would refer as:

So this was the whole conundrum, something that could be sequenced as:

\[
\text{Ki} \cdot \text{Gy} \cdot \text{Ph} \cdot \text{Qi} \cdot \text{ev} \cdot \text{ys} \cdot \text{mo} \cdot \text{ny} \cdot \text{ac} \cdot \text{el} \cdot \text{ür} \cdot \text{tos} \cdot \text{ix} \cdot \text{ak}
\]

Other stylings

{ 
(set: $s to "&nbsp;")
(set: $quote to (css: "font-weight: 400; font-size: 50%; color: #8A6853; letter-spacing: 0.01em; line-height: 1.4; ") + (align: "\leq"))

(set: $passage to (css: "font-size: 55%; line-height: 1.5; ") + (align: "\leq"))

(set: $red to (css: "color: #157D9A; font-weight: 400;"))
}

End2
Credits
$passage[Written by $red[Gabriel Jacobi]
<small>Inspired by Tlön, Uqbar, Orbis Tertius from $red[Jorge L$u$s]$s$ Borges]</small>

<small>My gratitude for those who played this game at some stage of it's development and offered their valuable$ss$ observations:</small>

$red[Ingrid Skåre]
$red[Bolívar Escobar] <small>(the real one)</small>
$red[Kevin Ong]
$red[Anna Lidia Jacobi]
$red[Luiz Gilberto de Barros Filho]
]
(if: $l1 is "Xyzzy")[(css: "font-size: 35%;")][If you intentionally spelled Xyzzy, congratulations. However, nothing happens.]]

Title
(set: $t1 to "Hex")(set: $t2 to "ter")(set: $t3 to "ia")
(css: "font-size: 170%;;")[
<tw-link class='cyclingLink' data-cycling-texts='["Hex", "Sk", "Qi"]'
onclick='clickCyclingLink(this, "$t1");'>$t1</tw-link>∙
<tw-link class='cyclingLink' data-cycling-texts='["ter", "ax", "am"]'
onclick='clickCyclingLink(this, "$t2");'>$t2</tw-link>∙
<tw-link class='cyclingLink' data-cycling-texts='["ia", "is", "eth"]'
onclick='clickCyclingLink(this, "$t3");'>$t3</tw-link>
]

[[☉|Start]]
APPENDIX 2
Answers compiled from questionnaires
<table>
<thead>
<tr>
<th>Age</th>
<th>Occupation</th>
<th>Do you often play video games or are familiar with them?</th>
<th>Have you played any kind of Interactive Fiction Games before?</th>
<th>Other comments that you would like to add</th>
<th>How would you describe the affordance of the interactions?</th>
<th>How would you describe the navigation?</th>
<th>How would you describe the writing?</th>
<th>How would you describe the story?</th>
<th>How would you describe the experience in 5 words?</th>
<th>Any other comments or suggestions that you would like to add?</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>Designer</td>
<td>Yes</td>
<td>Yes</td>
<td>Hyperlink based (Twine games such as howling dogs and My Father Long Long Leg), Stanley Parable?</td>
<td>4 5</td>
<td>A branched experience about trying to decipher languages through the viewpoint of the people who crafted it and their intentions</td>
<td>multiple-choice, enigmatic, linguistic, creative, jojouinha</td>
<td>Immersive engaging, thoughtful enlightening fun</td>
<td>comments and feedback maybe colored by multiple playthroughs</td>
<td>Some problems I had with a previous version of the game have been amended, namely non interactive red text. I really liked it, the writing, the possibilities, especially the bit with the layered translation of the text.</td>
</tr>
<tr>
<td>23</td>
<td>Student</td>
<td>Yes</td>
<td>No</td>
<td>I haven't played any other than testing yours. I am aware of the genre though.</td>
<td>5 5</td>
<td>I really enjoyed and found it easy to follow. Choosing my own words and seeing how they resolve the story is really enjoyable. The ending felt quite meta and really satisfying to see it all come together.</td>
<td>Immerseing engaging, thoughtful enlightening fun</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Designer</td>
<td>Yes</td>
<td>No</td>
<td>Quality based (Sunless Sea, 80 Days, etc.)</td>
<td>4 4</td>
<td>Engaging, believable and intriguing.</td>
<td>self explanatory exploration of language.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Designer</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>4 2</td>
<td>An interactive experiment with language</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Graphic designer</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td>3 5</td>
<td>An interactive experiment with language</td>
<td>Simple, Confusing, intriguing, ambiguous, literary.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>UX design</td>
<td>No</td>
<td>No</td>
<td></td>
<td>4 5</td>
<td>Intriguing, arking curiosity and inspiring an explorer’s spirit</td>
<td>explorative, linguistic, detective, mysterious, nerdy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Programador</td>
<td>Yes</td>
<td>Yes</td>
<td>some Adam Cadre stuff, Photopia etc.</td>
<td>4 5</td>
<td>It's an interesting exploration of the concept of language</td>
<td>mysterious, intellectual, philosohical, referential, interesting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Software Developer</td>
<td>Yes</td>
<td>Yes</td>
<td>Hyperlink based (Twine games such as howling dogs and My Father Long Long Leg), Choice based (Choice of Robots, Creatures such as We, etc.)</td>
<td>4 5</td>
<td>Very entertaining and a great food for thought</td>
<td>Thought provoking with good replayability.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Student</td>
<td>No</td>
<td>No</td>
<td></td>
<td>4 3</td>
<td>I believe it to be really engaging for those who enjoy fiction. I am not a fan of fiction.</td>
<td>curious, nerdy, immersive, endless, exploratory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Student</td>
<td>No</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I am not a fan of fiction neither of games. To me it was boring because of that, but I can still see the quality of it, the richness in the texts, the subtle and bold graphics, creativity, the smart content and successfully smooth running functioning program behind it.</td>
</tr>
<tr>
<td>Age</td>
<td>Occupation</td>
<td>Do you often play video games or are familiar with them?</td>
<td>Have you played any kind of Interactive Fiction Games before?</td>
<td>If the previous answer was positive, which ones?</td>
<td>How would you describe the affordance of the interactions?</td>
<td>How would you describe the navigation?</td>
<td>How would you describe the writing?</td>
<td>How would you describe the story?</td>
<td>If you had to describe the experience in 5 words, what would be?</td>
<td>Any other comments or suggestions that you would like to add?</td>
</tr>
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<td>-----------------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td>28</td>
<td>Illustrator</td>
<td>Yes</td>
<td>Yes</td>
<td>Hyperlink based (Twine games such as howling dogs and My Father Long Long Legs), Quality based (Sunless Sea, 80 Days, etc.)</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>intricate</td>
<td>playful, intriguing, atmospheric, sandboxy, curious</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Game designer</td>
<td>Yes</td>
<td>Yes</td>
<td>Parser based (Zork, The Hitchhiker Guide to the Galaxy, etc...), Hyperlink based (Twine games such as howling dogs and My Father Long Long Legs), Choice based (Choice of Robots, Creatures such as We, etc.), Quality based (Sunless Sea, 80 Days, etc.)</td>
<td>5</td>
<td>4</td>
<td>In one of the first passages I've already been set on a different, but quite similar reality. Maybe it was an influence of Kentucky Route Zero in my head, but it was a good thing. I felt compelled to find out more about the languages. Then discovery after discovery I realized I've really been taken somewhere else.</td>
<td>Unusual, intriguing, alluring, sarcastically funny</td>
<td>Although the overall navigation was clear and consistent, the text in bold for the description of how the first language described concepts seemed to be interactible but bugged.</td>
<td></td>
</tr>
</tbody>
</table>