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**MULTIMÉDIA - ESPECIALIZAÇÃO EM CULTURA E ARTES**

# **Electronic Books and Multimedia: A Tool to Enhance the Narratives' Engagement**

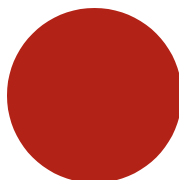
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Mestrado em Multimédia da Universidade do Porto

Orientador: Prof. Bruno Giesteira

Julho de 2023

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# Abstract

Storytelling is a vast topic with many different cultures having different methods of transmitting narratives. This research stems from the notion that if storytelling is not dependent on written artifacts, then a new form of e-book can be the alternative. Furthermore, media insertion in literary narratives will upgrade the user experience present in electronic books, especially in terms of engagement.

This study explores the disadvantages of electronic books, while examining the different shapes and sources of storytelling. It investigates the emergence of new ways of telling stories in contemporary contexts and explores the importance of the medium through various demonstrations. Furthermore, the research delves into the relationship between narrative, games, and theatre, specifically focusing on digital storytelling. It also analyzes the role of interface design and different media in shaping the storytelling experience. Lastly, it emphasizes the significance of engaging the senses in storytelling and how sensory elements contribute to the overall narrative experience. Through an examination of these topics, this research aims to provide insights into the evolving landscape of storytelling in the digital age.

The data collected in this project was achieved through a co-designing session with potential users, consequent prototyping, user experience questionnaires, and further data analysis with a control group. Moreover, guidelines were reached to help the creation of this product in the future. The prototype garnered positive feedback from users, who found it highly appealing, enjoyable, and inspiring. Although some concerns were raised regarding the prototype's unpredictability during task completion, users acknowledged its exceptional interactivity and potential to elevate the reading experience. While the prototype's dependability received lower ratings, suggesting room for improvement in usability, its positive reception and alignment with market needs indicate a promising future. Continuous user feedback and refinement efforts will be pivotal in addressing usability issues and further enhancing its appeal and effectiveness.

These findings indicated that readers are open to new ways of interacting with a novel, particularly if it focuses on their senses and emotions. This study holds great value as it allows readers to have control over the media that engages them the most, considering the role of emotions in both human-computer interactions and narratives.

**Keywords:** Electronic Books, Narrative, Storytelling, Multimedia, Engagement



# Resumo

A narração de histórias é um tema vasto, onde muitas culturas diversas têm diferentes métodos de transmissão de narrativas. Esta investigação parte da noção de que, se a narração de histórias não depende de artefactos escritos, então uma nova forma de livro eletrónico pode ser a alternativa. Além disso, a inserção de mídia nas narrativas literárias melhorará a experiência do utilizador presente nos livros eletrónicos, especialmente em termos de envolvimento.

Este estudo explora as desvantagens dos livros eletrónicos, ao mesmo tempo que examina as diferentes formas e fontes de narração de histórias. Para além, investiga a emergência de novas formas de contar histórias em contextos contemporâneos e explora a importância do meio através de várias demonstrações. Além disso, a investigação aprofunda a relação entre narrativa, jogos e teatro, centrando-se especificamente na narração de histórias digitais. Analisa também o papel do design de interface e dos diferentes mídia na modelação da experiência de contar histórias. Por último, salienta a importância de envolver os sentidos na narração de histórias e a forma como os elementos sensoriais contribuem para a experiência narrativa global. Através de uma análise destes tópicos, esta investigação tem como objetivo fornecer informações sobre a evolução do panorama de storytelling na era digital.

Os dados recolhidos neste projeto foram obtidos através de uma sessão de co-design com potenciais utilizadores, consequente prototipagem, questionários sobre a experiência do utilizador e análise de dados adicionais com um grupo de controlo. Além disso, foram elaboradas diretrizes para ajudar a criar este produto no futuro. O protótipo obteve um feedback positivo dos utilizadores, que o consideraram muito apelativo, agradável e inspirador. Embora tenham sido levantadas algumas preocupações relativamente à imprevisibilidade do protótipo durante a realização da tarefa, os utilizadores reconheceram a sua excecional interatividade e o seu potencial para elevar a experiência de leitura. Embora a fiabilidade do protótipo tenha recebido classificações mais baixas, sugerindo a necessidade de melhorar a usabilidade, a sua receção positiva e o alinhamento com as necessidades do mercado indicam um futuro promissor. O feedback contínuo dos utilizadores e os esforços de aperfeiçoamento serão essenciais para resolver os problemas de usabilidade e melhorar ainda mais a sua atração e eficácia.

Estes resultados indicam que os leitores estão abertos a novas formas de interagir com um livro, em especial se este se centrar nos seus sentidos e emoções. Este estudo tem grande valor,

pois permite que os leitores tenham controlo sobre os média que mais os envolvem, tendo em conta o papel das emoções tanto nas interações homem-computador como nas narrativas.

**Palavras-chave:** Livros Eletrónicos, Narrativa, Storytelling, Multimédia, Envolvimento

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# Glossary & Abbreviations

AI	Artificial Intelligence
Fandom	The fans of a particular person, team, fictional series, etc
Ludus	“Play”
Lo-Fi	Low-Fidelity
Mise En Abyeme	Narrative within a narrative
Meta-Medium	New relationships between form and content in the development of new technologies and new media
Paidia	“Childish play, amusement”
Seiza	An upright kneeling position which is traditionally used in Japan
UEQ	User Experience Questionnaires
Wiki	Wiki is the general name of a hypertext publication that is collaboratively edited by participants in a fandom



# 1. Introduction

## 1.1 Contextualization and Objectives

By analyzing the evolution of e-books and how they have been mixed with other media, this dissertation seeks to ponder and reflect on the success of these developments while also exploring new ways of encouraging the public toward literature. To do this, it is useful to analyze the creation of a new form of e-book that learns from the storytelling techniques used in the technological advancements in the field to date. The goal is to therefore reach guidelines for the creation of this new form of e-book.

## 1.2 Hypothesis and Research Questions

E-books have often intersected with other media to make them more appealing. This research aims to explore the limits of this idea through several multimedia fields focusing on the similarities and differences between them. Therefore, this dissertation proposes that:

- If storytelling is not dependent on written artifacts then a new form of e-book can be the alternative.
- Media insertion in literary narratives will upgrade the user experience present in electronic books.

Firstly, it is necessary to acknowledge what are the main differences between oral, written, and digital storytelling, focusing on the oral traditions of other cultures. By looking into certain issues readers have with e-books such as the ease of reading, ponder if media insertion can be the answer. It is also necessary to explore how developments including multimodal novels, transmedia storytelling, hypertext fiction, and interactive narratives have influenced the field but also figure out what can be improved and/or learned from these existing methods. Not only developments in the literary field can help but also other areas namely theatre and games with a bigger focus on the role of emotions and feelings. Finally, it is important to analyze if “e-book” is the correct term etymologically speaking for this new method.



## **2. State of Art**

In this part of the dissertation, the history and nuances of electronic books will be explored, as well as a look into different types of existing media experiences that involve storytelling, accompanied by examples to further illustrate and explore what has been done before in the field.

The authors here discussed were achieved through suggestions from the supervisor (for instance Brenda Laurel, and Jane McGonigal), as well as secondary and tertiary references from each. In terms of storytelling and media experiences, some authors (namely, Henry Jenkins, Janet Murray, Marie-Laure Ryan, Chris Crawford, Espen Aarseth, Ted Nelson, and Aristotle) were essential authors to discuss while others (such as Marina Grishakova, William Hallet, Jurij Lotman, Richard Saint-Gelais, Don Norman, William Kuskin, and William Mitchell) were included in punctual moments due to their referential importance.

Moreover, for the topics of Electronic Books and Oral and Ancient Storytelling Traditions, the authors (namely, JoAnne Banks-Wallace, Nathalie Piquemal, Yee Bee Choo, Tina Abdullah, Abdullah Nawi, Sm Dhawan, B. M. Gupta, Leslie Rule, and Hilary McLellan) were reached through databases (such as Semantic Scholar and Google Scholar) by searching keywords such as electronic books, oral storytelling, and digital storytelling, the goal being to find recent and pertinent articles.

### **2.1 Chapter I: E-Books**

#### **2.1.1 Electronic Books: History & Disadvantages**

According to the Oxford Dictionary, an electronic book (e-book) can be defined as a book that is displayed on a computer screen/electronic device, instead of being printed on paper. They can be read on dedicated devices (e-readers) or on any viewing screen that allows it (most commonly computers, tablets, and smartphones). While most of its popularity has risen in the 2000s and 2010s, the concept of the devices and formats used today started to appear as early as



1930 with functioning precursors appearing in the 1960s. A global research study in the field of 'electronic books' registered a fast 25.95 percent annual average growth between 1993 and 2018 (Gupta and Dhawan, 2018), proving this topic is continuously growing. The most common formats in e-books are PDF, and EPUB, although many others have appeared throughout the decades.

It is also necessary to acknowledge the different types of e-books. Most common are the ones that are a simple digitalization or re-mediation of the physical version of a novel, there are also the ones that add minor changes (links to move through the chapters easily, annotations and highlighting quotes and passages, links to playlists to listen to while reading such as Grady Hendrix 2016's *My Best Friend's Exorcism*) and, the rarest ones, are the e-books that push the term of the book itself (interactive narratives, hypertext fiction, between others that will be discussed).

When designing something new from pre-existing formats it is necessary to assess what the target audience needs and see how those needs have been met across different media platforms (Murray, 2012) hence why it is necessary to primarily analyze the advantages and disadvantages of e-books.

Some of the advantages that have allowed for the popularity of e-books to grow include an easier method of publication in comparison to printed books, more accessible pricing, compatibility between hardware, convenience, and being more environmentally friendly. Furthermore, e-books help authors reach a higher readership and therefore more monetary return, they help publishers save costs, customers interact more with the text, improve libraries' efficiency in delivering books, and can even provide entertainment through the insertion of multimedia (Subba Rao, 2003).

In terms of disadvantages, Siriginidi Subba Rao points out two main causes: shortcomings of the technology, and the difference between what a user expects and how books are handled (2003). In terms of technological problems, the pricing of devices that sustain e-books is expensive (whether those be devices that have multi-functionalities like computers and tablets, or e-readers that are solely for the purpose of reading e-books). In terms of devices like computers, the screen resolution and quality are not comparable to that of a printed book, the first being harsher on the eyes. Furthermore, e-readers, although taking steps to improve and fix this problem, still have somewhat limited screen resolutions and refresh rates. Moreover, not all the books published in the world are instantly released in an e-book format, although they are continuously increasing. Compatibility and availability are other issues, while PDF formats can be read on most devices, EPUBs can't be opened on a regular computer, however, this has been combated in recent years with the availability online of file converters. For authors, there is the issue of licensing versus sales and for libraries, e-books are harder to catalog due to a lack of bibliographic data (Subba Rao, 2003).

As Janet Murray states:

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“I am not among those who are eager for the death of the book, as I hope the present volume demonstrates. Nor do I fear it as an imminent event. The computer is not the enemy of the book. It is the child of print culture, a result of the five centuries of organized, collective inquiry and invention that the printing press made possible” (1997, p.14).

## 2.2 Chapter II: Narrative

### 2.2.1 Storytelling: Different Shapes & Sources

If a new model for the format of e-books is to be explored it's necessary to clarify what has been done and is currently being worked on in the realm of storytelling, especially in the digital space. The concept of stories and storytelling being purely textual is a westernized ideal, with western literacy focusing on the analysis and deconstruction of texts, while oral traditions (the roots of story and storytelling) focus on a more holistic context (Piquemal, 2003; Banks-Wallace, 2002). Furthermore, oral cultures "often rely on inscription technologies such as representational drawings or symbolic markings" besides oral traditions (Murray, 2012), proving that there is more to storytelling than the written word.

In a world that includes multimodal books, transmedia storytelling, and intermedial projects, narrative can no longer be associated with language in writing. The term narrative now must consist of other modes and media that contribute to the story as a whole (Hallet, 2009). While storytelling is a two-way interaction between the storyteller and the audience to receive feedback (Choo, Abdullah, Nawi, 2020), digital storytelling can communicate stories in new ways using digital media (McLellan, 2006).

There are plenty of differences between oral storytelling and digital storytelling. The latter requires more time in preparation, drafting, and rewriting, but results in a more active and engaged audience. Meanwhile, oral storytelling has immediate feedback (instead of delayed), the content can be modified, and involves the imagination of the listener in an essential way (Choo, Abdullah, Nawi, 2020). However, it is important to note that in human-computer interactions, language becomes trivial if the primary medium of expression of thoughts is non-verbal signs (Laurel, 2014).

Moreover, examples of storytelling going beyond the written word are worldwide. In Japan, there is a storytelling technique called Rakugo, which focuses on comical (and sometimes sentimental) tales depicted by one single person on the stage in *seiza* sitting position performing all the characters through paper fans and small cloth (Shores, 2021).

In Aristotle's *Poetics*, language is treated as being present purely due to its ability to assist in helping the plot's potential and advancement (Heath, 1996) so there are examples not only from Native American, and Aboriginal cultures (Piquemal, 2003), and Japan (Shores, 2021) but also from Ancient Greece where the written or spoken word is considered to be mere tools to tell a story. Moreover, Aristotle's *Poetics* is helpful for this work in more ways than one since his theories illuminate formal and structural elements that can be used productively (Laurel, 2014).

Furthermore, in the XXI century, tools like technology and different media replace written and spoken languages with images, video, and sound, among others, and many consider this evolution needed since it has now become common to view the book as outdated and deserving

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of refurbishment (Kuskin, 2011). With the concept of fiction becoming “emancipated from language” (Ryan, 2011, p. 24) this transition from verbal to visual possibly creates essential changes in meaning (Lotman, 1977; Kuskin, 2011). No longer is the act of presenting stories divided in two ways – diegetic or mimetic (Plato).

As Brenda Laurel states:

“This mode of development involves experimental design as we search for rule shifts that are most likely to produce emergent behavior that is interesting and generative” (2014, p. 215).

There are several types of these events that have grown and multiplied in the past few years that feel essential to explore in order to distinguish them from what this dissertation aims to complete, namely: multimodal novels, transmedia storytelling, hypertext fiction, and interactive narratives.

## 2.3 Chapter III: Storytelling

### 2.3.1 The New Ways of Telling Stories

Multimodal Novels no longer rely on the written word in printed form, they still make use of it but complement it with non-verbal symbolic representations and non-narrative semiotic modes (photographs, diagrams, maps, among others), with the verbal and visual media becoming co-extensive (Grishakova, 2011). The word 'Novel' is not used by chance, these objects are still physical printed books that set limits on what modes and media can be included and still relies on verbal narrative discourse as most of its content (Hallet, 2009). Due to the insertion of visual media, multimodal novels help show all the features of a description through an image, without solely focusing on specific written-out characteristics of the said image, thus becoming more objective and giving better testimonies of what the text intended (Ryan, 2011). However, it can be argued that, in some instances, it can take out of the experience of imagination, so inherent to the act of reading fiction (Esrock, 1994), since "the rift between [...] the seeable and the sayable" (Mitchell, 1994, p.12) is so prominent with the narrative functions of the act of reading versus the cognitive aspect having so much discrepancy (Grishakova, 2011).

*The Illuminae Files Series* (Fig.1) by Amie Kaufman and Jay Kristoff is a sci-fi young adult story published between 2015 and 2020 told through a dossier of presumably hacked documents. These include emails, maps, files (including audio), IMs, medical reports, and interviews, among others. These novels are a perfect example of a story told through more than just the written word.

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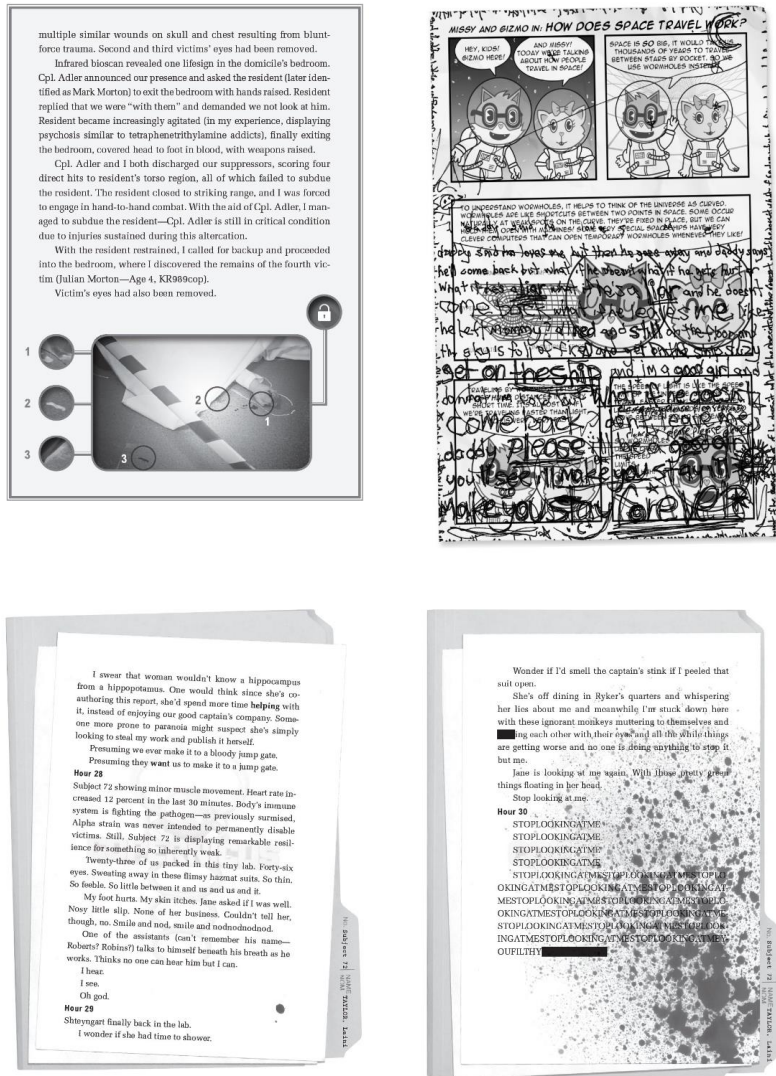


Figure 1. *Illuminae* by Amie Kaufman and Jay Kristoff (2015)

Another successful multimodal novel is *House of Leaves* (Fig.2) by Mark Z. Danielewski (2000), a horror story that is integrally purely textual, however, this novel has the peculiarity of utilizing text in different ways, by redacting it, overlapping it, creating shapes with it, between others, making it unique and advancing the story in a productive way towards horror.

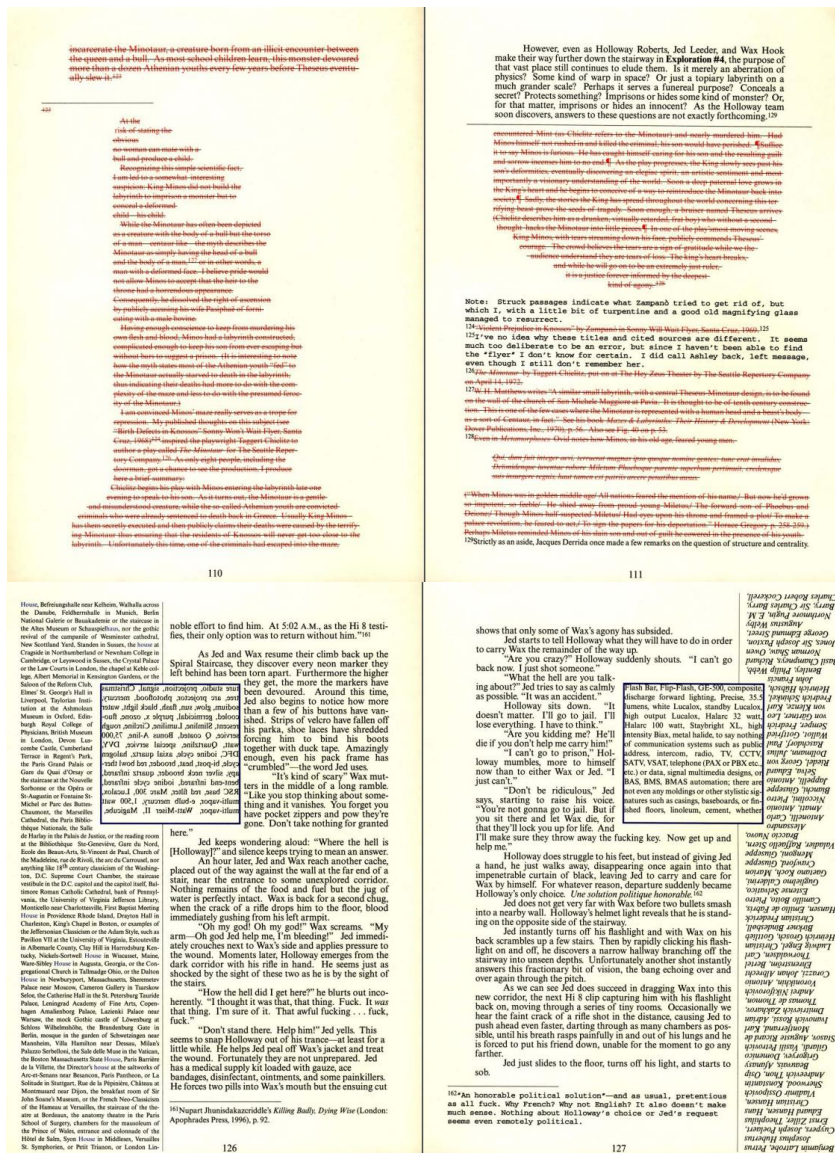


Figure 2. House of Leaves by Mark Z. Danielewski (2000)

Similarly, *S.* by Doug Dorst and J. J. Abrams (Fig.3) published in 2013 is a *mise en abyme* meaning a story within a story. In itself, it is a novel written by a fictional author although handwritten notes were added on the book's margins corresponding to two college students trying to uncover said author's identity. Furthermore, other ephemera and supplementary materials are tucked throughout the novel.

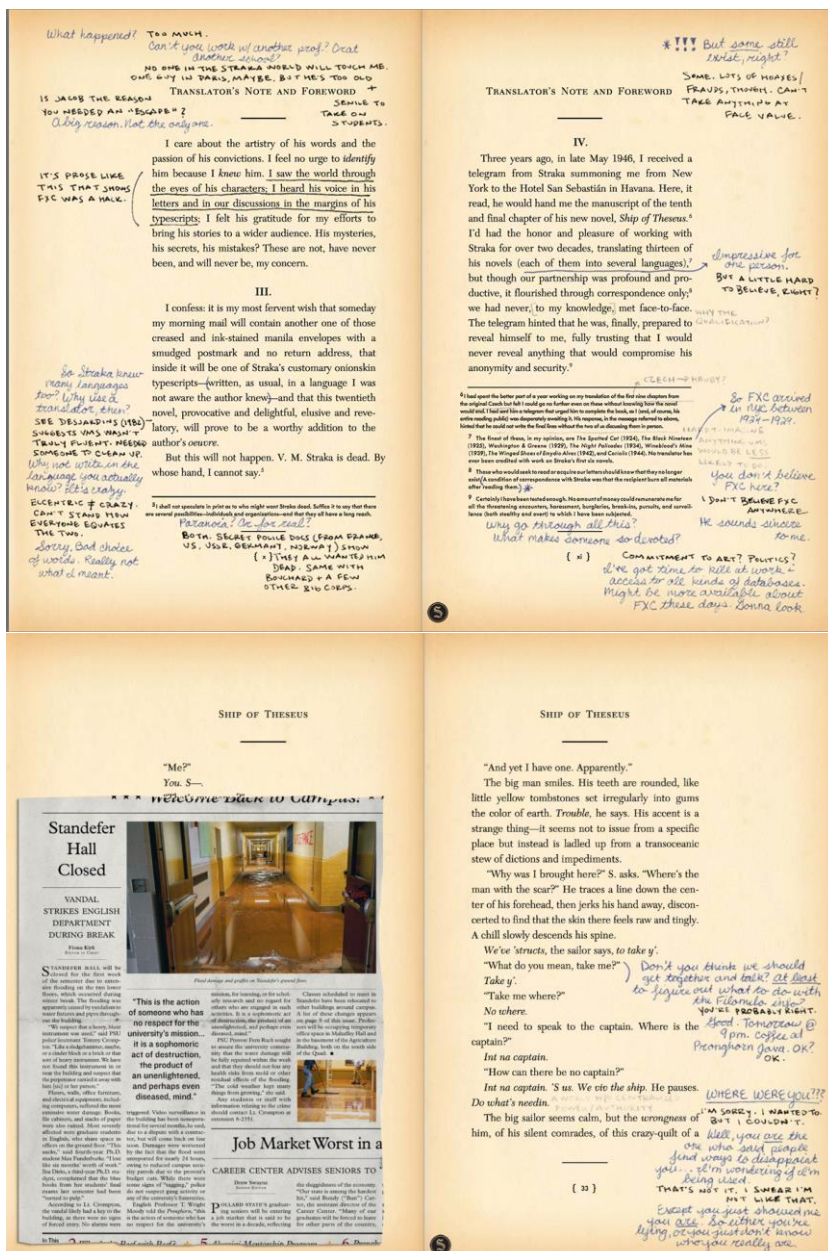


Figure 3. S. by Doug Dorst and J. J. Abrams (2013)



Transmedia Storytelling is defined as a process that divides several independent and essential fiction elements and disperses them across different media and means with the goal of creating a new coordinated experience with each channel having a unique contribution to the narrative at large (Jenkins, 2007). There are, however, some peculiarities that should not be ignored. Transmedia Storytelling is not meant to be a mere adaptation or illustration, its goal is to make media converge by telling different stories about the same fictional world (Ryan, 2015) and it should not be confused with Transfictionality, that is, the migration of fictional entities across different texts (Saint-Gelais, 2011). Moreover, if each channel is lacking unique contribution (either through redundancy or poor construction) the entire experience will most likely go wrong (Laurel, 2014).

Due to a participatory cultural climate, transmedia storytelling has flourished (Jenkins, 2007), and due to digital technology, there is the existence of a new medium (with some suggesting the name of meta-medium) that has an incredible capacity of transmitting other media, while also providing tools for a more creative engagement with narratives (Ryan, 2015). Transmedia Storytelling has been particularly successful in fiction since the fantastical worlds are harder to imagine than the real ones and therefore offer more interpretations and possibilities while also focusing more on adolescents and young adults (Ryan, 2015). Furthermore, in the world of fiction, fictionality should not be considered a type of stylistic choice but a feature that can show the authors what to do with the text (Ryan, 2011). While some believe that pictures are fiction by definition (Walton, 1990), and some state that fictionality should not depend solely on the ability to say something true but on the ability to tell a story (Menoud, 2005), others offer up the defense that “some pictures are fictional, some are non-fictional, and for some of them the decision is irrelevant” (Ryan, 2011, p.20). Furthermore, in fiction “mimetic representations do not necessarily have real-world referents” (Laurel, 2014, p.53).

Big franchises like *Star Wars*, *Game of Thrones*, and *Harry Potter* are perfect examples of transmedia storytelling being used in the modern world to expand existing storyworlds that began with only one medium but expanded by utilizing other media.

Looking into the case of *Star Wars*, what began with films in the late 1970s grew to involve comic books, tv series, novels, video games, and card games, among others that expand the *Star Wars* canon, instead of strictly being merchandised for the original movies. New storylines, new plots, and new characters keep appearing (Guynes and Hassler-Forest, 2017).

Hypertext Fiction was coined by Ted Nelson in 1965 as “a body of written or pictorial material interconnected in such a complex way that it could not conveniently be presented or represented on paper” (p.96) with some considering it a limitation in user’s agency due to the set menu of possible choices (Ryan, 2009). Although it is an exciting implementation it forces the reader’s choices to be very restricted since in any other way it might lose narrative logic. However, it is still possible to tell stories through hypertext since it is very programmable yet challenged (narrative-wise) and limited (interaction-wise) (Ryan, 2009).

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An example is *Storyspace*, which is a system for interactive fiction that utilizes a series of links and episodes (Bolter, Joyce, 1987) that facilitates the creation of this type of fiction in an interactive way. It is important to acknowledge that the idea of an interactive story in which the reader can choose their own path isn't something that only appeared thanks to technological advancements. A perfect example is the *Choose Your Own Adventure* book series by Edward Packard which was a popular gamebook project published between 1979 and 1998 for children in which said type of fiction occurred. Hypertext fiction can also be referred to by its broader alternative as Cybertext (defined by Espen Aarseth in 1997) which appeared due to the search for the ability to control the reception process without reducing interactivity (Ryan, Emerson, Robertson, 2014) focusing more on the role of the medium itself.

Furthermore, in 1945, Vannevar Bush speculated the creation of a *Memex*, which purpose was to aid memory and would function as a filing system that would connect material by association and act almost like a brain, running through facts with the press of a key.

The constant creation of new technologies has been increasing in speed while designing innovations that can be born from these new technologies keep falling behind due to the discrepancies of time both parts share (Murray, 2012, 1997) which can explain why there seem to exist so many different ways to tell stories in the digital space, but with most having few functioning examples. Furthermore, nostalgia for older methods and resistance to change can be pointed out as another reason for this delay in keeping up (Murray, 2016).

## 2.4 Chapter IV: Medium

### 2.4.1 Contemporary Demonstrations of the Importance of the Medium

There are a lot of projects worth mentioning that fall into these categories of telling stories (and others that push their limits entirely). All of these, however, are connected with the medium they act on in an essential way.

Starting with *Cain's Jawbone* by Edward Powys Mathers (Fig.4). It is a novel published in 1930 with 100 pages that tell a story, although not in the correct order. The reader must separate each page individually and through narrative clues solve it by placing them in the correct order. At the date of this dissertation, only four people have successfully solved it since the original release. The incredible part of this novel is the fact that it is an intrinsically physical experience. In the potential e-book format of this book, one can't simply rip apart every page individually and change their order as easily at least. It is meant to be a hands-on experience and yet it still pushes the concept of the book and of narrative.



Figure 4. *Cain's Jawbone* by Edward Powys Mathers (photo by Sarah Scannell)

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The opposite would be an experience that cannot be produced physically. *Device 6* is an app described as a thriller with the map being the written word itself created by Simogo in 2013 (Fig.5) where the reader must interact (by looking, listening, and reading) with three-dimensional photographs to solve the mysteries. In this purely digital storytelling experience, the physical aspect of it makes it impossible to solve.

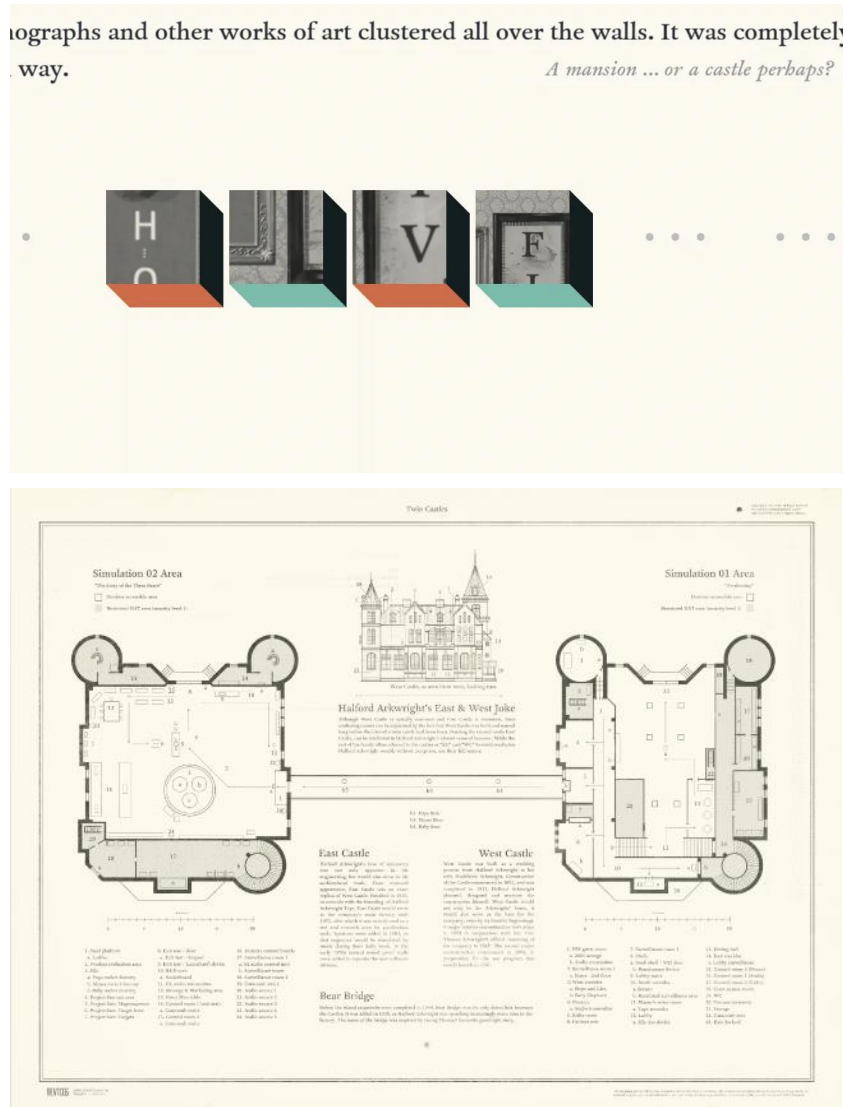


Figure 5. Device 6 by Simogo

In movies and tv series, the importance of the medium and how the story is displayed is of vital importance. Netflix's new show *Kaleidoscope* (2023), is a heist story that invites viewers

to watch the episodes in different orders, claiming that there are 40.320 different ways of taking in the story (Fig.6).



Figure 6. Some of Kaleidoscope Viewing Suggestions by Netflix

## State of Art

Therefore it is undeniable that the way an experience is laid out, and the way the user experience works, changes the way the story occurs.

After all,

“A computer is just an electrical device, but when we exploit its affordances for symbolic expression we make possible new genres that hold a similar possibility for changing what we can know and what we can share with one another” (Murray, 2012, p.21).

In Janet Murray’s *Hamlet on the Holodeck*, the author reflects on the act of a Shakespearean play as something that is better experienced with access to multiple performances of the dramatic play than the printed text alone (with its excessive footnotes and abbreviations) and the answer to this greater experience is the computer since it allows greater control over all the information and all the tools, creating more complex and new tasks and questions (Murray, 1997).

## 2.5 Chapter V: Gamification & Theatre

### 2.5.1 Narrative, Games & Theatre

Another point that is necessary to explore is Narrative in Games and in Theatre. Marie-Laure Ryan states that *ludus* is what inspires narrative games but it's the spirit of *paidia* that infuses playable stories where the purpose of the player is to observe the evolution of the narrative and not win or lose (2009). This latter point is extremely important for the creation of this new form of an e-book whose goal is to be infused with gameful knowledge without falling into the category of a narrative game. It is necessary to reject game patterns that can be harmful but embrace the expressive power of games (Murray, 2012).

From her reflections on *ludus* and *paidia*, Ryan proceeds to set "Poetics of Interactivity" – of which "a natural interface" is the most important for this new form of e-book – and "Pleasures of Interactive Narrative" – spatial, epistemic, temporal, and emotional immersion (2009).

Spatial immersion has been achieved in many different ways and is considered the easiest to do so. Animations, images, virtual reality, augmented reality, and three-dimensional video games all help achieve spatial immersion, whether that be through movement within a location or through an emotional connection with a certain space (Ryan, 2009). After all, the setting is the most easily remembered component of a narrative (Mandler; Johnson, 1977). Epistemic immersion is the idea of figuring out a mystery (Ryan, 2009). In a world of this new form of e-book this sense of investigating can be achieved through the medium itself with the notion of figuring out and discovering a new interface.

Moreover, temporal immersion can be reached through curiosity, surprise, and suspense (Sternberg, 1992). And finally, emotional immersion falls into the notion of catharsis by Aristotle. As a reader, most of this emotional immersion is accomplished by witnessing the character's emotions and lives (Ryan, 2009).

Although Interactive Storytelling has still a few ways to go before it can be fully implemented effectively, it shouldn't be dismissed, as Chris Crawford states,

"To dismiss interactive storytelling on the grounds that it hasn't been done before is to reject the entire basis of the human intellectual adventure" (2004, p.50).

Interaction in the digital formats exemplified is a crucial factor many times connected with how an interface is constructed. The goal is to create an account of fictionality that can expand as more media is included and embedded with the narrative (Ryan, 2011). Others, like Brenda Laurel, put one of the key factors of interactivity simply: "You either feel yourself to be participating in the ongoing action of the representation or you don't" (2014, p. 29) meaning, even if your actions don't impact the storyline, it can still feel immersive and interactive if sensory wise you feel satisfied, whether there are "in-world" consequences or not. This, in the case of an already written-out story like the one in most e-books, is fundamental. It is essential

to make sure that it is possible for a reader to feel immersed in a narrative simply through sensory techniques (without the need to affect the story directly).

To improve this interaction one can simply look at theatre, and posteriorly at games. In Brenda Laurel's *Computer as Theatre*, the author initially seeks to define human-computer interface as a surface where humans and computers can communicate that joins them and conforms to the necessities of each in an ergonomic way (Laurel, 2014). The importance of theatre however comes in part from its definition, which is as a representation of actions with multiple characters (or "agents" using Aristotle's term). Laurel states that this definition can also be applied to interface design, pointing out that an effective interface should focus on what a person is trying to do and not on an idea of what should appear on the screen. Both in theatre and in interfaces, emotion is key, it is necessary to evoke feelings, behaviors, and thoughts (Norman, 2007) to make both of these terms successful. An interface that is simple and immediate will give its agent more pleasure, like a well-done theatric play.

Theatre and Psychology both contribute to the field of human-computer interaction. They both revolve around emotions, behaviors, and anything that is concerning human activity. While psychology seeks to understand human behavior in the real world, theatre represents possibilities of what might happen in a simplified and clear way. The first explains human behavior, the latter represents it in an intellectually and emotionally pleasing way. Therefore, theatre is informed by psychology but switches in by representing the action itself (Laurel, 2014).

The importance of this correlation comes from the fact that similarly, human-computer interactions and e-books can accomplish this representation as well. When creating a human-computer interaction, there is also the creation of a new convention in the digital space that expands meaning-making understandings in a culture allowing the apprehension of the perception of the world and each other (Murray, 2012).

A big part of theatre is the audience, however in this art form if the audience were to get up and interrupt the play, trying to insert themselves in it would create some confusion both physically and psychologically (Laurel, 2014, p. 27). Furthermore, by participating on stage the audience members no longer can call themselves audience members. A solution to this is to focus on the representation itself, not seeing the audience members that invade the stage as such but as actors.

Laurel says:

"The technical magic that supports the representation, as in the theatre, is behind the scenes. (...) its only value is in what it produces on the "stage." In other words, the representation is all there is" (2014, p. 27).

This notion is particularly important in the idea of representing senses and sensory immersion, as explained ahead. Furthermore, when creating a new media template (in this case a new form of e-book) it is necessary to make the new media artifacts understandable the same way a new kitchen or a new car is (Murray, 2012).



## 2.5.2 Interface & Media

Laurel divides human-computer interaction into two larger categories - productive and experimental (1986) - and further reflects on the “seriousness” associated with both these terms. Often, something productive is considered something objective and serious, while experimental is considered subjective and creative when in fact productive moments can involve creativity and vice-versa. Playfulness can’t be associated with one activity only, and one activity doesn’t necessarily have to be either serious or playful, it can be both at different times (Laurel, 2014). These assumptions often occur with the assumed rift that supposedly exists between artistic and scientific pursuits that, through works such as this dissertation, is challenged.

Reading involves imagination, the same way a computer software can be seen as a joint exercise between the imagination of the creator of the program and the individuals that use it (Laurel, 2014). This search to make our imagines palpable is not a new occurrence. Furthermore, experiences in which individuals get to explore and experience a representation of something, without the real-life consequences after, are helpful to form a cathartic and empathic (as defined by Aristotle) experience.

Alan Kay reflected on the computer in 1984 describing it as a medium with the ability to mimic the details of other media (even media that does not exist physically), considering it not a tool but a meta-medium that can act like many tools with levels of representation and expression never available before in order to create new worlds where one can extend and enrich human capacities to think, feel and act (Laurel, 2014).

While some, like essayist Sven Birkerts, may be of the opinion that any digital environment will eliminate this act of imagining, the act of reflecting, and fail in comparison to the introspectiveness of reading a book, Janet Murray defends that this association and comparison of a media format with knowledge value, artistic merit, or depth of attention is ultimately indefensible. Furthermore, in the same way titles on a bookshelf or headlines can distract the reader, so can the internet and its infinite possibilities, however, it can also open the door to sustained exploration and engagement (Murray, 2016).

Moreover, Laurel adapts the six qualitative elements of structure (action, character, thought, language, melody, and spectacle) modeled by Aristotle into human-computer interactions. The most successful human-computer interactions to fully grasp all six of these elements are games. Many involve sensory phenomena and perceivable patterns that are essential for these interactions to be pleasurable (Laurel, 2014; Aristotle).

A big part of human-computer activities can be adapted through the concept of plot and the potential created within it by considering it as a process of possibility to probability to necessity (Laurel, 2014) fueled by the passage of time. Much like in novels, any scene that doesn’t further the plot in some way is deemed unnecessary and gratuitous, while the characters' goals and ambitions set the direction for the plot, or in the case of human-computer activities, the agents’ goals, whether that be the human or the computer element (Laurel, 2014). Therefore, it is

important that the media inserted in this new form of e-book is relevant and helps the plot, focusing on key moments and not on passing curiosities.

From all her research, Laurel reaches Design Heuristics that are essential to the success of human-computer interaction. Some can be useful in designing this new form of e-book. Namely, “think of the computer not as a tool, but as a medium” and “interaction should be couched in the context of the representation - its objects, environment, potential, and tools” which are important when creating something that involves several different types of media with the goal of creating an immersive experience that makes the reader forget they are using a digital instrument.

Furthermore, one should “focus on designing the action. The design of objects, environments, and characters must all serve this grand strategic goal” which, again, goes to the idea that the focus should be on key moments that appeal to most if not all human senses. Moreover, the heuristic “learn about your audience to gain insights that will help guide you in design”, helps justify the co-designing methods that will be used in the prototyping phase. It is important to define the target audience, namely, readers aged 18-30 years old who have had previous and regular contact with e-books.

Finally, it is important to “examine your assumptions and biases”, and “check your preconceptions and values at the door” (2014, p.151-176) meaning, it’s important to focus on the act of co-designing and not on pre-formed ideas that may exist.

Another important topic in creating this interface is the existence of constraints. Constraints are essential to human-computer interactions, not only to guide the interactors to where the designer wants them to be and to match the technological constraints that may exist on the tools used but also to increase creativity (Laurel, 2014; Stokes, 2005; May, 1975). Constraints can either be explicit, present before the action begins, or implicit. They can also be extrinsic or intrinsic. As Laurel states, “constraints that are implicit and intrinsic to the mimetic context are least destructive of engagement and flow, although explicit and extrinsic constraints can be successfully employed if they frame rather than intrude upon the action” (2014, p. 134).

### **2.5.3 The Importance of the Senses**

Flow is an important concept, it is the name given to the state of being entirely cognitively engrossed in an activity. It is full engagement (McGonigal, 2015). Flow is therefore the ultimate goal.

Engagement is a big part of any story, it is what grasps the reader’s attention and encourages an emotional involvement, and it is also an essential element of human-computer interaction. To achieve engagement, the interactor has to be willing to give themselves to the system but the latter shouldn’t also break the mimetic illusion that is trying to create. There is also the importance of agency.

According to Janet Murray:

“Agency results when the interactor’s expectations are aroused by the design of the environment, causing them to act in a way that results in an appropriate response by the well-designed computational system” (2012, p.12).

The issue with novels is that they are usually third-person experiences using third-person pronouns making the experience lack agency. Human-computer interactions can help with this issue by recurring to sensory modalities and mimetic techniques, the activity itself can become more similar to a first-person experience (Laurel, 2014). Moreover, a focus on multi-sensory hints throughout an experience, instead of being displayed as second-hand knowledge, can increase engagement (Laurel, 2014; Bender, 1976).

Therefore, which senses can this new form of e-book affect the most? The three that are not most directly possible are touch, smell, and taste. However, they can be represented (as stated before “representation is all there is”). Touch can be represented through textures that, although visual, can, through the past experience of the reader, remind them of a particular tactile feeling. The same way through smell and taste, with description. The other two senses, sight, and hearing, are the most straightforward to represent, with the visual aspect being such a presence in digital formats (as shown before) and sound easily inserted as well. Moreover, books are the prime example of representing senses through another medium (language).

Games are a valuable tool when it comes to human-computer interaction. It is proven that they affect us psychologically by helping us control and hold our attention, thoughts, and feelings, power up our relationships with others, and motivate ourselves (McGonigal, 2015). As previously stated, the importance of senses and feelings is paramount to make interactions between humans and computers successful, as Jane McGonigal phrases “cognitive absorption is the key” (2015, p.60).

It is true that not everyone agrees with this overlapping of gamification and narrative however it is also true that digital games can be seen in the same way other works of artistic imagination are (Murray, 2016). As proof successful games that involve the power of computational narratives exist namely, *The Sims* (EA, 2000-present), *Grand Theft Auto* (Rockstar Games, 1997-present), *The Walking Dead* (Telltale Games, 2012-2019), among others.

When a person reads a novel (or plays a game or any other hobby that completely gathers the individual’s attention) they are either self-suppressing or self-expanding. When a person self-suppresses they are “avoiding rather than seeking” (McGonigal, 2015, p.140), and while it may improve well-being for a moment, it is not a long-term solution. By self-expanding however, a person is engaging with the world by creating positive thoughts and feelings that can improve everyday life (McGonigal, 2015). Therefore it is important that e-books help the reader self-expand, even if the act of reading in itself can be an act of escapism, it doesn’t necessarily have to be in a negative way.

## **2.6 Conclusion**

Through the analysis of the disadvantages and advantages of electronic books, through proving that it is a rising topic of increasing importance to the day-to-day lives of readers, it is possible to speculate on a new way of taking in stories that takes into account the other senses and other capabilities of the human being (besides reading written out stories).

By exploring multimodal novels, hypertext fiction, transmedia storytelling, theatre, and games, it is feasible to get an idea of where they stand and how to diverge and interact with them in the following stage of this dissertation.



## 3. Methodologies

In search for the most adequate methodology, it is necessary first to evaluate and study several different ones in order to assess their utility, when they are commonly utilized, and in what context. To organize the research in question they were split into different groups considering the role of the designer and the participant (Participatory, Observational, Self Reporting, and Design Process) as divided by Bella Martin and Bruce Hanington (2012).

### 3.1 Participatory Methods

Participatory methods are ones in which the designer and the participant have an active role. The ones discussed in this section will be all qualitative ones, namely, Collage, Design Charette, Flexible Modeling, and Participatory Design.

Collage is an attitudinal and innovative methodology that generates results. It is usually utilized in the phases of exploration, design implications as well as concept generation, and early prototyping. Collage allows participants to express their thoughts, opinions, and ideas creatively without recurring to more traditional means of communication. It serves mostly as inspiration for the designer and thus allows the evaluation of similarities and differences between collages, and the disposition of the elements, and, when analyzed individually, can result in important conclusions.

Design Charette, much like Collage, is an attitudinal and generative method used in the phases of exploration, design implications as well as concept generation, and early prototyping. However, in this case, it is a method adapted from other disciplines. Design Charette involves having several designers, and non-designers, among others, in a room where they are divided into groups and encouraged to share ideas. After a certain set time, the groups are mixed up by a moderator and thus creating a cross-pollination of the best ideas.

Flexible Modeling is an innovative and behavioral method. It is often used in concept generation and early prototyping in order to generate results by presenting participants with several parts of something and seeing how they are assembled. Flexible Modeling is ideal when

the designer wants to analyze which elements or features users prefer for accomplishing a certain task. It is also a way to see which parts create emotions in participants.

Participatory Design is an innovative method not only used in the phases of exploration, and early prototyping but also in evaluation, refinement, and production. It is a human-centered approach that invites participants to engage in several different activities creating a co-designing environment making it both behavioral and attitudinal. Furthermore, the results of this method are not only generative like the others previously mentioned but also exploratory and evaluative, since they allow the participants to inspire and help guide the design process while under the careful watch of design experts.

## **3.2 Observational Methods**

Observational methods are ones in which the role of the investigator/designer is to observe. For observational methods, the ones discussed in this section will be AEIOU, Card Sorting, Remote Moderated Research, and Usability Testing (with the latter three being self-reporting as well).

AEIOU is a qualitative method commonly used in the exploration of the design implications phase and it is by nature innovative and behavioral. This exploratory method follows a guiding taxonomy, namely, Activities, Environments, Interactions, Objects, and Users. These focal points are not independent of each other and in fact, interconnect and overlap in essential ways to reach a more well-rounded conclusion.

Card Sorting is a qualitative and quantitative method commonly utilized in the phases of exploration, design implications as well as concept generation, and early prototyping. It is attitudinal and was adapted from other disciplines. It is a very rich method since it is not only generative but also exploratory making it extremely flexible. Card Sorting allows the designer to perceive how the user comprehends the topic in question but also find meaningful categorization.

Remote Moderated Research is a qualitative and behavioral method often used in the latter phases of a design process, namely, concept generation, early prototyping, refinement, production but also launch, and monitoring. It is an adapted method that allows designers to evaluate remotely how a user interacts with a certain task on their own electronic devices which reaches conclusions hardly achieved if it happened in a lab environment. Remote Moderated Research usually involves a researcher (who interviews the participant and watches their behavior using screen-sharing software), the participants (who share their screen), and observers (who watch over everything).

Usability Testing is a qualitative and quantitative method commonly used in the same phases that Remote Moderated Research is also utilized. This method is evaluative, and traditional that focuses on people and their tasks seeking ways to improve the usability of an

interface. Because it is behavioral, Usability Testing allows for a smaller group of participants to find the necessary changes.

### 3.3 Self-Reporting Methods

Self-Reporting methods, besides the ones already mentioned, include Experience Sampling, Surveys, Interviews, Desirability Testing, Laddering, and Questionnaires.

Experience Sampling is a behavioral and exploratory method that allows the designer to collect various information such as behaviors, choices, and interactions, among others, that the participants themselves self-report, either all the time or in set intervals. It is a qualitative method commonly used in the exploration of the design implications phase and it was adapted from other disciplines.

Surveys are a common qualitative and quantitative method used in the exploration phase to collect information from people on a certain topic (including both behaviors and attitudes). Surveys are highly flexible and traditional, easily adapted to different disciplines and research.

Interviews are a traditional qualitative method that allows direct contact with participants making it a firsthand experience regarding their attitudes. It is exploratory, generative, and evaluative which proves its well-roundedness. Interviews can be used in the exploration, concept generation, and production phases.

Desirability Testing is a qualitative attitudinal method commonly used in concept generation, and early prototyping but also evaluation, refinement, and production. This method is innovative and allows the designers to define which design is the most optimal for the users by evaluating their emotional responses when coming in contact with an interface.

Laddering is a qualitative attitudinal method that allows connections between the physical characteristics of the design with the deeper meaning they may have in the user's life. Laddering is an exploratory method that uses one on one interviews usually in the exploration and design implications phase and/or the latter launch and monitoring phase.

Questionnaires are a traditional method both qualitative and quantitative, behavioral and attitudinal. It is an incredibly flexible way to explore and evaluate people's thoughts and perceptions usually in a written form. Commonly used in the design implications phase or the evaluation, refinement, and production phase, this method is simple to create, however, it has its peculiarities since the designer should pay special attention to how questions and answers are worded.



### 3.4 Design Process Methods

Finally, for Design Processes, which are conducted by design teams as an integral part of the overall approach, there are Brainstorm Graphic Organizers, Bodystorming, User Journey Maps, Parallel Prototyping, Prototyping, Evaluative Research, Automated Remote Research, Contextual Design, Affinity Diagramming, and Evidence-Based Design.

Brainstorm Graphic Organizers is a qualitative method commonly used in the phases of planning, exploration of design implications, concept generation, and early prototyping. It is an adapted method that is both attitudinal and behavioral since it resorts to graphic physical depictions of a certain problem (diagrams, flow charts, among others) to generate new results and knowledge.

Bodystorming is a qualitative method that combines roleplaying and simulation to generate new thoughts and ideas. This method is behavioral and can inspire spontaneous prototyping in concept generation.

User Journey Maps are a qualitative method that is usually used in the same phase as bodystorming, that is in concept generation and early prototyping. This innovative method is both behavioral and attitudinal by visualizing the experiences people have with a certain interface in order to then evaluate each moment individually.

Parallel Prototyping is once more commonly used in concept generation and early prototyping by exploring multiple design opportunities that can help narrow them down and/or improve them. It not only helps generate results but evaluates them as well.

Prototyping is a traditional design method that consists of the generation of artifacts at various levels of resolution that are then evaluated by users to improve the design team's ideas. It can be, therefore, behavioral and attitudinal.

Evaluative Research is a traditional quantitative method commonly used in the evaluation, refinement, and production phases. It involves testing prototypes, ideas, and interfaces through real potential users by resorting to different formal or informal means making it, therefore, behavioral and attitudinal.

Automated Remote Research is an innovative qualitative and quantitative method that reveals statistically relevant data about what people interact the most with on a certain interface. Automated Remote Research is behavioral and both exploratory and evaluative commonly used in the exploration of design implications, concept generation, early prototype iteration, and launch and monitoring.

Contextual Design is an innovative qualitative design that can be used in most design phases (except launch and monitoring). It is both behavioral and attitudinal since it resorts to customers to center the design around, being open about each step of the design with them so that every single step can be anchored in data coming directly from the users. Therefore it is exploratory, generative, and evaluative.

## Methodologies

Affinity Diagramming is a behavioral and attitudinal method that can be used in most design phases (except in the earliest stage of planning and definition). It is an adapted qualitative method that generates results by grounding designers in data helping designers keep track of research-backed insights, observations, concerns, and/or requirements on, for example, individual sticky notes.

Evidence-Based Design (EBD) is an adapted quantitative method that can be used throughout all the design phases making it, therefore, exploratory, generative, and evaluative. By referring to credible research and assessed outcomes, this behavioral and attitudinal method bases each decision on said implications.

### 3.5 Methodologies Chosen

Despite all of the methodologies presented having their advantages for the topic of this dissertation, it is necessary to consider time limitations and resource availability in order to pick the ones that would be the most productive to use.

Firstly, any method that relies on a significant number of participants or on bigger groups for statistics should be put aside. Secondly, any that require a bigger amount of time than the one available (that is, longer than three months) are unrealistic to pursue. Thirdly, it is important to choose the ones that are the most beneficial to the creation of the artifact in question.

Furthermore, because the goal is to have this development section help create the artifact (that is, along with the guidelines, the goal of this dissertation) it is important that the method chosen helps to do so, and so, any methodologies that are mostly used in later phases (that is methods that are there to help improve and/or evaluate an already existing prototype) should be saved for a later moment.

Therefore, the one that seems the most beneficial is mostly of the participatory and observational variety, namely, Co-Design. The goal is to conduct an in-person session where a small number of participants can co-design the prototype from several existing cards (and other materials) with each representing individual media objects that can be embedded into the text with minimal intervention from the designer/moderator. It should be a session in which participants can feel comfortable drawing, writing, and scribbling with the physical materials they are provided. This way, the participants would have the freedom to ponder what is asked of them and discuss ideas among themselves without being stirred in certain directions by the moderator.

Moreover, by the end of the session, there would exist ideally a simulation of a prototype, something lo-fi but from which conclusions and further developments could grow.

These participants should be young adults with previous experience reading on electronic devices (whether that be e-readers, tablets, or computers, among others). This way, it can be

assured that they will create something different that takes into account their own desires regarding the prototype.

In the posterior phase, Usability Testing comes in. In this phase, several points should be the focus. Firstly, the three metrics of this method: efficacy, efficiency, and satisfaction. Efficacy should focus on whether the prototype is effective or not, it is a binary metric. Efficiency should focus on what resources are required, how long it takes to utilize them, and whether they are helping or arming the main purpose of the prototype. Satisfaction is the most subjective of all three and they will all be evaluated through User Experience Questionnaires (UEQ) questionnaires.

Due to the fact that literature itself is an emotional experience and that this dissertation also focuses on improving said emotional link it is important to evaluate if this prototype engages emotionally with the user/reader through User Experience Questionnaires (UEQ). This method can also help estimate how accessible the prototype is, with the goal being that it should be accessible anywhere by anybody at any time (although being realistic regarding the possibility of fully making this prototype fully accessible or not considering the time restraints and resource limitations).

This way, by mixing the Co-Design session with further Usability Testing through UEQ questionnaires a few guidelines and conclusions should be reached for heuristic evaluation.

Following the User Experience Questionnaires, it is necessary to present the results to the same group of potential users from the co-designing session as well as a different set of people who will act as a control group. This way, it will be possible to compare results and analyses to further validate the qualitative conclusions regarding this new form of e-book.

## 4. Implementation

### 4.1 Co-Design Session with Potential Users

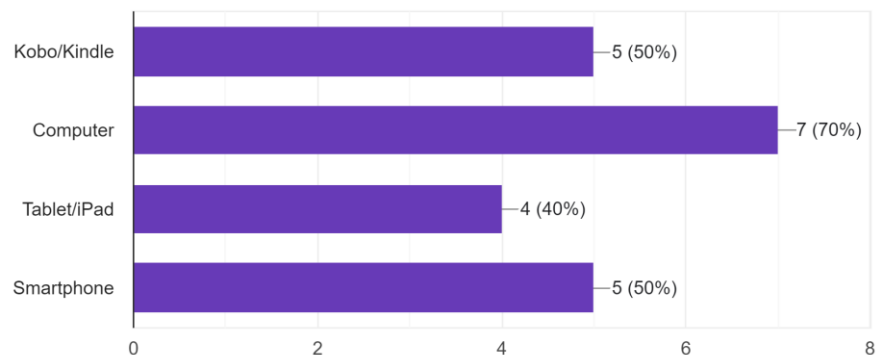
Through several physical materials such as pieces of text, placeholders for images, video, sound, and availability for more, pens, adhesives, and scissors, the participants are asked to interact with said artifacts in order to create a new one. The participants in question, due to their previous experience reading in digital formats, are able to look beyond existing formats and hopefully find themselves answering their own needs and questions (Appendix A, D).

The goal of this session is to figure out what potential users wanna see in this simulation, what interactive elements they want to explore more, and which ones should be less focused on. It would be also focal to understand what triggers emotions in the readers, and which way and/or order they most prefer to get that emotional payback.

To reach out to these Potential Users, a Google Form (Fig.7) was created in which, besides demographic data, it was asked what formats of e-books have they read and on which devices, allowing for some overlapping of answers. The results of the ten people (of which five accepted/had availability to be in the session), were that eighty percent of them had read in epub format and eighty percent in pdf. In terms of devices, fifty percent read on the kobo/kindle, seventy percent on the computer, forty percent on the ipad/tablet, and fifty percent on their smartphones (Anex A).

Select the devices on which you have read e-books previously:

10 respostas



**Figure 7. Readers' Devices**

## 4.2 Session Results

Throughout the session (Fig.8), the potential users allowed their imaginations to answer their own needs and desires. It was an open conversation often jumping between topics and returning to past ones. For the sake of organization, the most common topics were divided between the Peculiarities of the Device itself, the Interface, and the Story Elements.



**Figure 8. Co-Design Session**

### 4.2.1 Peculiarities of the Device

The main question that needed an answer in terms of the device was where to set up this new form of e-book. Would it be a computer device, a tablet, a phone, or even an e-reader (such as Kindle or Kobo)? The answer to this was unanimous among the potential users: it must be something that can be carried anywhere, making transport a main concern. To this, tablets, e-readers, and phones were the most accepted artifacts.

Other peculiarities of the device were suggested such as a sound system in order to accept audiobooks throughout the read. Many devices already have this although the link up of simultaneously reading physically and having access to the audiobook version is often overlooked.

## Implementation

Furthermore, it was acknowledged that certain genres of novels are more prone to this new format of e-book than others, the main consensus being that fiction, specifically fantasy stories, was better suited than non-fiction.

Finally, because Artificial intelligence (AI) has been increasingly present in everyday life, some suggested the role that it could have in this format. AI could be the answer for Too Long Didn't Read Sections (commonly called TLDR) in particular for when a reader stopped reading a certain book for a time and requires a shortened summary of what occurred so far.

Moreover, image generation through AI was a highly discussed topic. The inclusion of images was a consensual must across the potential users since they can improve the immersion in the story, regarding fantastical environments, among others. However, not everyone was keen on accepting AI-generated imaging right away with some suggesting bringing in artists to create these images. For example, in the same way book covers are part of the editing process, so would these images.

### 4.2.2 Interface

As for the Interface, there were a few things in general that the potential users requested: it should be colorful (as opposed to the grayscale currently present in e-readers for example), it should be easy on the eyes (meaning using the same technology most e-readers use today that allow for a screen that imitates paper and therefore, isn't harsh on the sight), and all the extra elements that will be discussed in the following section should appear either through pop-ups, split screen or dropdown options.

One unexpected yet interesting focus of the session was the social side of reading. The potential users wanted to interact more with the text but also with fellow readers. Either by connecting with existing online reading communities (such as Goodreads or Storygraph), or through the facilitation of Buddy Reads. This would occur by being able to add and see comments and chat rooms. When asked how these comments would appear, the potential users decided that the ones from added friends should appear first followed by other online readers. For this social side to function Wi-Fi would have to be available and when confronted with the possibility of the reader being in a place with no Wi-Fi access, some suggested that the comments would be stored in the device's cache, for example, and uploaded at a later time.

Another way to involve the reading community even further would be to allow the readers to request certain books to be adapted to this new form of e-book. It was also clear that this new form of e-book should be something that one can adapt existing stories into, meaning it shouldn't be a type of writing or an artifact that must be involved with the story from the point of creation.

When faced with the possibility that some readers might not want to have to engage with all the story elements that will be explained in the following section, they suggested that this

could all be managed in the settings. Meaning, there would be default settings for the experience the reader is looking for (with more advanced settings to toggle specific things).

### 4.2.3 Story Elements

In terms of more specific elements that would involve the story itself, the following were highly requested by the participants.

Regarding characters, the potential users express their desire to see the information about said character by clicking on their name (this information would include illustrations, as well as their backstory), however, to avoid spoilers, this information would evolve and grow depending on how far in the book the reader is. Another detailed request was having a voice actor read out said information and backstory.

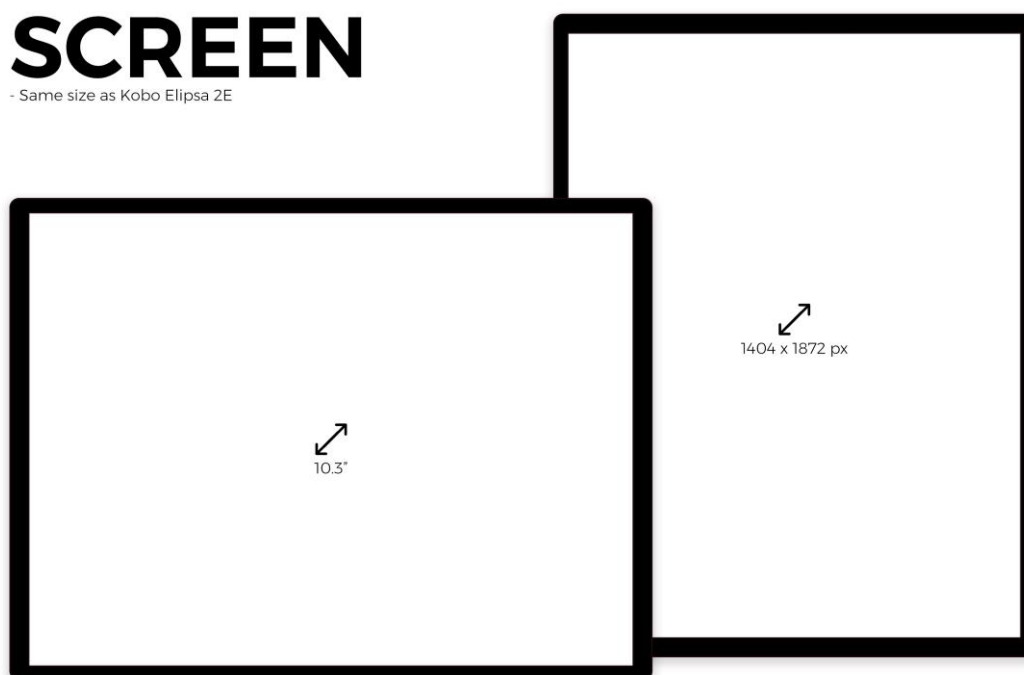
In stories involving maps, there were ideas on how to make them more interactive. For example, the map could show where in the story the reader is, and what each location looks like (said image generation), either through 3D images or 2D images slightly animated.

As for other sound elements another one that would be interesting, according to the potential users, would be ambient sound to help with immersion. Other ideas were playlists inserted throughout the story.

A rarer and more out-there proposition was the insertion of minigames relating to what happens in the book. An example used by the participants was in *Harry Potter and the Philosopher's Stone*, when there is a game of chess in the book, the readers would have the chance to play the game themselves.

### 4.3 Lo-Fi Prototype

From the results of the Co-Designing session with the potential users, where they were able to answer their own needs, it was time to proceed to the creation of a Lo-Fi Prototype that met their requirements. Firstly, it was decided to use as a base the size of the Kobo Elipsa 2E (1404 x 1872px), the latest release in e-reader technology at the time of this dissertation (Fig.9). The participants in the co-designing session were pretty adamant that they preferred a portable device as opposed to a computer, laptop, or other heavier objects to carry, placing mobility as one of their main concerns.



**Figure 9. Lo-Fi Prototype Screen**

Other important elements of note are that the interface present should be colorful yet still easy on the eyes for better accessibility, utilizing similar screen technology present in e-readers with light adaptable screens. Furthermore, there should be 'Too Long Didn't Read' Sections for when a reader hasn't picked up a certain story in a while and needs a refresher on what happened so far.

Certain requests from the readers had to be allocated to Future Work, in particular the elements referring to the social side of reading. In order to keep the focus of this dissertation consistent, the buddy reads elements were pushed to explore at a later date, giving priority to media-related elements.



### 4.3.1 Sound Elements

In terms of sound, this prototype reflects the need to imbed text-to-speech capabilities, so that the experience of an audiobook can be had while reading it in the digital format. Moreover, it makes the prototype extra accessible by allowing this text-to-speech option for all the elements present as well (Fig.10).

# STORY ASPECTS

- Ambiance Sound in certain scenes;
- Audiobook sound system;
- 'Too Long Didn't Read' Sections.

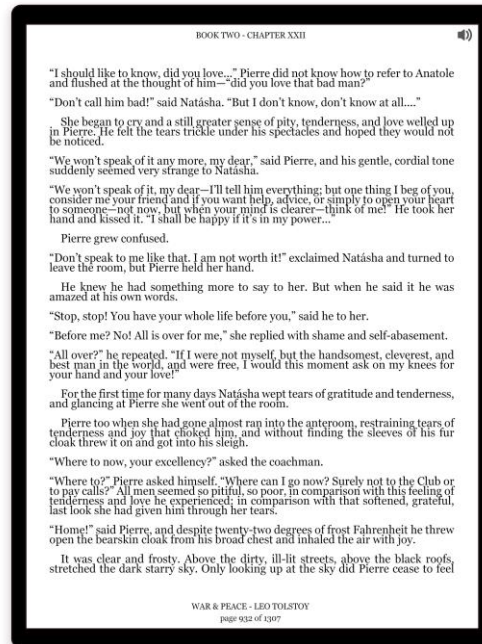


Figure 10. Lo-Fi Prototype Story Aspects

Still in the realm of sound, depending on the novel, some scenes could involve ambiance in the background in order to boost immersion with a simple click of a button. This would be, for example, the wind rustling in the trees on a forest setting, or the waves on the seaside.

## Implementation

### 4.3.2 Visual Elements

#### 4.3.2.1 Characters

In order to understand the story even further and to connect with the characters more, it was of interest to have a pop-up with character information, such as name, age, and place of birth, among others, depending on the novel. To avoid spoilers, when discussing more detailed information such as a full biography, certain parts should be redacted depending on the progress of the reader in the story. This pop-up would be movable and would appear by clicking the name of the character in question (Fig.11).

### CHARACTER INFORMATION

- Colorful Interface;
- Character Information on a Pop-Up;
- Statistics about the character;
- Character's Biography with parts that get unlocked as the story moves on;
- Option to have narrators narrating the information;
- Links to Fanart and Wikis.

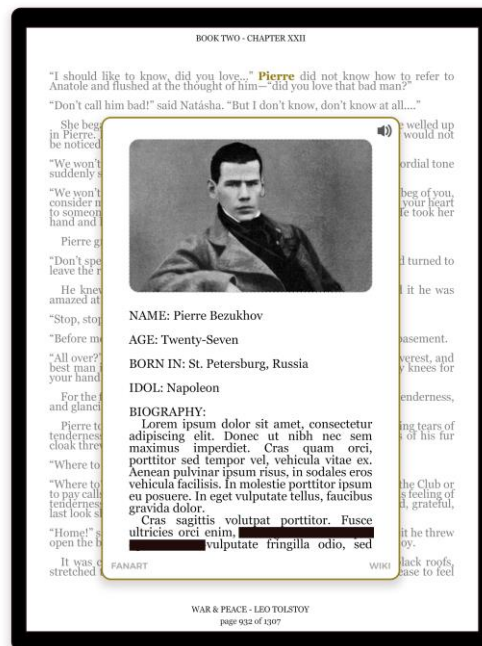


Figure 11. Lo-Fi Prototype Character Information

Besides information regarding said characters and also an illustrated image of what they look like it was important to add a link for Fanart, in order to connect with other readers and artists, as well as to the Wiki page of the fandom in question. These latter elements refer to the desire of exploring the more social side of reading which will be further discussed in the Future Work section.

### 4.3.2.2 Interactive Map

## INTERACTIVE MAP

- Interactive Map that allows to listen and see locations of the story.



**Figure 12. Lo-Fi Prototype Interactive Map One**

For novels that include a map, it was important to make it more interactive. To achieve this, it was necessary to allow the reader to not only see where in the world of the book they are at a certain point in a story, but also to be able to visualize it through 2D images (possibly animated by using a simple technique of separating part of the image into layers and using them to allude to movement) and 3D representations as well (Fig. 12, 13).

## Implementation

### INTERACTIVE MAP

- By clicking on a location, one of two things could happen: a 2D animated image could appear, or a 3D space of said location.

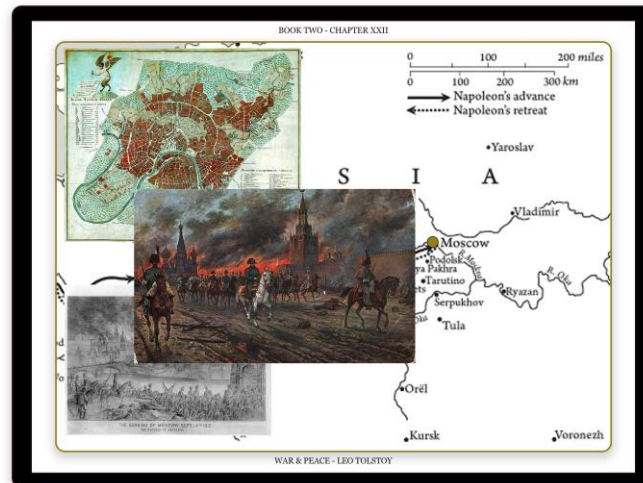


Figure 13. Lo-Fi Prototype Interactive Map Two

# 5. Results

In order to evaluate the validity of the prototype in question, User Experience Questionnaires were developed according to Andreas Hinderks, Martin Schrepp, and Jörg Thomaschewski's values of Attractiveness, Perspicuity, Efficiency, Dependability, Stimulation, and Novelty. This was chosen in order to assess the classical aspects of user experience (efficacy, efficiency, and satisfaction) but also other important elements that, considering that this is a qualitative-based evaluation, felt necessary.

The goal of using User Experience Questionnaires (Anex A, B) was not to achieve statistical value (hence why the need for the minimum of thirty-three participants was discarded) but to take qualitative conclusions from the data since the focus of the dissertation itself is a subjective, emotion-based experience.

The User Experience Questionnaires were conducted through a Google Form that involved a link to the prototype as well as all the questions organized in a way that allowed for the easy transition to the Excel file used to extract conclusions from the data collected. Each participant was asked to on a scale of an attribute to another, evaluate the lo-fi prototype. After two weeks, the questionnaire had twenty answers and the following data is the summary of them.

## 5.1 Data Analysis

The Benchmark presented in the graph below is in relation to a set of existing values concerning hundreds of different technological products collected by Andreas Hinderks, Martin Schrepp, and Jörg Thomaschewski and therefore serves as a safe comparison point to reach conclusions regarding the prototype in question (Fig.14, Anex C).

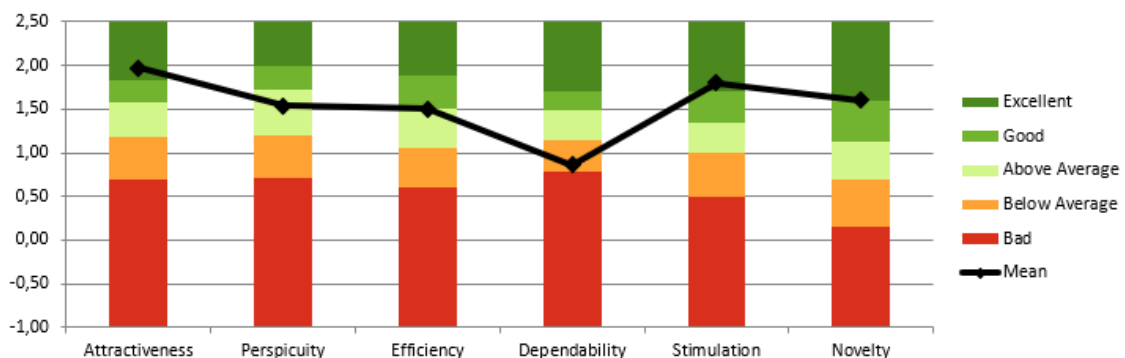


Figure 14. Prototype Benchmark Placement

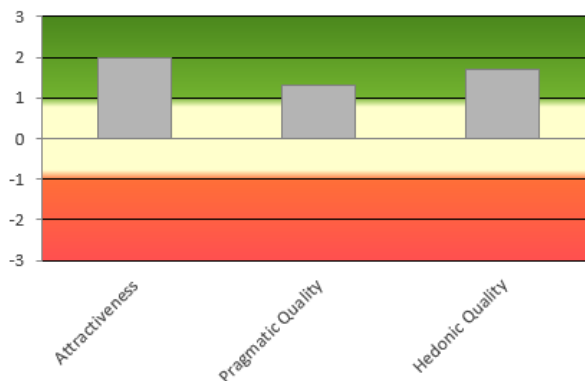
## Results

According to this benchmark, in terms of Attractiveness, the prototype scores 1,97, its highest, which is excellent in relation to other products. This means that the prototype in question is aesthetically pleasing and goes with what the potential users not only are accustomed to seeing but would like to have added to other e-books.

Perspicuity, with 1,54, is above average, meaning the prototype was more prone to be understood and easy to use. Efficiency had a 1,50, falling in the above-average category as well. This parameter relates to the practicality of the prototype. Dependability has the lowest score of 0,86, making it below average, with the users finding it unpredictable.

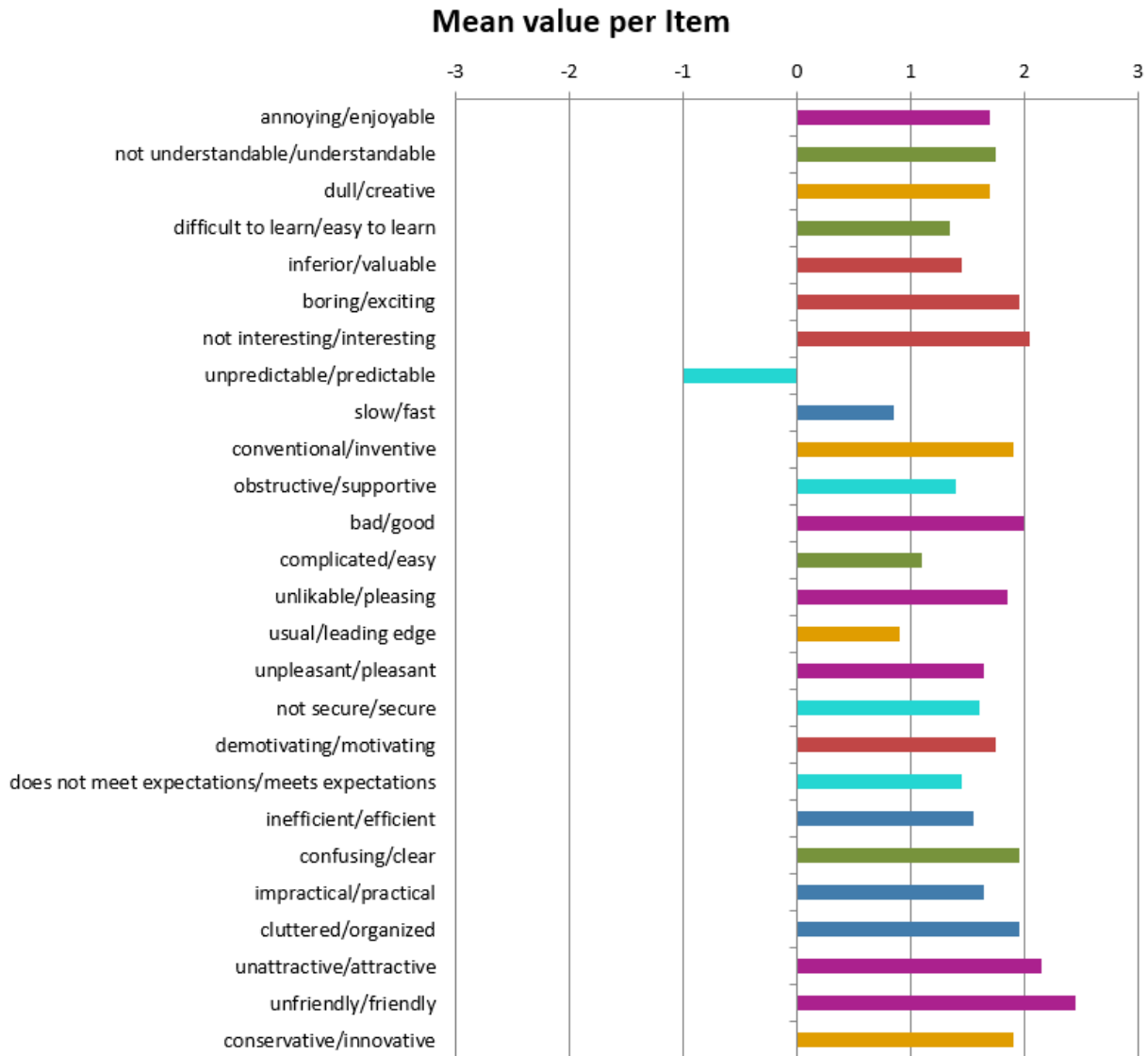
Stimulation has a 1,80, making it an also excellent score meaning the users found it an interesting and exciting experience. Novelty is a 1,60 has a good score, making it innovative and creative.

Another set of numbers that is interesting to see is the collection of Pragmatic versus Hedonic Values. The scales of the UEQ can be grouped into pragmatic quality (Perspicuity, Efficiency, Dependability) and hedonic quality (Stimulation, Originality). Pragmatic quality describes task-related quality aspects, while hedonic quality refers to the non-task-related quality aspects.



**Figure 15. Pragmatic vs Hedonic Qualities**

According to this graphic, the prototype is stronger in Attractiveness and Hedonic Qualities than it is in the Pragmatic ones (Fig.15). This is due to the mean of each answer, as demonstrated below (Fig.16).



**Figure 16. Mean Value Per Item**

## 5.2 Main Group vs Control Group

In order to further evaluate the obtained results it felt necessary to run them by two different groups in small debate sessions. The main group, meaning the people that helped conceptualize the prototype in the co-designing session, and a control group, meaning people with no biased opinions regarding the prototype because they weren't a part of its ideation (Appendix B, C).

The main group's conclusions were, as expected, pretty defendant of the prototype itself, with very few errors to point out. They concluded that the prototype excelled at attractive and friendly parameters and fail to come to terms with the lower score in dependability so affected

## Results

by the “unpredictable/predictable” attribute since they found unpredictability to be a positive aspect yet they understand that some might think predictability is the better goal, however hesitantly.

The main group also had a hard time understanding why the Pragmatic quality was lower than the Hedonic because they believe that the prototype fully met the goals they had set out for it and completed the task goals it set out to fulfill.

Meanwhile, the control group had access to the prototype and the results so they would be able to produce meaningful conclusions without being affected by any involvement in the creation of the artifact.

The results from the session with the control group revealed several interesting points. Firstly, it was observed that the only category consistently placed on the left side of the evaluation scale was "unpredictable." This finding suggests that participants had different ranking methods in mind compared to the researcher, as unpredictability was the only category positioned separately.

Unpredictability was perceived as a positive characteristic in terms of product innovation. It indicated that the prototype had the potential to bring something new and groundbreaking to the market. However, it also had the potential to create a sense of uncertainty and unreliability among customers. The positive effect of unpredictability was supported by the high ratings in the "Attractiveness" category, indicating that the prototype appeared innovative and appealing. Nevertheless, the apparently low values in the "Dependability" category may accentuate the customers' mistrust, further fueled by the element of unpredictability.

The prototype received positive evaluations in various aspects, with particular emphasis on being "friendly," "attractive," and "interesting." These characteristics are essential indicators of the audience's interest and potential consumption. The prototype's hedonic qualities, such as enjoyment and attractiveness, seem to strongly support this positive analysis. The innovative nature of the project may have contributed to participants perceiving it as unpredictable. However, it is noteworthy that despite being seen as unpredictable, participants still considered the prototype as "understandable" and "friendly," indicating a certain level of user acceptance.

While the prototype was highly rated in most aspects, the pragmatic quality, specifically "Dependability," received relatively lower scores. This suggests that participants found the prototype less pragmatic than desired. However, it is important to note that pragmatic quality is something that can be better evaluated through actual product usage. Nevertheless, the prototype's overall positive ratings and comparative advantage in the market indicate its readiness for integration and perceived quality.

Despite the below-average ratings for "Dependability," it is believed that this result is due to a misconception or different interpretation of the "unpredictable/predictable" question between the researcher and participants. Excluding the capitalist perspective, the prototype seems to align well with market needs and presents an exemplary and creative solution. It shows



potential to attract and engage users, particularly those who are seeking innovative multimedia experiences.

The prototype's positive evaluation, emphasizing its friendliness, attractiveness, and stimulation, suggests that it can play a significant role in modernizing reading and aligning it with current media trends. Considering the decreasing trend in reading and the preference for visual media, the prototype holds the potential to generate greater interest in reading and provide a more immersive and enjoyable experience.

The prototype received a predominantly positive evaluation from the 20 participants. It was perceived as easy to understand, handle, and interact with, evoking interest and curiosity. The prototype's unpredictability was not seen as a negative aspect, but rather an exciting element that positively surprised users.

While the prototype was generally perceived as appealing and easy to understand, the slightly lower ratings in task completion suggest some difficulty in using certain features. To enhance the prototype, it is crucial to focus on improving its intuitiveness and making the process of completing tasks more immediate and understandable. This would ensure a smoother user experience and encourage users to explore the full functionality of the prototype.

### **5.3 Summary and Implications**

In summary, according to both groups, the evaluation of the prototype revealed a positive perception overall, with users finding it attractive, enjoyable, and stimulating. The unpredictability of the prototype, although initially intriguing, may have led to some apprehension in completing certain tasks. Nonetheless, the prototype's high level of interactivity and potential for enriching the reading experience were appreciated. The pragmatic quality, particularly dependability, received relatively lower ratings, suggesting the need for further improvement in usability. The prototype's positive reception and alignment with market needs indicate its potential for success. However, continuous user feedback and refinement are necessary to address usability issues and enhance its overall appeal and effectiveness in meeting users' expectations.

## 6. Discussion

As we analyze the results from this study, it is safe to say that both hypotheses were proven to be correct. As observed in the state of art of this study, storytelling is not dependent on written artifacts, and this new form of e-book is a safe alternative. Both potential users that helped create the product, as well as individuals outside of the co-designing sphere agree that this is an attractive alternative full of potential.

Furthermore, media insertion in literary narratives upgraded the user experience present in electronic books as seen through the User Experience Questionnaires. Not only is it an attractive and friendly alternative, but it is also an effective one when it comes to immersion and engagement in the narrative.

All the technologies and methods explored in the state of art of this study helped acknowledge how the insertion of media was done in the past and how it could be traversed now with new e-reader technology on the move, and better screens each time, making the possibilities endless. Moreover, by taking into account the role of emotions not only in human-computer interactions but also in the narratives themselves, it is possible to point out which media would engage the reader the most by putting those options in their own hands, giving this study its greatest value.

Additionally, there is also the matter of the name to give this new form of e-book, if a new one even feels necessary. Throughout all the sessions all the participants always called the artifact in question an e-book, they did not feel the need to change the name, even if etymologically it leaves something to be desired. Therefore, retaining its nomenclature seems the most fitting.

Finally, it is necessary to generate some guidelines of important elements to consider when it comes to the development of these new artifacts, whether those be through creation or adaptation. These guidelines should encompass aspects such as user experience, media integration, immersion, and engagement, ensuring that the development process aligns with the goals of enhancing the reading experience and leveraging the potential of this new e-book format.

# 7. Guidelines

These guidelines aim to guide the development of the artifact, focusing on key aspects such as device specifications, interface design, sound elements, and visual elements related to characters and interactive maps. The implementation of these guidelines will help creators, designers, writers, publishers, and editors, meet the requirements and preferences expressed by potential users during the co-designing session.

## 7.1 Device Specifications

- Prioritize mobility, as potential users expressed a preference for a portable device over heavier objects like computers or laptops.

## 7.2 Interface Design

- Create a colorful interface that is visually appealing yet easy on the eyes for better accessibility.
- Utilize screen technology similar to e-readers with light adaptable screens for a comfortable reading experience.
- Include "Too Long Didn't Read" sections to provide a concise summary for readers who haven't picked up a certain story in a while.

## 7.3 Sound Elements

- Implement text-to-speech capabilities to enable the experience of an audiobook while reading the digital format.
- Consider incorporating ambient sound effects for certain scenes to enhance immersion. For example, background sounds like wind rustling in a forest or waves crashing at the seaside.

## 7.4 Visual Elements

- Include pop-ups with character information, such as name, age, and place of birth, to deepen the understanding of the story and enhance connection with the characters.
- Redact certain parts of character biographies to avoid spoilers, revealing more details as the reader progresses in the story.
- Make the character pop-up movable and accessible by clicking on the character's name.
- Provide illustrated images of the characters' appearances to aid visualization and connection.
- Add links for fanart and the Wiki page of the fandom to facilitate engagement with other readers and artists, supporting the social aspect of reading.
- Enhance the interactivity of maps in novels by allowing readers to see their current location within the book's world.
- Utilize 2D images, possibly animated using layer separation techniques, to create the illusion of movement.
- Consider incorporating 3D representations of locations to provide a more immersive experience.

## 7.5 Miscellaneous Reminders

- Because all stories are different, be open to feedback from the readers
- Don't be afraid of having to do new iterations until the media inserted in the narrative truly assists it and not obstructs it

# 8. Future Work

It is impossible to close off this research without mentioning a big part of the desires from the potential users that were purposefully left out since they fell on the outside focus of this dissertation and therefore would require a vaster set of study topics to give it the full attention it deserved. That element is the social side of reading (Fig.17).

## BUDDY & READS

- Social side of reading;
- Buddy Reads System;
- Book Socials.

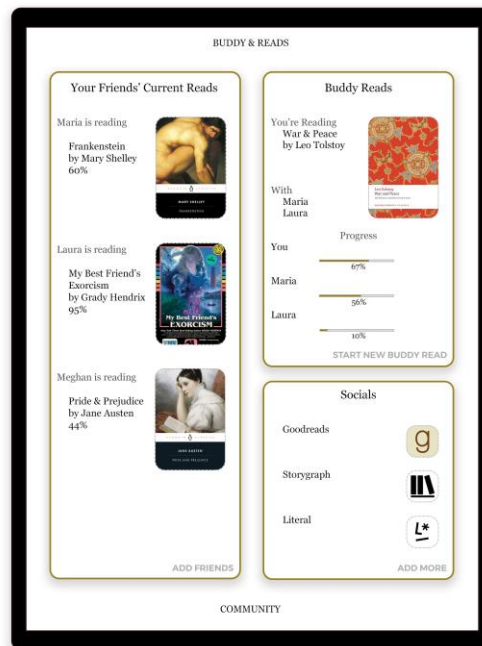


Figure 17. Lo-Fi Prototype Buddy Reads

## Future Work

Due to not partaking in the user experience questionnaires and the following data analysis, this section of the potential users focus can not reach truly proven guidelines, however from their needs alone, they would look something like the following subsection (Fig.18).

### COMMENT SECTION

- Ability to comment on passages of the text;
- Chat rooms;
- Opportunity to see other people's comments on said section.

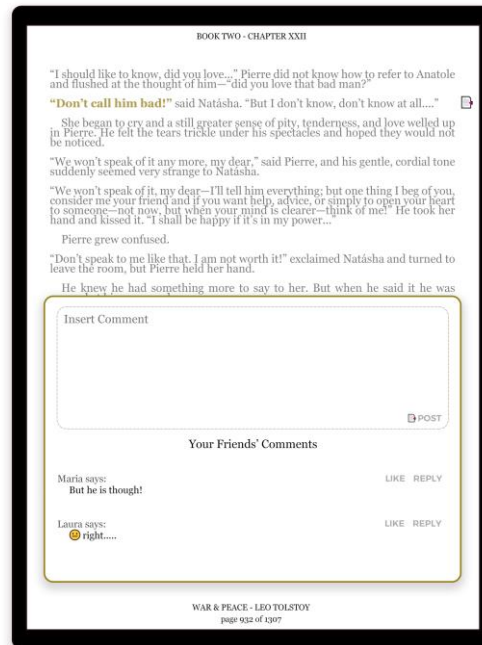


Figure 18. Lo-Fi Prototype Comment Section

## 8.1 Guidelines for Social Interaction

- **Connect with existing online reading communities:** Integrate features that allow users to connect with popular online reading communities like Goodreads or Storygraph. This enables users to engage with a larger community of readers, share recommendations, and discover new books.
- **Facilitate Buddy Reads:** Implement functionality for users to participate in Buddy Reads, where they can read and discuss books together with friends or like-minded readers. Provide options to create private chat rooms or join existing ones dedicated to specific books or genres.

- **Comments and Chat Rooms:** Enable users to add comments and participate in chat rooms to discuss specific sections, chapters, or overall impressions of a book. Display comments from added friends first, followed by comments from other online readers, fostering a sense of familiarity and community.
- **Offline access:** Account for situations where Wi-Fi might not be available by allowing comments to be stored in the device's cache. Users can then upload their comments at a later time when Wi-Fi connectivity is restored.

By incorporating these guidelines, the reading experience can become more interactive, social, and engaging, allowing readers to connect with others, share their thoughts, and enhance their enjoyment of books. However, once again, these guidelines would have to be truly assessed in the future, in order to be implemented properly.

## 9. Conclusion

Through the conduction of this research, it is possible to conclude that there is a gap to be filled when it comes to engagement in electronic books, with readers and potential users distinctly not only wanting but also welcoming this change in content. It is clear that emotions and senses have a big role in assuring said engagement and that the focus of this new form of e-book and its elements should be this aspect of human-machine interaction.

The goal, ultimately, was to prove that the narrative in e-books could not only function but benefit from media insertion, in order to join the world of multimedia and literature. Although succinct, the prototype helped illustrate the wants and needs of the potential users and provided the guidelines displayed prior. Guidelines that, depending on each fictional narrative each story displays, open the possibilities to a new form of electronic books - and literature itself. Hopefully, the guidelines here reached will be a tool for writers, editors, designers, publishers, and every individual involved in the wonderful world of storytelling to take their stories a step further when it comes to digital copies.

With such a vast digital world in such a big digital era that is the XXI century, it is only natural to wonder how to embed media everywhere but it is also important to note when and how. Stories come naturally to human beings, the skill to spin narratives is innate to humans, across cultures and oceans, but, most importantly to the topic at hand, across mediums too.

Ultimately, stories are all different, and producing a one size fits all set of guidelines for them is difficult, if not impossible, but hopefully this research can help bring some expressiveness to those that set themselves upon this endeavor. If not, at least let it inspire people toward literature since, in the words of Jane Austen:

*“The person, be it gentleman or lady, who has not pleasure in a good novel, must be intolerably stupid.”* (Austen, 1817).



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# 11. Appendix

## 11.1 Appendix A - Script - Co-Designing Session

[Room with several tables joined together and chairs around them so that people can sit at the same table together. In the center of this surface several materials are laid out: paper in different colors, colorful markers, printed sheets of text, and duck tape.]

Good afternoon and welcome everyone to this co-designing session. Firstly, I ask that you sign the General Data Protection Regulation / GDPR documents before you. These are a way to assure you that all your data will be solely used for this dissertation and will be destroyed after its delivery. Similarly, all the photographic and audio artifacts collected from this session will be handled in the same way. Secondly, I need you to fill in a couple of demographic information about yourself such as name, age, gender, and occupation.

Now, I give you space to introduce yourselves, I can start: Hello, my name is Melissa Guimarães, I am twenty-two years old, I use she/her pronouns, and am currently finishing up my Masters in Multimedia. I am very grateful to all of you for coming to this session.

[Time for participants to introduce themselves and get to know each other.]

I will explain now how the session will work, it will be a maximum of three hours long with a ten-minute break in between each hour (we may not need the full three hours, it will depend on how it goes), and you are free to discuss among yourselves and use all the materials you see before you.

Now I'll explain what is the goal of this session and why we are all here. The focus of my dissertation is to improve upon the e-book. Meaning, I want to create a new simulation of an artifact that builds upon the e-book, with a brand new interface that answers any concerns and/or wishes you as potential users may have when you interact with an e-book.

What do you consider to be an e-book? What is it to you?

[Time for participants to answer.]

The goal of this session for me is to figure out what potential users wanna see in this simulation, what interactive elements they want to explore more, and which ones should be less focused on. It would be also important to me to understand what triggers emotions in the readers, and in which ways you get that emotional payback.

## Appendix

You are free to solve your own doubts and wishes in any way you can imagine. The goal of this session is to get a lo-fi prototype, a simulation of sorts, so don't limit your imagination just because you think something is impossible or unattainable.

Inside this room for the next three hours, the sky is the limit. You may begin.

### **11.2 Appendix B - Script - Session w/ OG Group**

[Zoom Call]

Good afternoon and welcome everyone to this session. In this session, I will show you some results of the questionnaires I conducted regarding the prototype that was born from our previous session and ask you for some feedback. This session will be recorded as stated in the General Data Protection Regulation / GDPR documents you've signed previously.

The people in the questionnaire were asked to, between two values, pick on the scale where they felt the prototype was closest to. So now I am going to share my screen with certain graphics that analyze this data and give you room to speak. The feedback can be either regarding differences in responses, qualitative elements about what you think should be different in new iterations of the prototype, and so much more.

[Share Screen and Begin Discussion]

### **11.3 Appendix C - Script - Session w/ Control Group**

[Zoom Call]

Good afternoon and welcome everyone to this session. In this session, I will show you some results of the questionnaires I conducted regarding a prototype for a new form of electronic book that has the goal to insert media in order to allow better immersion in a story.

The focus of my dissertation is to improve upon the e-book. Meaning, I want to create a new simulation of an artifact that builds upon the e-book, with a brand new interface that answers any concerns and/or wishes potential users may have when you interact with an e-book.

This session will be recorded as stated in the General Data Protection Regulation / GDPR documents you've signed previously. These are a way to assure you that all your data will be solely used for this dissertation and will be destroyed after its delivery. Similarly, all the photographic and audio artifacts collected from this session will be handled in the same way.

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[Time for participants to introduce themselves and get to know each other.]

The people in the questionnaire were asked to, between two values, pick on the scale where they felt the prototype was closest to. So now I am going to share my screen with certain graphics that analyze this data and give you room to speak. The feedback can be either regarding differences in responses, qualitative elements about what you think should be different in new iterations of the prototype, and so much more.

[Share Screen and Begin Discussion]

## **11.4 Appendix D - General Data Protection Regulation Permits**

## AUTORIZAÇÃO E CEDÊNCIA DE DIREITOS DE IMAGEM E EXPLORAÇÃO

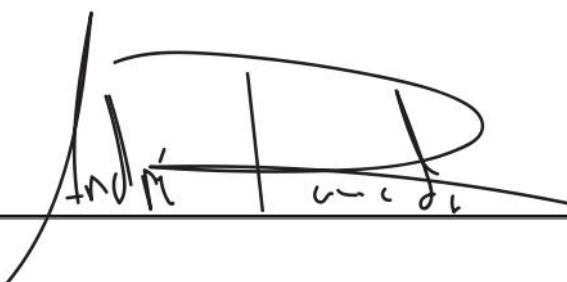
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A Melissa Guimarães, na presente data, e enquanto responsável pelo tratamento de dados prestou-me as informações necessárias à formação da minha vontade, garantindo-me que honrará a finalidade da recolha dos dados, não podendo posteriormente utilizar os mesmos para quaisquer outras finalidades além das indicadas, salvo se nova autorização for facultada por mim; que os dados registados não serão facultados a qualquer outro organismo ou entidade; e que, serão asseguradas condições de acesso e possibilidade de correção dos dados pessoais registados, se justificável e solicitado.

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## AUTORIZAÇÃO E CEDÊNCIA DE DIREITOS DE IMAGEM E EXPLORAÇÃO

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Assinatura:

Daniela Oliva

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Data 26 / 05 / 2023

Assinatura:

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*J. Figueiredo*

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Data 29 / 03 / 2023

Assinatura:

*Melissa Guimarães*

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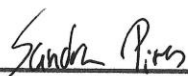
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Ao abrigo do disposto no artigo 79º do Código Civil Português conjugado com o estabelecido no artigo 4º, nº 4 e 6 da Lei de Proteção de Dados Pessoais, e no artigo 141º, nº 1 e 2 do Código do Direito de Autor e dos Direitos Conexos (CDADC), autorizo a captação, tratamento e respetiva difusão da minha imagem e dos meus dados pessoais, no âmbito da minha participação na sessão de Co-Design, realizado pela Melissa Guimarães em prol da sua dissertação de Mestrado em Multimédia.

Autorizo a Melissa Guimarães, ao abrigo do artigo 68º, nº 2, alíneas e}, i} e j} do CDADC, a utilizar as gravações feitas e material fotográfico e vídeo da minha pessoa, integral ou parcialmente, e reproduzir o meu nome, imagem e gravações de voz para efeitos de transmissão, retransmissão, colocação à disposição do público para os fins acima mencionados.

A Melissa Guimarães, na presente data, e enquanto responsável pelo tratamento de dados prestou-me as informações necessárias à formação da minha vontade, garantindo-me que honrará a finalidade da recolha dos dados, não podendo posteriormente utilizar os mesmos para quaisquer outras finalidades além das indicadas, salvo se nova autorização for facultada por mim; que os dados registados não serão facultados a qualquer outro organismo ou entidade; e que, serão asseguradas condições de acesso e possibilidade de correção dos dados pessoais registados, se justificável e solicitado.

Data 26 / 05 / 2023

Assinatura:

Virgínia Neta

# **12. Anex**

## **12.1 Anex A – Questionnaires**

### **12.1.1 Call For Co-Designing Session**

# A New Form of E-Book (Co-Designing Session)

For my dissertation (Masters in Multimedia @ FEUP) I'm proposing a prototype for a new form of e-book, one that integrates media and values interactivity and emotional payback. In order to do this, I'll be conducting a Co-Designing session that will happen as follows:

An in-person session will occur and the participants (potential users) will be given plenty of materials and artifacts (paper, pens, text, scissors, etc). The participants are therefore free to do what they like with said given materials (and even encouraged to) in order to answer their concerns regarding the current format of e-books. They will be free to choose the amount of interactivity they would want to see, etc (the sky is the limit).

The goal of this session is to figure out what potential users wanna see in this simulation, what interactive elements they want to explore more, and which ones should be less focused on. It would be also focal to understand what triggers emotions in the readers, and which way and/or order they most prefer in order to get that emotional payback.

*\* Indica uma pergunta obrigatória*

---

1. Please select your age range \*

*Marcar apenas uma oval.*

- Under 18
- 18-30
- Over 30

2. Select the formats in which you have read e-books previously: \*

*Marcar tudo o que for aplicável.*

- EPUB
- PDF
- Outra: \_\_\_\_\_



## 3. Select the devices on which you have read e-books previously: \*

*Marcar tudo o que for aplicável.*

- Kobo/Kindle
- Computer
- Tablet/iPad
- Smartphone
- Outra: \_\_\_\_\_

## 4. Would you be willing to participate in the co-designing session explained in the description? \*

*Marcar apenas uma oval.*

- Yes
- No
- Outra: \_\_\_\_\_

## 5. If yes, please let me know a way to contact you if necessary (can be social media or whatever is the easiest for you)

\_\_\_\_\_

---

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Google Formulários

## 12.1.2 User Experience Questionnaire

11/06/23, 10:29

User Experience Questionnaire

### User Experience Questionnaire

Firstly, please see the following prototype of a new form of e-book (it will link you to a Google Drive folder):

#### LO-FI PROTOTYPE

For the assessment of the product, please fill out the following questionnaire. The questionnaire consists of pairs of contrasting attributes that may apply to the product. The circles between the attributes represent gradations between the opposites. You can express your agreement with the attributes by ticking the circle that most closely reflects your impression.

Please decide spontaneously. Don't think too long about your decision to make sure that you convey your original impression.

Sometimes you may not be completely sure about your agreement with a particular attribute or you may find that the attribute does not apply completely to the particular product. Nevertheless, please tick a circle in every line.

It is your personal opinion that counts. Please remember: **there is no wrong or right answer!**

*All of your answers will be handled purely for the development of this dissertation and nothing else as stated [HERE!](#)*

*\* Indica uma pergunta obrigatória*

<https://docs.google.com/forms/d/1qMGq7Cb4zxZ1L72BNfpl4uRoMzMV4F-8VG-INe5xGVQ/edit>

1/28

11/06/23, 10:29

User Experience Questionnaire

1. #1 \*

*Marcar apenas uma oval.*

annoying

1

2

3

4

5

6

7

enjoyable

<https://docs.google.com/forms/d/1qMGq7Cb4zxZ1L72BNfpl4uRoMzMV4F-8VG-INe5xGVQ/edit>

2/28

2. #2\*

Marcar apenas uma oval.

not understandable

1

2

3

4

5

6

7

understandable

3. #3\*

Marcar apenas uma oval.

creative

1

2

3

4

5

6

7

dull

4. **#4\***

Marcar apenas uma oval.

easy to learn

1

2

3

4

5

6

7

difficult to learn

5. **#5\***

Marcar apenas uma oval.

valuable

1

2

3

4

5

6

7

inferior

6. #6\*

Marcar apenas uma oval.

boring

1

2

3

4

5

6

7

exciting

7. #7\*

Marcar apenas uma oval.

not interesting

1

2

3

4

5

6

7

interesting

8. **#8\***

Marcar apenas uma oval.

unpredictable

1

2

3

4

5

6

7

predictable

9. **#9\***

Marcar apenas uma oval.

fast

1

2

3

4

5

6

7

slow

10. #10 \*

Marcar apenas uma oval.

inventive

1

2

3

4

5

6

7

conventional

11. #11 \*

Marcar apenas uma oval.

obstructive

1

2

3

4

5

6

7

supportive

12. #12 \*

Marcar apenas uma oval.

good

1

2

3

4

5

6

7

bad

13. #13 \*

Marcar apenas uma oval.

complicated

1

2

3

4

5

6

7

easy



14. #14 \*

Marcar apenas uma oval.

unlikable

1

2

3

4

5

6

7

pleasing

15. #15 \*

Marcar apenas uma oval.

usual

1

2

3

4

5

6

7

leading edge

16. #16 \*

Marcar apenas uma oval.

unpleasant

1

2

3

4

5

6

7

pleasant

17. #17 \*

Marcar apenas uma oval.

secure

1

2

3

4

5

6

7

not secure

18. **#18 \***

Marcar apenas uma oval.

\_\_\_\_\_

motivating

\_\_\_\_\_

1

\_\_\_\_\_

2

\_\_\_\_\_

3

\_\_\_\_\_

4

\_\_\_\_\_

5

\_\_\_\_\_

6

\_\_\_\_\_

7

\_\_\_\_\_

demotivating

\_\_\_\_\_

19. **#19 \***

Marcar apenas uma oval.

\_\_\_\_\_

meets expectations

\_\_\_\_\_

1

\_\_\_\_\_

2

\_\_\_\_\_

3

\_\_\_\_\_

4

\_\_\_\_\_

5

\_\_\_\_\_

6

\_\_\_\_\_

7

\_\_\_\_\_

does not meet expectations

\_\_\_\_\_

20. **#20 \***

Marcar apenas uma oval.

inefficient

---

1

---

2

---

3

---

4

---

5

---

6

---

7

---

efficient

---

21. **#21 \***

Marcar apenas uma oval.

clear

---

1

---

2

---

3

---

4

---

5

---

6

---

7

---

confusing

---

22. #22 \*

Marcar apenas uma oval.

impractical

1

2

3

4

5

6

7

practical

23. #23 \*

Marcar apenas uma oval.

organized

1

2

3

4

5

6

7

cluttered

24. #24 \*

Marcar apenas uma oval.

attractive

1

2

3

4

5

6

7

unattractive

25. #25 \*

Marcar apenas uma oval.

friendly

1

2

3

4

5

6

7

unfriendly

26. #26 \*

Marcar apenas uma oval.

conservative

1

2

3

4

5

6

7

innovative

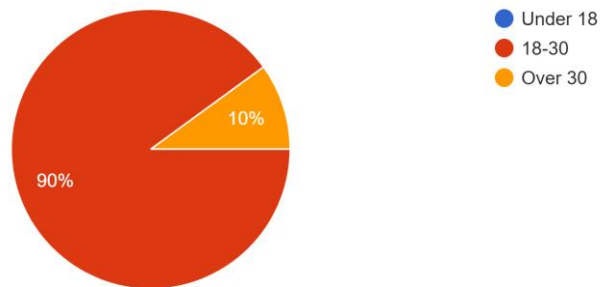
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Google Formulários

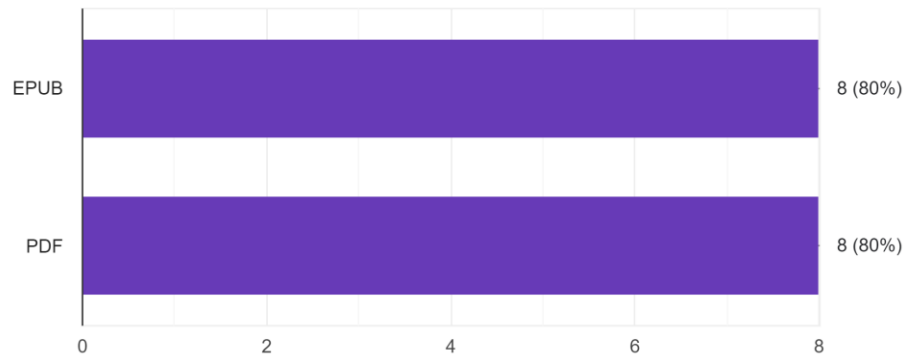
## 12.2 Anex B – Questionnaires Results

### 12.2.1 Call For Co-Designing Session

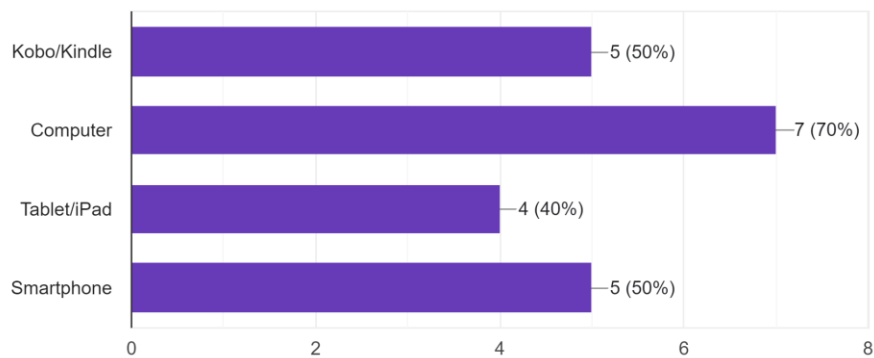
Please select your age range  
10 respostas



Select the formats in which you have read e-books previously:  
10 respostas



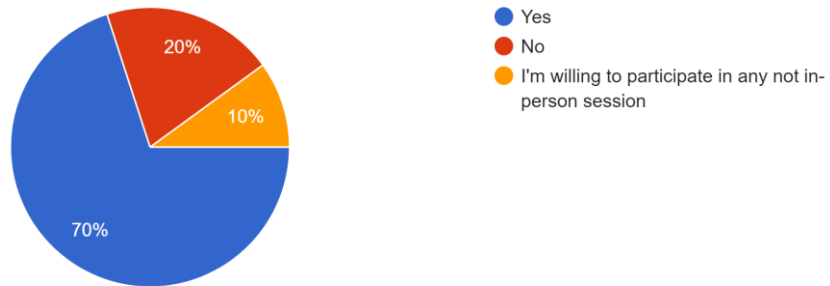
Select the devices on which you have read e-books previously:  
10 respostas





Would you be willing to participate in the co-designing session explained in the description?

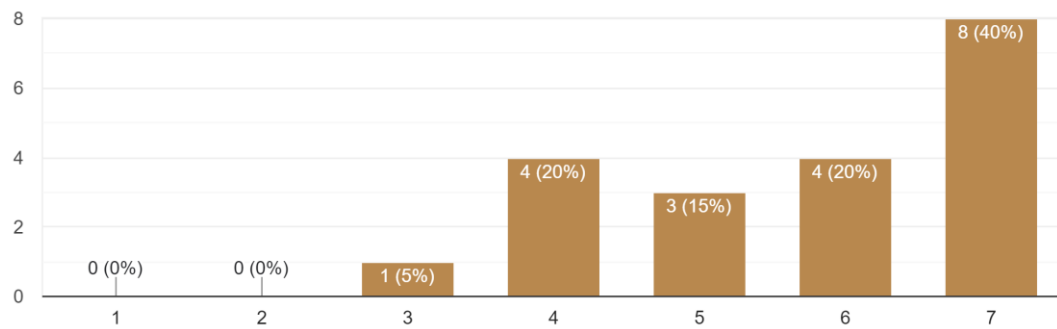
10 respuestas



## 12.2.2 User Experience Questionnaire

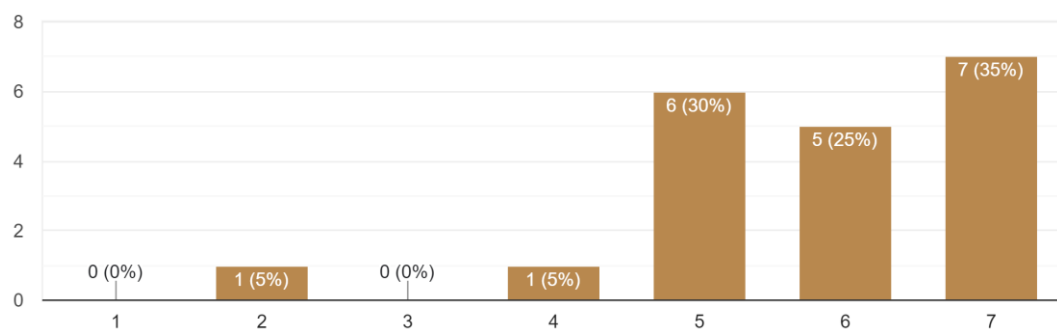
#1

20 respuestas



#2

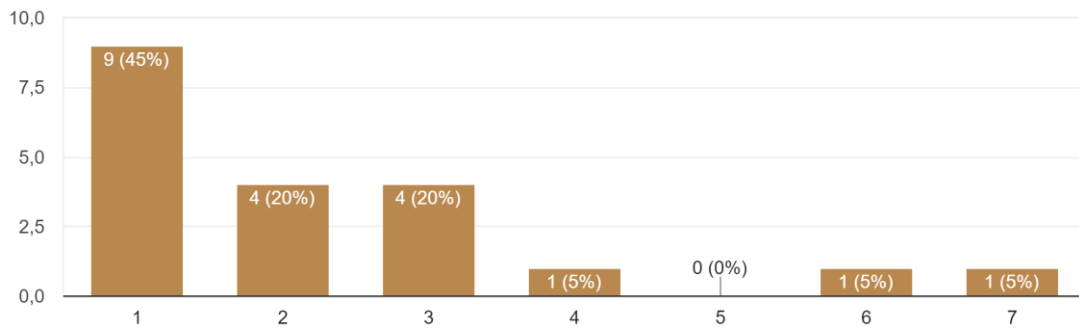
20 respuestas



## Anex

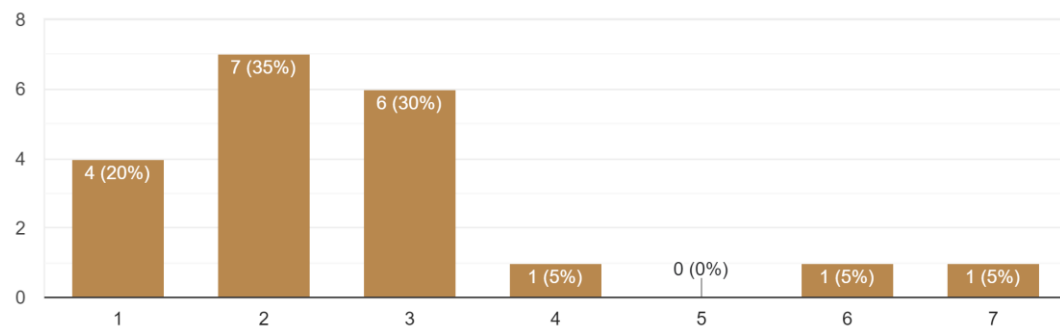
#3

20 respostas



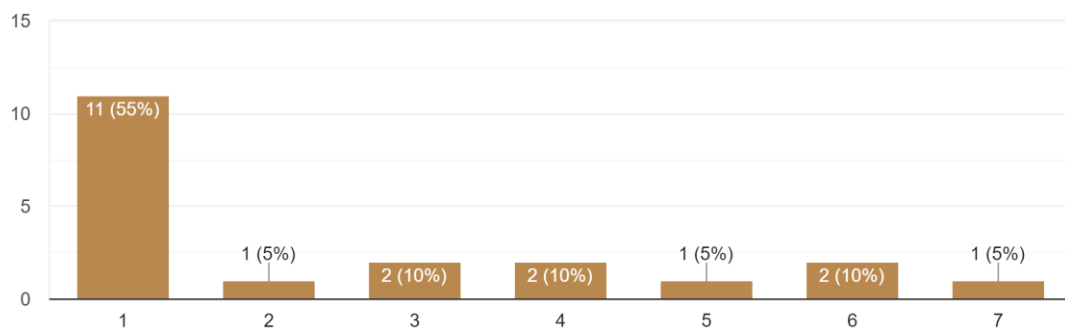
#4

20 respostas



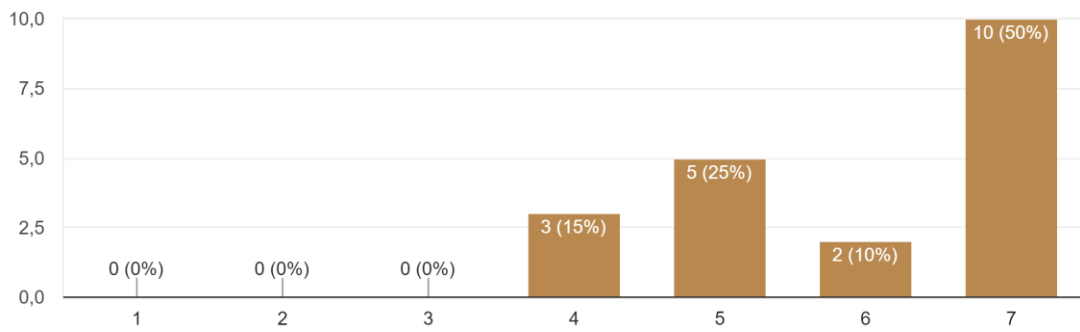
#5

20 respostas



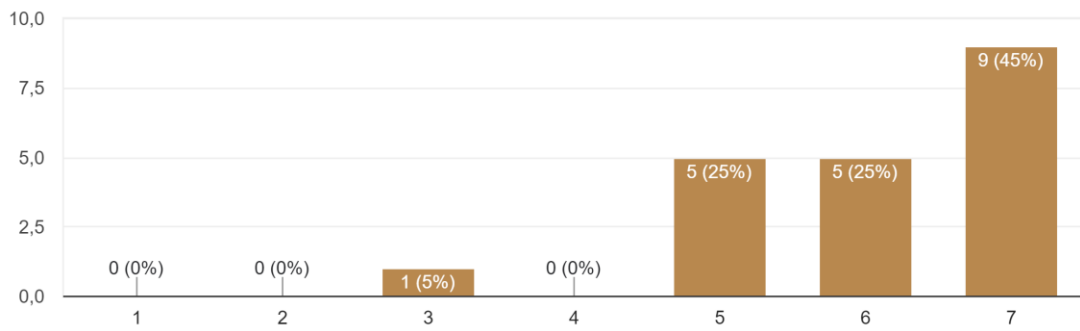
#6

20 respostas



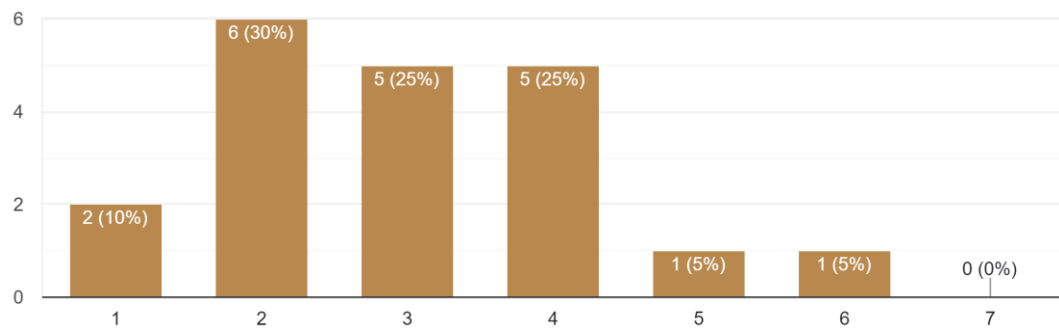
#7

20 respostas



#8

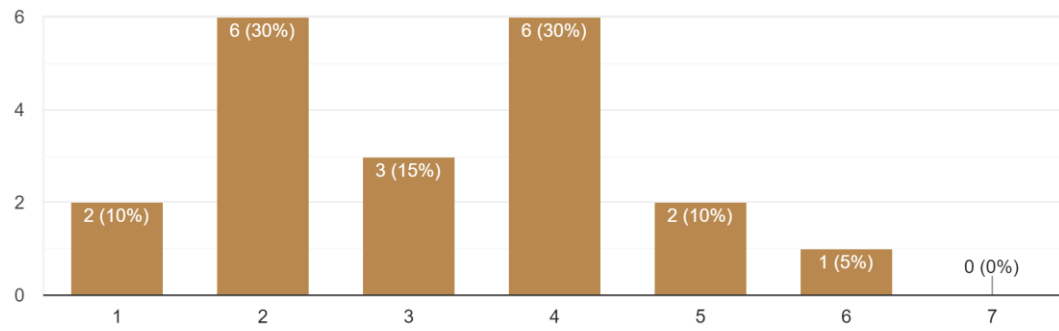
20 respostas



## Anex

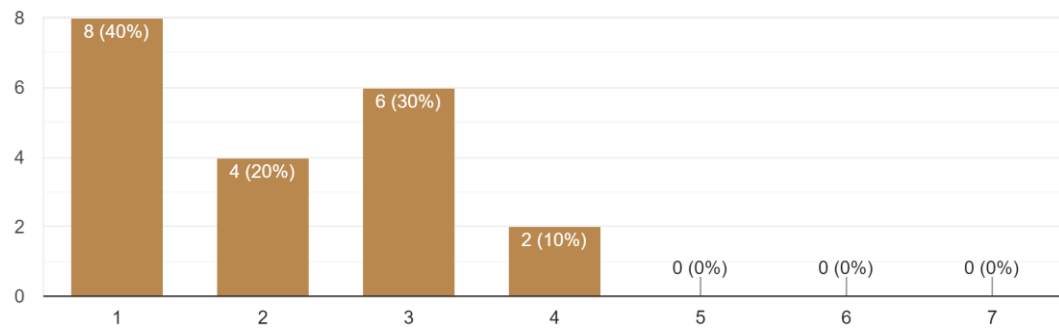
#9

20 respostas



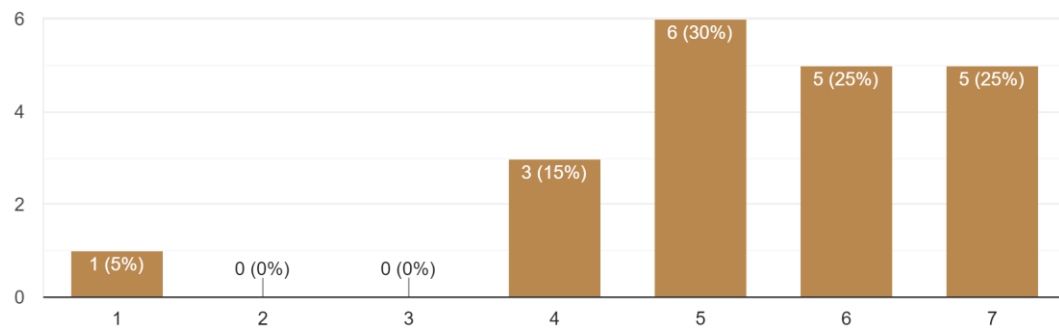
#10

20 respostas



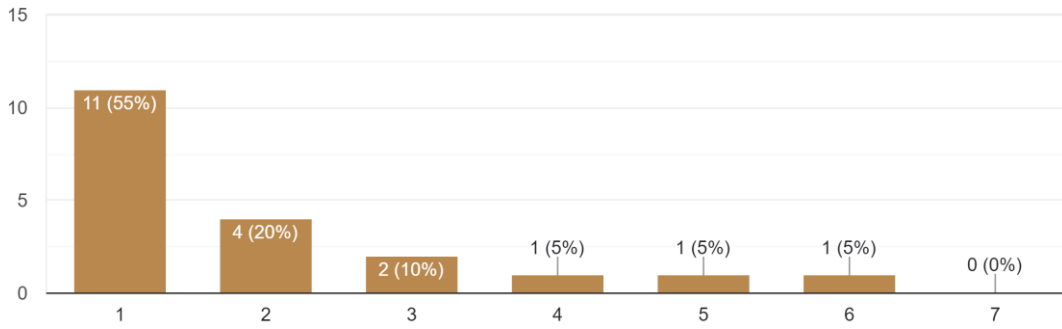
#11

20 respostas



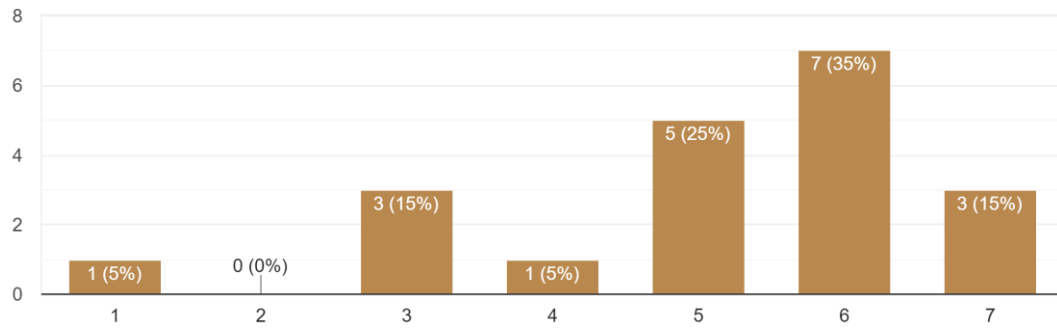
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20 respostas



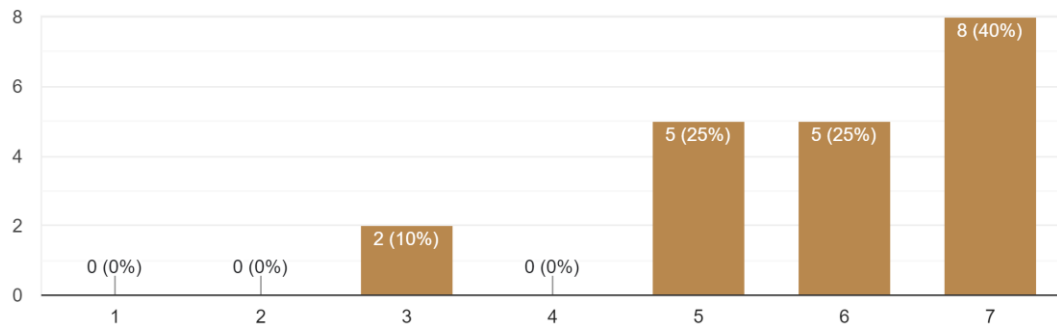
#13

20 respostas



#14

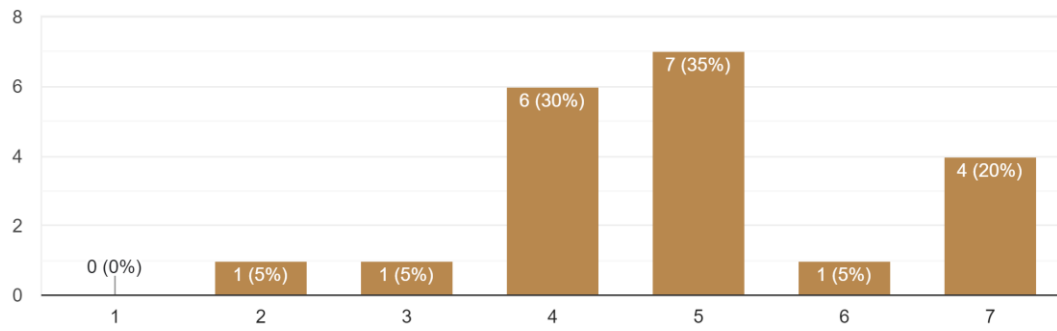
20 respostas



## Anex

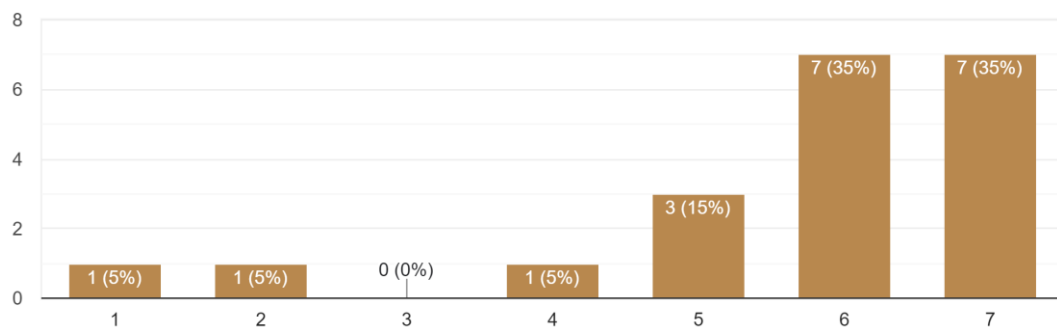
#15

20 respostas



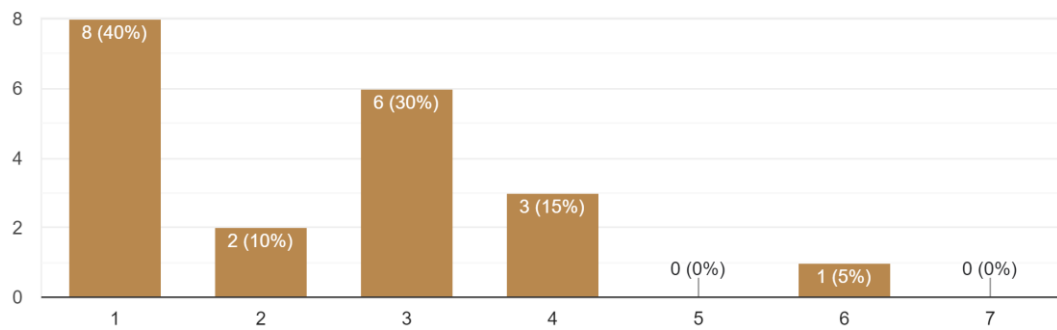
#16

20 respostas



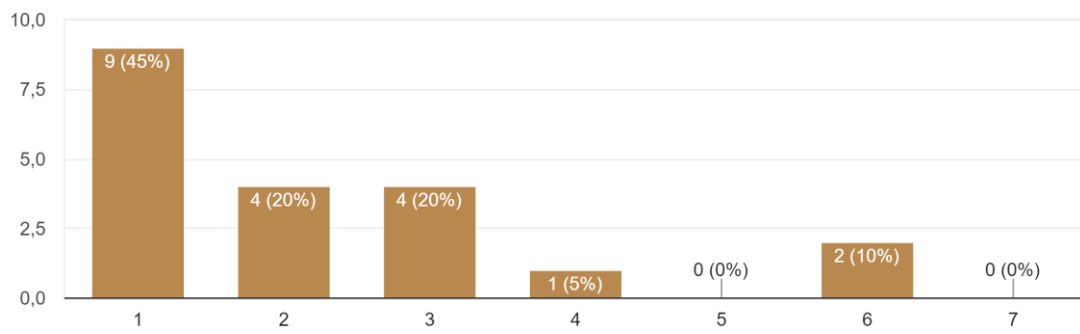
#17

20 respostas



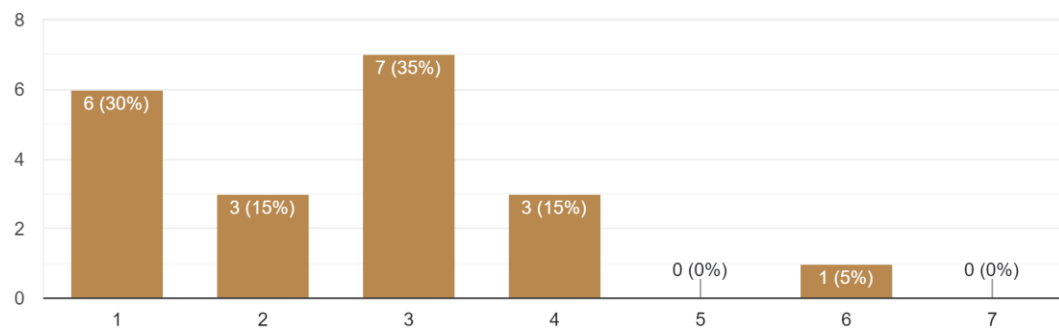
#18

20 respostas



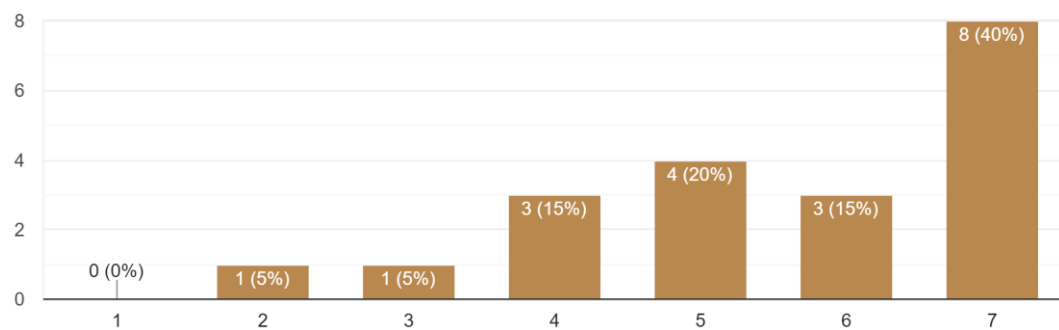
#19

20 respostas



#20

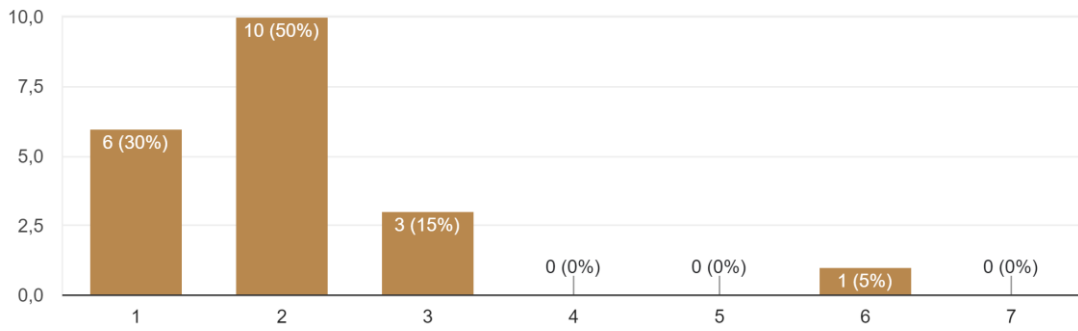
20 respostas



## Anex

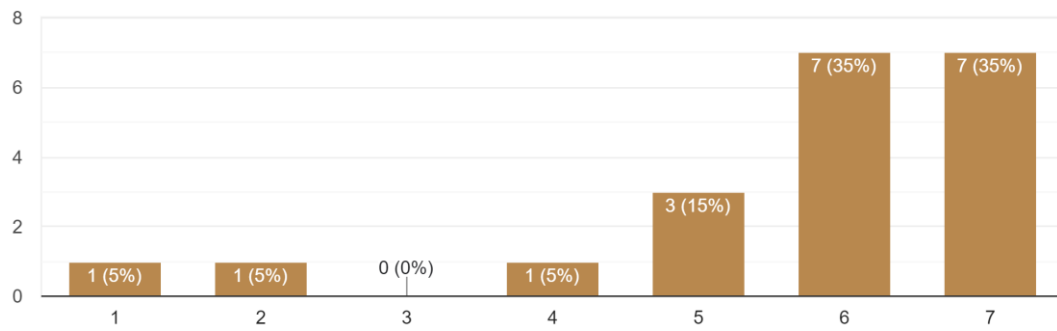
#21

20 respostas



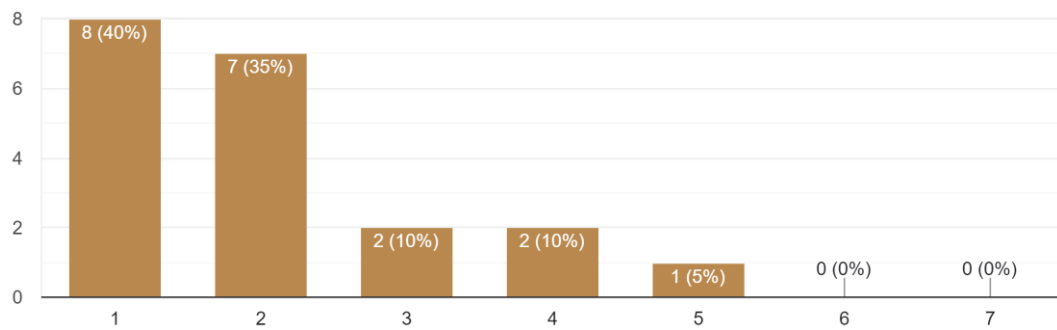
#22

20 respostas



#23

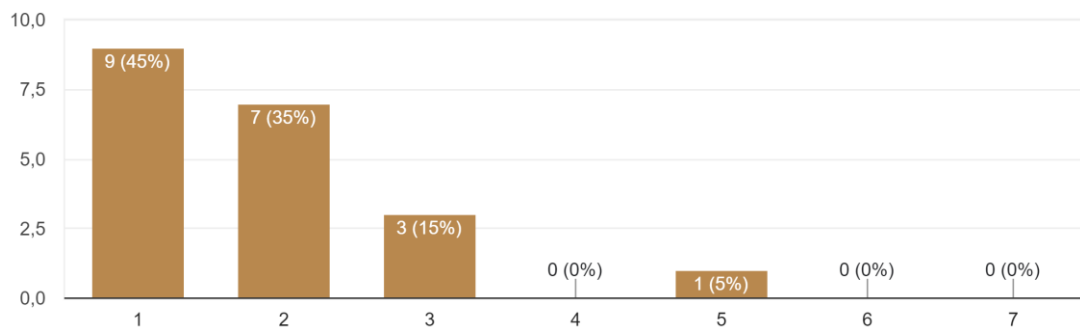
20 respostas





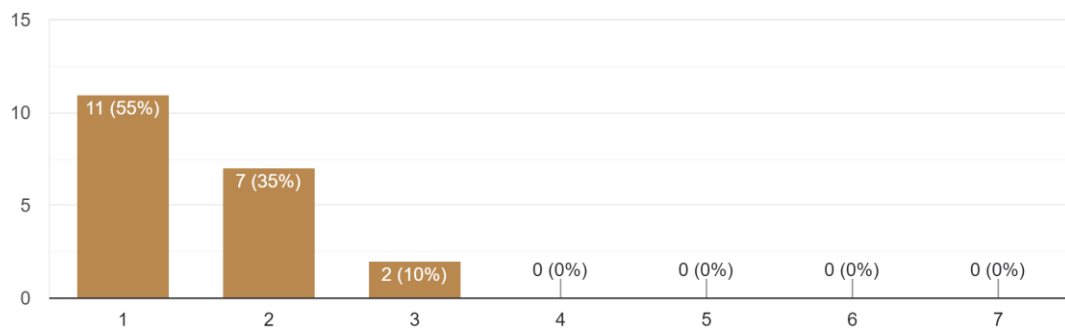
#24

20 respostas



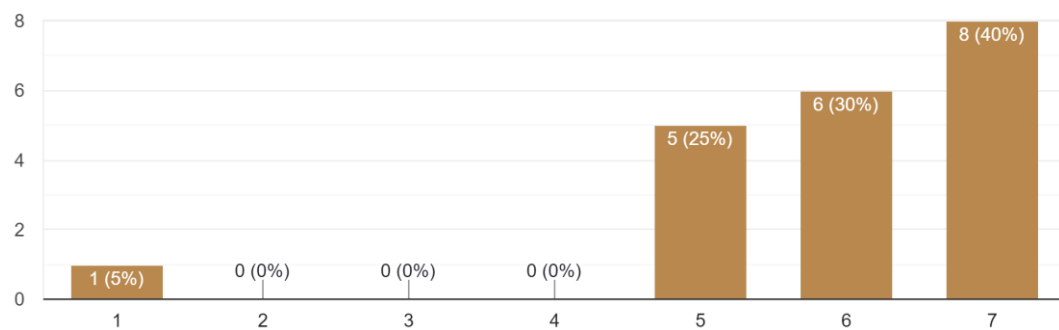
#25

20 respostas



#26

20 respostas

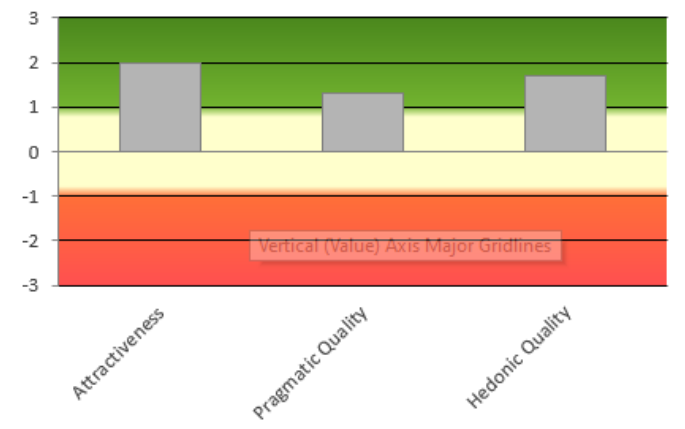
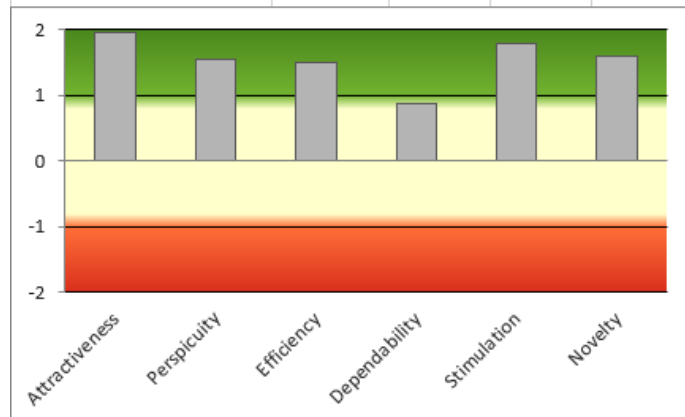
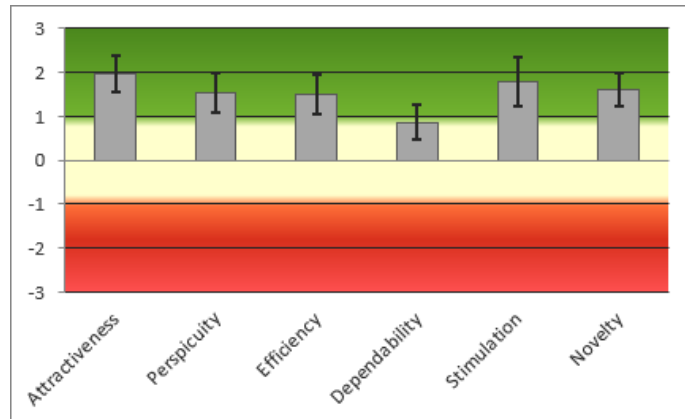


### 12.3 Anex C - Data Analysis Tool Results

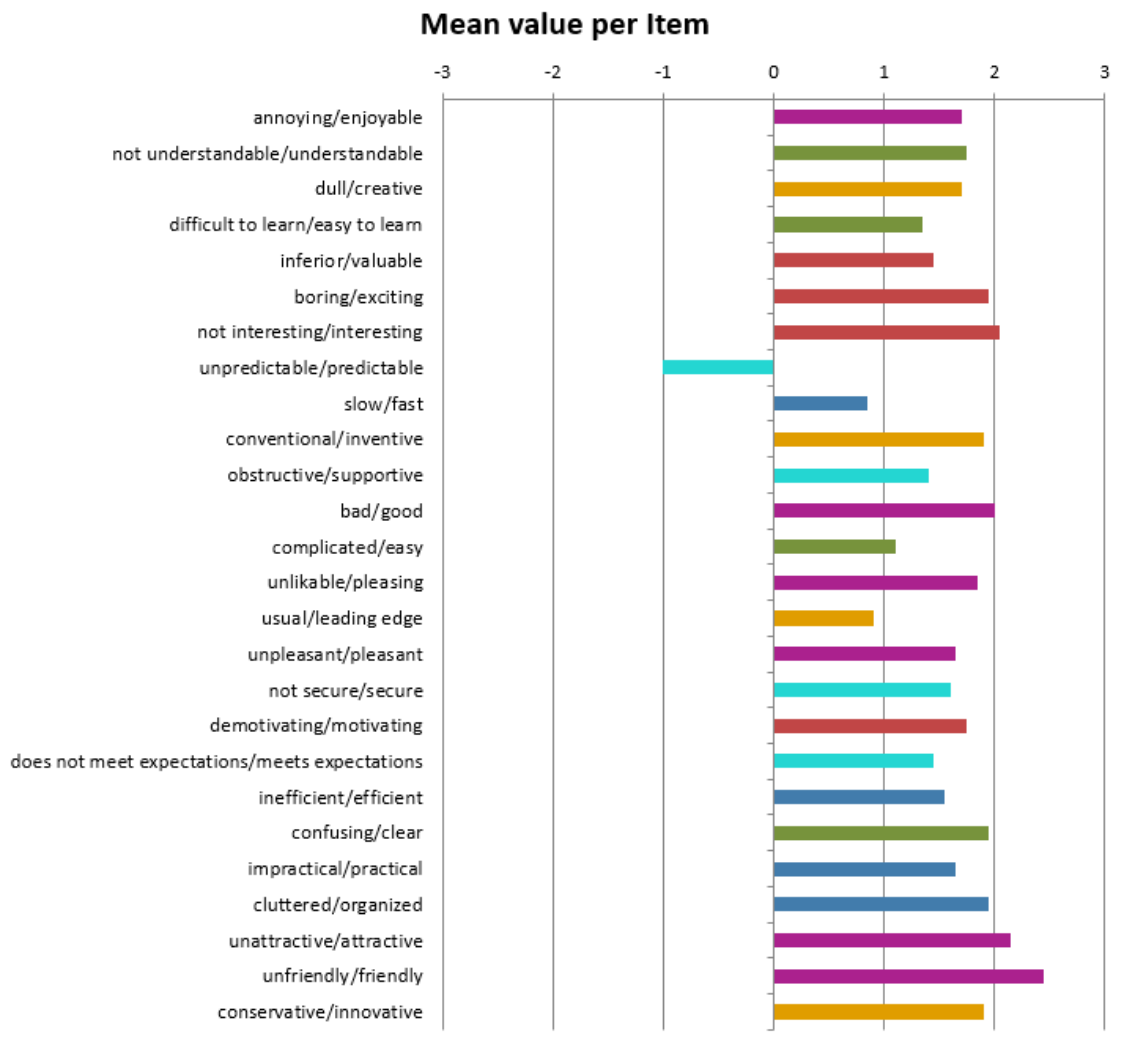
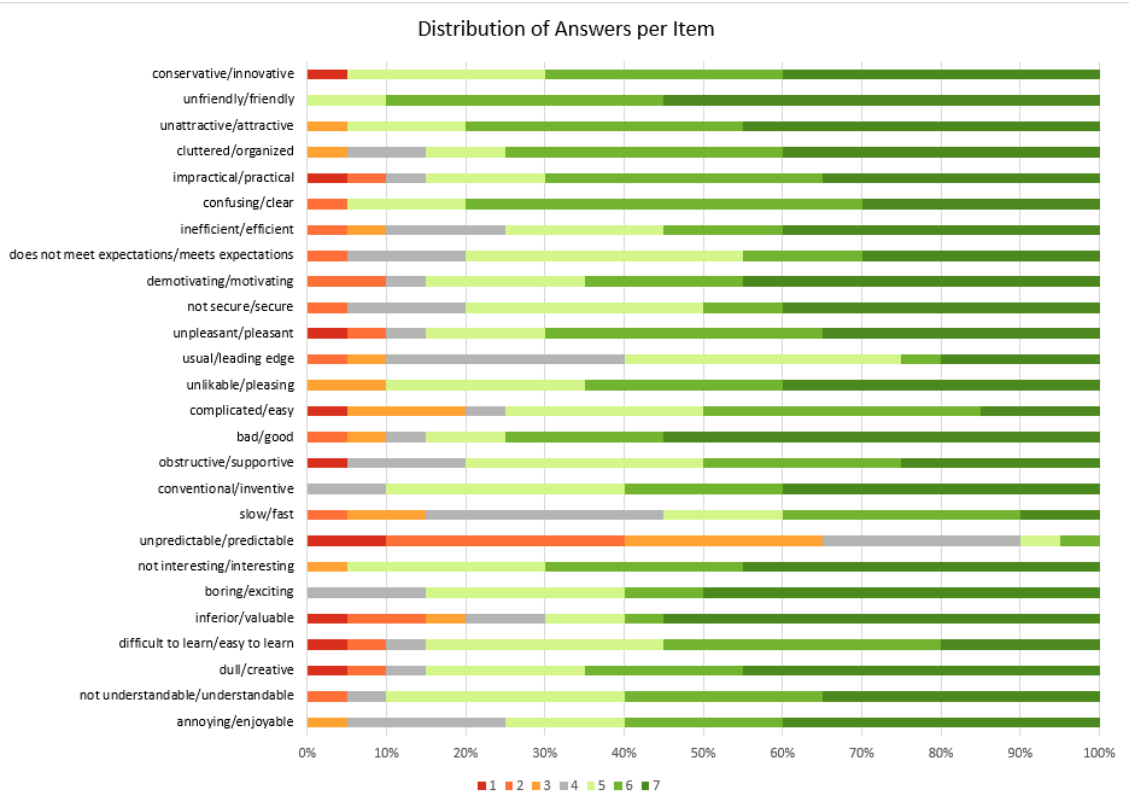
Item	Mean	Variance	Std. Dev.	No.	Left	Right	Scale	
1	↑ 1,7	1,8	1,3	20	annoying	enjoyable	Attractiveness	
2	↑ 1,8	1,7	1,3	20	not understandable	understandable	Perspicuity	
3	↑ 1,7	3,0	1,7	20	creative	dull	Novelty	
4	↑ 1,4	2,5	1,6	20	easy to learn	difficult to learn	Perspicuity	
5	↑ 1,5	4,3	2,1	20	valuable	inferior	Stimulation	
6	↑ 2,0	1,4	1,2	20	boring	exciting	Stimulation	
7	↑ 2,1	1,2	1,1	20	not interesting	interesting	Stimulation	
8	↓ -1,0	1,7	1,3	20	unpredictable	predictable	Dependability	
9	↑ 0,9	1,9	1,4	20	fast	slow	Efficiency	
10	↑ 1,9	1,1	1,1	20	inventive	conventional	Novelty	
11	↑ 1,4	2,1	1,5	20	obstructive	supportive	Dependability	
12	↑ 2,0	2,2	1,5	20	good	bad	Attractiveness	
13	↑ 1,1	2,5	1,6	20	complicated	easy	Perspicuity	
14	↑ 1,9	1,6	1,3	20	unlikable	pleasing	Attractiveness	
15	↑ 0,9	1,9	1,4	20	usual	leading edge	Novelty	
16	↑ 1,7	2,8	1,7	20	unpleasant	pleasant	Attractiveness	
17	↑ 1,6	2,0	1,4	20	secure	not secure	Dependability	
18	↑ 1,8	2,5	1,6	20	motivating	demotivating	Stimulation	
19	↑ 1,5	1,8	1,4	20	meets expectations	does not meet expectations	Dependability	
20	↑ 1,6	2,4	1,5	20	inefficient	efficient	Efficiency	
21	↑ 2,0	1,3	1,1	20	clear	confusing	Perspicuity	
22	↑ 1,7	2,8	1,7	20	impractical	practical	Efficiency	
23	↑ 2,0	1,4	1,2	20	organized	cluttered	Efficiency	
24	↑ 2,2	1,1	1,0	20	attractive	unattractive	Attractiveness	
25	↑ 2,5	0,5	0,7	20	friendly	unfriendly	Attractiveness	
26	↑ 1,9	2,0	1,4	20	conservative	innovative	Novelty	

UEQ Scales (Mean and Variance)		
Attractiveness	↑ 1,967	0,96
Perspicuity	↑ 1,538	1,13
Efficiency	↑ 1,500	1,06
Dependability	↑ 0,863	0,81
Stimulation	↑ 1,800	1,61
Novelty	↑ 1,600	0,77

Pragmatic and Hedonic Quality	
Attractiveness	1,97
Pragmatic Quality	1,30
Hedonic Quality	1,70



# Anex



Scale	Mean	Comparisson to benchmark	Interpretation
Attractiveness	1,97	Excellent	In the range of the 10% best results
Perspiciuity	1,54	Above Average	25% of results better, 50% of results worse
Efficiency	1,50	Above Average	25% of results better, 50% of results worse
Dependability	0,86	Below Average	50% of results better, 25% of results worse
Stimulation	1,80	Excellent	In the range of the 10% best results
Novelty	1,60	Good	10% of results better, 75% of results worse

