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Informing Information Architecture Problems through Convergence of IA Methods and Future Workshop Technique

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Abstract

User involvement in the design process on the web has arguably become something that can be considered a norm. In the field of information architecture, there has been an ongoing debate on what contributes to the design of information spaces. There is a lack of established semantics and research methods that could help designers design these information spaces of which websites are arguably the most common expression type. Some of the reasons for this situation are the difficulties arising from the rapid pace at which technological standards on the web change such as the shifts to what is commonly known as web 2.0 as well as the gap between practitioners of the design field and researchers.

Researchers of this paper devised a case that is common with today's web design - sharing-economy based solutions via proposing a social application with users that would encourage and help people to share books and book reading experiences.

In the context of this problem, the researchers sought to answer the following research questions: How to converge different IA methods and participatory future workshop to create better informed web IA? How can a participatory future workshop format be utilized on an information architectural level in the early stages of designing an application?

To explore the research questions, researchers of this study first positioned themselves as researchers and information architects, thus defined the key aspects of the app to-be-developed and used comparative analysis; and Oinas-Kukkonen and Harjumaa's Systematic Framework for Persuasive Requirements, to design a solution for users. Afterwards three future workshops (Jungk & Müllert, 1987; 1996) were organized to see how the knowledge gathered about the users would potentially contribute to information architecture of the application in the conceptual phase. Surveying all the 11 participants regarding habitual information and their overall experiences during the workshop helped researchers support their solution and reflect on the workshop process.

The key findings of the research paper are the following:

Involving the users in the design process through the means of future workshop help identify the weak points of an initial design. The research suggests that information architects can use future workshop as a tool to confirm the relevancy of the problems addressed by their design, even after a concept has been established. In the case of the application of book sharing, the future workshop enabled researchers, as information architects, to evaluate whether their design addressed the problems voiced by participants accurately and how well they were prioritized. Also, involving users in the conceptual design phase may be critical, because it enables to identify some of the key priorities of users that other data collection methods were unable to indicate.

This research also confirms the findings of some other researchers (Pommeranz et al., 2012; Light, 2010; Soini, 2006.; Apel, 2004), that the level of guiding in the future workshops is the key factor influencing how likely the participants themselves are to produce a more workable and realistic solution. While another observation unfolded that there can be gender-specific differences both in the domain of book-reading, as well as within participation in the future workshop. Male participants displayed a tendency to focus more on technical aspects and visualize their design solutions, whereas females were more likely to describe them in text and express their emotions towards books. Similarly, when discussing the domain of books, males were more likely to emphasize technical challenges/inconveniences whereas as females very strongly emphasized the role of the book as an important, personal and emotion-invoking artefact.

Finally, an “information ecology” framework is proposed, as means to integrate and converge different data gathering methods (from comparison analysis as a form of heuristics, to a more phenomenological nature future workshop) for creation of a better informed information architecture. This was unfolded by dissecting all the data into content, context and user categories.

Foreword

This thesis was written as completion to the Master's Programme of Information Architecture, at Aalborg University, Denmark. The programme focuses on the development and analysis of various information systems, while understanding the user and the use context.

Since January this year, we have been conducting research on the topic, *Informing Information Architecture Problems through Convergence of IA Methods and Future Workshop Technique*, and the road leading to finalizing our research was very interesting and constructive.

We appreciate the contribution of our workshop participants in the process of completing the research. And also, we would like to thank all our teachers we had during the education and most of all, our supervisor, Lone Dirckinck-Holmfeld, who guided us and helped us shape our thesis. Their support, efforts and guidance have provided us with the energy to and write this thesis.

1.Introduction

The purpose of this chapter is to present the research background and purpose of the study, as well as to formulate research questions the study wishes to solve.

1.1 Research background

In our modern, information-packed environment, people depend on and trust man-made technical systems more and more to help them execute various tasks daily. Thus, there is an increasing demand for development of new information technologies not only to be mobile, but also to improve quality of life, democratic participation, increase engagement and support communication efforts of individuals.

It is an established practice in the field of Human Centered Informatics to create effective interfaces, systems and/or products achieved by seeking to meet user needs, often with the help of end users. The academic narrative largely stems from the school of communication, psychology and education in trying to advance our understanding of knowledge-sharing and creation practices.

However, it is not only the potential users that form the design process and resulting product. Designers themselves shape these by their own values and choices (Iversen and Leong (2012). Moreover, we are witnessing ever-increasing momentum in the web and tech communities. Many of the catalysts of these developments are influenced more by things such as start-up culture, the increasing collaboration between practitioners (Dindler & Iversen, 2014) , a wish to increase efficiency of development practices as well as a number of success stories in the private industries, especially with regard to the sharing economy rather than research.

1.2 Purpose of the Study and Research Questions

Information architecture, serving as the foundation of an interface, is about organizing and designing information in the simplest form possible to create clear and consistent information spaces for users to interact with, while helping people understand and manage information

and as a result, make right decisions (Ding & Lin 2009). According to Salvo (2004.) „*information architecture is a process of designing working models of the technocultural future that values participations, access, and input from users, seen as both stakeholders and citizens, for whom and by whom technocultural designs are created <...> a design process compatible with democratic processes and with an active, engaged user population; indeed, information ultimately requires the active participation of its users, who are agents in the definition, design, and maintenance of the technocultural system.*"

Although there are studies about participatory design being used in the field of information architecture, some of them are only using PD methods to consult community-groups on specific issues after observing and interviewing members (Merkel et al., 2004), others use card sorting as user involvement in testing an existing application (Gatsou et al., 2012),or toolkits to find usability problems with children (Baek & Lee, 2003), while some talk about using PD in enterprise system architecture implementation (Pries-Heje & Dittrich 2009-ERP implementation). The researchers of this paper struggled to find articles about the use of the future workshop format in the early stages of IA and product design. Also, no papers were found where classic IA methods are combined with participatory future workshop.

Therefore, the main questions in the thesis are:

a) How to converge different IA methods and participatory future workshop to create better informed web IA?
b) How can a participatory future workshop format be utilized on an information architectural level in the early stages of designing an application?
    - What could participation do in the conceptual phase of the design process?
    - What are the benefits/perspectives/impact of user involvement on an IA level?
    - What are the challenges in achieving an effective user involvement?
    - How could it stimulate and/or support the researchers' own processes?

In which ways would results of a participatory workshop inform/change early concepts done by the researchers?

Researchers of the thesis attempted to answer the above mentioned questions by taking a specific scenario of designing a book-sharing application.

2. Research Design

Due to the ambiguity that arises from a very broad understanding of what design is, operating within the "current state of ongoing conversations on theory and its impact on how knowledge is conceptualized and expressed" (White, 2011) becomes ever more complicated because the research process in itself is much less prescriptive (Luck, 2015).

Such circumstances therefore require for any design research to first design the research itself. Hence, the following section provides the reasoning the authors of this paper share in whose light the research design ought to be understood.

Using an exploratory case methodology with focus on qualitative methods, the researchers of this study aim to explore how composition and synthesis of different design methods (designer-driven and participatory) in the early development phase contribute to creating better informed designs in the context of web Information Architecture and provides a foundation for further development.

To create a context in which researchers could apply various design methods, a case has been chosen that would represent a real-life problem, shared common traits to problems addressed by information architects and/or web designers and which is supposed to be solved via design proposal. For this reason, the researchers explicitly sought to choose the context of sharing-economy market that has gained extremely a lot of traction in recent years and as such, is of high importance when we discuss the modern web in general (further reasoning for the choice of the case can be found in the according chapter of the research).

The particular case was defined in the following manner:

To create a social application that would enable book readers to share and exchange books and would enhance their reading experience.

Within the context of this problem, the researchers applied different qualitative and quantitative methods for data collection and then analyzed how it contributes to creating a

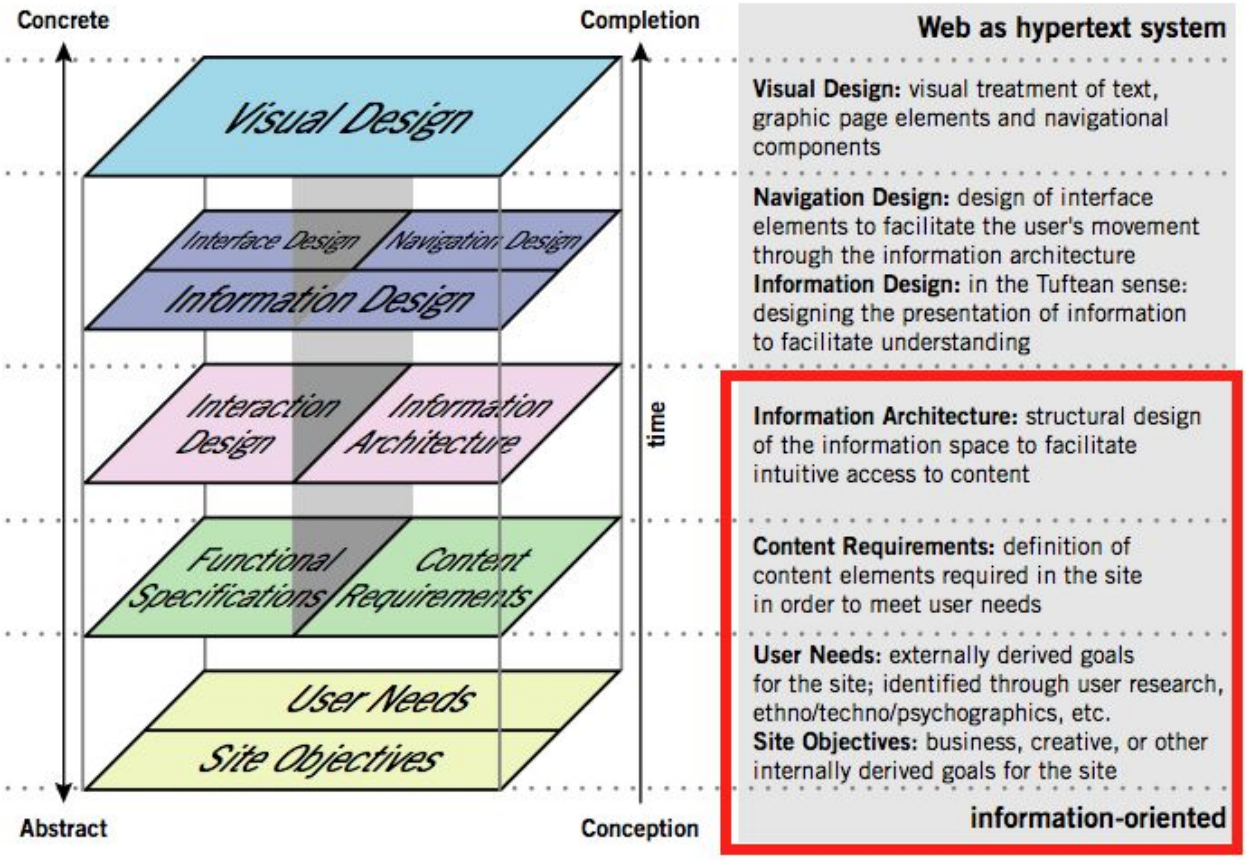
better informed design through the framework suggested by Morville,Rosenfeld and Arango (2015) by evaluating to which aspect of information architecture collected data contributes (user, content and context). Data collection methods about possible end-users included a survey and participatory future workshop discussions, while data for the case's topic itself were gained through looking at trends and patterns in sharing economy of similar business models and a comparative analysis as a form of heuristics. Comparative analysis (Myer 2002) was used to identify key structural points in similar websites (amazon, goodreads etc) to also gather information about conceptual design decisions made. On top of that researchers used Oinas-Kukkonen and Harjumaa (2008) specified software requirements to identify persuasive design elements present in the websites to expand upon different design ideas made by internet giants.

As tools of participatory design and for framing the cooperative design activities, the form of a future workshop was followed. Originally developed by Jungk and Müllert (1987; 1996), future workshops provide a framework for involving users in the design of a future artifact and making them collaborate through three distinctive phases. There were three different workshops in total - male-only, female-only and mixed one which enabled researchers to also see if any gender-specific differences would arise. The participants of the workshops had a follow-up questionnaire that provided demographic information as well as some extra questions about their domain (reading) related habits.

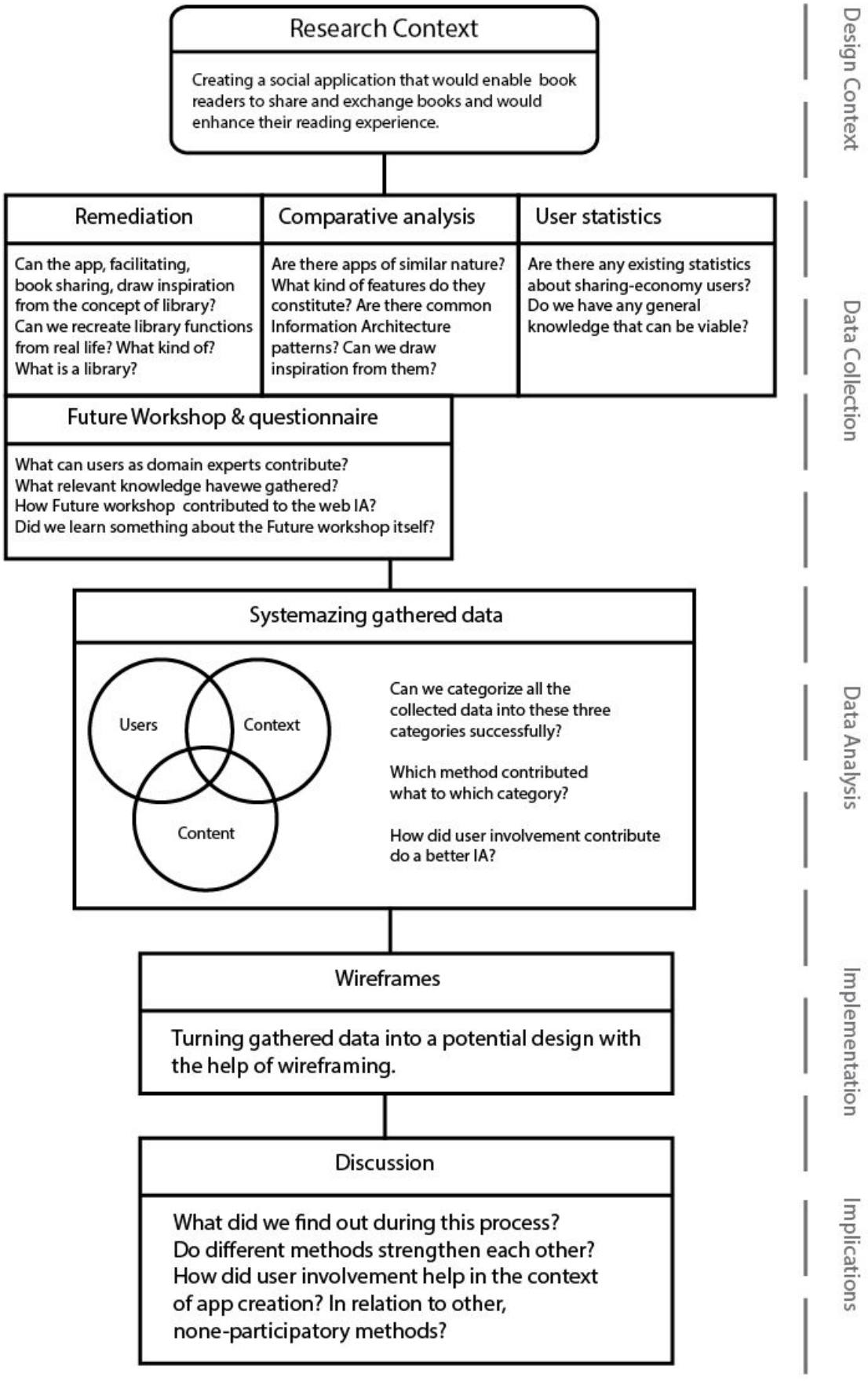
Researchers used remediation (Bolter & Grusin, 1998) as means to contemplate the initial necessary structural aspects of application design by using library concept as an object of remediation (sharing books with the help of internet being a practice that is mediated from the function that is being performed by libraries in real life).

Finally, all data gathered was segmented, categorized and synthesized together in accordance with Morville and Rosenfeld's (2006) user, content and context "information ecology" concept. Some data were interpreted into personas, others were used to further validate design solutions.

The following illustration (Garrett, 2000) emphasizes the part of the design process this research focuses on marked with red, namely objectives of the web application, user need formulation, content requirements and the structural design of information space.



The research had two main objectives - to try to converge different methods, primarily based around designer and user participation to balance the "designer designs for himself" phenomenon and see how participatory future workshop would help to improve the web IA in the early stages of design. As a summary, the following illustration shows the entire research process used and presents how researchers systematized, evaluated and converged all the data that was used for creating better informed design decisions.


Research Context
Creating a social application that would enable book readers to share and exchange books and would enhance their reading experience.
Remediation
Can the app, facilitating, book sharing, draw inspiration from the concept of library? Can we recreate library functions from real life? What kind of? What is a library?
Comparative analysis
Are there apps of similar nature? What kind of features do they constitute? Are there common Information Architecture patterns? Can we draw inspiration from them?
User statistics
Are there any existing statistics about sharing-economy users? Do we have any general knowledge that can be viable?
Future Workshop & questionnaire
What can users as domain experts contribute?
What relevant knowledge havewe gathered?
How Future workshop contributed to the web IA?
Did we learn something about the Future workshop itself?
Systemazing gathered data
Users
Context
Content
Can we categorize all the collected data into these three categories successfully?
Which method contributed what to which category?
How did user involvement contribute do a better IA?
Wireframes
Turning gathered data into a potential design with the help of wireframing.
Discussion
What did we find out during this process?
Do different methods strengthen each other?
How did user involvement help in the context of app creation? In relation to other, none-participatory methods?
Design Context
Data Collection
Data Analysis
Implementation
Implications

3. Research Methodology

This chapter is dedicated to the introduction of the research strategy and the underlying philosophical assumptions, epistemological implications towards this research, including its scope, context, goals and limitations.

Much debate has taken place in the academic world over the questions of research design methodologies in the design field from epistemological aspects (Ben Matthews, 2015; Feast, 2010) to the placement and implications of prototypes within the scope of academic design research (Stappers, Visser, & Keller, 2015). It should not be forgotten, as it is considered an important milestone by many (Luck, 2015; Margolin, 2010), that less than mere two decades have passed since the first conference on doctoral education in design was held at Ohio State University where discussions over the importance and the nature of design research have been reignited by academics such as Richard Buchanan.

In this research, different methods for creating design were used to see how they can be mixed with future workshop and how they contribute to a better informed design.

3.1 Epistemology

Michael Crotty (Crotty, 1998) defined a framework for composing research which consisted of 4 intrinsic parts – epistemology, theoretical perspective, methodology, and methods. While designing our research, we have taken Luke Feast's design research literature review (Melles & Feast, 2010) and epistemological analysis of existing design research using Crotty's framework (Feast, 2010) as our point of departure. Feast identified three different common epistemological positions to various design research projects. Summary of different epistemological positions within existing design research (Feast, 2010):

Epistemological paradigm	**Standing and Designer's role**	**Authors**
Objectivism	Systematic conversion of tacit knowledge into	Ken Friedman

	explicit knowledge. Designer is domain expert.	
Constructionism	Intellectual reflection on usage and development of artefacts. Designer improves through critical analysis of his/her own work.	Nigel Cross
Subjectivism	Focus on personal development and direct making. Designer is an artistic genius.	Christopher Frayling

The aforementioned positions are derived from the way the work of the designing process is defined, for instance the constructionist position as described by Nigel Cross (Cross, 2001, p. 12):

- *Designers tackle 'ill-defined' problems.*
- *Their mode of problem-solving is 'solution-focused'.*
- *Their mode of thinking is 'constructive'.*
- *They use 'codes' that translate abstract requirements into concrete objects.*
- *They use these codes to both 'read' and 'write' in 'object languages'.*

While Ken Friedman largely agrees with the design process defined by Cross that takes places from the perspective of the designer, the objectivist position argues that there are predefined set of skills necessary for designers whose work has become interdisciplinary by nature due to global socio-economical developments in modern society (Friedman, 2012):

"Today, professional design practice involves advanced multidisciplinary knowledge that presupposes interdisciplinary collaboration and a fundamental change in design education. This knowledge isn't simply a higher level of professional education and practice. It is a qualitatively different form of professional practice. It is emerging in response to the demands of the information society and the knowledge economy to which it gives rise."

The difficulty in addressing the epistemological position in design research where design process is being democratized is the position of the designer as Borg et al. (2012) note:

"Reflexivity requires the researcher to be aware of themselves as the instrument of research. This is a particularly important issue for action researchers who are intimately involved with the subject of the research, the context in which it takes place, and others who may be stakeholders in that context."

However, it is important to note that while participatory future workshop is being committed with a mindset of researcher as simply a guide and participants as the instrumental designers, the data collected through future workshops is still being interpreted by the designers to be incorporated into the design. This is a crucial, yet controversial moment because on one hand an argument could be made that the origins of codesign process stem from a reality constructed by the participants, yet it is not an argument for Friedman's objectivist approach who suggests that quantitative methods in "information society" can largely suffice to make objective design decisions. The key difference exists in understanding that by delving into qualitative research we by no means conclude that the outcome can be perceived as an objective solution to an object problem.

In order to clarify the position of the research, we must identify the two different moments of the research: the participatory future workshop during which participants are given freedom to come up with their solutions and designs to problems and the moment of implementing their visions and suggestions into the design which arguably still happens through constructivist approach. However it rather should help expand the knowledge about the context by including the constructions of reality of the participants - not help us define a unified theory of a finite list of objective problems experienced by any domain experts or users. In the light of this research, the researchers viewed the participation as means to go beyond their construction of reality and design by reconstructing it with the help of participant inputs. It should be understandable that no user, designer or an information architect can create "a one size fits all" solution, however by agreeing with the constructivist approach, we commit to believing beyond any doubt that problems suggested by potential users and/or co designers are real, regardless of

what we as designers and researchers may think ourselves. This could be viewed as a "middle-ground" between Friedman's objectivist and subjectivist approach defended by Christopher Frayling that focuses on the more artistic aspects of design process suggesting that within the artistic work cognitive functions are also present and there are ways to research the creative process itself, through, for example, activity theory (Christopher Frayling, 1993).

As a result, from a constructivist point of view, we value the reality participants construct from both - the perspective of the problems they face and means they try to address those problems but within that view as researchers we do not treat their solutions as viable end products but rather as another piece of information that helps us understand the problems user address.

All three of these respectful ways of looking at design research could be argued for but within our research paper we have focused on a more exploratory research into the design process from the perspective of the designer. It is also important to note that aforementioned authors focused on the nature of the design processes heavily due to the interests of developing quality education systems for future designers.

Considering also the fact that our domain of research falls strictly within the boundaries of web development and design and we have tried to minimize the aspect of the aesthetic artistry through which designers have more liberty to express themselves. We focus more on conceptual design phase and the general structure of web applications, we are therefore more inclined to perceive the designer as an entity from a constructivist point of view.

Designer is someone who, as it is often the case in the domain of web design, navigates between what is usually called as best practices and his or her own individual construction through personal and critical perception of the individual analysis. While Friedman is correct in stating that multiple methods exist for a designer to get informed well-beyond the point where he acts as an artists, designer still needs to make conscious, transparent and valid decisions,not only about what to design but in many cases also what to leave out of the design. Finally, it is questionable if users themselves are well aware of what they would prefer. Even if information is present, the designer still needs to interpret it, prioritize it and translate into an actual design

which leaves plenty of space for construction of reality, though inspired by users, addressed for users, yet created by the designer.

3.2. A Qualitative, Exploratory Case Study

In order to apply different methods - from heuristics to future workshop, a need for a context in which it could be done is necessary. The case provided such a context in which researchers were able to apply the design process to reach conceptual design and analyse the implications of different methods and participatory future workshop in particular to the design process. Morse (1991) identified 4 different characteristics of qualitative research:

> *the concept is "immature" due to a conspicuous lack of theory and previous research;*
> *a notion that the available theory may be inaccurate, inappropriate, incorrect, or biased;*
> *a need exists to explore and describe the phenomena and to develop theory; or*
> *the nature of the phenomenon may not be suited to quantitative measures. (p. 120)*

As evident from our literature review and search, not only the question of using participatory future workshop for early design stages in common web applications is rather undocumented but even within the context of Information Architecture it is unclear how to move from a position where the context of the problem isn't very clear (for instance business requirements are scarce, a lack of established procedures exist and in general there is no clear point of departure, only a problem exists).

It could also be argued that the theory itself is still in the process of maturing. Finally, it would be difficult to quantify such a thing as design process or design conceptualization, considering that it is so unique to every case and devising some control variables would be a questionable practice. Moreover, not only would quantifying design process would be difficult, in a scenario of this research, when a method is being incorporated into a framework, the outcome is difficult to predict. According to Yin (1994) this is one of the valid arguments for a case-based research among:

To explain complex causal links in real-life interventions

To describe the real-life context in which the intervention has occurred

To describe the intervention itself

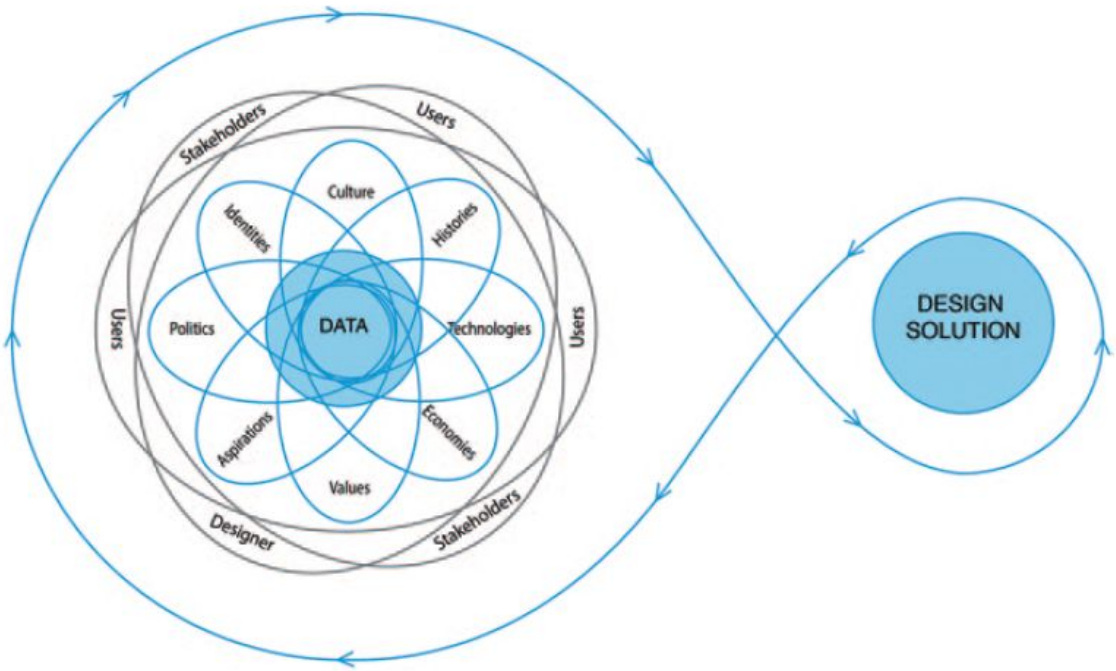
To explore those situations in which the intervention being evaluated has no clear set of outcomes.

Similarly while mixed methods are employed in this research paper - the study is primarily qualitative methods based. The only quantitative method used is the data collection from the internet - usage of user statistics, both the heuristics and the participatory future workshop are qualitative methods because they use observational data and open-ended questions, as covered by Creswell (2014, p.45).

4. Literature review

To understand how Information Architecture (IA) positions itself with regards to design questions, the state of the field as it currently is must be addressed. It is a relatively new field which historically has been largely dominated by practitioners and therefore struggles with many issues common to doctrines that are still in the process of "brewing". The following chapters are dedicated to presenting the current situation of information architecture and the web, the context in which this research is being developed, presenting its challenges and possible means to address them, furthermore to introducing participatory design.

Information architecture is arguably best summarized as dualistic problem-solution approach of the designer who uses "design as means to solve a problem" (Cross, 2006) and express the understanding of the problem through the design (Rittel & Webber, 1973) as visualized in the following illustration (Terence & Hobbs, 2014).



The world of web is intertwined between ever emerging practices, trends, technological evolution and amidst that chaos, IA attempts to balance and structure it all, as the authors of the "Information Architecture for the World Wide Web" summarize in the very preface of the book (Morville & Rosenfeld, 2006):

In the intervening years, it's been exciting to see information architecture mature into an established profession and an international community of practice. We have all learned so much from our work and from one another. And therein lies one of our biggest challenges. As our body of knowledge grows deeper, our discipline becomes more resistant to change. Individually and collectively, we find it harder to unlearn.

And yet, unlearn we must, for technology relentlessly transforms the playing field, changing not just the answers but the questions as well. In a post-Ajaxian Web 2.0 world of wikis, folksonomies, and mashups, how do we structure for co-creation? How do we document the rich interfaces of web applications? How do we design for multiple platforms and mobile devices? What has changed, and what remains the same?

Indeed, the complexities that arise from the intensity at which information spaces change (Haverty, 2002) as well as the complexities of defining and limiting the scope of the information spaces and the converging factors (Haverty, 2002; Lacerda & Lima-Marques, 2014; Terence & Hobbs, 2014) both have hindered the furthering of the IA discipline. Such is the current state of the field of information architecture (and will possibly remain that way due to the very shifting nature of the web), we further discuss some more specific challenges this circumstance creates.

4.1 Challenges Faced by the Field of Information Architecture

Unfortunately, conceptualizing the complexity of the influencing factors fails to result in the developments of grounding theories. Some indication in terms of case-approach studies and successful pattern finding in organizations has been delivered, though it also showed that information architecture practices, in particular in small to medium enterprises, are often

carried out by practitioners of different fields, such as, for example marketing managers (Burford, 2014).

What is more, the discipline of information architecture has been suffering from difficulties in both establishing a common concept language among researchers of IA (Hinton, 2013) as well as establishing a common language and a better collaboration between researchers and practitioners (Resmini & Instone, 2010; Degler, 2014).

The major defense of the need for information architecture (IA) often emphasizes the ever increasing complexity and number of mediating channels for information (Degler, 2014; Klyn, 2014; Terence & Hobbs, 2014). Despite such defense, arguments using such casing points as Facebook's Google graph (Klyn, 2014) as examples of impressive structural and semantic IA design do not address the fact that the practice upon which Facebook's graph api has been built is far from new or unique, in fact one could just as easily look at it as a relational database representation of a system similar to thousands of others, unique more in terms of its scope rather than design.

Similarly when we talk about navigations, taxonomies and other aspects of semantic web, the web developers and designers have spent years developing and improving upon the existing systems. The natural question arises if IA could or should be viewed as an independent field when the very complexities it addresses, that is the rapid evolution of the web, the shift from the user as information seeker to a user as content creator and collaborator, in fact forces the tech industry to move rapidly ahead.

The researchers pointing to the lack of codified language (Terence & Hobbs, 2014) in IA as well as the external drivers influencing the shifts in the field (Degler, 2014) and those using case approaches of systems like twitter and Facebook (Simon, 2014) may not necessarily be making arguments and counter-arguments for complexity and uses of it to solve.

Finally, the challenges of the field of information architecture can be witnessed in the extensive literature review carried out about existing literature in the domain, resulting in a collection of several conceptualized definitions of the field, which are given in *Appendix 1.*, where the

publication dates of the written matter ranged between 2006 and 2016. Despite the fact that historically, the term information architecture is accredited to Richard Saul Wurman (a trained architect), who in 1976 first used the two words together and abstracted the meaning of architecture (and formed the concept of it connected to structure and behaviour), the „polar bear book" being the sacred guidebook on Information Architecture, Resmini and Rosati's brief history and Ronda Leon's analysis are the point of departure for this review.

Findings of the literature review showcased that the main study characteristics revolve around websites, and/or other channels, creating navigation for better findability and the actual organization of content parts in such a way, which allows users to make associations between them. Terms like information overload, usability, user experience, semantics, taxonomy, metadata often appear in connection with the topic. While related design deliverables are identified to be wireframes, flowcharts, storyboards, blueprints, and/or prototypes. Moreover, the definitions no longer concentrate solely on structuring the website, but the attention switches to the entire digital landscape/ecosystem (Ding & Lin, 2010; Arango 2011; MacDonald 2013) and the enterprise as a whole- environment, business values, goals, strategy, operation, culture (Robertson, 2007; Wodtke, 2009; Davis, 2011). Respectable researchers have very varied opinions ranging from not being certain what domain IA encompasses (whether it is only web or not) to openly stating that nobody really knows where IA starts and ends. Originally, Morville and Rosenfeld defined and popularized the concept/field/practice, but later, throughout the years, Morville himself added functionalities to his classic definition of IA and described an information architect as one who "helps in technology integration" and "builds bridges between users and content, strategy and tactics, units and disciplines, platforms and channels, research and practice".

The researchers of this paper took the latter definition as the point of departure, because it encompasses not only what Information Architecture aims to be (or rather problems it aims to solve) but also explains some of the problems that arise due to ambiguity (as mentioned before - such as establishing common semantics and even the domain of operation). The chart by Terence and Hobbs showcased before identifies the many interrelated aspects of design (often

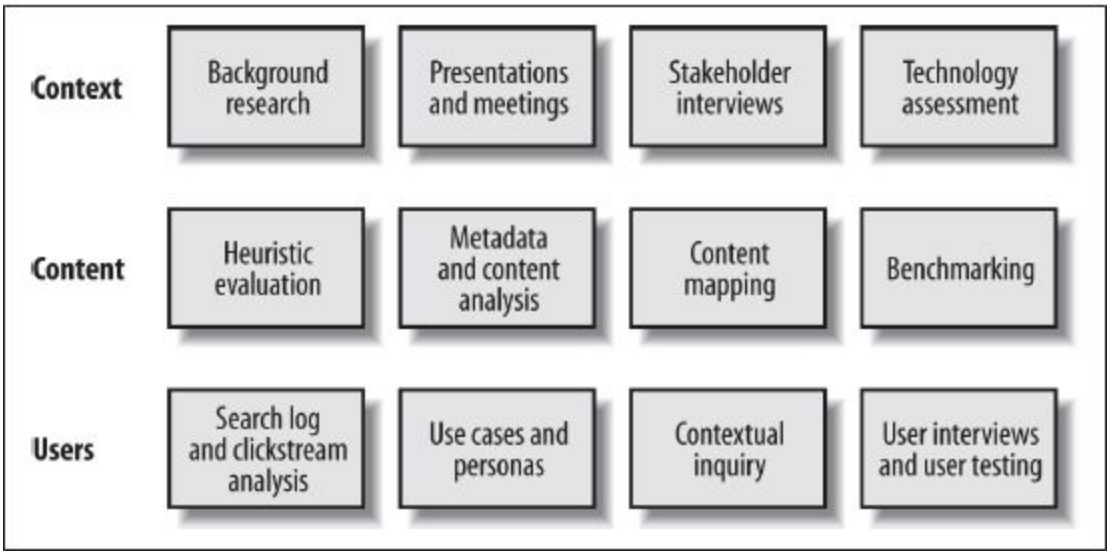
having their corresponding domains) that are supposed to be “bridged” by information architecture (from designers and stakeholders, to technology and culture in the broadest sense).

However, for the same reasons, there is quite a bit of uncertainty when choosing relevant methods for information architects and in fact creating what is called an Information Architecture research strategy, in particular in early design stages.

4.1 IA Research Methods

There exist numerous offline and online techniques, tools and methods for designing the information architecture of individual information spaces. Such can be categorized to being either generative (e.g.: open card sorting, Modified-Delphi card sorting) or evaluative (e.g.: closed card sorting, tree testing, usability testing, findability studies, heuristics, walkthroughs), depending on the goal (to generate ideas or test and receive feedback on them) and the stage of the design process. Other conventional methods focus on studying potential users and include interviews, surveys and questionnaires, or ethnographic research methods such as field studies and walkalongs are based on users’ explicit knowledge. However, the methods exist for products that already exist or already have established requirements.

The following illustration of IA methods (Louis Rosenfeld, Morville & Arango, 2015, p.316) from the probably the most esteemed IA book displays the sample of methods that could be used for different aspects of IA research. However, as the authors themselves suggest - information architects shouldn’t limit themselves to the aforementioned methods nor should they use all of them. What is immediately noticeable is that these methods already need a certain basis for the research. But what happens when there is a need to create an information architecture for a product that does not exist, a product that does not yet have a clear and well-specified vision? What happens when there is no existing information architecture?



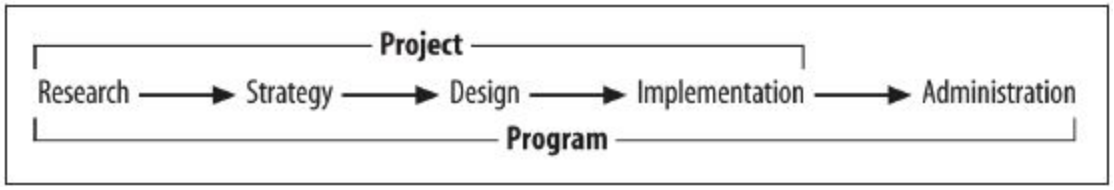
The majority of successful web projects from social media websites to sharing economy business start of from an idea. Morville himself suggests (p.316) that business context is often the best point of departure:

For practical purposes, an investigation of the business context can be a good place to start. It's critical to begin projects with a clear understanding of the goals and an appreciation of the political environment. Ignoring business realities is just as dangerous as ignoring users. A perfectly usable website or app that fails to support business goals won't last long. The term "user-centered design" is valuable insofar as it moves the pendulum away from executive-centered design, but don't let that pendulum swing too far.

Of course, context isn't just about politics. We also need to understand goals, budgets, schedules, technology infrastructure, human resources, and corporate culture. Legal issues can also be important, particularly in heavily regulated industries. All of these factors can and should influence the shape of the information architecture strategy.

However, taking a simple start-up as an example, setting budgets, corporate culture and often even more robust product visions do not exist - what exists is solely an idea.

Unfortunately, the use of information architecture in early design (pre-design) stages has a limited coverage, despite the fact that there is a general agreement that Information Architecture strategy should be more akin to “waterfall” model and should be used from a holistic perspective throughout the entire design process, as displayed in the following IA phased development approach (Louis Rosenfeld,Morville & Arango, 2015, p.313).



In fact Rosenfeld, Morville & Arango (2015, p.359) themselves point to the “chicken and egg” question (“What comes first, the business strategy or the information architecture?”). Even so, as discussed in the beginning, IA tries to solve problems through design and as such, the questions of what to do when the problems are not entirely clear - that is when products don’t exist or problems are way too complex, or difficult to identify the point of departure - becomes rather difficult. Consequently, the people behind the initial design conception are the ones that generate the very idea, which is perhaps one of the reasons why there is so much talk about the “designers who design for themselves” (Cooper, 1999, Coleman et al. 2003) and/or use self-observation (Hasdogan, 1996).

However, the natural question arises, if we are trying to solve a fairly abstract problem, as, within the context of this research - come up with ways to encourage book sharing/reading - an activity that has so many cultural/habitual/individual preferences, does the very idea of solving the problem inherently encompass the basis for the “design solution”? In other words, an assumption about what kind of design (even if on a very high-level) would help to achieve the objective of encouraging people to read, turn reading into a more social experience so on and so forth?

It is a very common business (and not only) business objective - to sell a service people are supposed to benefit from, but it is a common scenario, that for instance most startups that pass the initial phase - fail due to the lack of customer interest, or else, the relevance of the idea.

What such a situation has in common with the goals of information architecture, without delving too deeply into the business world, is that it is desirable to know in advance whether a design solution will be relevant for users. This would suggest that involving users in the very premature stages of design would perhaps serve as a good tool not only to help polish the design towards their benefit but also to discover before hand about the user as a domain expert in the first place. For this reason, the field that does exactly that - praise the user as a domain expert - is covered.

4.2 Participatory Design

The term user-centered design (UCD) is said to be first used by Norman and Draper when they published their book called *User Centered System Design: New Perspectives on Human-Computer Interaction* in 1986. As a process, it focuses on understanding the needs of the future users of the product through analysing various data, originally not by user involvement, but by seeing the user as an object of the study. As Norman later defined, it is "a philosophy based on the needs and interests of the user, with an emphasis on making products usable and understandable".

Although its meaning varies widely among practitioners, Participatory Design (PD) moves beyond user-centered design and is grounded in collaborative processes, where power relations are removed and mutual learning takes place. This is achieved by involving stakeholders and in/direct future users in the design of information technologies, and so making them active agents in the study.

In this section, some research material on PD for the study will be presented. The idea is not to give a complete overview of the history of Participatory Design, but rather to focus on more recent cases and methods within the field. Two databases were searched to find articles focusing on PD. More precisely, papers for this review were from EBSCOHost (Academic Search Premier and ERIC) and ACM Digital Library. The search was performed in February 2016, restricting the language of publications to English, the year of publication to be between 2006 to 2016. Combinations of the following words were used: "participatory design", "tools",

“methods”, “practices”, and “techniques”. After reading the titles and abstracts of the results, the primary research included 183 articles, which were further restricted by eliminating workshop descriptions, some short papers, and/or industry cases. By reading these papers, a first insight on the existing literature was gained and areas, name of researchers, and/or keywords for further search were noted, thus later some more papers were hand-picked additionally to the literature list.

The roots of Participatory Design (PD) can be traced back to Europe and North-America in the 1960s, 1970s and mid-1980s, but appeared in very different contexts. Thanks to the Norwegian Industrial Democracy Program, „studies investigated how social groups formed around production technologies and sought to reform job distribution and wage systems for workers”(Asaro, 2000) and brought about two research programs. One of which, done by Scandinavian researchers (Ehn & Kyng, 1987), was meant to alter the hierarchical nature of workplaces, thus decentralize management’s control and empower trade unions. The other focused on autonomy in group dynamics, done by British researchers (Mumford & Henshall, 1979). Although they targeted different goals, both perspectives had a Marxist foundation, critiquing Taylorism, political imbalances and advocating democracy. Hence, it is clear that PD emerged with having a strong focus on the political dimension, while in recent years; there has been a growth of fascination across multiple disciplines.

As Ehn (2008) defined, “Participatory design is seen as a way to meet the unattainable design challenge of fully anticipating, or envisioning, use before actual use, takes place in people’s life-worlds.” Or according to Manzini et al (2011), „participatory design is a constellation of design initiatives aiming at the construction of socio-material assemblies where open and participated processes can take place”.

For the participants to articulate their tacit knowledge, Kyng (1991) coined one has to “trigger” them. Considering that the importance of PD has been recognized across the field of HCI and academic discourses, a wide range of tools and techniques (and triggers) appeared to engage people in a conversation, make them think and reflect on what has been said. Moreover, these ever-expanding diverse approaches help designers to extract unspoken values, views and

concerns, support creativity and facilitate idea-development. Such methods include for example personas (Cabrero 2014), generative toolkits, card-based techniques (Lundberg & Arvola 2007; Beck et al, 2008, Kwiatkowska et al 2014), probes (Graham & Rouncefield 2008; Mattelmaki et al 2011), mock-ups, design games (Törpel 2006, Brandt et al 2008, Selina et al 2014) and self-reporting tools, storytelling (Buskermolen & Terken 2012), workshops (Denef et al 2008; Steen 2012), or future workshops (Jungk &Müllert 1987;Kensing & Madsen 1991; Greenbaum & Kyng 1991; Kensing & Halskov 1998) to aid a "common language, to discuss existing reality, to investigate future visions" (Ehn & Sjøgren, 1991) in the "third space" (Muller, 2003) region bridging users and professionals.

Not only does collaboration come in an ever-expanding variety of ways, with different time scales and various types of facilitation, but PD has been applied within several domains, to almost all aspects of everyday life as well. It has been used in the public sector (Bodker & Zander, 2015;Lepouras 2007), library development (Kusunoki & Khoo 2012; Dalsgaard 2012; Blandford 2006), education (Palaigeorgiou 2011, Triantafyllakos et al 2008), healthcare (Wechsler 2015; Wozniak 2014; Björgvinsson 2008; Byrne 2007), disaster risk management (Akama & Ivanka 2010), urban planning (Wouter et al 2014; Redhear & Brereton 2008; DiSalvo et al 2008), agriculture (Romani et al 2015) and art (Muller & Loke 2010).

The assorted participatory approaches provide space for involving any type of participants. The reviewed literature is rich in case studies with children, students, people with depression, or differing mental capabilities, people with impairments, depressed people, elderly with dementia,disadvantaged groups, lead users, students, or children. Users can be of help from the idea generation to iterative refinements of products/services.

It is for these reasons that PD becomes relevant in the light of IA problems discussed before - because Information Architecture as a field is so broad and tries to conceptualize realities that are very different, lower level standardized methods for answering problems are unlikely to ever emerge - participatory design practices can help, as mentioned before, with envisioning the use of the system before it actually happens - this moment forms a crucial point for synergy, considering information architects usually work with systems that are already existing

(whether in a form of IS or an organization) and have an established context. Many web IA initiatives, however, start with a very abstract problem and the point of departure is often not a particular group of people or organizational representation but rather a social phenomenon which is, as mentioned before, is very abstract in nature.

4.3 Summary of Literature Review

With the help of literature review we have identified that Information Architecture suffering from a lack of common semantics, that information architects disagree with regards to the goals of the field itself and that consequently when confronted with the complexity of real life, information architects still have to make personal decisions about how much to listen to the users (and user data), how to balance the business needs/goals with information architecture needs, or what to pick as a point of departure before creating Information Architecture strategy.

However, it was established that the goal of information architects at the most abstract level is essentially to connect different stakeholders and different domains relating to the problems at hand to create a unified and consistent approach to solving particular design problems.It was also formulated, that especially in the early design phase, the ambiguity is the biggest problem and that participatory design has had a lot of success with gaining domain knowledge in very different contexts (which is one of the key factors of consideration for Information Architects) and therefore may prove as a relevant tool in any design stage, perhaps even in the requirements phase.

Finally, even though philosophical and principled similarities between IA and PD exist in data gathering (interviews), evaluation methods (user testing), culture (both consider users) and documentation (use of personas, mockups, storytelling) exist, differences arise in conceptual focus (system content vs collaboration). It is a question worth pondering, if involving users not only as someone to whom information needs to be accommodated but also as those who are

able themselves to identify critical problems at an early stage, would serve as means to provide information architects with point of departure for their designs.

5. Case Description

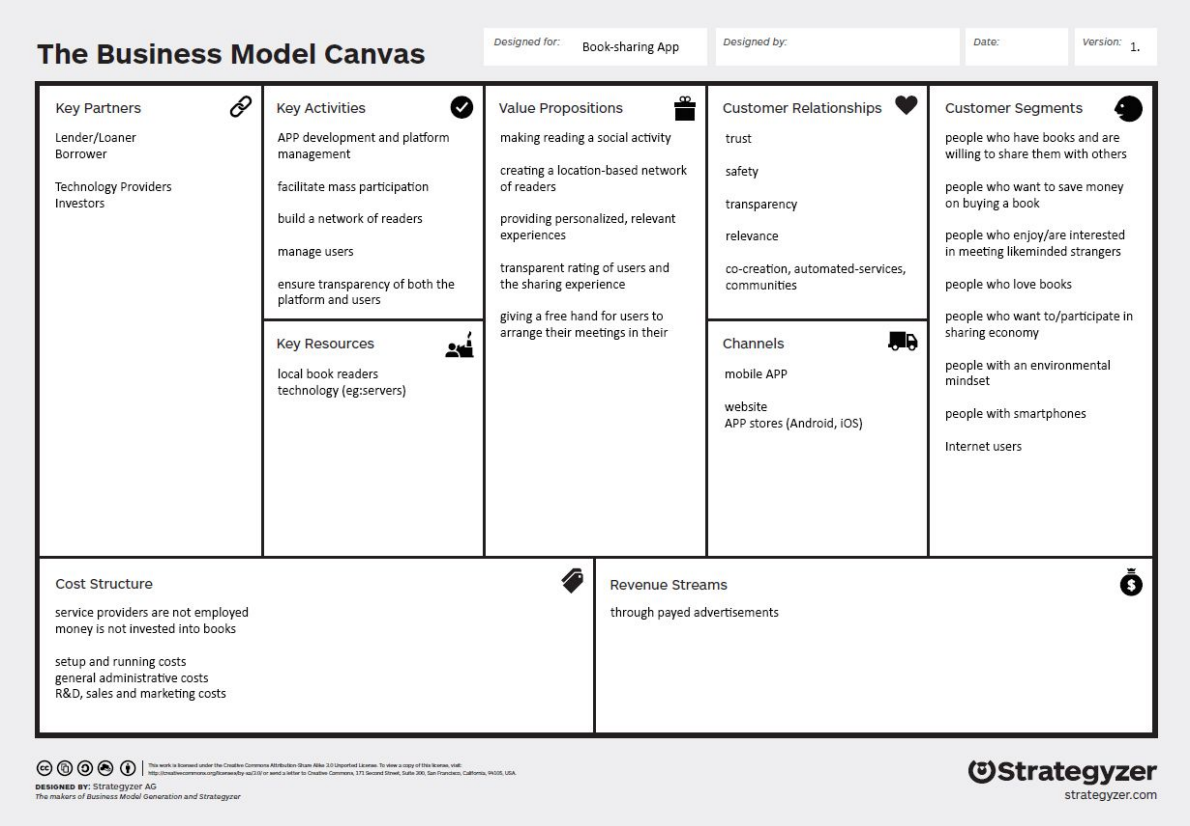
As a domain, the sharing economy is chosen for the case, considering it is a common trend in the world of web today and as there exist a lot of such applications, there are basic identifiable characteristics which appear in most. These qualities and functions are based on traits such as openness, transparency, and involve creating trust by having rating, ranking and commenting systems. Also, it has to be mentioned, that it is the users who shape such applications (community-driven) and thus the brand itself by creating the content, so such platforms provide space for interactions and transactions- support communication and efficiently sharing and/or uploading information.

Additionally, the topic is especially appropriate for participatory design from both a moralistic and pragmatic perspective. On the one hand, as according to Carroll and Rosson (2007) “people have the right to participate in the design of technological artefacts and systems that affect their activities and experiences”, as they are the beneficiaries of the technology, which has a direct effect on their experiences. They are the ones who in the end have to own and control the application. While on the other, the target users of such technologies are very diverse, making it challenging to foresee their various needs without their contribution and interacting with them in advance.

More precisely, the case researchers of this paper wish to create a basic IA concept design proposal for is a social application that would enable book readers to share and exchange books and would enhance their reading experience. Other key aspects of the application on this wise cover helping finding book readers, allowing users to communicate, providing security and ensuring trust.

KEY ASPECTS	POSSIBLE SOLUTIONS
Facilitate book sharing	Clear, understandable structure
Help finding book readers	Location-based application
Allow users to communicate	Contact by private messages
Providing security and ensuring trust	Feedback and rating system

With the help of the Business Model Canvas, an overview of the concept was mapped out, listing most importantly the key partners, resources and key activities in the operation, channels (through which users would be reached), customer segments (to target) and customer relationships (wished to be maintained).



The most important aspects for this specific project the model captures are the key partners needed for the application to operate, essentially the lenders and the borrowers, as value is co-created through them (peer-driven app) and their personalized experiences. More specifically, the target group contains people who like to read, people with environmental concerns, or a financial mindset (wanting to avoid costs), those who seek for social proof or just want to belong to community and those with smartphones. Value propositions to keep in mind reflect on the customer relationship to be established (communities that trust the application due to its transparency, feel it is safe to use and relevant for them). The goal is to create a location-based dynamic network platform for readers , make reading a social activity and provide personalized experiences by locally organizing and connecting people. By showcasing only the people in the given areas, there is a potential for the creation of self-organized offline communities, assisted by a transparent rating of users.

In the following sub-chapters, the sharing economy- on which the application is based- is described, listing some of its major fields and biggest platforms. Then, as conducted by the

Boston Consulting Group, the most interested users are presented and segmented based on a 'Millennial Survey'.

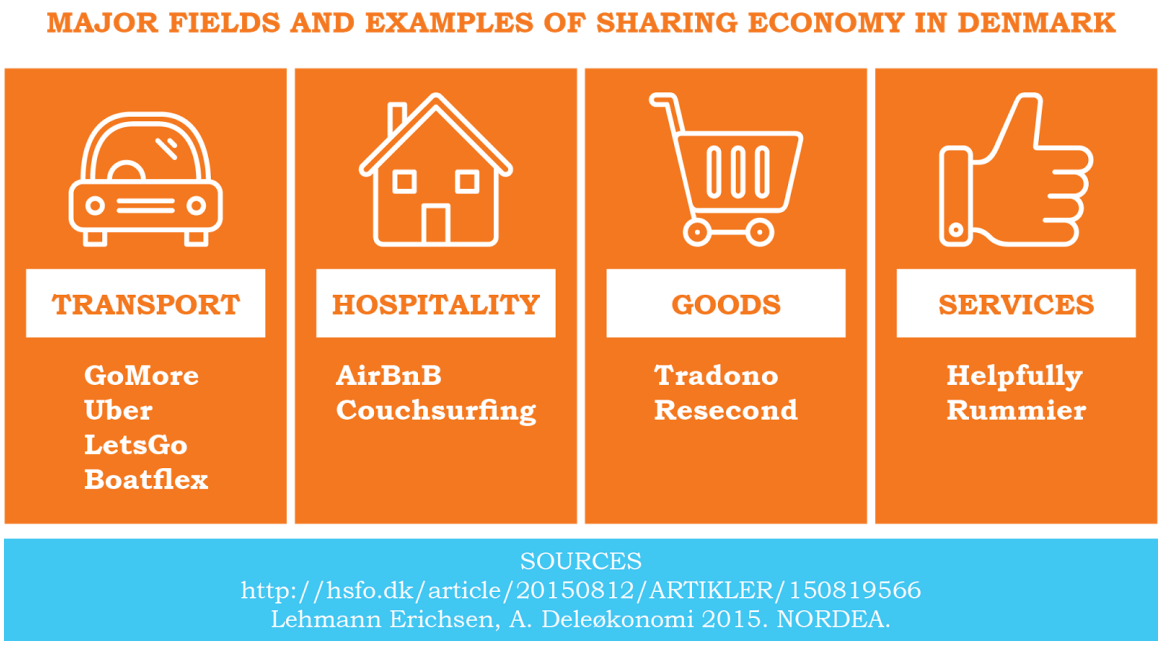
5.1 The Sharing Economy in Short

People's reliance on and expectations from technology greatly raised in the past years. This attitude can for example be attributed to the development of the Internet, faster wireless network connection, increase in smartphone adoption, moreover increased mobility, the expansion of social media platforms and a diverse flow of online community information. Internet became an internal part of our lives and the possibility to interact and maintain social relationship with others anytime anywhere through online environments enabled a paradigm shift and brought about the development of sharing economy (the size of which was estimated at $26 billion in 2013 according to the Economist), one of the buzzwords of today's startup communities.

„The phenomenon of the sharing economy thus emerges from a number of technological developments that have simplified sharing of both physical and nonphysical goods and services through the availability of various information systems on the Internet."- Hamari et al. (2015.)

Due to its diversity (recirculation of goods, increased utilization of durable assets, exchange of services, and sharing of productive assets- Schor, 2015.), there exists no solid, or unified definition of sharing economy. In their paper "Sharing Economy and Consumer Protection Regulation." Koopman et al. define the phenomenon *„as a broader classification for any marketplace that uses the Internet to bring together distributed networks of individuals to share or exchange otherwise underutilized assets*". Goods and services can be shared as non-monetized initiatives, or exchanged for monetary benefits (making the term debatable), thus challenging traditional economy and/or causing regulatory uncertainty and political battles (French, 2015.;Penn, 2015.; Rogers, 2015.). To name a few, the concept's operation has shook up and has an impact on the music and film industry, publishing industry, automotive industry, tourism and hospitality, catering industry and business administration. Examples of platforms

that put pressure on, or even alter markets are Airbnb, Uber, TaskRabbit, DogVacay and to have Danish business listed, Tradono, or the upcoming AirDonkey.



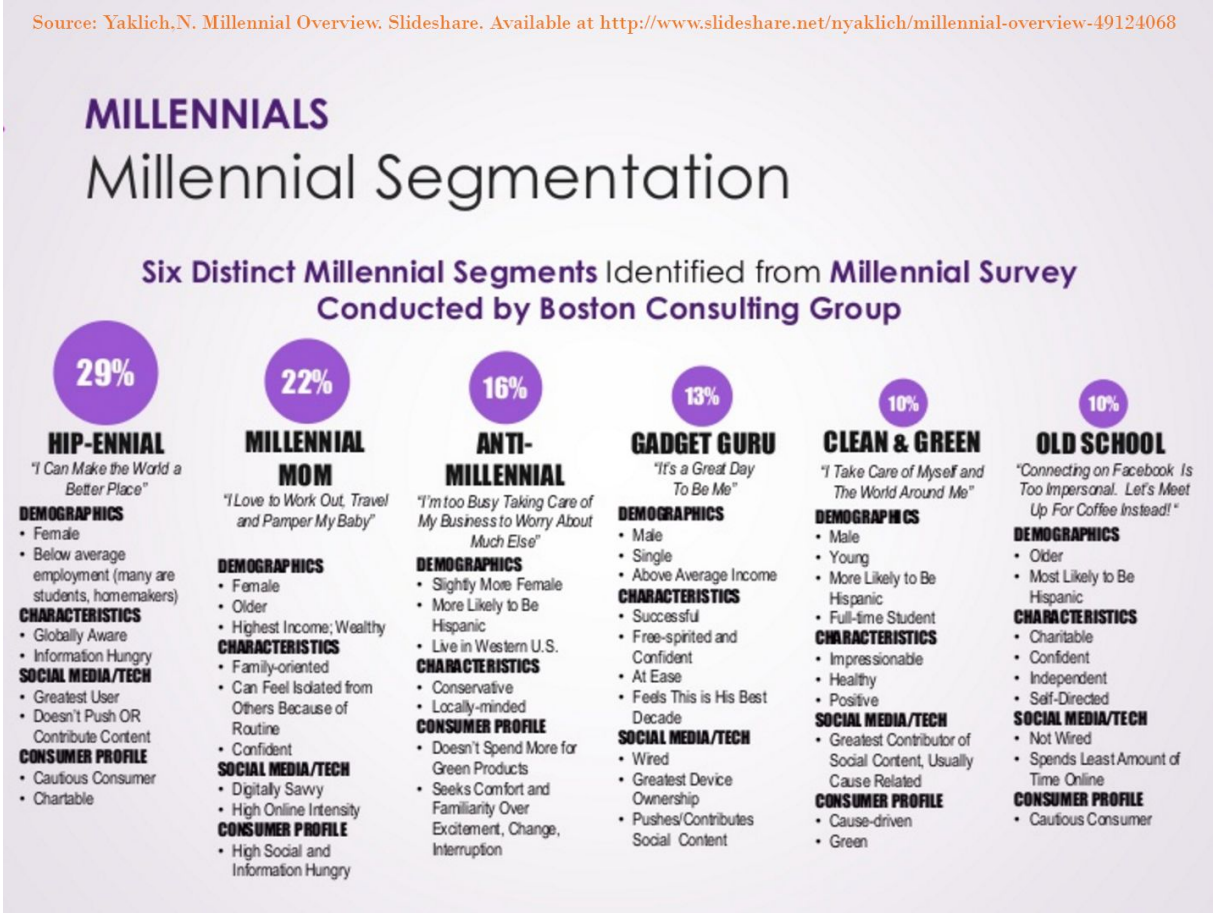
In general, online collaboration is encouraged by enjoyment, reputation, self-fulfillment and relatedness (Hamari et al. 2015.), convenience, lower prices and transaction costs (Puschmann, 2016). Besides societal and practical reasons, other motives affecting attitudes and goals towards participating in the sharing economy is an increasing concern about the ecological and developmental impact of humanity, namely, an individual's consumption and carbon footprint. There exists an ideological motivation as well, which is critiquing capitalism and the operation of the market (Schor, 2014.) Lastly, social trust is also a factor that underpins why consumers participate in favor of these hybrid market models.

5.2 Users of the Sharing Economy

According to emarketer Inc., the Millennial generation (born between the early 1980s and 2000) is the most interested in sharing economy, while Havas Worldwide's Prosumer Report from 2014 goes even further and says they are its drivers. Although the following characteristics are not true for all Millennials (e.g.: anti-millennials), generally, they are educated, but can be

financially constrained. They are deeply involved in mobile, digital and multi-cultural, multi-lingual social environments; are active on social media (they create and share content); they care about the environment, value family and are community-minded, who solve problems with logic, vision and determination (Trim, 2011) Dan Schawbel listed some statistics about their attitudes and behaviour (Schawbel, 2013), such as 61% of millennials are worried about the state of the world and feel personally responsible to make a difference, 32% say they don't like advertising in general and also, they are more engaged in activities like rating products and services than older generations. Another source (PricewaterhouseCoopers LLP. n.d.) found that amongst 1000 sampled US consumers, those people who have children under the age of 18 are also excited about this new type of economy once they tried it and so are households with the income between $50k-75k.

Source: Yaklich,N. Millennial Overview. Slideshare. Available at http://www.slideshare.net/nyaklich/millennial-overview-49124068



As stated in Brooks' (2014) research and Yaklich'(2015) slides, Millennials can be divided into 6 subgroups. Based on their life stages, these sub-categories range from the Hip-ennial being

charitable and a cautious consumer, the highly social and information hungry Millennial Mom, the conservative Anti-Millennial, to the single male Gadget Guru, cause-driven Clean-and-Green Millennial and self-directed Old-school Millennial. Looking at their demographics, characteristics, social-media usage and consumer profile, it is clear that they value transparency, efficiency, value and/or reasoning. Since they spend a lot of time on their smartphones, designing for mobile devices and intuitiveness should be a priority. This can be done by focusing on simplifying navigation, making tap-or-swipe friendly content arrangement solutions, following a polished, minimalistic design.

As stated before, they are socially-responsible, pro community and like ratings, which mean, having a discussion forum, providing rating and sharing options and performance monitoring are also in their favour.

5.3 Case relevance

The contemporary phenomenon of the sharing economy provides a solid base for this case study research paper, due to the fact that it is present in various industries (has multiple source of evidence Yin 1994.; regularities can be discovered), while reading itself is a widely practiced activity. The subject/theme of the analysis being a book-sharing application can be attributed to be relevant trough some of the characteristics listed in the previous sections, namely:

- It relies on user-based rating system for control, to ensure the level of trust between users and make them more engaged with the application. (social trust-building; reputation)
- It is network-based, thus it provides personalized experiences. (enjoyment, relevancy)
- It has the potential to build local communities.(relatedness)
- It advocates sharing and saving resources and so, acts as a redistribution market. (environment)

Moreover, the case setting is relevant for the research of IA with regards to the following aspects:

- The nature of the case (sharing-economy services) resemble many startups and web projects that take place nowadays

- Clear business goals (that would often serve as a point of departure in IA process) do not exist - it is a problem that Information Architects often come across with
- The goals are very abstract - encourage sharing and reading, it is a social problem, as such offers a lot of uncertainty and complexity as well as place for flexibility, meaning researchers are free to refocus much like in a start-up environment nowadays when they “pivot”
- It offers a good case scenario where nothing is known about the users and there is a lot of diversity - meaning such context would enable to see the benefits of contextual inquiry and user involvement to the fullest as well as the limitations of “executive-led” or “designer-driven” design
- Such an application does not yet exist - therefore researchers can immerse themselves in a rather unique scenario and avoid simply reevaluating an already existing application

6. Design-Analysis

As according to Newman & Landay (2000), who interviewed designers involved in website design, “designers follow a process of iterative refinement that moves the design from high-level and general to increasingly specific and detailed”. They presented a generalized design process in their study consisting of four phases: discovery, design exploration, design refinement and production. This design analysis is intended to focus on the first two stages, which both have different purposes, namely

“The purpose of the discovery phase is to determine and clarify the scope of the project, the desires of the client, and the characteristics and/or needs of the intended users<...> It is common to perform a competitive analysis during this phase, which involves reviewing and evaluating competitors’ products for common features and opportunities for improvement and differentiation. Other techniques that might be applied at this phase include interviewing or corresponding with the client to clarify aspects of what is expected, and various techniques to discover the needs of the users such as interviewing, observing, testing, or surveying.”

While during refinement, the “designers develop the selected idea further” and iteratively improve and detail it.

6.1 Comparative Analysis Of Similar Applications

Myer (2002) made a list of items to examine (home page’s content, site organization, consistency, informativeness, performance, distinguishability of sections, titles and links, readability and the search engine’s effectiveness) when doing a competitive, or more so in our case,a comparative analysis. Four applications- Goodreads, “the world’s largest site for readers and book recommendations”; Amazon, a retailer which started as an online bookstore; Tradono, “a flea market on your phone, where you will find bargains among a broad selection of used items from people in your neighbourhood” and Facebook, an online social networking service-were analysed and compared using his suggestions. The basis for considering these specific apps were, to have some applications about a similar topic, one that is fairly new on the

Danish market and the third being the top smartphone application of 2015 (The Nielsen Company).

	Goodreads	**Amazon**	**Tradono**	**Facebook**
HOMEPAGE	After downloading and starting the App, a 'What's new' page appears with a button on the bottom. sets proper context understandable clear design Sign up/Sign in page is also simple.	After downloading and starting the App, a 'Sign in' page appears. There is an option for creating a new account and a note about terms and privacy under. If the page is inactive for a few seconds, the screen changes to show popular items and 'Sign in' becomes an option on the right side, under a search section.	After downloading and starting the App, a 'Log in' page appears, where it is only possible to log in with Facebook. ontext is unclear lear design After log in, a clear welcome message appears on the screen.	After downloading and starting the App, a 'Log in' page appears. There is an option for choosing language on the top and creating a new account in the bottom of the page. context is unclear clear design After login, a screen suggest the opportunity for easier login next usage. Home page itself is easily understandable and using icons.
NAVIGATION	Top navigation: hamburger menu on the left,search on the right.Subpages titles appear always on top with a back option before it.	Top navigation: hamburger menu on the left, logo is in the middle, cart is on the right. Under this is a search bar. Hamburger menu opens up as a local,side navigation on the left.	Top navigation: hamburger menu on the left, title is in the middle, search and sub-menu for categories on the right. Hamburger menu opens up as a local,side navigation on the left.	Primary top navigation: search on the left, messages and settings on the right. Under this is the secondary navigation with 'home','friend requests','notifications' and ''. Global navigation changes in 'messages' and ''. The latter has a different mechanism as well,sliding to the left.

ORGANIZATION/LINKS	A bit chaotic design, sections divided by thin lines. Easily distinguishable section titles on the left, 'show', 'more', 'add' labels are blue and on the right. Buttons are black,grey, red, orange or green-inconsistent. 'Groups' subpage is not responsive. Use of overlays.	Consistent, but slightly crammed. Sections are divided by thin lines and content groupings are done with boxes. Links are easy to distinguish (blue) and informative. Buttons are yellow or grey.	Clear and consistent. The whole App operates with two main colors, buttons are fonts written with orange. When a label is clicked in the categories, it does not change its appearance. Use of overlays.	Clear,intuitive, sections and content groupings are divided by thin lines and/or boxes and are easily understandable. Links are easy to distinguish (blue) and informative. Buttons are blue or have grey boxes around. Use of overlays.
SEARCH/RESULTS	Search can be based on title, author, or both. Search results show the picture of the given book, its title, author, rating and year of publication. Results are organized according to the date of publication.	When the search bar is in use, the system gives suggestions found in different departments. Top results are shown. Results can be viewed in two formats and filtered as well.	Search can be based on class fields, or people. Search results do not provide any relevance weightings.	There are no specified categories within search, but before one starts writing, recently searched words are shown. Search results provide websites first,then pictures and posts. Thereafter come specific Fb pages weighted by the number of likes/followers.

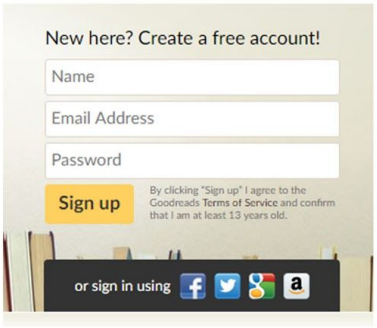
READABILITY	Sans-serif font. Easy to read. Combination of regular and bold fonts, upper-and lower case fonts. This has a disorganized effect.	Font is easy to read. Combination of regular and bold fonts.	Sans-serif font. Easy to read.	Sans-serif font. Easy to read. Combination of regular and bold fonts.
CONTENT	There seems to be a sufficient depth and breadth of content. Content matches the mission of the organization and needs of the audience.	Content matches the mission of the organization and needs of the audience.	There seems to be a sufficient depth and breadth of content. Content matches the mission of the organization and needs of the audience.	There seems to be a sufficient depth and breadth of content. Content matches the mission of the organization and needs of the audience.

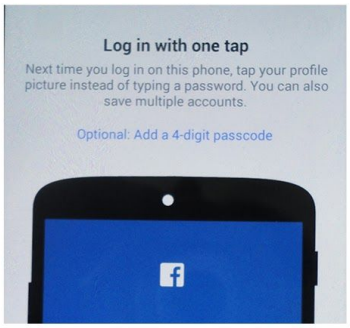
Similarities, such as top navigation, use of overlays and sans-serif fonts were identified between the four applications. Search is also placed in the top half in all of the applications, but only in three cases (Goodreads, Amazon and Tradono) can it be carried out based on categories, while in other two cases (Goodreads and Facebook) relevance weightings were assigned to the search results. Except for Goodreads' design, which is a bit chaotic and inconsistent, there is clear site organization and consistent appearance of buttons and labels in the interfaces.

Since technology has changed greatly in the past 20 years, so did online persuasion. The belief that computers have the ability to persuade users became a fact, by cause of the various websites, social networks and mobile applications influencing us on a daily basis. As Fogg (2009) puts it, „we meet persuasion attempts at every click. In fact, virtually every website has a persuasive purpose: the creators intend to affect user attitudes or behaviours some way".

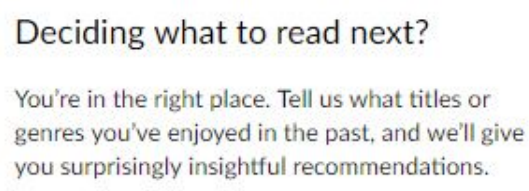
6.1.2 Persuasive Design Elements in Similar Applications

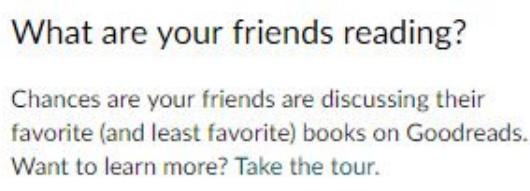
Oinas-Kukkonen and Harjumaa (2008) specified software requirements based on Fogg's functional triad and design principles. As for these persuasive elements, most can clearly be detected, some other concepts seem to overlap in the applications taken above. To present some examples (others can be found in a form of tables under *Appendix 2*), each design principle covering primary task support are present in the applications. Looking at both the websites and their mobile version, Goodreads, Amazon and Facebook each reduce complex behaviours into simple steps, some before sign up, other during ordering or login.





The clearest example of tunneling is present in Goodreads website, where they offer personalized content after a user lists some books s/he have read in the past. By this offer, they can be able to persuade simple visitors to become members.

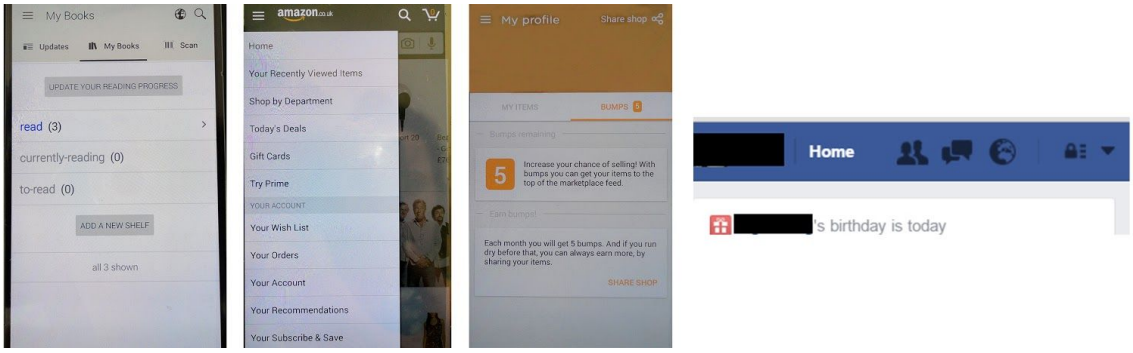




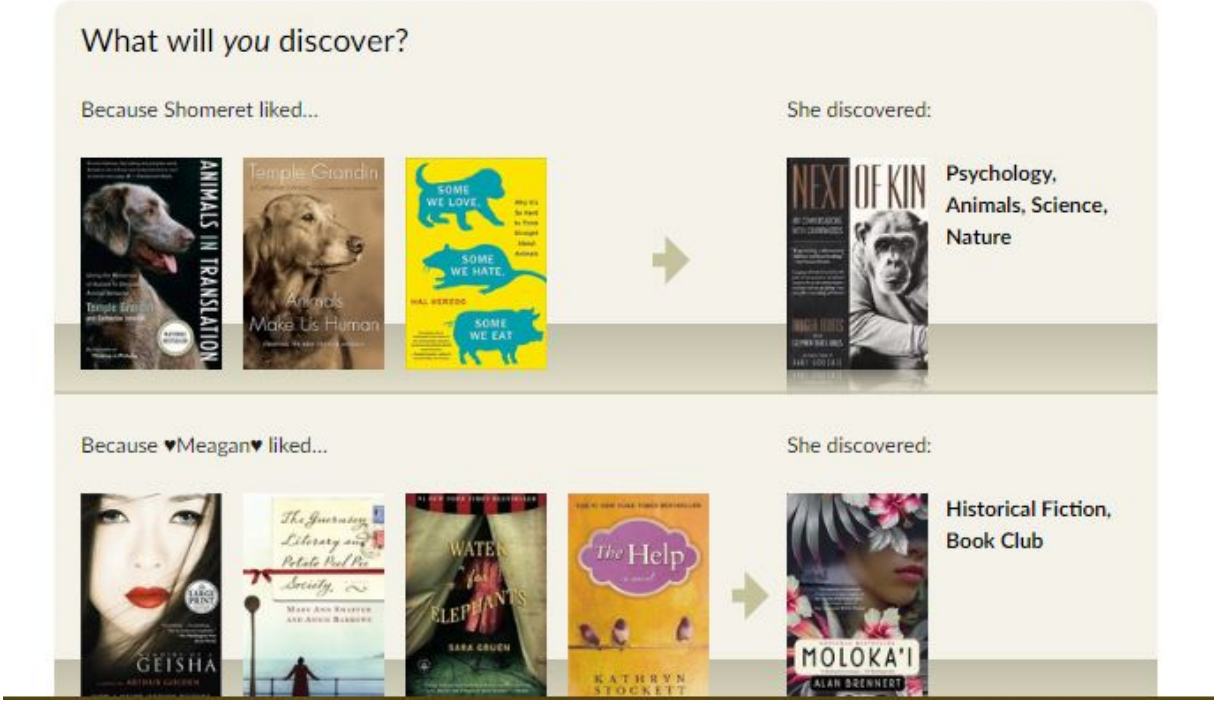
One of the main characteristics of social websites that can be considered the backbone of such systems is tailoring content for its user groups, to user needs and interests. Tradono for example is working only after one has located themselves in an area, and presents items available in that specific region and close surroundings. Goodreads provides different content

and generates recommendations after a user has rated 20 books. In our understanding, these examples are representations of personalizations as well.

All four examples help track a user's own performance, or status, in the case of Facebook, easier understanding is gained through the use of distinctive icons, which are perfect representations for what they stand for.



Giving visitors the chance to observe links between cause and effect in the form of simulation is also a persuasive element. Goodreads as such, shows what happens after a user liked specific books, by drawing an arrow between books liked and books suggested and so making the notion of causality even more recognisable.

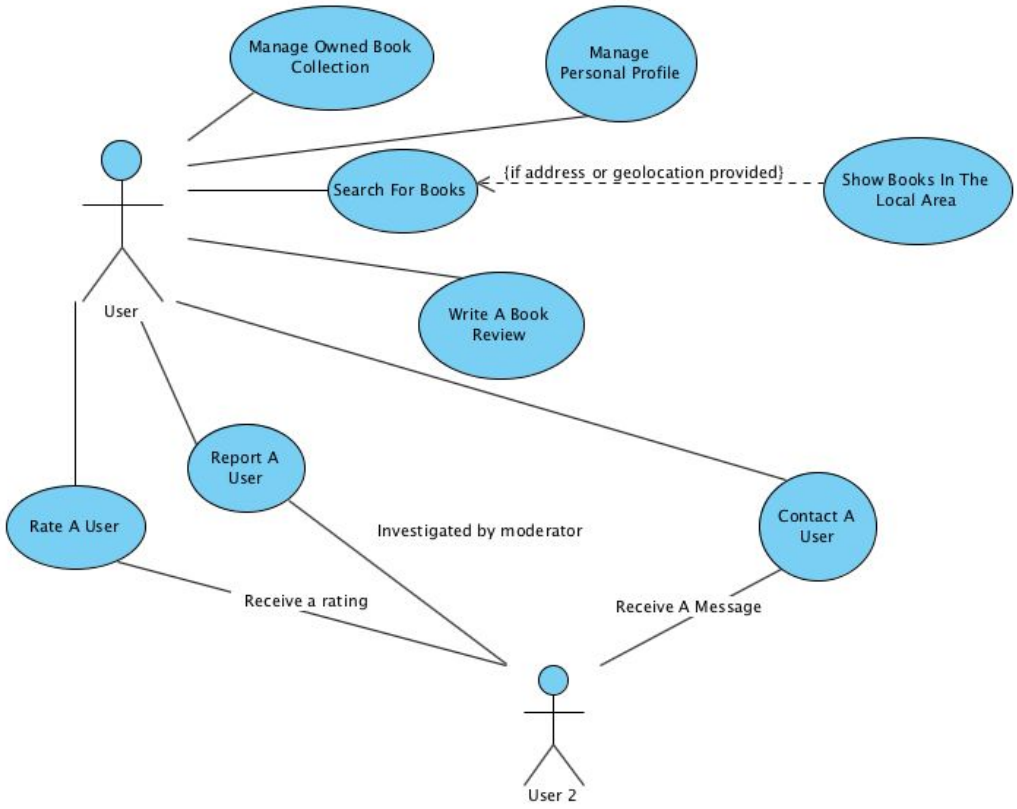


Except for Tradono and Facebook, which work only after signing in, the two other systems provide ways in which to rehearse target behaviour - browsing and searching for books is possible without having an account.

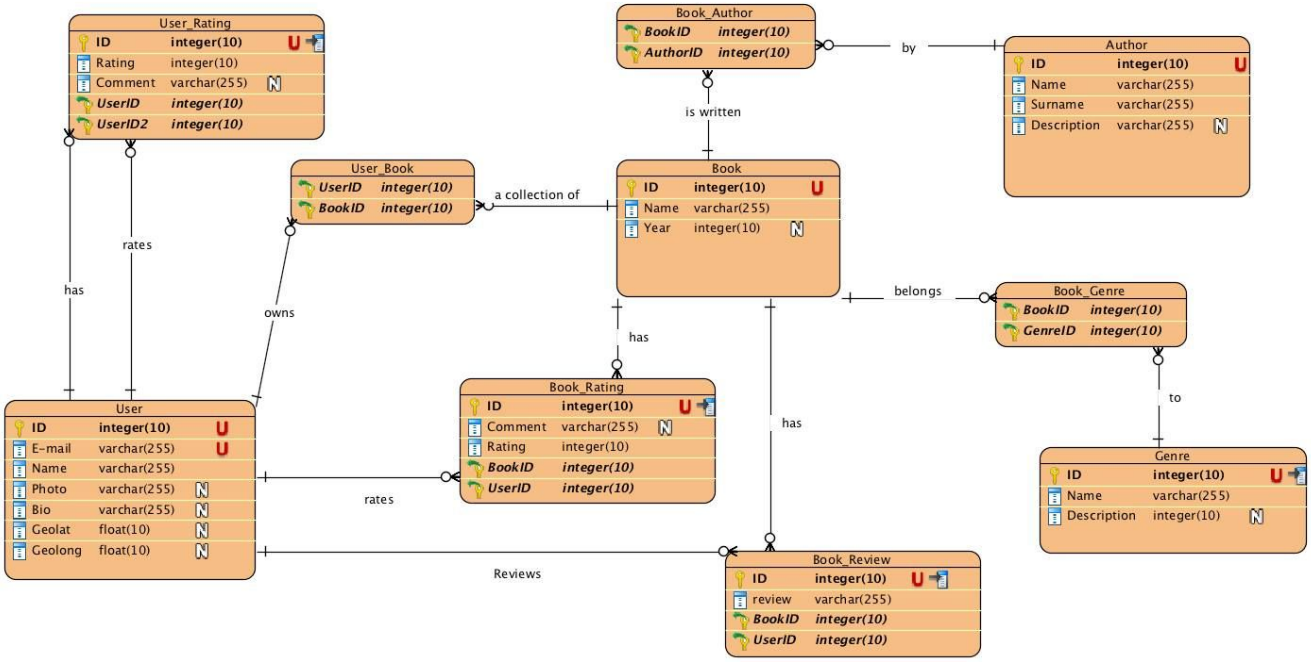
6.2 Design-Analysis Result

With the qualitative analysis of the collected data on sharing economy and its participants, the comparative analysis of similar applications, and by specifying the most important features, the researchers created a few UML diagrams - entity relationship and use case, a sitemap and wireframes of the imagined book-sharing application.

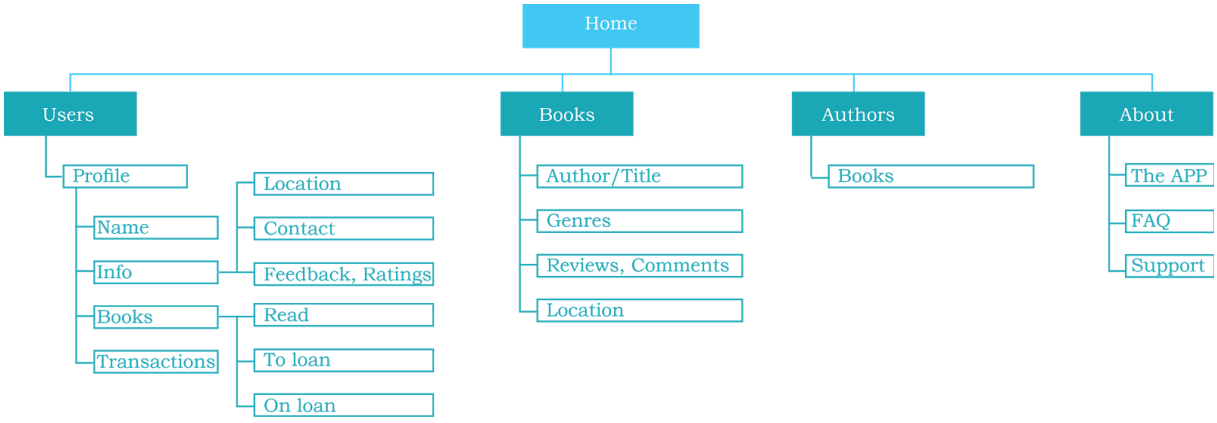
Below is a use case diagram, which shows the core functions of the user. At the center of the user functionality is the ability to view available books in some radius from his location and use the app to mediate a possible meetup and exchange.



Next, an entity relationship diagram is provided, which essentially shows the database design of the application. It signifies the important relationships between owners of the books (users), book metadata - author(s), genre, ability to rate, comment and evaluate both books and other users.



Finally an early, simple sitemap concept plan for the application was created.



From an information architecture perspective, one can see that there are only four major elements at the top level of site architecture, which represent four kinds of pages. plus

6.3 Future Workshop

For framing the cooperative design activities, the form of a future workshop was followed, by reason of time limitations and taking the clear ways of segmentation it provides into consideration. Originally developed by Jungk and Müllert (1987; 1996), future workshops provide a framework for involving users in the design of a future artifact and making them collaborate through three distinctive phases. The workshop starts with a problem analysis by critiquing the present situation, where participant voice their perspectives, experiences and current problems and have the opportunity to understand each other's as well. This part of the session generates a list of problems that need to be solved. This is done in the second phase, where participants generate visions and co-create solutions about an ideal future. This part of the process is kind of an opportunity analysis, where feasible solutions are seeked, before the phase of implementation.

6.3.1 Plan and Procedure

Multiple future workshops, following the schedule seen in the table below, have been conducted (with different people) in order to have more data, diversity and people, as well as to increase the number of ideas.

Having presented the facilitators and explained the roles, the format, phases and rules of the workshop, deliverables were discussed. The importance of activity and creativity was pointed out and each person signed a document stating their participation is voluntary and anonymous, and agreeing to having their work process recorded (by video, photos and notes).

After the necessary formalities, the workshop process started with a warm-up conversation about the current situation of the book industry and book reading in general. This step helped participants in tuning in, so that the critique phase could start, where they individually had to brainstorm and formulate problems of the present situation by drawing out specific issues they have experienced. Pictures (people reading at different places, a bookshelf, a book bus, a library corner and a scene from a bookstore) were used to help this phase. After about 10 minutes, these problems (feelings, sentiments) were explained and discussed, to achieve a shared understanding and bring up new insights. Clustering outlined a clear distinction of

problem areas and participants chose 3 areas they found the most important to solve in the future.

To assist their creative process, some pictures were used again as triggers. These photos were about exhibition pieces, future technologies and fabrics, mixing abstract with concrete shots, conceptual and already existing high-tech products. Having the ideas described and shared with everyone, the participants were organized into two groups and were asked to make a prototype by mixing and matching ideas to find the best fit for a more realizable and practical product. Besides having to sketch and/or cut out pieces for visualization, this implementation phase contained a sub-task as well. While creating the mock-up, the groups also had to build a scenario around the prototype by answering 5 questions (who, when, where, what, how). Scenario building proved to be helpful in describing key aspects of the ideas and in getting to know more about the context of use.

By being present at the workshops, the researchers made notes and learned a lot about the participants and their experiences. While some thoughts and comments were annotated on site, others were gained after the sessions throughout watching the video documentations. Further information and patterns were discovered when looking at the physical workshop deliverables.

Learning through organizing and carrying out the first two workshops let the facilitators see shortcomings of the processes. Thus, a third workshop was organized, where there was more focus on guiding the participants both during the discussions and the creation parts. There were more statements formalized, questions asked as a way to start conversations, help participants keep focus on more relevant areas, or point towards specific issues in connection with books and book reading. Furthermore, the triggers and materials available to use in the course of the critiquing, envisioning and implementation were more diversified. There were for instance actual physical print books and an e-reader device displayed to prompt thinking along with LEGO, paper mobile wireframes and paper browser wireframes to assist creativity.

6.3.2 Participants

Three future workshops were organized altogether, but all focused on the concept-creation phase and had the same format.

In the first workshop, all participants were male, 60% of them were between the ages of 25-34, most of them had a university degree and some were still studying. In the second workshop all participants were females and students, 75% of them being 25 or over. As a consequence, the opportunity was provided to compare the differences in the process of future workshop in terms of gender.

To overcome the possible distinctive characteristics of the same gender groups, a third workshop was held by inviting both women and men into the process. Here, all participants were students, within the age category 25 and over.

6.3.3 Observations of the Workshop Processes

There were a number of interesting observations to be made during the workshops. Having workshops with different gender specific groups may or may not have influenced the processes, but there certainly were a number of contrasts to be compared.

Gender Differences

For starters male-only workshop participants overall tended to have stronger opinions about reading than female-only workshop participants. In fact, some members of male-only group were even open about not having a particular interest in reading itself (the frequency of reading varies between the participants from everyday to once a year).

Also, there were some interesting differences in how the two different groups critiqued the medium of the book that was the second most important critique after price. While the object of critique remained the same – that is issues with the electronic or physical books, the reasons for critique were entirely different and this pattern was common to all members of female-only

and male-only workshop participants with slight deviations. The table below illustrates the differences in the critique aim regarding books:

Male-only	Female-only
Difficulties with translations of the books – no easy way to translate parts of a physical book and no user-friendly in-app way to translate books even in an electronic format	Physical books have sentiments attached to them which do not carry over in the electronic formats, for instance you cannot touch the book, you cannot look at it even post-reading
Movies and visuals in general are a more efficient way to transfer knowledge and information (even when it comes to creative writing)	Difficulties carrying books with you because they weigh a lot and take a lot of space - especially when travelling and so on, and so forth.
Extra materials cannot be incorporated into physical books (for instance no way to add an app that calculates something into a book, the only way would be to describe and explain formula or no way to add a piece of a working programming code – have to be downloaded separately)	There is a common feel to all devices as such reading books in an electronic format does not generate a feeling of detachment from the virtual world unlike physical books which allows a person “to rest” from all the technical world
Switching between electronic books and extra material on the same computer disturbs the	Electronic books allows one to escape routine because you can carry them with you everywhere and they serve

reading process because you have to switch through windows	especially well in cases where you have to wait (like airports) whereas physical books make it difficult to travel with
No way to continue reading a book on a different platform from the same point you stopped (for instance if a reader started reading a book on a laptop and then would like that the book opened the page the user left it of at on a phone)	Books do not have reliable abstracts, such as movies with trailers and which makes it especially hard to choose a book to read
You cannot search in a physical book	You cannot search in a physical book
There is no way to share extracts from a physical book.	Electronic books do not facilitate a feeling of “ownership” unlike physical books and in certain cases with certain authors there is a preference to “collect books”
It is difficult to keep track of all the notes you make with books. The diversity of electronic books and electronic formats as well as devices and the existence of physical books makes this even more complicated – no general “standard”	User books have a “cultural artefact” feel as some kind of memorabilia not only with its own content but also its own history

There is too much software for reading electronic books and a lot of it is unreliable	Physical books gather dust
Books as a genre take too much time to read, are inefficient, riddled with long descriptions and in general could be much more “compact” in terms of its “content”	Having a personal library is time consuming but in a kindle-like device it is possible to have thousands of books and read multiple books at the same time with ease

In the table above there are 10 points each from two different groups. While there were more points made in the discussions, these reflect the points that participants had a tendency to circle back to. What becomes immediately apparent that male-only group was more concerned with the technical aspect of reading (softwares, compatibility, efficiency and usability, user-friendliness of reading on devices), whereas the female-only group largely emphasized the sentimentality attached to books and reading. In fact, even the participant in the female-only group that held a very strong opinion about the benefits of electronic book format also agreed and emphasized the sentimental value of the book. In other words, all female members kept emphasizing how even the newly discovered opportunities of electronic books (such as carrying an entire library with you) all contributed to the same aspect – enabling them to use books in order to delve into reading experience, rather than finding more efficient ways of simply transferring knowledge as fast as possible. In the male-only group, this was not even mentioned.

Concern participants would naturally revisit during the male-only workshop was “whether technology will push out books entirely or not” and amid the female-only workshop was “which is better – electronic or physical books”.

It would not go too far or stretch anything if it was concluded that within the male-only group the most dominating sentiment if phrased in a form of question was “What are the problems

with reading?" whereas in the female-only group the most dominating sentiment was "What is it that prevents me from facilitating this intimate reading experience?" Or, in other words, males had a mindset of using books in a situation where they seem to know what they need and simply must use books for specific information, whereas women seemed to look at reading as the end goal itself, which in the process facilitates a unique experience.

What is more, perhaps rather interestingly, in the envision and implement phases, females chose to write about their ideas, whereas the male group preferred to visualize and so sketch their solutions (in spite of providing different materials to use in both groups).

Discussion Process

While having the gender differences in mind between the two workshops, during the critique phase and others whenever any sort of discussion would arise, there was a certain pattern to return to some kind of position – whether from a point of critique or defense.

For instance, in the beginning in the male-only workshop there was a fluid discussion about the problems of books and the book industry, but later it seemed to be only focusing on issues participants came across with online. As one participant said "I bought a Kindle for traveling,

but the books I buy in iBook are not compatible with it." Another mentioned problems he encountered when not being able to filter on language in a database. Comparing print books with other forms, there were some thoughts on movies and also the new generation and children using tablets from an early age.

Later two conflicting opinions developed clearly. One of the participants was against books in general. He voiced his opinion by saying, "Reading books takes so much effort to get entertained", "Reading is tiring" and "Books train imagination. This is the only plus I find." On the other end of the spectrum were participants trying to defend the process of reading a book by telling how "resources online sometimes kill the experience", "I have my own characters" and saying it is sometimes faster to look up something in a physical source, than looking for it online " I turn around in my office, take a book and open it."

Similarly when it came to female-only workshop one could witness a similar pattern (electronic books vs physical books) albeit with the differences in discussion matter addressed in the "gender differences" chapter. In the beginning, the female-only workshop started with participants discussing their personal experience with reading. To illustrate this by example, one participant mentioned that she "Likes the feeling of old books when she touches them and the unique smell the books have", another participant suggested that "book readers facilitate a similar experience because you still get yourself comfortable and focus on the book and only the book, no matter the medium", then the first participant commented again that "it does not feel the same because you cannot turn the pages with your hand and you still have to stare at the screen which takes away the authentic experience", finally a third participant added that she "carries a number of books with her all the time, even when travelling because those books feel special together" and the fourth said that "to me, the reading experience is all about sitting warmly with a book when it is raining outside – the whole experience is a part of it".

Unfortunately, even when some of the participants would offer new insights, or when facilitators emphasized one point or another, or suggested certain questions derived from statements made (such as for example, after hearing a comment such as "We were growing up in a communist country and the books we had were mostly ridden with propaganda and so it was difficult to get into reading", asking the participants "Whether they think the social environment influences the general attitude of social groups towards books and if so – how?"), the attempts would only frame the discussion momentarily, and then it would get back to the problems participants experienced or they perceived others experience within the two mentioned main topics.

Even though some triggers were used to boost creation of utopian presentations, the ideas participants produced were not greatly novel and filtering these ideas were not done collectively, but only when the groups were separated. Using the term 'idea bank' and discussing, collecting or deducting exciting, promising ideas together might have provided deeper understanding of the concepts and spark even more constructive and creative solutions.

The implementation phase went in accordance with suggestions. Groups debated during making the sketches and used the guiding questions to help them in making a scenario when presenting the concepts to each other.

Ideas from the the two workshops	
Virtual reality interface	An interface showing books in 3D, where community is key.
Multi-platform application	A app,that works on different devices to make continuous reading possible when changing devices.
Hologram	A hologram that creates an image of an actual book and is controlled much like the traditional book - turning pages with hands and so on while preserving all the benefits of modern day e-books.
Google-glasses like device	An in-ear or glasses like device that would allow a person to transfer the feelings that reader felt when read the book, his imagination, switch between reading and listening to the book and store a personal library inside it.
A reusable paper-like digital material	A device that feels just like paper and looks like a small book with papers that can be reused for reading different books.

Facilitation and Guiding

Both before and during the first two workshops it became apparent that one of the key issues with future workshops is the decision on how much the facilitators were to guide the participants. As noted by Apel (Apel, 2004):

"Methodically, the future workshops can be roughly classified according to which extent they promote creativity and/or how strong the moderator emphasizes non-rational performance elements. In short words: workshops can be classified as being conducted "intuitionally" or "top-heavily". As a general rule, the methods of a future workshop depend largely upon the methods and biographical background of the moderators."

Facilitating workshops requires guiding the group and asking questions, while at the same time managing processes and group dynamics. One should observe, listen and interpret participants actions and comments. To facilitate the articulation of how participants experience the current situation, imagine future solutions, or the look of the interface, triggers and different materials for implementation phase have to be carefully selected. This process also causes some troubles, as for example to which extent should they be guided, how concrete or abstract should the visual materials be, how much should the pictures be 'forced into' the process and if having multiple kinds of materials help creativity, or if abundance causes blockage in it.

As the research developed, researchers of this paper became interested in where would the workshop lead the participants if their creativity were unrestricted entirely and they were allowed to develop their ideas with only minimal intervention by facilitators. This is namely due to the following reasons:

- Wish to avoid any influence in the way participants perceived the problems (and the solutions) from the facilitators.
- Wish to know what exactly do participants think and come up, as well to be able to see how different these perceptions were from the researchers and how any differences could lead to a completely different problem-solution approach.
- To see if participants when given complete autonomy would naturally aim to consider their ideas in the light of how likely it is that they could be implemented in reality.
- To find out if any of the participants having different relationships with book reading, would come to a similar solution that is based on the emergence of sharing economy, such as the researchers took inspiration from.

Thus, it was decided that a third workshop needs to be organized, which also gives the opportunity to have mixed-gender groups instead of gender-specific ones.

6.3.4 Future Workshop Deliverables

Critiquing produced small cards with one critique point per card, while the envisioning phase also brought about many kinds of outcomes, as for the various expression forms of the participants.

MALE GROUP		FEMALE GROUP	
PRICE	4	PRICE	4
QUALITY	0	INFORMATION	3
ACCESSIBILITY	5	ACCESSIBILITY	1
MEDIUM	2	MEDIUM	4
CREATIVITY	0		
SOFTWARE	0		
PLATFORM	4		

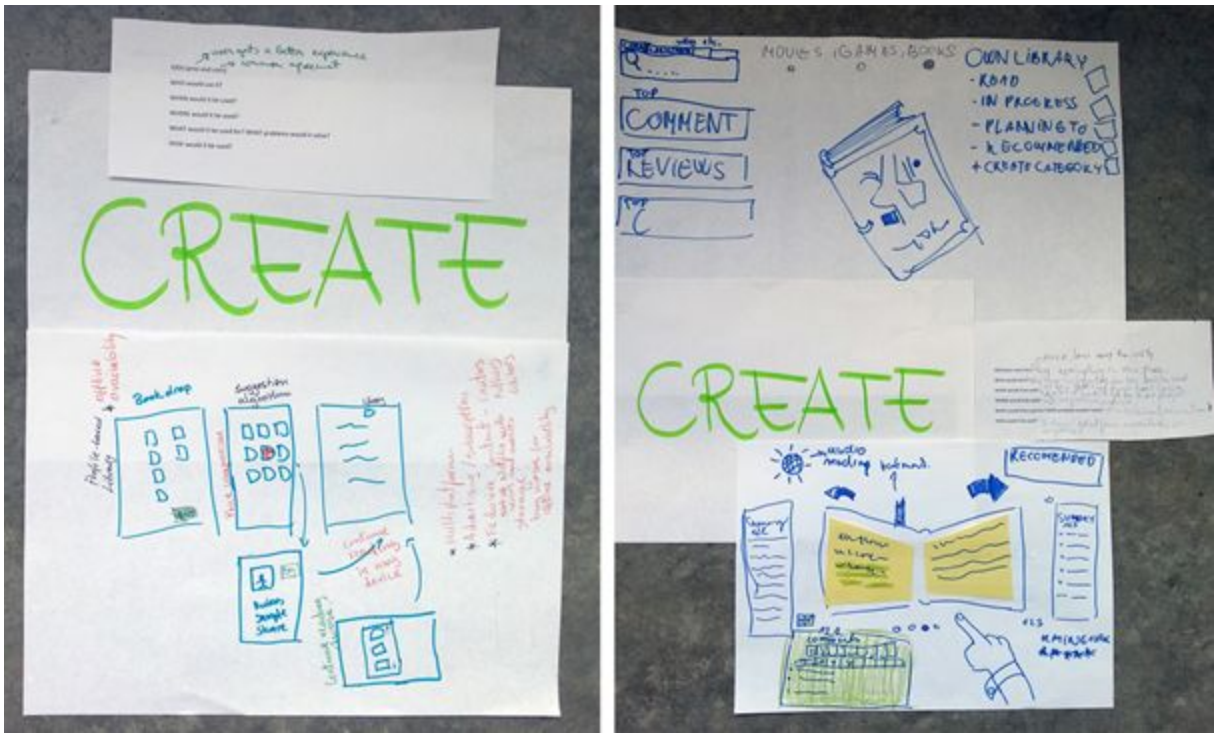
In the envision phase, the participants of male-only group had to imagine an ideal future solving problems in connection with accessibility (with 5 votes), price (4) and platform (4) individually and turn the previous critique points into positive statements. Accordingly, female-only group had to do the same with once again price becoming a very important issue when it comes to reading books, followed by the nature of medium (it is important to note that 3 members of the female-only group were more critical of the nature of physical books whereas one took more issue with the nature of electronic books).

Some chose to draw, some wrote, others used the trigger photos to explain their idea. The ideas were of very different nature, some more and some less realistic.

During the envision phase, participants were divided into two groups and given some time (30 minutes was suggested as a general aim but time was not restricted)to work on ideas. In the male-only workshop “Group A” came up with a multi-platform application, that makes continuous reading possible when changing devices. Participants talked about a situation where the app shows that a user has been reading 3 different books and asks which one does the reader want to continue reading. They also said that after reading an entire book, it should either auto-destroy itself, or put itself on a shelf. The app was connected to publishing services that enabled to sell and buy books as well as contact the publishers or get exclusive content. There would be options for reading reviews or samples, to share a book with others and to choose from suggestions.

“Group B” sketched a virtual reality interface where they would show books in 3D. They stressed how important the idea of a community is and imagined options for reading about others’ experience, (top) comments and ratings of a book. If a reader comments on a specific sentence or paragraph, the original text would be highlighted with a different color, so that others could see the opinion if they wanted to. There would be an option to create collections

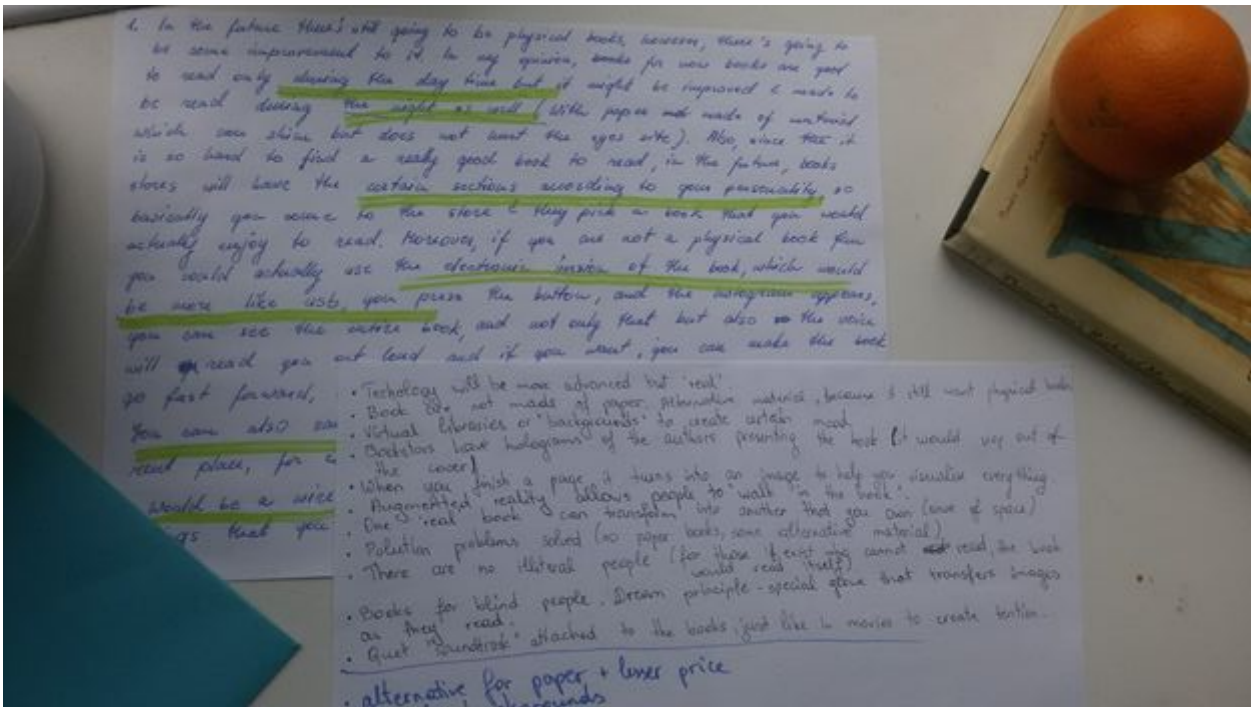
within the categories of “owned books”, “read”, “stopped”, “want to read”, but a reader could make his own categories as well.



Meanwhile “Group A” of female-only group also came up with a very similar virtual reality concept though it was much less formalized. The major difference being that female-only group put much more focus on a stimulation of “a preferred reading environment”, meaning for instance that one could choose to be in a virtual library when one would be reading a book. This is probably consistent with the fact that female participants have emphasized the importance of the environmental circumstances needed for the desired reading experience. Much like with the “Group B” of male-only workshop, “Group A” of the female-only workshop emphasized the ability to share and save their thoughts and extracts over Internet from the virtual reality medium.

“Group B” of the female-only workshop had some more radical ideas which they carried from the envisioning phase. Their proposed idea was some kind of small device that one could connect to oneself and then be able to share their emotions that they felt were invoked by a book read. This idea was based on the necessity for a reader to give feedback about a book and

share his impressions. More so, this device would not only allow a person to transmit emotions but his imagination as well so that one reader could see how another reason imagined the book he was reading. On top of that there would be a similar device to “Google glasses” that would allow people to read a book, chose to listen to it at any point in the reading process and choose the voice which a person listens to.



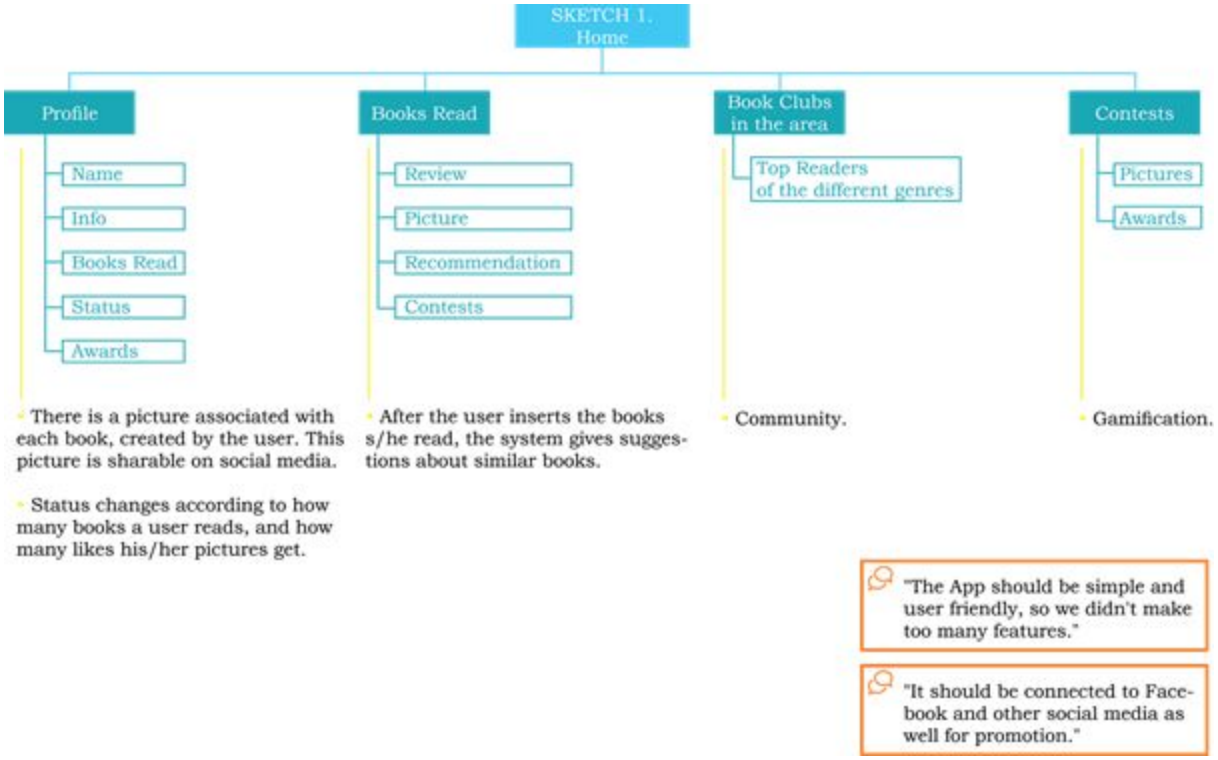
6.4 Future Workshop Result

Albeit the triggers were actively handled and studied in the beginning of the processes, LEGO was only used by one participant in visualizing a brain chip mechanism idea during the third workshop, while the paper wireframes were mainly employed as a simple paper to write on, rather than visualizing interfaces. Though participants were members of Millennials, when having to implement their ideas and create a solution, they were not precise at all in visualizing interface solutions.

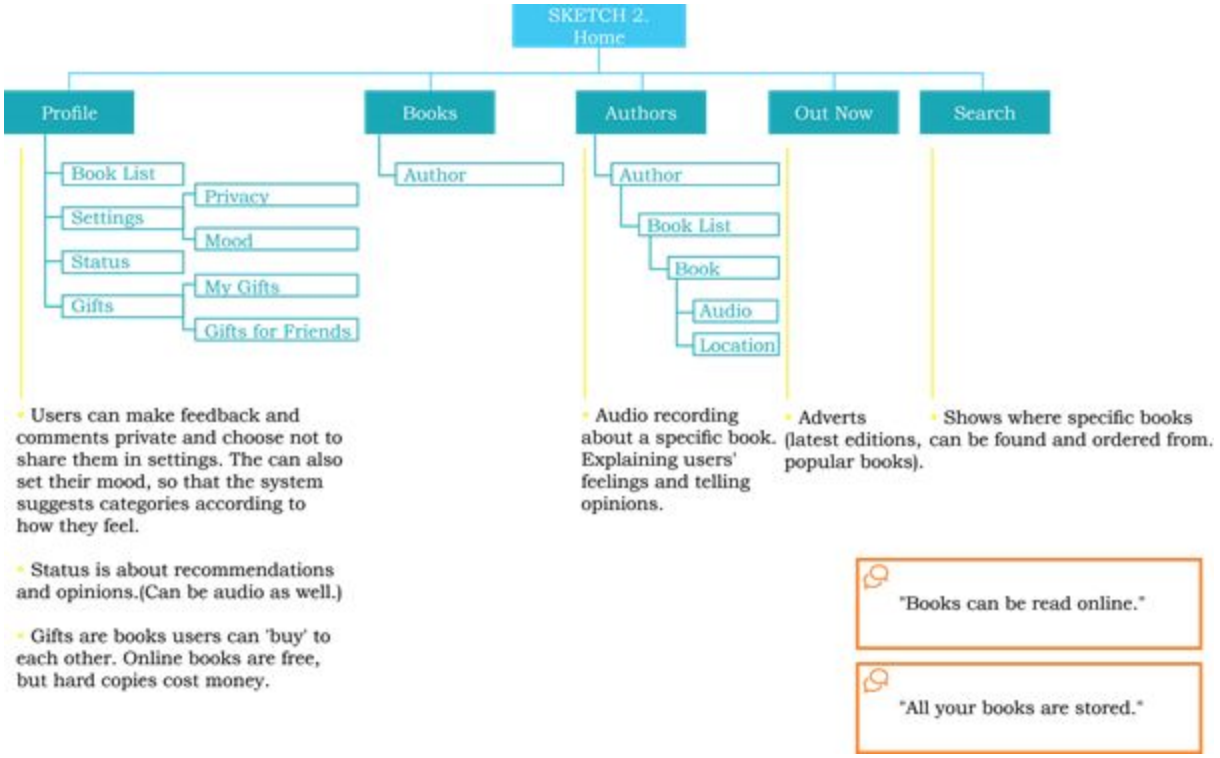
However, researchers had the opportunity to understand the context of experiences better. For example, although a very personal experience and medium, reading and books themselves are something participants do talk about, even share with others occasionally. Also, researchers

received indirect feedback on their concept, by paying attention to issues participants experienced and problems they focused on within the domain. With the increased level of guiding during the third workshop, further information about use context and user preferences were accessed. Also, participants produced gamification as an extra insight that could be implemented into the non-game context of reading and book sharing in later phases of the design process.

Ideas of the mixed-gender groups during the third workshop were converted into separate sitemaps as seen below. Group “A” came up with the idea behind sketch I., a simple and social application solving problems in connection with medium and visibility, where members have profiles and hand-made pictures about the read books. These photos are sharable on social media and collaborate to gamification elements, like status change or rewards according to how many likes or shares a piece gets. The app would also show book clubs, as well as top readers of the different genres in the user’s area. By typing in the books one has already read, the system would give suggestions or further books to read.



Group “B” on the other hand envisioned a more complex system, mostly derived from a sales and marketing perspective, similar to an MLM strategy. First of all, there would be a website for all authors and their books, with audio-recordings about people sharing their feelings and opinion about specific books they have read. Secondly, an application (as seen in sketch II.), with reader profiles and book lists. Besides the normal search mode, books can be searched according to one’s mood. They can be read online, be commented and reviewed. Advertisements of popular books, or latest additions are considered to be important elements.



6.5 Participants' Survey

To gather data about the workshop participants, confirm what they said during the workshops, and get feedback on their workshop experience, a survey *Appendix 3.* was composed and sent out using the guidelines provided by Thelwell (2015.) on Invision Blog. This survey included demographic questions, rating scale type of questions, which provided participants the opportunity to assign different weights to statements, multiple choice questions to let them select more best possible answers and open-ended questions so that participants can communicate their thoughts in their own words. The collected data is summarized in the following tables and passages.

SURVEYED = PARTICIPANTS	**7 men, 4 women**
AGE	
18-24yrs	2
25-34 yrs	7
35-44 yrs	2
HIGHEST DEGREE RECEIVED or LEVEL OF SCHOOL COMPLETED	
High school or equivalent	1
associate degree	2
bachelor degree	7
graduate degree	1

According to the demographic data, most of the respondents were male and between the ages of 25-34 years and having bachelor degrees. When asked about how much they enjoy reading on a scale from one to five (one being 'only when it is my choice', five being 'very much'), three responded 'very much', two 'enjoy' reading and six answered reading to be 'just okay'. Having to put in order the preferred way of reading, participants chose paper books over reading on

different devices, while their motivation to read revolved around gaining information and knowledge, relaxation, learning, escaping reality and having time to do so. Ten out of the eleven participants have at least once borrowed books from someone and/or borrowed books from a library, nine recommended books for others and the same amount have downloaded books, while seven gave a book for someone to read at least once, and five read book reviews before deciding on what to read- confirming there is a possible need for a book-sharing application.

Finish the sentence with at least one ending.
I like...

	NUMBER of RESPONDENTS
...discussing books	5
...looking at print books and their cover	6
...visiting bookstores	4
...reading online	4
...spending time in the library	5

What problems do you face when choosing a book to read?
Select all that apply.

price	63,6%
lack of reviews	18,2%
quality	45,5%
language	54,5%
poor recommender-systems	45,5%
Other	27,3%

What influences your reading choices?
Select all that apply.

friends(opinions and recommendations)	81,8%
movies based on books	45,5%
online reviews	36,4%
popularity ratings	63,6%
bookstores' rankings	27,3%
advertisements	18,2%

More than half of the respondents (54,5%) find joy in a book's physical appearance, while spending time in the library and discussing books were both favoured by 45,5%. It was also found that less than half (36,4%) enjoy reading online, which again proved the preference of print books over digital files. Biggest problems faced when choosing a book to read are price (63,6%), language (54,5%), quality (45,5%) and poor-recommender systems (45,5%). Besides, reading choices are strongly influenced by friends' opinion and recommendation (81,8%),

popularity ratings (63,6%). These insights all raise the need for showing cover photos of books in the designed application and providing space for discussion, comments and feedback.

When asked about book sharing, five people (45,5%) answered they are slightly likely to participate in such an activity, two (18,2%) were moderately likely, while three (27,3%) were very likely to do so. Phrases like “social website”, or “social application” are primarily associated with Facebook, but concepts like communication, sharing, community and interaction also came into people’s minds. Thus, the functionalities expected to be seen in such a book sharing application are chat, discussion forums, comment sections, reviews, recommendations and ratings, while within the user profile user rankings, lists of favourite books and a news feed were mentioned. Again, answers supporting the portrayed concept of application.

Mark the statements you agree with.

6	If I have to do reading on the internet I would prefer a bright background and dark text.
2	Some of my favorite websites have very unique design.
3	I sometimes find it very difficult to navigate in an app or a website.
6	I expect the navigational menu to be at the top of the screen.
7	I prefer websites that are more minimalistic.
9	I think that most websites and applications follow similar design practices.
5	Usually I have no trouble navigating websites and applications intuitively.
1	Websites are very different from each other.
2	I can intuitively guess whether website’s design is new or old just by looking at it.
3	The most important thing on the website for me is readability.

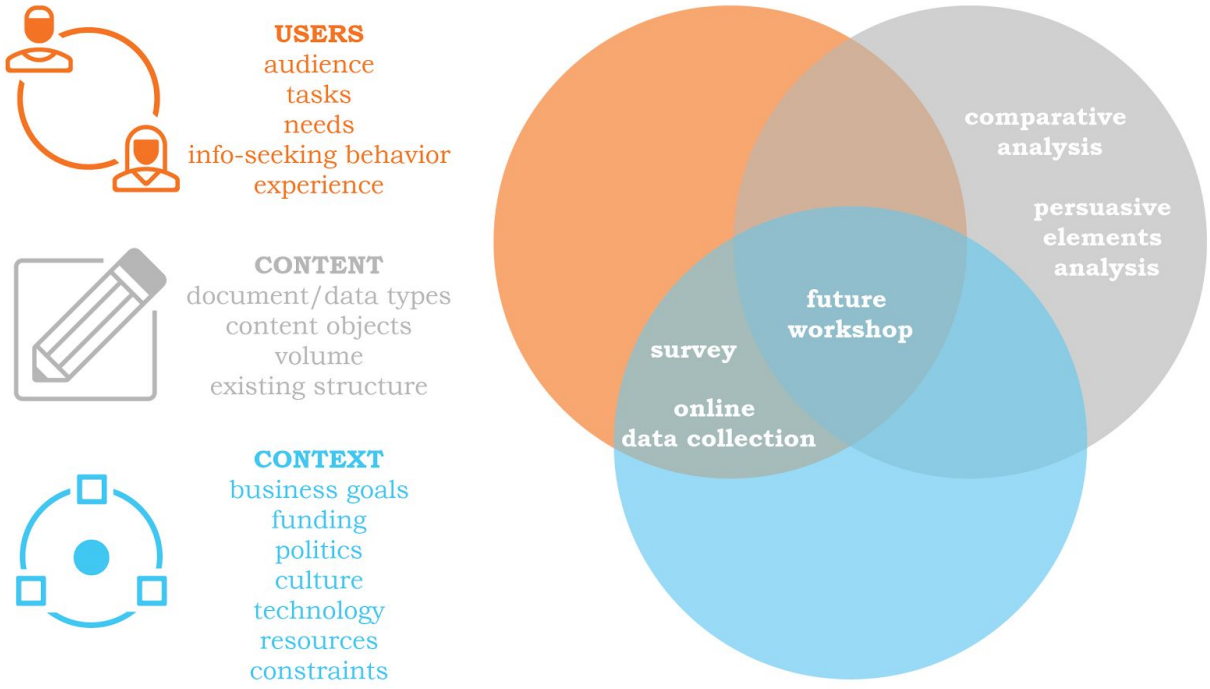
Almost all surveyed (81,8%) think that most websites and applications follow a similar design practices; 63,6% prefer websites that are more minimalistic; 54,5% prefer having a bright background and dark text when reading online and the same amount (54,5%) expect the navigational menu to be at the top of the screen. These being useful information in later iterations.

7. Design

This chapter is intended to map the methods according to Rosenfeld and Morville's content-context-user trio, known as "information ecology", and categorize and describe how the knowledge gathered through them can be utilized in the early stages of the software design process.

7.1 Information Ecology and Data Contributing to its Variables

Healthy information ecologies take time to grow and are "a system of people, practices, values, and technologies in a particular local environment <...>[in which] the spotlight is not on technology, but on human activities that are served by technology" (Nardi & O'Day, 1999). Rosenfeld et al. concept of an such an information ecology comprises of "users, content, and context to address the complex dependencies that exist in information environments". The reason behind creating the following Venn diagram is to better visualize the data gathered throughout the whole process, the methods used to collect them, their co-dependency and reliance.



7.1.1 Data Collected through Internet-based Research

Method/ Activity	**Data gathered**	**Part of "information ecology"**	**Activity output/ Results**
Online/internet-based data collection	Online collaboration is encouraged by societal, practical and ecological reasons. Biggest user group is Millennials (deeply involved in the online world, care about the environment, community-minded)	Context Users	Early sitemap concept Persona Proof for case relevancy

Taking the Internet as a primary source of data collection can provide convenience, easy and quick access to information, a big sample size and so greater diversity. Before specifying the business objectives and brainstorming on the key aspects of the application, the domain of sharing economy was primarily explored to get an overview about the term itself. Using the Internet as a tool for gathering information about this hybrid market model's drivers, some of its major fields, successful platforms and biggest user group provided basic information about the context and users. Generally, peer-to-peer online collaboration is encouraged by societal, practical and ecological reasons, hence the business objectives (intended value propositions and ideal customer relationship to be maintained) were guided towards community-creation, trust and transparency, while also providing personalized and relevant experiences. The customer segments targeted were also in accordance to the primary findings. Having Millennials as the biggest consumers of the sharing economy, besides book-lovers and owners, the book-sharing application targets people who have an environmental mindset or just want to save money (by loaning a book), or social people who enjoy meeting like-minded strangers.

7.1.2 Data Collected with a Comparative Analysis

Method/ Activity	**Data gathered**	**Part of "information ecology"**	**Activity output/ Results**
Comparative analysis	Similarities: Top navigation and search bar placement, overlays, sans-serif fonts, search based on categories, 50% had relevance weightings	Content	Early sitemap concept, Entity-relationship diagram Use-case diagram

The comparative online analysis of four successful applications helped in identifying key content parts within applications relying on user-generated content. In most of the cases, a clear and consistent site organization was maintained by a top global navigation and search bar placement throughout the pages. Visuals are center elements of the sites. When looking at the sites on a mobile device, the use of overlays become essential elements of the screen and comprise hidden filter options, or navigations made by another type of organization scheme (keeping in mind the fact that users can have different specific information-seeking behaviours). Furthermore, as Goodreads and Amazon both deal with books, their groupings, information about and presentation of each material provided researchers with knowledge on already working IA. While, although not being in focus this time, the style of their labeling systems, syntax and vocabulary could be used later in the design process, as a basis of another workshop.

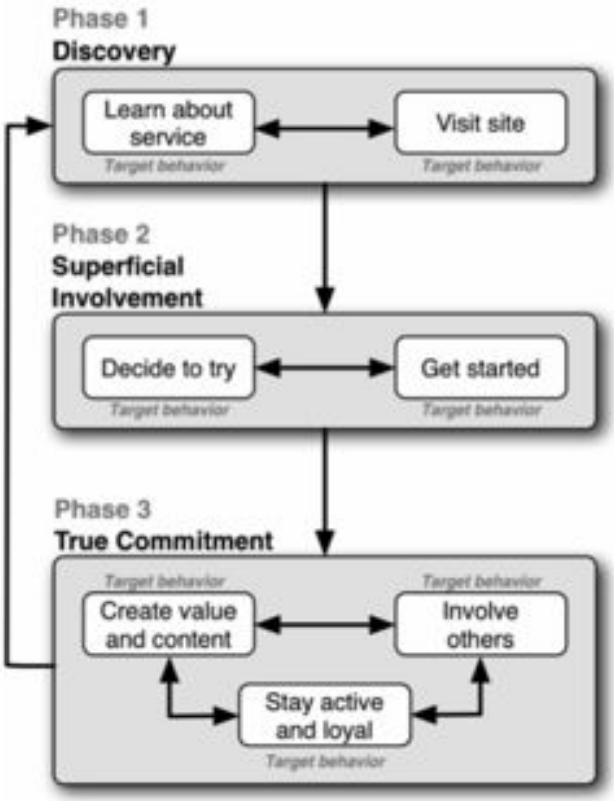
7.1.3 Data Collected with the Analysis of Persuasive Elements

Method/ Activity	**Data Gathered**	**Part of "information ecology"**	**Activity output/ Results**
Analysis of Persuasive Elements	Principles covering primary task support, dialogue	Content	Wireframes

	support, social support		

The same four applications evaluated in the comparative analysis were checked in light of persuasive technology, devised to change user attitudes and/or behaviors and adding to the content variable. The scan revealed that above all, principles covering the primary task support (reduction, tunneling, tailoring, personalization, self-monitoring, simulation and rehearsal) were included when designing to achieve different persuasion goals. Similarly, some principles under the umbrella of dialogue support (e.g.praise, suggestion, similarity) and some from under social support (e.g.social learning, social comparison and social facilitation) were distinctly applied.

Concentrating on the key activities and value propositions defined in the Business Model Canvas, example persuasion goals of the book-sharing application and users' target behavior can be formulated, as according to Fogg & Eckles (2008.) Their framework distinguishes three phases (Discovery, Superficial Involvement, and True Commitment) each of which contain specific target behaviors.



Below is a table of goals and behaviors the book-sharing application needs to achieve in order to succeed. These points imply for example representing the 'sign up' and 'edit profile' options in an emphasized section of the application-on the top, so that users can decide to try, get started and create value and content. Keeping users active and engaged can be encouraged by showing notifications and enabling them to see the activity, new content and comments of others.

Persuasion Goal	→	**Target Behavior**
Become a member	→	Decide to try, get started and create value and content
Use the application often, Respond to other users' contribution and requests	→	Visit site and stay active and loyal, create value and content
Make connections, invite friends	→	Involve others

7.1.4 Data Achieved through Future Workshops

Method/ Activity	**Data gathered**	**Part of "information ecology"**	**Activity output/ Results**
Future workshop	Demographic data on participants, book-reading habits Differences between male vs. female participants Problems to solve: Male: accessibility, price, platform Female: price, medium, info	Users Context Content	Persona Participant sitemap Proof for case relevancy

Future workshops enabled direct collaboration and co-creation with possible future users of the system and aided all three elements of the "information ecology". Participants were

representatives of the Millennial group, previously identified to be the driving force of the sharing-economy. Their comments, notes and sketches and the researchers' observations can be interpreted to the early concept design as follows.

Data collected during the first workshop described male users and provided an insight about their attitude towards books and understanding about book reading. Someone expressed criticism about having no option to filter language on Amazon, others disapproved of incompatibility between Kindle and iBook. From the first criticism, it is clear that male participants clearly use differentiating - selecting or restricting information according to specific requirements (Ellis et al. 1993.) - during their information seeking process. When comparing books with movies, the majority (3 people out of 5) agreed that movies entertain people more easily, but the group also shared the opinion that books are good for training the imagination. They said if one watches a book adaptation after reading the print material itself, it can cause disappointment in a way that characters "are not mine anymore". The envision phase brought about ideas focusing on solving accessibility, price and medium of books. Such were an algorithm that composes books after given some specifications by the user, an online library that works like Spotify, bendable e-readers that have ink-like texture, a virtual reality concept, which would change books into graphics and a thought about an artificial paper so that content can change on it. By translating these concepts, further user preferences and concerns can be inferred - need of personalized content, community, preserving the book-feel, convenience, environmental-friendliness- which can be incorporated to the business model and values (context) simultaneously. It was also made obvious (through the discussion in the critique phase about movies, and in the envisioning phase by ideas about virtual reality and graphics) that male users prefer visual content.

Data collected during the second workshop unravelled a lot of personal information about the roles of books and book reading behavior among female participants. A sentiment that dominated very strongly from the beginning suggested that female participants had very strong emotional attachments towards not only the content of the books but the physical medium as

well. Reading books for them was more of an experience rather than an activity - one participant described that the environment for reading books has to be specific ("I imagine raining outside, sitting comfortably in an armchair with a good book"), another participant mentioned how she sometimes likes to simply touch books that she has already ("sometimes I just notice a book on the shelf that I have read and I pick it up, smell it and put it back"). Moreover, females collectively agreed that one of the biggest problems with books are a lack of trustworthy recommendations which makes it difficult for them to choose a book because it is a time-demanding experience. Though opinions differed on preferences for electronic and physical books with physical books having an advantage of a more authentic reading experience and electronic ones being a higher convenience ("I can carry an entire library with me and it fits in my bag"), there was also an agreement that books help to escape routine no matter the medium. What is perhaps fascinating is that participants perceived books as a sort of memorabilia, much like photos, a reminder of their experience ("I have a set of books that I have already read that I carry with me everywhere I go, even when I travel from China to Europe and back") - there was a very strong need expressed to have such a personal library not as much for the sake of convenience or interest in content (for instance reading it again) but much more as a collectable thing, as if they were proud of their books in a manner no less significant than memories of important events in their lives. Their future visions and possible solutions to the problems they experienced among more general social causes such as developing materials that would be more environmentally friendly and would allow to reuse a book with different content (described "as a book whose pages change" - much like an ebook reader but a kind of that preserves the authenticity of an actual physical book) to devices that would enable them to share their experiences on a more personal level - such as allowing to share the "things they imagined while reading a book", to more convenient solutions that would allow them to for instance switch between reading a book and listening to it. The female group praised the importance of book reading as an overall activity and expressed disappointment that book reading is underappreciated, during the process of the discussion participants seem to come to realization that are actually very little information present about things such as book clubs and they wouldn't even know where to look for that.

During the data collection on the third workshop, researchers focused more on participants' experiences.

Issues with owning too many books, time issues with reading, travel issues with print books were recalled. When one of the facilitators shifted focus to try finding out the reasons behind why people do not read enough, participants listed reason like there is too much information nowadays, people became lazy and that during our childhood (mostly in Eastern Europe), children have a "conflict with books" as a result of too much compulsory reading.

Later in the critique phase, book clubs were mentioned as a solution to the characteristic of reading being an antisocial activity, although they were considered as "unpopular" and participants did not know where such clubs can be found, neither how to find them. Libraries were regarded to have become primarily a meeting place and a place where children can play and youngsters can use computers. Such perceptions suggest the need of a new concept, where books, people and social interactions could coexist again (context). After being guided towards the topic of exchanging books, people articulated feeling pressured by "having to return the book quickly", which implies an indicator of time about the loan/lease is for should be visualized on the pages of the application. A statement expressing that finishing a physical book lacks suggestion for further readings (there is no stimulation or trigger) affirms the need of reviews, ratings, peer suggestion.

As a new understanding, one's library was defined as "a direct, or indirect feedback about personality".

7.1.5 Data Collected through an Online Survey

Method/ Activity	**Data gathered**	**Part of "information ecology"**	**Activity output/ Results**
Survey	Demographic data on participants, book-reading habits, book preferences	Users Context	Proof for case relevancy

	Feedback on workshop		

Asking participants to fill out an online survey most importantly provided further information on potential users and the context (demographic data, information on book-reading habits and book preferences), but answers confirmed the book-case's relevance as well.

These chapters on design justifies Morville et al. statement that the mix of the three variables (user, content, context) transform over time, even within single information environments, as new knowledge is developed with the help of each separate methodology and feed into the trio.

7.2 Persona Creation

As stated by Hasle (2006.),"IA-workers, while availing themselves of as much solid information as can be had about future users, still are doing the same thing constantly in the course of their work – trying to imagine how future users will react to various features of the system to be developed." This can cause too much of a risk, and implies that information architects might confuse user representations (personas) for the actual users they depict and so, " 'selling' it to other team members may actually further distance the IAs from the users for whom they are designing" (Massanari 2010).

Including potential users as participants in the future workshops as co-creators helped to avoid the aforesaid trouble. Derived from the Millennial Segmentation (Chapter 5.2) sub-categories and their characteristics, furthermore enriched by the observations made during the future workshops and informed by the data gathered through the survey, two persona profiles were created to help researchers in guiding their design. These profiles were depictions of the opposing spectrum of the Millennials; a female 'Hip-ennial' and a male 'Gadget Guru'.

LILY-ROSE

KEY CHARACTERISTICS

Age: 23
Marital status: in a long term relationship
Income: student support
Employment: occasional part-time jobs
Hobbies: reading blogs, hang out on social media, boardgames, DIY, gardening

INTERNET USAGE: high
SOCIAL SITES VISIT: high
MOBILE USAGE: high
CONTENT SHARING AND GENERATING: low

Lily-Rose loves her family and friends. She has been living with her boyfriend for the past year and so they spend a lot of time together. Their favourite activities include inviting some friends over to play boardgames, going to the farmers' market during weekends and ramble in the close surroundings.
She also likes to be alone and have a couple of tea on the balcony while arranging her flowers and spices.
Usually she spends hours on the Internet. Most of the times she reads news portals, looks at some of the blogs she is interested in, calls her family members on Skype and chats with friends on Facebook.
Valunteering is something she does willingly and needs for her personal well-being, so once every month, she arranges activities for and with children at the local library.

JOHN

KEY CHARACTERISTICS

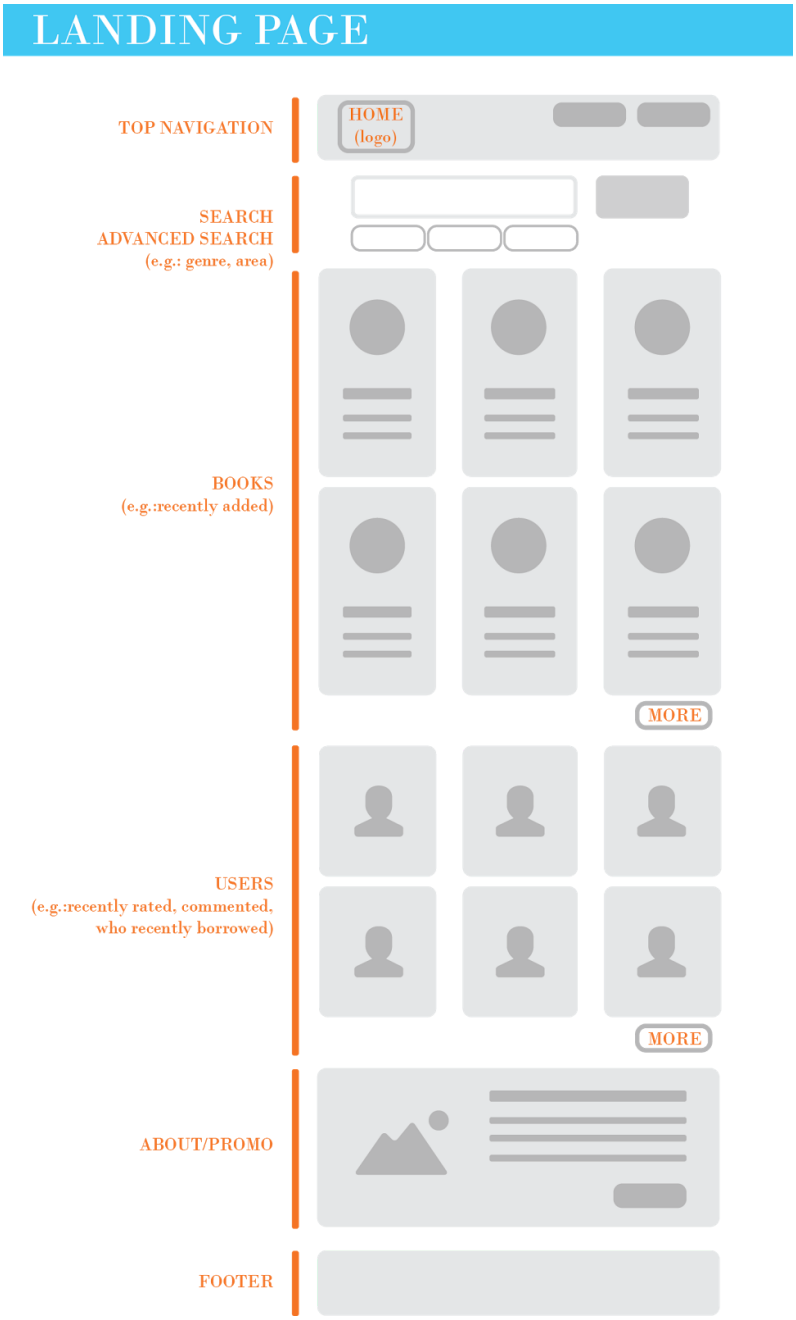
Age: 34
Marital status: single
Income: upper-middle income (above average)
Employment: full-time, sales, tech company
Hobbies: listening to music, startup conferences, clubbing

INTERNET USAGE: high
SOCIAL SITES VISIT: high
MOBILE USAGE: high
CONTENT SHARING AND GENERATING: high

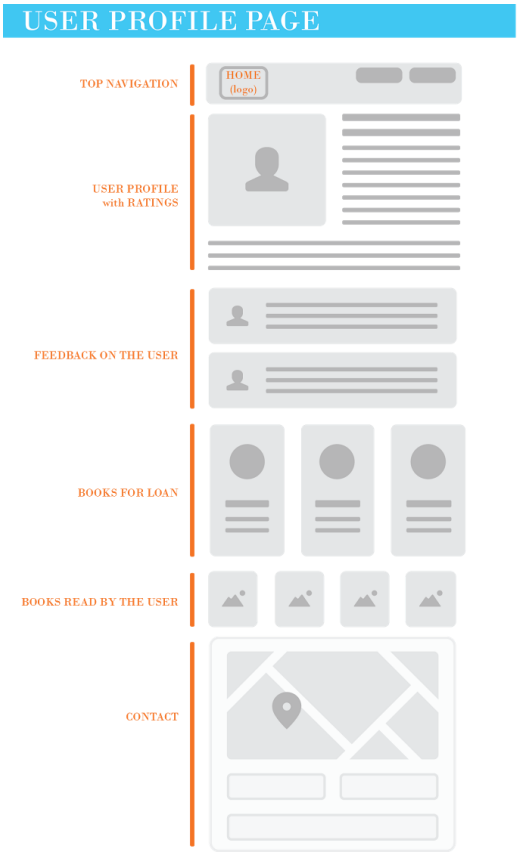
John is obsessed with technology. He spends most of his money on the newest, high-quality, branded products. During his lunch break at the office, he likes listening to some music and vaping his e-cigarette. Often, he shares some content he read and found interesting through Linkedin. He never gets off his smartphone, he checks his mails and bank account regurarly, while also looking at Tinder profiles.
His favourite activities include going to startup conferences, buying smart clothes for himself and appearing in bars and clubs on Fridays with his mates.
He is a self-confident individual, who likes surrounding himself with people of status. He collects watches.

7.3 Wireframes

The landing page, where all elements can be seen, a profile page and a book page were interpreted to wireframes. These individual pages depict where navigation should be and show major sections a page should consist of, while also tell about their content.



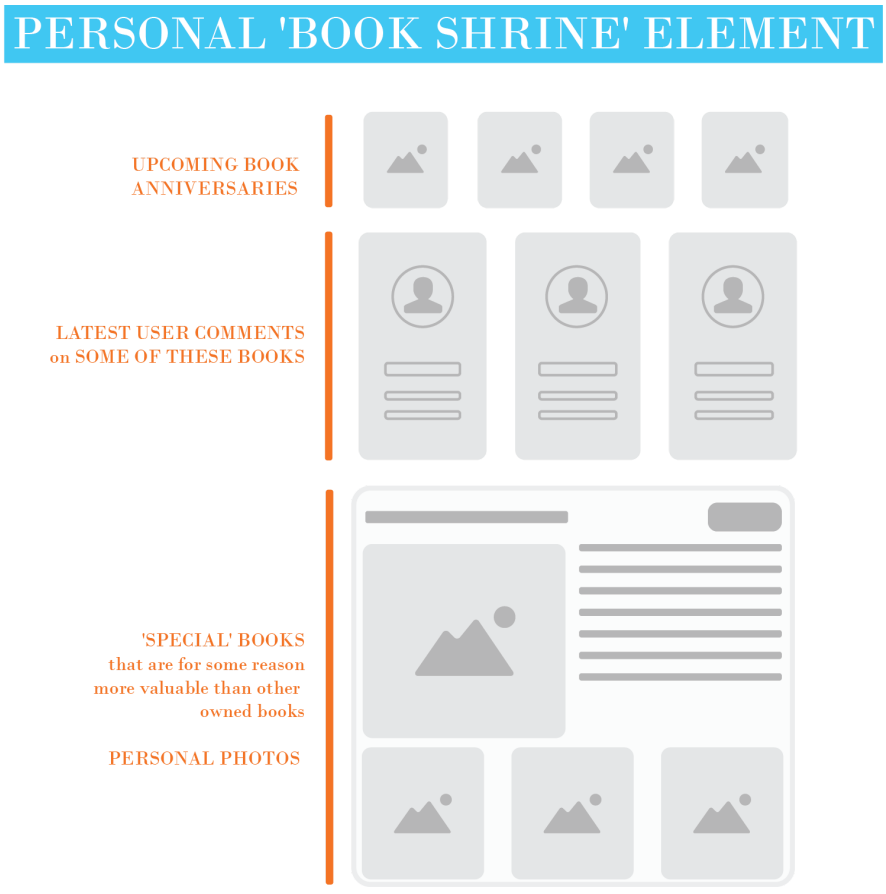
The landing page presents a horizontal, global navigation on the top, following the pattern of the examined applications. Besides the logo, login and sign in options would be presented here. The next section contains the search field, one of the most important features in the whole application. As seen in the design of the example search interfaces, there exists many options for guiding users in their search and organizing search results, but it's success will depend on how well the content is tagged. Books and users are both imagined to benefit from card-based design, a web-trend to use when there is a lot of image content on a site (e.g.: Pinterest, dribbble). This grid approach helps consistency and transparency of the materials and aids responsiveness, by being easily compatible with mobile frameworks, and convenient browsing. In the bottom of the landing page, a footer would be placed.



The user profile and book pages would follow a pattern similar to the landing page. Added features within would be for example user ratings and feedback, reviews and comments on

books. Just as seen in Goodreads and Facebook, users could upload a profile picture, add a short description about themselves and put in/create lists of books they own, have loant or requested from other members of the book sharing community. By setting their location, a more personalized experience is guaranteed and the possibility of meeting and socializing with people in the area is given.

Future workshops provided valuable insights about the culture of book-reading. As to find a way to incorporate them, an element of something like a 'book-shrine' could be added. Here, the user could mark some of his/her owned books to being special, assign a date (indicating when it was read, or if an event is connected to it), add personal photos and comments to them, favorite quotes from them. As follows, book anniversaries would appear, reminding the reader about that specific special experience and providing them with the opportunity to relive the emotion attached. Essentially, books would be personified.



Since the field of IA is complex, the final design for this paper deals with the book-sharing application as an early concept and its organization and general navigation systems, while excludes labeling and search systems, thus sub-elements such as metadata, or search schemas. By converging IA methods with the participatory future workshop format, the resulting persona, and primary wireframes support the defined business goals and objectives, user intentions and expectations, desired user experience and functional specifications. These deliverables visualize specified requirements, content organization, structure and user goals more clearly.

8. Discussion

In the previous parts of the design chapter, researchers have examined how the data gathered through different methods could contribute to the "information ecology". This was done in an effort to investigate how various means influence the user, content and context variables of a single information environment (book-sharing application). As discussed in the literature review chapter, Information Architecture practice in a setting with very unclear requirements leaves information architects with very few points of departure, therefore investigation of the context is crucial. In our case we have demonstrated how, through a basic set of requirements for a case and some heuristic evaluations of information spaces similar in context as well as surveys with potential users it is possible to start gathering data for possible requirements of the potential information system when mixed with the information ecology framework suggested by Morville et al (2015).

We have demonstrated a creation of conceptual design by using nothing else but a "problem" that is supposed to be solved by design means - a scenario which is very common and is advocated by "lean design" advocates, start-up culture and others and manifests in concepts such as "minimal viable product" (MVP), "keep it simple" (KIS) and the general culture of minimalism. While it was sufficient to create web IA blueprints, the general data was scarce and limited and the application problem remained abstract.

Including Participatory Future Workshop practice generated a lot of cultural and personal knowledge, more importantly, as showcased in the previous chapter - participatory future workshop provided information on the entire three categories of information ecology - context, user and content. More importantly, however, it allowed to expand the understanding of the realities of book readers and provided relevant domain knowledge even in the scenario when the intended audience of the web IA in question were the majority of people.

From Nigel Cross (Cross, 2001, p. 12) who conceptualized designer work as "tackling ill-defined problems" to academics who criticized "designers who design for themselves" (Cooper, 1999, Coleman et al. 2003) and/or use self-observation (Hasdogan, 1996) to prominent Information Architecture figures who argued that information architecture should have a holistic overview of design throughout the entire design process (Rosenfeld,Morville & Arango, 2015, p.313), there is an understanding that the position of designer or an information architect inevitably deals with a lack of established criteria (or data) for design which results in the necessity for the designer to make less informed (or more subjective) decisions. Indeed, the argument that Information Architects should have a holistic overview of the design process from the very beginning, is of perhaps extreme importance because design by nature tends to try to persuade users (as famously said by B.J. Fogg (2006) "interfaces are inherently persuasive"), whereas IA tries to accommodate to what is best for the users. Per F.V. Hasle (2006) argues that " IA-workers, while availing themselves of as much solid information as can be had about future users, still are <...> trying to imagine how future users will react to various features of the system to be developed" - the less data available, the more likely it is that the information architect will "fill the gaps" by himself or herself, however as established in the beginning - information architect is supposed to act as a bridge between the designers, the users and the overall goals of web IA.

This makes a compelling argument for involving users from the very beginning of the design process, perhaps even at the phase of business requirements so that user needs would not end up as part of the system design but rather would help to initiate the changes in the system design and as a consequence would help build a better informed design. To achieve this from the perspective of information architecture - two things are necessary:

a) Incorporation of participatory design practices into information architecture process at an early stage that would turn users into co-designers and perhaps even "co-owners" of the very problem in general.
b) A conceptual understanding of how methods can be combined and converged to produce successful outcomes.

In the context of this research, researchers have discovered that participatory future workshop as a tool can serve as invaluable for information architects. As documented in the design chapters, while gathering data for the initial point of departure did yield some results and enabled researchers to proceed with design, even in the conceptual phase organizing future workshops has showed how much researchers, as designers, have "missed" by avoiding direct user participation. The most important finding in the context of this case was the fact that, while some information could be found by multiple means (for instance the fact that potential users are environmentally-conscious was found in statistics about millennials as well as were discovered during future workshop, similarly with the fact that there is a lack of existing recommender systems for book readers or that friends influence the decision to choose a book), participatory future workshop allowed to:

a) Weight how important a particular aspect can be (for instance the fact that participants would circle back to the topics of sentimental feelings towards books).
b) Find out that not only there is a lack of recommender systems, but that it is in fact one of the most critical factors influencing participants' decision to read - this is not a feature that is desireable, it was expressed by many that it is a feature whose lacking has a very clearly negative effect.
c) Through their future visions and problem solutions, all of the participants showcased a wish to make the reading process more effective (whether choosing a book to read through a recommender system, Virtual Reality as means to immerse oneself in the book or having an option to "listen" to a book).
d) Prioritizing the most problematic aspects related to book reading and talking about them allowed researchers to confirm the relevance of the problem (accessibility and price where two most important factors addressed by participants - those are exactly the two main things that a sharing-economy type of service for book readers would essentially address).

The following table showcases the major differences in data gathered by online data collection, comparative analysis, analysis of persuasive elements and survey, and participatory future workshop.

Comparative analysis - Online Data Collection - Persuasive Element Analysis - Survey

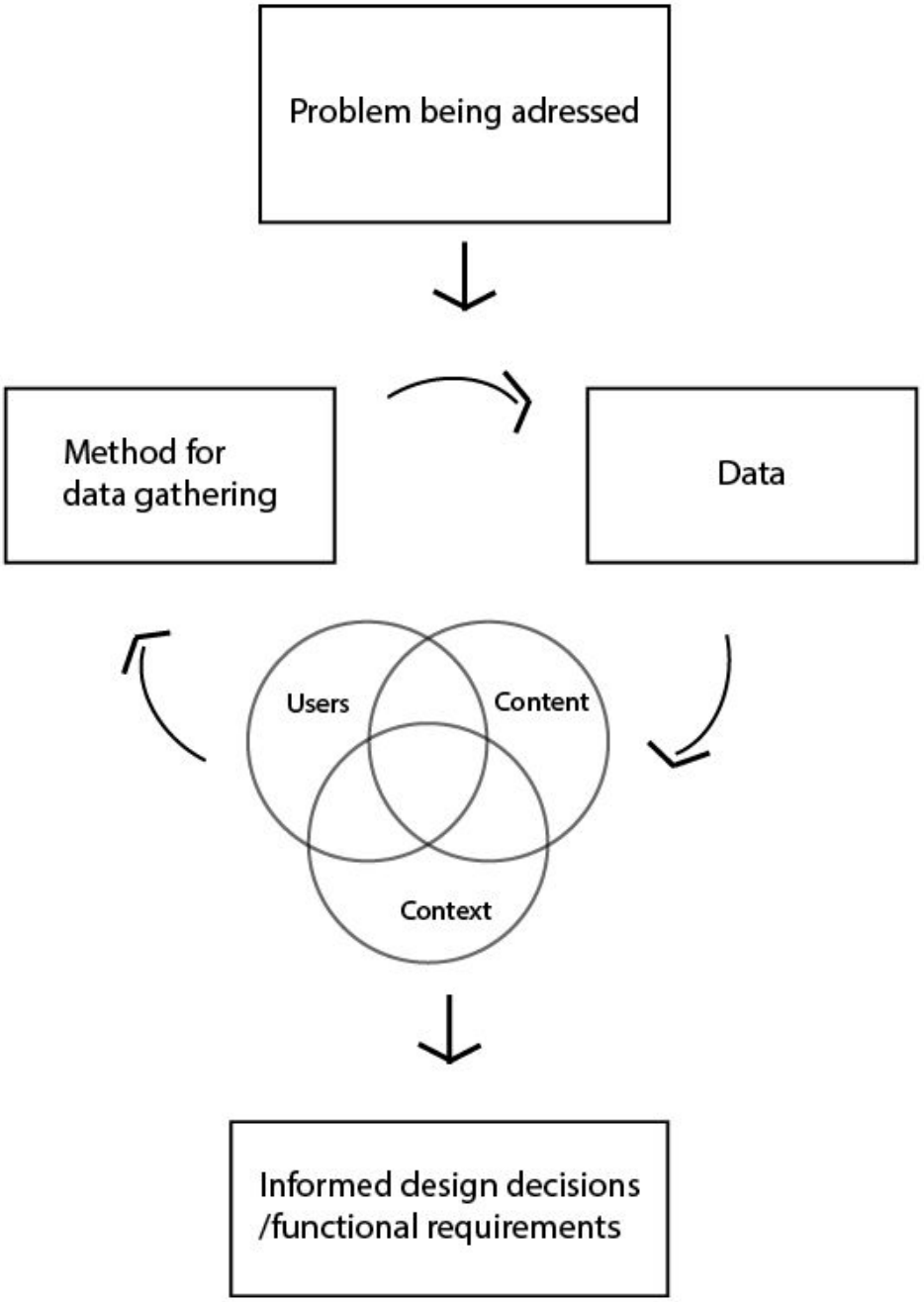
Neccessity to socialize	Overall website structure	Environmentally-minded
Lack of translations	Search importance (relevance weighting)	Noticeable market buying power
No recommender systems	Primary Task Support	Books are too expensive
Friends influence books of choice	Dialogue Support	
Book popularity important factor	Social Support	

Future Workshop

Differences between genders	Recommender systems would encourage reading activity	Reading is not perceived as a social activity
Sentimentality towards physical book medium		No information regarding local communities for book readers
Difficulties in sharing Book experience		

Reasons behind the study revolved around the researchers' original interest in how to converge different information architecture methods and the form of participatory future workshop to create a better informed web IA, and furthermore, how could such a workshop be utilized on an IA level in the early stages of the system design process. As such, simply employing the

information ecology as a conceptual framework and mixing the various methods proved to be a compatible approach, as illustrated in the following chart:



It is of course evident that this does not entirely solve the problem of creating clear business/case requirements when very few are present, however it clearly shows the advantage of contextual inquiry. Considering the fact that lot of tools employed by information architects such as heuristic evaluations, card sorting and similar already require a more

established problem case that could be worked with, users as a point of departure provide invaluable context with their already formed problems to be addressed. As we demonstrated with our example, creating an information architecture even by making informed decisions but excluding simple users can result in important information being left out and consequently lead to poorer designs as well as increase the amount of designer/information architect personal influence over the project.

Organizing workshops requires careful planning; from defining the objectives to considering the arsenal of tools, triggers and activities to be used. Facilitating a workshop requires even more, as one has to directly deal with diverse people ; make them comfortable (create a safe space), communicate with them, get them to participate and even collaborate. There are many possible ways of facilitation and thus, it proved to be tricky to balance the level of guiding. The research unfolded that the level of “guiding” in the future workshops is one of the most crucial aspects in using the future workshops to create this knowledge, thus reinforcing this notion expressed by other researchers (Apel, 2004) as well. Likewise, it became clear that a two and a half hour workshop is too short for such a format and that the scheduling of time should be handled with flexibility (as on the one hand, some participants need more time on brainstorming, than others; while on the other, some discussions last longer,than others).

9. Summary and Conclusions

While limited in scope to a case basis, our research suggests that involving users through participatory future workshop can act as means to provide context for information architects in the early design stages.

Due to the emphasis of Information Architecture on the importance of users, their content and context, participatory future workshop was able to provide data in all three of these dimensions. While we cannot state with certainty that similar result could not be achieved by other data gathering means, considering the fact that it enabled us to reach very personal information and detect serious issues for potential users, issues which we have not identified neither ourselves, nor by looking and analyzing for statistical information, or by evaluating similar applications, we believe that it should be a recommended practice. Especially in situations where problems are poorly defined as means to counter-balance the risk of information architects or designers coming up with solutions that are influenced by their personal preferences.

We also believe that our case serves as an example that could help information architects when trying to synthesize participatory methods and information architecture methods at an early design stage. As discussed in the literature review, Information Architecture field is having a difficult time in developing a more universal and codified language. Utilizing participatory future workshop could contribute as a method that could help combat the increasing complexity of information architecture.

Only after organizing participatory future workshops have we been able to identify the importance of a book as a cultural artefact and its personal value to people. This understanding could lead information architects to suggesting that a book for book readers is not merely an object of content but something that has deep emotional meaning - just being aware of this fact can suggest to for instance simulate the personal relationship a book reader has with a

book, by personifying book object in the application. Similarly, only through the participatory future workshop were we able to identify the fact that for some book readers accessibility may be a lesser problem than for instance a reliable recommender system - ignoring this information would exclude functional requirements that could potentially solve numerous problems for book readers. Also, participatory future workshop as a method can not only help identify problems that are otherwise difficult to identify but also help to confirm information architects and designers whether their current understanding of the problems is relevant for users.

Finally, we have showcased that different methods can be converged with the help of Morville's (2015) information ecology framework that serves as means to categorize data collected by different means and methods and then reconstructed “as a whole” to provide a wider understanding of design problems.

11. Appendix

Appendix 1. - Information Architecture Definitions

#	Author/s	Date and Title
1.	Batley, S.	2006. The I in information architecture: the challenge of content management
	There is no single, straightforward definition of information architecture <...> much of the IA literature looks at high level content, a top-down approach, in focusing on taxonomies and information audit <...> Content analysis and content mapping are part of the information architecture development process.	
2.	Ames, A.L. & Corbin, M.	2007. Information Architecture: Contributing Strategically to the Success of Our Customers and Our Business
	<...> we define information architecture as an analysis and design process that involves these key elements: -The organization of, structure of, and relationships between chunks of information, thereby providing meaning to users and enabling them to build a mental model of the information within the specific context of the product being documented -The organizing structures (such as navigation) and signposts (such as labels) that guide users to browse the information and improve the retrievability across chunks of information. -The underlying classification schemes and metadata that enable the searching and customization of the information -The application of minimalism and other information design principles to ensure that the appropriate information is presented to users and that the	

	information can be scanned or read quickly and easily (for example, applying minimalism to information architecture enables an architect to make the right choices about the information, specifying that only the information that the user needs will be the focus for implementation) -The strategic approach for implementers (designers and writers) to design, develop, and deploy the information in the context of business, product, competitive, and user experience goals	
3.	Robertson, J.	2007. Enterprise IA Methodologies
	Information architects working within enterprises are confronted by unique challenges relating to organizational culture, business processes, and internal politics. Compared to public website or interface design projects, key aspects differ in the application of IA discipline relating to uncertainties around the exact nature of the business problems being solved.	
4.	Wodtke, C.	2009. Information Architecture: Blueprints for the Web 2014. Towards a New Information Architecture
	And now, in organizations that recognize the critical strategic role that information architecture plays in the success of their Web offerings, information architects are increasingly considered vital decision makers <...> Go make the complex clear. <...> The great works of Information Architecture <..> They are understanding spaces made of information. They are new works that make data dance. They make the impossibly complex clear.	
5.	Resmini, A., Byström, K. & Madsen, D.	2009. IA Growing Roots - Concerning the Journal of IA

	The international IA community is now roughly 10 years old, and defining information architecture has been an elusive and maddening task since the beginning.... IA is what has been going on in the self-identified IA community of practice (and related academic oases) in the last 10 years or more.	
6.	Leganza, G.	2010. Topic Overview: Information Architecture
	A framework providing a structured description of an enterprise's information assets — including structured data and unstructured or semistructured content — and the relationship of those assets to business processes, business management, and IT systems.	
7.	Ding, W. & Lin, X.	2010. Information Architecture-The Design and Integration of Information Spaces
	Information architecture is about organizing and simplifying information, designing, integrating and aggregating information spaces/systems; creating ways for people to find, understand, exchange and manage information; and, therefore, stay on top of information and make right decisions. Information architects not only design individual information spaces (e.g., websites, software, applications, intranets) but also tackle strategic aggregation and integration of multiple information spaces including all channels, modalities, and platforms... Finally, the goal of IA design is to support people not only to find information, but also to manage and use information."	
8.	Brown, D.	2010. Eight Principles of Information Architecture
	Information architecture is the practice of designing structures.	
9.	Arango, J.	2011. Architectures 2015. ... for everybody (2015 IA Summit opening keynote)

	I define information architecture as the intentional composition of nodes and links as organized structures that facilitate understanding. Note that this definition promotes a specific objective: to produce structures that facilitate understanding. IA has three principles: places made of language, coherence across contexts, and systems thinking. And two goals: findability and understandability. These are unique characteristics that make our discipline distinct and valuable. No other design discipline has this particular focus. And importantly, these principles and goals are independent of particular technologies.	
10.	Klyn, D.	2011. Editorial: Information Architecture is a Way of Seeing
	IA offers a systematic way of seeing that allows fundamental — we could even say "skeletal" — bases for taking corrective actions that lead to positive outcomes.	
11.	Davis, N.	2011. Framing the Practice of Information Architecture
	Our IA recommendations should address more than a Web site's navigation and information organization and relationships. While these cover the basic concepts in the practice of information architecture, they represent only a part of the required effort. Management, strategy, and research are where information architecture goes deep to address the complexity of information domains in a sustainable manner.	
12.	Resmini, A. & Rosati, L.	2012. A Brief History of Information Architecture

	Information architecture (IA) is a professional practice and field of studies focused on solving the basic problems of accessing, and using, the vast amounts of information available today.	
13.	Ohlin, F.	2012. The Role of Information Architecture in Context-Aware Adaptive Systems
	Information architecture is positioned to approach context-aware adaptive systems holistically, adopting a human-centred perspective of context.	
14.	An Oracle White Paper in Enterprise Architecture	2012. Oracle Enterprise Architecture Framework: Information Architecture Domain
	A solid data infrastructure foundation is a critical capability within information architecture <...> Information Architecture is not a tool or technology, but rather, a set of business and IT processes, disciplines and practices coordinated with an enterprise strategy to manage the information as a business asset for the organization. Information Architecture must be implemented as a coordinated program that associates with business objectives, so it could deliver business values and serve long term business strategic goals as it evolves.	
15.	DSIA Portal of Information Architecture	2012. Information Architecture as a Practice 2010. The Business Function of Information Architecture
	The practice of information architecture is the effort of organizing and relating information in a way that simplifies how people navigate and use content on the Web. The business function of information architecture is to simplify how people navigate and use information that connects to the Web.	

16.	The Information Architecture Institute	2013. What is IA?
	The structural design of shared information environment. The art and science of organizing and labeling websites, intranets, online communities and software to support usability and findability. An emerging community of practice focused on bringing principles of design and architecture to the digital landscape.	
17.	MacDonald, C.	2013. Learning and Teaching Information Architecture: The Current State of IA Education
	Structuring and organizing information-rich, web-based hypertext systems is still a critical IA task, but the increasing pervasiveness of digital interfaces has led to a much broader challenge: designing cross-channel, multi-screen experiences that deliver different types of information in volumes and ways that are difficult to predict...	
18.	Lacerda, F. & Lima-Marques, M. (source: Reframing Architecture book by Resmini,A.)	2014. Information Architecture as a Discipline-A methodological Approach
	In a wider approach, we could consider the design of information spaces and its social, cultural and technological aspects as information architecture's main object of interest <...> Information architecture has a specific and relevant object of study: the design of information spaces and its social, cultural and technological aspects...a creative process of transformation.	
19.	Fenn, T. & Hobbs, J.	2014. The Information Architecture of Meaning Making

	(source: Reframing Architecture book by Resmini,A.)	
	The practice of IA tends to be associated with an adaptation and evolution of thinking, tools and techniques (for example taxonomies, common in the field) derived from fields such as Information and Library Science <...> The practice of information architecture today is predominantly product-led where solutions are required for specific channel bound problems...In particular information architecture presents ways of thinking, tools and techniques that assist in the organization of very large amounts of data and information that explicitly reveal the cognitive resolution of the problem/ solution ecology.	
20.	Hinton, A. (source: Reframing Architecture book by Resmini,A.)	2014. What We Make When We Make Information Architecture
	Information architecture <..> has always been an abstract, interstitial practice concerned with not just what happens within things, but what happens between them <...> If there is a “re-framing” for information architecture, it is partly in seeing more clearly the problems we were solving all along: figuring out how language forms environments in more explicit, concrete ways than ever before.	
21.	Simon, D.P. (source: Reframing Architecture book by Resmini,A.)	2014. Representing Information Across Channels

	I believe information architecture is a useful lens when considering the design of systems of components, as it enables content to become flexible, so that it moves through a diverse set of devices while still making sense to users.	
22.	Nielsen and Norman Group Cardello, J.	2014. The Difference between Information Architecture and Navigation
	IA is the backbone of the site <...> it is not part of the on-screen user interface <...> it most definitely impacts the User Experience	
23.	Degler, D. (source: Reframing Architecture book by Resmini,A.)	2014. Dynamic Information Architecture—External and Internal Contexts for Reframing
	The perception of information architecture as a structural, organizing discipline is not the only information architecture of the future. The information architecture discipline that has begun to emerge as a result is a Dynamic information architecture <...> Dynamic information architecture helps provide a coherent framework for a user's experience, allowing many contextual forces to interact with each other in a way that is transparent, yet able to be controlled by the user <...> The role of information architecture in design is important to keep users grounded in their activities and responsibilities, oriented to the impact of changes on the information space, as well as to define how the user's inputs are captured in ways that can be used by an application and by other users <...> the role of the information architecture extends to how meaning and relationships are encoded in page markup, and what effect that has on information's wider role on the Web.	
24.	Merholz, P.	2014. Use Experience has stunted IA

	IA needs to free itself from being seen under the umbrella of UX, and instead pursued as a distinct, and difficult practice that's not just about taxonomies and semantics, but the organizational, operational, and technological change to realize that.	
25.	Morville, P.	2014. Information Architecture Summit Closing Plenary
	Nobody understands information architecture. We don't even know what it is.	
26.	ASIS&T Elmendorf, J. & Hinton, A. & Hoff,K.	2015. Practical Modeling: Making the Invisible Visible
	A fundamental part of information architecture is translating rough ideas through language to a set of organized relationships, understandable to all stakeholders. Modeling information helps visualize the problem to be addressed en route to finding a solution <...> Information architecture isn't just about designing labels, links and content arrangement <...> and it's not just about websites. It has to do with the way language acts as infrastructure. It addresses meanings and relationships and how together they create structures.	
27.	Rosenfeld, L., Morville, P. & Arango, J.	2015. Information Architecture for the Web and Beyond
	1. The structural design of shared information environments. 2. The synthesis of organization, labeling, search, and navigation systems within digital, physical, and cross-channel ecosystems. 3. The art and science of shaping information products and experiences to support usability, findability, and understanding. 4. An emerging discipline and community of practice focused on bringing principles of design and architecture to the digital landscape.	

Appendix 2. - Persuasive Elements of Four Compared Applications

Primary Task Support -Design Principles-	**Goodreads**	**Amazon**	**Tradono**	**Facebook**
REDUCTION	3easy steps before sign up	„Turn on one click ordering for this browser.”	Pictures of items are listed.	„Log in with one tap.”
TUNNELING	-„Tell us what titles or genres you’ve enjoyed in the past, and we’ll give you surprisingly insightful recommendations.” -when not having an account: „Start by marking...as want to read.”	„Add to list”	Setting a location makes the system show only items in that specific area and close surroundings.	Suggested Pages
TAILORING	„Once you have rated 20 book, we’ll generate	It is possible to filter search results		Showing only friends’

	recommendations for you”	according to several aspects e.g.: delivery option, language, price		posts in news feed.
PERSONALIZATION	user’s friends, favorite authors, favourite genres	„Customers who viewed this also viewed...”		
SELF-MONITORING	-user’s read books-currently reading- to-read -ratings and reviews given by the user -activity -recent updates	-„Your recently viewed items” -„Your orders”	-„My items”, „Bumps” -„Notifications”	New friend requests, messages, notifications on the top are visualized.
SIMULATION	„Because Someret liked...she discovered” pictures of liked books and an arrow pointing towards the	„Customers who viewed this also viewed...”, „Customers who bought this also bought...”-bo	„Log in to your Fb account to connect to Tradono”	Friends’ activities are continuously updated in the sidebar, so the user can follow and check

	newly discovered cover picture of a book	th showing cover of the book, title,ratings and number of reviews		those happening out.
REHEARSAL	Browsing and searching books is possible without creating an account.	-„Look inside" provides a sneak peak into the book itself by presenting some pages from it -„Start your free 30-day trial"of Amazon Prime	Users can always browse,onced signed in. Buying is totally optional.	

Dialogue Support -Design Principles-	**Goodreads**	**Amazon**	**Tradono**	**Facebook**

PRAISE	ratings, reviews	ratings,reviews	likes, flags under each picture	likes,emotions about a post can be added
REWARDS				
REMINDERS				
SUGGESTION				„Nex ttime you log in on this phone, tap your profile picture instead...”
SIMILARITY	using standard referencing for books	using standard referencing for books		
LIKING	showing book covers	showing book covers	showing pictures of items	
SOCIAL ROLE				solidarity with different happenings,solidarity with causes can be visualized with photo filters on profile pictures

System Credibility Support -Design Principles-	**Goodreads**	**Amazon**	**Tradono**	**Facebook**
TRUSTWORTHINESS	online activeness of community, ratings			
EXPERTISE	databases and interfaces are improved and updated regurarly			
SURFACE CREDIBILITY				
REAL-WORLD FEEL	About us, Jobs,Help...	About us, Careers, Help, Amazon Assistant	-	Help Team
AUTHORITY				
3rd-PARTY ENDORSEMENTS	available in App Store and Google Play	logo for secure transactions	-	
VERIFIABILITY		-	-	

Social Support -Design Principles-	**Goodreads**	**Amazon**	**Tradono**	**Facebook**
SOCIAL LEARNING	„What are your friends reading?"	„What other items do customers buy after	Other user's acitvity visible by the pictures they	Other user's acitvity feed (sharing, commenting, liking, posting)

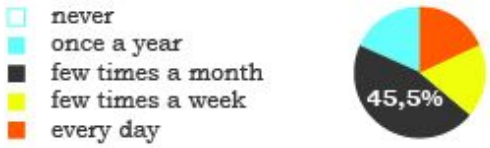
		viewing this item?" -„Popular..." -„...best sellers"	upload of items.	
SOCIAL COMPARISON	number of Ratings,Reviwes, books,friends of a user	„helpful votes", activities	Number of likes, comments under pictures	Followers, number of likes under pictures
NORMATIVE INFLUENCE	„My Reading Challenge"	-	-	Invitations to a group
SOCIAL FACILITATION	number of books one has read	comments of other users	activity	activity
COOPERATION				
COMPETITION	challenge			
RECOGNITION	-	-	-	-

Appendix 3. - Survey Questions and Answers

SURVEYED = PARTICIPANTS	7 men, 4 women
AGE	
18-24yrs	2
25-34 yrs	7
35-44 yrs	2
HIGHEST DEGREE RECEIVED or LEVEL OF SCHOOL COMPLETED	
High school or equivalent	1
associate degree	2
bachelor degree	7
graduate degree	1

How much do you enjoy reading?

How often do you read when it is your choice?



How do you prefer to read books the most?

1. paper book
2. tablet
3. e-reader device
4. computer
5. smartphone

What motivates you to read?

Information
Information
It helps you to relax and experience a personal relation with a book.
Learning new things
Quality content
Gaining information, knowledge and perspective.
If I want to escape the world
Personal interest
For me reading is very relaxing. It's like escaping from the reality and going into completely different world.Probably the desire to break away from the reality and enjoy myself while reading a book.
free time

Choose the statements that are applicable.
I have at least one...

	NUMBER of RESPONDENTS
...visited or was part of a book club	0
...purchased an ebook	3
...borrowed books from someone	10
...borrowed books from a library	10
...gave a book for someone to read	7
...recommended books for others	9
...read book reviews	5
...ordered books online	4
...downloaded books	9

Finish the sentence with at least one ending.
I like...

	NUMBER of RESPONDENTS
...discussing books	5
...looking at print books and their cover	6
...visiting bookstores	4
...reading online	4
...spending time in the library	5

What problems do you face when choosing a book to read?
Select all that apply.

price	63,6%
lack of reviews	18,2%
quality	45,5%
language	54,5%
poor recommender-systems	45,5%
Other	27,3%

What influences your reading choices? Select all that apply.

friends(opinions and recommendations)	81,8%
movies based on books	45,5%
online reviews	36,4%
popularity ratings	63,6%
bookstores' rankings	27,3%
advertisements	18,2%

How likely are you to participate in book sharing?

not at all	9,1%
slightly	45,5%
moderately	18,2%
very	27,3%
completely	-

What is the first thing that comes to your mind when you hear the phrase "social website" or "social application"?

Facebook
Facebook
Community
Facebook
Never heard of it. Social website, maybe "Facebook"?
Free, global
Interaction
Communication
Platform where people can communicate and share their ideas/experiences.
Articles
Sharing

During the last part of the workshop, when you were generating your ideas for the application, did you draw your inspiration from some other applications or websites and if so - which?

No, we found unique design
Dropbox
No
Steam
www.topinfopost.com/all-european-newborn-babies-will-be-microchipped...
Other application
Chinese version of Amazon
No, I was trying to come up with things that I personally would like.
No, it was completely random ideas which popped into the head
No specific in mind, just thought of general social media practices
iBook (or mostly what was missing from it)

If you think about an application with social functions in general, what functions do you expect to be present?

Book rating, comments, user ranking.
Commenting socially
User friendly interface I think
To be informative and give something unique.
Picture/comment upload, chat session
Ability to change language
Ranking
Public reviews, e-book exchange with one another, public list of favourite books.
Profile, news feed, sharing, discussion forums
Creation of profile, sharing
Rating, review, recommend

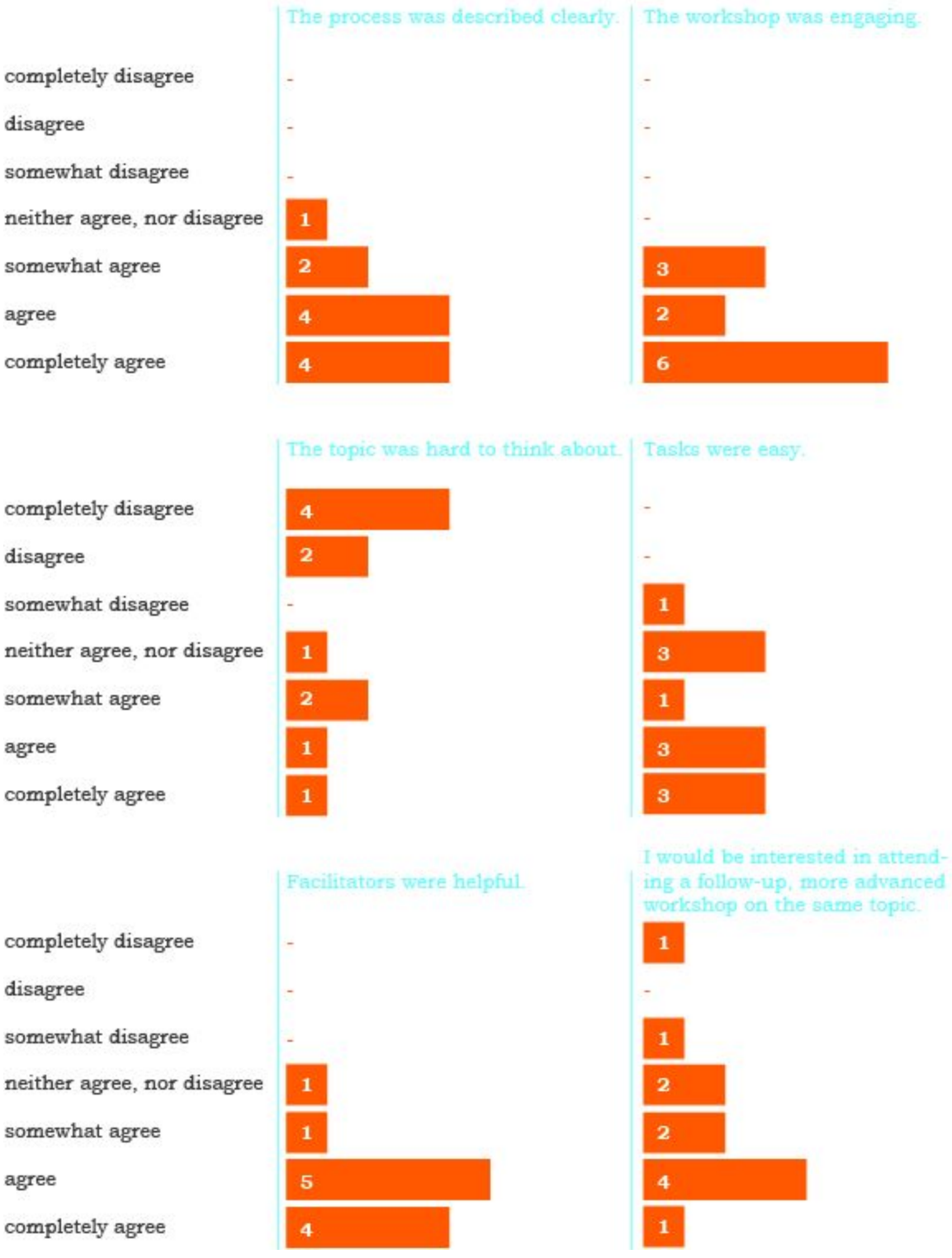
Do you experience any kind of problems with websites and apps? If so what kind?

No
Closeness of the system
Never used one
Dont use too many of them.
You dont always have internet.
Difficult to navigate
Not really
Not really, I prefer physical books, so I don't use apps that much. But I guess the biggest issue is the lack of information about the content and quality of a book.
Not that I could think of right now.
News feed could have some kind of a sorting option.
Filtering the results based on more criteria (like language f. ex.)

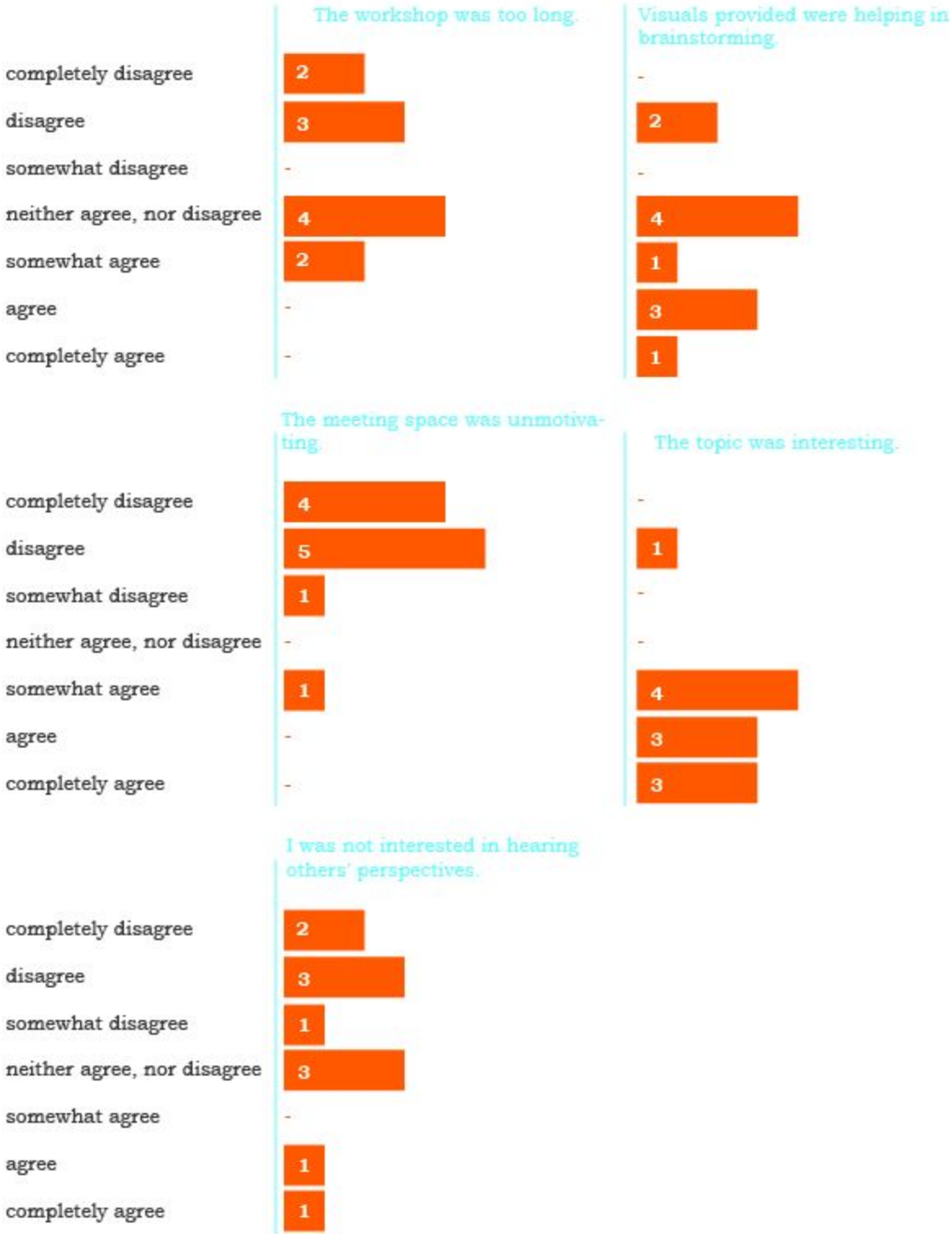
Mark the statements you agree with.

6 If I have to do reading on the internet I would prefer a bright background and dark text.
2 Some of my favorite websites have very unique design.
3 I sometimes find it very difficult to navigate in an app or a website.
6 I expect the navigational menu to be at the top of the screen.
7 I prefer websites that are more minimalistic.
9 I think that most websites and applications follow similar design practices.
5 Usually I have no trouble navigating websites and applications intuitively.
1 Websites are very different from each other.
2 I can intuitively guess whether website's design is new or old just by looking at it.
3 The most important thing on the website for me is readability.

How did you like the workshop? Rate the following sentences.



How did you like the workshop? Rate the following sentences.



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